ORGANISATION DES VILLES
DU PATRIMOINE MONDIAL

ORGANIZATION OF WORLD
HERITAGE CITIES

ORGANIZACIÓN DE LAS CIUDADES
DEL PATRIMONIO MUNDIAL

منظمة مدن التراث العالمي

ORGANIZAÇÃO DAS CIDADES
DO PATRIMÓNIO MUNDIAL

Proceedings of the 7th International Symposium of World Heritage Cities
Rhodes, 24-26 September 2003

Actes du 7e Colloque international des villes du patrimoine mondial
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Actas del 7º Coloquio Internacional de las Cuidades del Patrimonio Mundial
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Πρακτικά 7ου Διεθνούς Συμποσίου των Πόλεων Παγκόσμιας Κληρονομιάς
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Education and training for the preservation and management of cultural heritage

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Éduquer et former en vue de la préservation et de la gestion du patrimoine culturel

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Διατηρώντας την Κληρονομιά Ζωντανή
Εκπαίδευση και κατάρτιση για την διατήρηση και διαχείριση της πολιτιστικής κληρονομιάς

Since the first gathering in Quebec City, Canada, in 1991, the Organization of World Heritage Cities (OWHC) has produced 37 publications, namely the proceedings of all our symposiums. We are pleased to present to you the proceedings of our symposium held in Rhodes, Greece, in September 2003. These proceedings are a collection of the lectures given there on the theme "Keeping heritage alive. Education and training for the preservation and management of cultural heritage".

Thank you to all our speakers and enjoy your reading.

Depuis la première rencontre tenue á Québec, Canada, en 1991, l' Organisation des villes du patrimoine mondial (OVPM) a réalise 37 publications. Parmi ces dernières, nous avons publie les Actes de tous nos colloques te c'est avec plaisir que nous vous présentons ici les Actes de notre colloque de Rhodes, Grèce, qui s'est tenu en septembre 2003. Ces Actes rassemblent les conférences qui y furent prononcées ayant pour thème «Garder le patrimoine vivant. Eduquer et former en vue de la préservation et de la gestion du patrimoine culturel».

Merci á tous les conférenciers et bonne lecture á tous.

Desde el primer encuentro celebrado en Quebec, Canada, en 1991, la Organizacion de law Ciudades del Patrimonio Mundial (OCPM) ha realizado 37 publicaciones. Entre estas ultimas, publicamos las actas de todos los coloquios y con mucho gusto les presentamos aqui las Actas de nuestro coloquio en Rodas, Grecia, que tuvo lugar en septiembre del 2003. Estas Actas reunen las conferencias que fueron presesntadas bajo el tema "Mantener el patrimonio vivo. Educar y formar a favor de la preservación y la gestión del patrimonio cultural".

Gracias a todos los conferenciantes y les deseo una agradable lectura a todos.

Από την πρώτη συνάντηση στην πόλη του Quebec, στον Καναδά, το 1991, ο Οργανισμός Πόλεων Παγκόσμιας Κληρονομιάς (ΟΠΠΚ) έχει δημοσιεύσει 37 εκδόσεις, οι οποίες αφορούν κυρίως τα πρακτικά όλων των συμποσίων. Με ιδιαίτερη χαρά, σας παρουσιάζουμε τα πρακτικά του συμποσίου μας το οποίο διεξήχθη στη Ρόδο, στην Ελλάδα, το Σεπτέμβρη του 2003. Τα πρακτικά αυτά αποτελούν το σύνολο των εισηγήσεων οι οποίες δόθηκαν πάνω στο θέμα του συμποσίου «Διατηρώντας την κληρονομιά ζωντανή. Εκπαίδευση και κατάρτιση για την διατήρηση και διαχείριση της πολιτιστικής κληρονομιάς»

Θερμές ευχαριστίες σε όλους τους ομιλητές και εύχομαι σε σας ευχάριστη ανάγνωση.

Denis Ricard

SECRETARIO GENERAL ▪ SECRÉTAIRE GÉNÉRAL ▪ SECRETARY GENERAL ▪ ΓΕΝΙΚΟΣ ΓΡΑΜΜΑΤΕΑΣ

The Organization of World Heritage Cities (OWHC) would like to express its profound gratitude to its Greek hosts and especially the City of Rhodes, the Hellenic Ministry of Culture, the Prefecture of the Dodecanese, the RODOS Tourism Promotion Organization and the Marc de Montalembert Foundation. The OWHC also wishes to express its gratitude to Mayor George Giannopoulos of Rhodes for his invitation to convene in his city and for his successful reception. A warm acknowledgement goes to Mrs. Lee Minaidis, Chairman of the Organizing Committee and her team of collaborators and volunteers for such professional planning and efficient management of this international event. The Organizing Committee especially thanks UNESCO, UNESCO's WORLD HERITAGE CENTER, the COUNCIL of EUROPE, ICCROM, ICOMOS, the GETTY GRANT PROGRAM and the WORLD MONUMENTS FUND for their generous support.

L'Organisation des villes du patrimoine mondial (OVPM) exprime sa profonde reconnaissance à ses hôtes grecs et tout particulièrement à la ville de Rhodes, le Ministère de la culture de la république hellénique, la Fondation Marc de Montalembert, l'Organisation de promotion du tourisme de Rhodes et la Préfecture du Dodécanèse. L'OVPM veut également témoigner sa gratitude à l'égard du Maire George Giannopoulos pour son invitation à se réunir dans sa ville et pour son accueil couronné de succès. Nous exprimons notre reconnaissance chaleureuse à Madame Lee Minaidis, Présidente du Comité organisateur et à son équipe de collaborateurs et de bénévoles pour leur planification professionnelle et leur gestion efficace de cet événement international. Le Comité organisateur remercie tout spécialement l'UNESCO, le CENTRE DU PATRIMOINE MONDIAL DE L'UNESCO, le CONSEIL DE L'EUROPE, l'ICCROM, l'ICOMOS, le GETTY GRANT PROGRAM et le WORLD MONUMENT FUND pour leur généreux appui.

La Organización de las Ciudades del Patrimonio Mundial (OCPM) expresa su profundo reconocimiento a sus anfitriones griegos y particularmente a la ciudad de Rodas, al Ministerio de la Cultura de la República Helénica, a la Fundación Marc de Montalembert, a la Organización de Promoción del Turismo de Rodas y a la Prefectura del Dodecanese. Asimismo la OCPM quiere agradecer al Alcalde George Giannopoulos por la invitación para reunirse en su ciudad y su acogida coronada de éxitos. Expresamos nuestro sincero reconocimiento a la Señora Lee Minaidis, Presidenta del Comité Organizador y a se equipo de colaboradores y de voluntarios por su implicación profesional y su gestión eficaz de este evento internacional. El Comité organizador agradece especialmente a la UNESCO, al CENTRO DEL PATRIMONIO MUNDIAL DE LA UNESCO, al CONSEJO DE EUROPA, al ICCROM, al ICOMOS, al GETTY GRANT PROGRAM y a la WORLD MONUMENTS FUND por su generoso apoyo.

Ο Οργανισμός Πόλεων Παγκόσμιας Κληρονομιάς (ΟΠΠΚ) θα ήθελε να εκφράσει τις βαθύτατες ευχαριστίες στους έλληνες διοργανωτές και ειδικότερα στο Δήμο Ροδίων, στο Υπουργείο Πολιτισμού της Ελληνικής Δημοκρατίας, στην Νομαρχία Δωδεκανήσου, στον Οργανισμό Προώθησης Ροδιακού Τουρισμού και στο Ίδρυμα Marc de Montalembert. Ο Οργανισμός Πόλεων Παγκόσμιας Κληρονομιάς επιθυμεί να εκφράσει την ευγνωμοσύνη του στον Δήμαρχο Ροδίων, κ. Γιώργο Γιαννόπουλο για την πρόσκληση του να συγκληθεί στην πόλη του το συμπόσιο, καθώς και για την επιτυχή φιλοξενία των προσκεκλημένων. Θερμές ευχαριστίες αποδίδονται και στην κα. Λη Μηναΐδη, Πρόεδρο της Οργανωτικής Επιτροπής, στην ομάδα των συνεργατών της, καθώς και στους εθελοντές για τον επαγγελματικό σχεδιασμό και την άψογη διεκπεραίωση αυτού του γεγονότος διεθνούς βεληνεκούς. Η Οργανωτική Επιτροπή ευχαριστεί ιδιαιτέρως την UNESCO, το Κέντρο Παγκόσμιας Κληρονομιάς της UNESCO (WHC), το Συμβούλιο της Ευρώπης, το ICCROM, το ICOMOS, το GETTY GRANT PROGRAM και το WORLD MONUMENTS FUND για τη γενναιόδωρη υποστήριξή τους.

NOTES TO THE READER

The language of the published text is the same as that in the text submitted to the organizers. Only the texts submitted have been published in this document.

The opinions expressed by the speakers are in no way binding on the OWHC and are the sole responsibility of the authors.

NOTES AU LECTEUR

La langue du texte édité correspond à celle du texte écrit remis aux organisateurs. Seuls les textes transmis ont pu être publies dans ce document.

NOTAS AL LECTOR

El idioma del texto editato corresponde al del texto escrito y entregado a los organizadores. Solo los textos transmitidos han podido ser publicados en este documento.

Las opiniones expresadas por los conferenciantes no comprometen a la OCPM y son la responsabilidad exclusiva de sus autores.

ΣΗΜΕΙΩΣΗ ΠΡΟΣ ΤΟΝ ΑΝΑΓΝΩΣΤΗ

Το σύνολο των κειμένων που εμπεριέχονται στην παρούσα έκδοση αφορούν αποκλειστικά εισηγήσεις που έχουν δοθεί στους διοργανωτές και παρατίθενται στην γλώσσα συγγραφής τους.

Οι απόψεις που εκφράζονται από τους ομιλητές δεν δεσμεύουν με κανένα τρόπο τον ΟΠΠΚ και αποτελούν αποκλειστική ευθύνη των συγγραφέων.

Les villes du patrimoine mondial Une strategie de sauvegarde durable: Le cas de la Medina de Tunis. 001.doc
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LES VILLES DU PATRIMOINE MONDIAL

UNE STRATEGIE DE SAUVEGARDE DURABLE

LE CAS DE LA MEDINA DE TUNIS

De façon relativement récente, la notion de centre historique est venue se superposer à celle de monument historique. Aujourd'hui, s'impose l'idée de la mise en valeur et de la sauvegarde des noyaux anciens et le concept de conservation du patrimoine requiert non seulement une prise en compte des bâtiments exceptionnels mais, aussi, la reconnaissance de la valeur du contexte où ils se situent.

Le Patrimoine n'est plus considéré, aujourd'hui, uniquement comme une valeur culturelle mais, également comme un moyen de progrès et de développement.

Sauver les noyaux historiques imprégnés de culture, chargés d'histoire, mémoire collective de toute une population, les intégrer dans un-monde dit « moderne », mécanisé et en pleine mutation technologique, n'est pas une tâche aisée. Mais le défi a déjà été lancé à Tunis à l'instar de nombreuses autres villes méditerranéennes.

Témoignage vivant de l'urbanisme musulman, les quartiers résidentiels de la Médina se présentent sous une forme presque inchangée depuis la fin du XVIIIème siècle. Tunis est classée, par l'UNESCO, ville du patrimoine mondial depuis 1979.

Elle est caractérisée par un tissu dense, un réseau de rues, de venelles et d'impasses desservant des maisons à patio accolées les unes aux autres. Le long des boulevards crées sur l'emplacement des anciens remparts ainsi que dans les faubourgs, l'apport architectural de la période 1850-1950 se fait sentir dans les immeubles de rapport et les bâtiments officiels.

Avec ses 270 hectares et plus de 100.000 habitants, la Médina est non seulement un témoignage du passé, mais aussi un immense quartier en évolution dont l'avenir est indissociable de celui de la Capitale.

Dès lors, et vers les années 60, l'émigration rurale va trouver dans la Médina un lieu d'accueil et de transit d'une population rurale inadaptée à la Ville. Un facteur, parmi d'autres, qui a contribué à la dégradation de la Médina : détérioration des structures urbaines, dégradation du bâti (palais et demeures) et décadence des fonctions économiques.

Il est important de dresser le bilan de l'action entreprise dans ce sens et d'en saisir les points positifs et les défaillances afin de formuler des propositions et de monter les programmes à venir sur des bases solides.

Les actions vont très rapidement dépasser le cadre des monuments historiques pour déboucher sur des propositions d'intervention intégrée et sur une politique de sauvegarde définie suivant deux grands thèmes :

- **La sauvegarde d'un patrimoine monumental** avec, comme objectif, le développement d'un tourisme culturel, une option économique fondamentale prise par la Tunisie.

De nombreux monuments ont été restaurés ces dernières années. Ces restaurations ont intéressé d'abord les monuments religieux (mosquées, zaouïas, ...) ensuite les anciennes écoles coraniques (appelées medersas) et quelques grandes demeures, et cela suivant les programmes de réaffectation en équipements collectifs (siège d'associations, équipements socioculturels, centres de formation...), capables de s'adapter et de s'intégrer dans la structure de l'édifice sans le défigurer.

- **La sauvegarde d'un patrimoine immobilier social** avec comme objectif, entre autres, le développement socio-économique d'une Médina vivante remplissant un rôle social important dans l'habitat et l'artisanat.

Ces dernières années, des investissements importants ont été opérés dans la Médina concernant les infrastructures, les équipements et l'habitat : Le projet Hafsia financé en partie par la Banque Mondiale dans le cadre du IIIème projet urbain, le projet de la Kasbah avec la construction d'un grand parking en sous-sol et enfin le projet d'assainissement des oukalas avec le concours du FADES (Fond arabe de Développement Economique et Social) et renforcés aujourd'hui par la construction du nouveau siège de la Mairie dans l'enceinte de la Médina, dans un endroit stratégique chargé d'histoire à la Kasbah et par le projet d'embellissement de l'hypercentre de Tunis notamment la ville européenne qui a un siècle d'existence et peut être considéré comme un secteur à sauvegarder.

Les projets de visée sociale et touchant à l'habitat ont eu un impact sur la Médina, tant sur les plans architectural, urbain, social et économique que sur le plan patrimonial.

Ils ont permis de réhabiliter des quartiers entiers définis dans le Plan d'aménagement de la Médina comme des zones de restructuration à cause de leur état de délabrement, et surtout, d'amorcer une politique de réhabilitation du logement social avec tout ce que cela suppose comme solutions pour les problèmes surgissant au niveau des mécanismes d'intervention sur les plans institutionnel et financier ainsi que sur les plans législatif et technique. Ils sont conçus comme des projets intégrés faisant intervenir plusieurs composantes à la fois, telles que la rénovation, la réhabilitation, l'amélioration des infrastructures et aussi la création d'emplois.

L'engagement de deux institutions financières internationales (La BIRD et le FADES), pour la première fois de leur histoire, au financement de la réhabilitation de l'habitat dans un centre historique est encore une preuve de la pertinence et de la performance de ces projets.

L'approche cohérente du projet de restructuration du quartier Hafsia a réussi à inverser le processus de dégradation engagé depuis le début du XXème siècle. Il est parvenu à améliorer l'infrastructure du quartier tout en renforçant le tissu urbain traditionnel de la Médina.

Ce projet, primé à deux reprises par le Prix Aga Khan d'Architecture, a, également, réussi à revitaliser les activités commerciales du quartier, remplacé ou réhabilité plusieurs de ses habitations en ruines et favorisé les échanges entre habitants de milieux sociaux différents.

Quant au projet «oukalas» financé en partie par le FADES, il *a* contribué à la renaissance de la Médina. On enregistre avec satisfaction l'amorce d'un phénomène de retour dans la ville historique.

Ce projet, d'importance nationale, a été conçu avec comme objectifs essentiels :

- Le sauvetage des ménages locataires des risques d'effondrement. En effet, plus de 2000 ménages évacués de 300 oukalas ont été relogés en étapes par

la Municipalité dans des cités périphériques aménagées à cet effet et dans environ 400 logements reconstruits dans la Médina.

- La sauvegarde d'un patrimoine immobilier reconnu à l'échelle nationale et internationale pour ses voleurs architecturale, urbaine et historique.

Dans ce cadre, plus de 400 immeubles sont concernés par la réhabilitation et la restauration dont une trentaine appartenant à la Municipalité et à l'Etat. Une ligne de crédit est mise à la disposition des propriétaires pour la remise en état de leurs immeubles. Les crédits sont octroyés à un taux de 5 % remboursable sur 15 ans et avec une assistance technique gratuite assurée par l'Association de Sauvegarde de la Médina.

Aussi, les 20 bâtiments présentant un intérêt architectural et (ou) historique sont proposés à la restauration suivant un programme de réaffectation en équipements culturels ou socio-collectifs (centre méditerranéen des Arts appliqués, jardin d'enfants, club informatique pour jeunes, sièges d'associations).

Ce projet marque une étape importante dans l'évolution de la politique urbaine en Tunisie qui s'oriente aujourd'hui vers la récupération et la reconquête du centre ville constituant tout à la fois un patrimoine historique et culturel à sauvegarder et un ensemble urbain vivant à considérer.

Notons, par ailleurs, la décision de la Municipalité de Tunis d'implanter, au cœur de la Médina, un Musée de la Ville dont la construction fut vivement souhaitée depuis 1911, comme l'atteste les délibérations du conseil municipal de l'époque, en plus de la construction du nouveau siège de l'Hôtel de Ville dans l'enceinte de la Médina, en un endroit stratégique chargé d'histoire. Des actions de cette nature ne manqueront pas d'avoir un impact important sur l'animation et la revalorisation du centre ville.

Quelle stratégie pour la Médina aujourd'hui ? :

A partir de cette évaluation et de ce bilan, une réflexion s'est faite sur une stratégie nouvelle à mettre en oeuvre qui sera certainement en continuité et en

complément de ce qui a été déjà réalisé ou en cours de réalisation notamment les projets de visés sociales (Hafsia, oukalas).

La nouvelle stratégie adoptée repose surtout sur le renforcement du premier axe précédemment présenté c'est-à-dire la sauvegarde du patrimoine monumental parce que nous considérons aujourd'hui qu'il nous est permis après avoir traité l'insalubrité et freiner la dégradation, d'ajuster notre politique vers l'animation culturelle, l'embellissement et la réconciliation de cet héritage avec la modernité d'une manière non traumatisante.

Pour ce faire, le schéma directeur proposé s'appuie sur 2 volets importants:

- D'une part, sur une législation adéquate au niveau du classement des monuments historiques et du plan de sauvegarde ;
- D'autre part, sur une politique de mise en valeur du patrimoine monumental au niveau :
  . de l'esthétique urbaine,
  · de la promotion culturelle,
  . de la promotion du tourisme culturel,
  . de la promotion économique,
  . de la résolution des problèmes du stationnement et de la circulation.

Si le 1er volet ne pose pas de problèmes, une nouvelle législation avec la promulgation du code du Patrimoine, est en train de se mettre en place et le plan de sauvegarde est en cours d'élaboration. Le 2ème volet lui, il est plus complexe à mettre en oeuvre, nécessitant un engagement de la part des décideurs, des moyens financiers adéquats et aussi un savoir-faire à la hauteur des ambitions.

Plusieurs tentatives ont eu lieu pour récupérer des bâtisses laissées, jusque là, à la ruine et à la désolation (des édifices religieux, des medersas, des fondouks, des palais et demeures désaffectées, anciens abattoirs...) afin d'en faire des lieux prestigieux, rayonnant d'art et de culture et participent à la promotion socio-économique de la Ville.

Aussi, se retrouve-t-on en présence d'un stock important de monuments d'intérêt architecture ou historiques appartenant à l'Etat ou la Municipalité du fait de l'assainissement foncier et social dans le cadre du projet «Oukalas» et pour lesquelles il faudrait une programmation adéquate.

Le principe, donc, fondamental adopté pour la mise en valeur de ce patrimoine est la restauration suivant un programme de réaffectation nouvelle si la fonction originelle n'existe plus. La reconversion permet au monument restauré de continuer à vivre et à jouer un rôle déterminant dans le développement d'une cité.

L'intérêt pour la culture et le tourisme culturel dans la Médina s'est accru ces dernières années. La Médina redevient, peu à peu, le centre le plus recherché dans l'agglomération tunisoise, pour des activités culturelles d'envergure.

Des pôles culturels commencent à se former autour de noyaux précurseurs. Pôles culturels, mais aussi beaux espaces capables d'engendrer de véritables circuits de visite vers ces monuments restaurés et réaffectés à des fonctions diverses.

Ceci, d'autant plus qu'il y a un retour des équipements publics vers le cœur de la vieille ville notamment la Mairie et le Musée de la ville.

Un retour à encourager au même titre qu'il est nécessaire de développer un hébergement touristique de bonne facture (hôtels de charme et hôtel de haut standing) car la Médina ne devrait pas être uniquement un lieu de transit pour des visites guidées de quelques heures.

Concrètement, une cinquantaine de monuments ont été identifiés, répertoriés et étudiés. Des fiches projets ont été élaborées pour chaque édifice avec une note de présentation, un relevé de diagnostics et une évaluation sommaire des travaux de restauration et aussi une proposition de réaffectation établie en fonction de plusieurs paramètres suivant sa contenance, sa typologie, et aussi sa position géographique, par rapport aux pôles d'animation culturelle et touristique qui commencent à se dessiner dans la Médina et qu'il y a lieu de renforcer.

Cette stratégie proposée se veut une continuité et un renforcement de ce qui est déjà réalisé ou en cours de réalisation.

C'est une esquisse d'un schéma directeur qui servira comme cadre de réflexion à notre problématique de restauration/reconversion surtout au niveau de la programmation, une étape fondamentale avant toute intervention.

Aussi, apparaît-il important de souligner la prise de conscience chez les décideurs et les aménageurs en charge de la ville de la nécessité de développer une réflexion cohérente sur le devenir d'une ville en associant différents acteurs dans le cadre d'un partenariat renforçant davantage le pouvoir local et la société civile. Et la ville de Tunis fait l'objet, aujourd'hui, d'une étude stratégique pour son développement. Un des axes importants de cette stratégie concernera le renforcement de l'image de Tunis en vue de développer un tourisme culturel par la revalorisation de ses atouts, notamment, ses plans d'eaux et sa Médina comme patrimoine universel.

Et dans ce cadre, la Municipalité s'est engagée avec une 4ème tranche du « projet Oukalas », aussi importante et en continuité avec les tranches précédentes. Conçu comme un projet intégré, en plus d'une ligne de crédit destinée aux propriétaires pour la réhabilitation de leurs bâtiments, de la construction des logements nouveaux pour le relogement dans la Médina sur les parcelles vides, de la restauration et réaffectation de tous les bâtiments d'intérêts architectural ou historique, cette 4ème tranche englobera deux autres composantes nouvelles à savoir la réhabilitation et la restauration des ateliers et des fondouks dans la Médina avec la création d'espaces réservés aux artisans et aux jeunes créateurs et aussi un volet sur l'esthétique urbaine par la restauration des sabbats de la Médina (passage couvert) et par l'intervention sur certains parcours par la restauration de quelques séquences de façades, l'aménagement de quelques placettes et la rénovation du pavage et de l'éclairage public.

En conclusion, je me permets d'insister sur le fait qu'on ne peut parler de stratégie de sauvegarde durable d'une ville historique vivante que si trois éléments essentiels existent et se conjuguent à savoir la volonté du décideur et du gestionnaire, le savoir-faire du conservateur et l'engagement du citoyen.

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ΤΟ ΒΥΖΑΝΤΙΝΟ ΥΦΟΣ ΚΑΙ ΤΟ ΣΥΓΧΡΟΝΟ ΠΡΟΣΩΠΟ ΤΗΣ ΘΕΣΣΑΛΟΝΙΚΗΣ

Χ. ΜΠΑΚΙΡΤΖΗΣ

Ο μεν χρόνος σέβεται τα έργα των ανθρώπων, όταν αυτά έχουν μέγεθος και ποιότητα, οι δε άνθρωποι τα προστατεύουν, όταν πιστεύουν σε αυτά. Στο σημερινό λοιπόν Συμπόσιο με θέμα τη διατήρηση της πολιτιστικής κληρονομιάς ζωντανής ταιριάζει να αναφερθώ στα βυζαντινά μνημεία της Θεσσαλονίκης σε σχέση με τους ανθρώπους που μερίμνησαν για τη διατήρησή τους.

Τα μνημεία της ούτως ή άλλως γνωστής ως βυζαντινή Θεσσαλονίκης δεν ήσαν άγνωστα στους αρχαιόφιλους. Τα σημαντικότερα από αυτά προκάλεσαν το ενδιαφέρον των περιηγητών, οι οποίοι κατέγραψαν την παρουσία τους, συχνά με αρκετές λεπτομέρειες, και τον ρόλο τους στη λειτουργία της πόλης.

Ο πρώτος όμως που συστηματοποίησε το ενδιαφέρον για τα βυζαντινά μνημεία της Θεσσαλονίκης, ασχολήθηκε με την περιγραφή και την ερμηνεία τους και κατέστησε διεθνώς γνωστή την παρουσία τους υπήρξε ο Γυμνασιάρχης Πέτρος Παπαγεωργίου (1859-1914). Μολονότι το ενδιαφέρον για τα έργα του βυζαντινού πολιτισμού ήταν περιορισμένο στους επιστημονικούς κύκλους της εποχής του ο Π. Παπαγεωργίου, γνωστός κλασσικός φιλόλογος ο ίδιος, εστράφη προς τα βυζαντινά μνημεία της υπό τουρκικής διοίκησης Θεσσαλονίκης εμπνεόμενος από φιλοπόλιδα αισθήματα για την πόλη που τον ανέθρεψε. Με νεανική θέρμη κατέγραφε αδιακρίτως τα αρχαιολογικά πράγματα της βυζαντινής Θεσσαλονίκης, από τα οποία πολλά σήμερα έχουν χαθή. Δημοσίευε παντού, σε διεθνώς γνωστά επιστημονικά περιοδικά αλλά και στον εβδομαδιαίο Τύπο της Θεσσαλονίκης. Πάνω από 50 είναι τα δημοσιεύματα του Π. Παπαγεωργίου που έχουν εντοπισθή έως σήμερα περί Θεσσαλονίκης και άλλα ακόμη λανθάνουν. Δημοσίευσε αμέτρητες επιγραφές, έγραψε για τους Δώδεκα Αποστόλους, τη Μονή Βλατάδων, την Αγία Σοφία, για κειμήλια και έργα μικροτεχνίας από τη Θεσσαλονίκη. Τι άλλο από έναν καημό είναι η εργασία του "Μνημεία της εν Θεσσαλονίκη λατρείας του αγίου Δημητρίου" (BZ 17

(1908) 321-381), όπου περιγράφει και ερμηνεύει τα ψηφιδωτά, τοιχογραφίες και άλλα ευρήματα, που είδαν το φως το 1907 και η οποία αρχίζει με τον όρκο "Μα τον σον και ημων απάντων Δημήτριον, τον κηδεμόνα της Θεσσαλονίκης και πολιούχον";

Ο Π. Παπαγεωργίου δεν ήταν ο μόνος που ενδιαφερόταν τότε για τη βυζαντινή Θεσσαλονίκη. Κοντά του και ο Μιχαήλ Χατζηιωάννου, ένας αξιόλογος και πνευματικός λόγιος, που δεν επέτρεψε να γνωρίζουμε πολλά γι' αυτόν και που εκτός των άλλων εργασιών μας άφησε την πρώτη και ακόμη χρήσιμη "Αστυγραφία Θεσσαλονίκης" (Θεσσαλονίκη 1880).

Αλλά και οι περιστάσεις έδωσαν τροφή στα ενδιαφέροντά τους. Η Θεσσαλονίκη στο τελευταίο τέταρτο του 19ου αι. και στις αρχές του 20ου άλλαζε μορφή: σ' ένα πνεύμα εξευρωπαϊσμού της Τουρκίας τα θαλάσσια τείχη κατεδαφίστηκαν, η προκυμαία κατασκευάστηκε, το λιμάνι επεκτάθηκε και νέα κτήρια, δημόσια και ιδιωτικά, κτίστηκαν στην πόλη. Όλες αυτές οι εργασίες με τις εκσκαφές και τις κατεδαφίσεις έφεραν στο φως για πρώτη φορά αρχαιότητες αλλά και Ευρωπαίους μηχανικούς και επιχειρηματίες, που μετέφεραν στη Θεσσαλονίκη μαζί με την κοσμικότητα και τα ενδιαφέροντά τους. Η τουρκική Διοίκηση της Θεσσαλονίκης π.χ. εκάλεσε το 1907 τον Γάλλο μηχανικό Le Tourneau να επιστατήσει των εργασιών επισκευής δύο μεγάλων τζαμιών της πόλης, που προηγουμένως ήσαν βυζαντινοί ναοί, της Αγίας Σοφίας και της Αχειροποιήτου, ως συνέχεια των εργασιών συντήρησης του Αγίου Δημητρίου, που είχαν αρχίσει επί Σερίφ Ρεούφ πασά, νομάρχη Θεσσαλονίκης την ίδια χρονιά, υπό την επίβλεψη Επιτροπής, στην οποία φαίνεται ότι μετείχε και ο Π. Παπαγεωργίου. Την εποχή που η Ακρόπολη στην Αθήνα ανασκαπτόταν συστηματικά, αναστηλωνόταν και γινόταν αντικείμενο μελέτης από τους αριστείς της ευρωπαϊκής αρχαιολογίας, η Θεσσαλονίκη, με τουρκική διοίκηση και στόχος βλέψεων των Μεγάλων Δυνάμεων, έκανε τα πρώτα δειλά βήματα στη συντήρηση των μνημείων της. Οι εργασίες που επέβλεψε ο Le Tourneau στα μεγάλα τζαμιά της Θεσσαλονίκης δεν είχαν στόχο την αποκατάστασή τους στην αρχική βυζαντινή μορφή τους, αλλά την επισκευή τους με τον όρο, που το Κοράνιο υπαγορεύει, "να μη γίνει παραβίασις του παλαιού ρυθμού των".

Εκείνο, ωστόσο, που υπήρξε απρόσμενο ήταν η αποκάλυψη, κατά τη διάρκεια των εργασιών συντήρησης του Αγίου Δημητρίου και της Αγίας Σοφίας, άγνωστων ψηφιδωτών, που συγκλόνισαν τον επιστημονικό κόσμο και γνωστοί βυζαντινολόγοι της εποχής εκείνης έσπευσαν στη Θεσσαλονίκη, όπως ο Th. Uspenskij, διευθυντής του Ρωσσικού Αρχαιολογικού Ινστιτούτου Κωνσταντινουπόλεως, ο καλλιτέχνης ζωγράφος W.S. George από την Αγγλία, που απεικόνισε σε υδατογραφίες τα ψηφιδωτά του αγίου Δημητρίου, ο Ch. Diehl, που ασχολήθηκε συστηματικά με τα μνημεία της Θεσσαλονίκης και ο Ορέστης Tafrali, που μας άφησε τρία βιβλία για τη βυζαντινή Θεσσαλονίκη. Οι αρχαιολόγοι αυτοί με τα δημοσιεύματά τους κατέστησαν τη Θεσσαλονίκη το κέντρο του παγκοσμίου ενδιαφέροντος.

Η περίοδος αυτή κλείνει το 1917 με την πυρκαϊά της Θεσσαλονίκης, η οποία αποτέφρωσε το ιστορικό κέντρο της πόλης. Με την εκπόνηση νέου ρυμοτομικού σχεδίου της πυρίκαυστης ζώνης η πόλη με το έντονο κοσμοπολίτικο και βυζαντινό ύφος εστράφη προς ευρωπαϊκούς περιφερειακούς προσανατολισμούς.

Αν θέλουμε λοιπόν να χαρακτηρίσουμε την πρώτη αυτή περίοδο του τέλους του 19ου και των αρχών του 20ου αι., κατά την οποία τα βυζαντινά μνημεία της Θεσσαλονίκης αναζητούν τη θέση τους στην ιστορία του βυζαντινού πολιτισμού θα την ονόμαζα "περίοδο καταγραφών".

Θα αδικούσα ωστόσο μια αντικειμενική αξιολόγηση των τάσεων της περιόδου αυτής εάν δεν αναφερόμουν σε ένα φαινομενικά ασήμαντο έργο: το νότιο προστώο στο καθολικό της μονής Βλατάδων. Το έργο αυτό, που αποτελεί μία σύνθεση στοιχείων βυζαντινών και συγχρόνων του τουρκο-μπαρόκ, κατασκευάστηκε το 1907 σε σχέδια του Π. Παπαγεωργίου και είναι πρωτοποριακό γιατί εγκαινιάζει, μπορούμε να πούμε ένα νέο-βυζαντινό στυλ, που αργότερα αναπτύχθηκε από τον Αριστοτέλη Ζάχο.

Ο αρχιτέκτων Αριστοτέλης Ζάχος, δυτικομακεδών την καταγωγή, ήταν μία πληθωρική προσωπικότητα, που δέσποζε στα βυζαντινά πράγματα της Θεσσαλονίκης κατά την επόμενη περίοδο. Σε αυτόν ανέθεσε το 1918 το Υπουργείο Παιδείας να βοηθήσει τον τότε Έφορο Βυζαντινών Αρχαιοτήτων Ελλάδος Γεώργιο Σωτηρίου στη

σύνταξη μελέτης συντήρησης και την εξασφάλιση των σωζομένων τμημάτων της καμένης βασιλικής του Αγίου Δημητρίου. Ο Γεώργιος Σωτηρίου έχοντας έδρα την Αθήνα και αρμοδιότητα σ' ολόκληρη την Ελλάδα δεν ήταν δυνατόν να παρακολουθεί πάντα εκ του σύνεγγυς τις εργασίες στον Άγιο Δημήτριο γι' αυτό και επικεφαλής του αναστηλωτικού έργου, κυρίως μετά το 1926, που άρχισαν οι κατασκευές, ήταν ο Α. Ζάχος. Η εργασία ήταν δύσκολη και δαπανηρή και το έργο σταμάτησε μετά από λίγα χρόνια, λόγω έλλειψης κονδυλίων, και διεκόπη οριστικά το 1937 (και όχι το 1939). Το αναστηλωτικό πρόγραμμα του Α. Ζάχου ήταν η ελεύθερη ανοικοδόμηση του μνημείου μέσα σε μία μεγαλόπνοη και εντυπωσιακή διαμόρφωση περιβάλλοντος χώρου σε νέο-βυζαντινό στυλ με στοές αιθρίου, κλίμακες, φιάλη και Βυζαντινό Μουσείο.

Παρών στη Θεσσαλονίκη από το τέλος της δεκαετίας του '10 ή από το 1920, κυρίως όμως από το 1924 έως το 1928, ως Έφορος των Βυζαντινών Αρχαιοτήτων Μακεδονίας, ήταν ένας διακεκριμένος βυζαντινολόγος στα πρώτα του βήματα, Ανδρέας Ξυγγόπουλος. Κλειστός, μοναχικός και ρεμβώδης χαρακτήρας αφιερώθηκε στη μελέτη των βυζαντινών μνημείων και με μακρά σειρά μονογραφιών και άρθρων έθεσε τις βάσεις της έρευνας για τη βυζαντινή Θεσσαλονίκη. Ο Α. Ξυγγόπουλος δεν μετείχε στην αναστήλωση του Αγίου Δημητρίου, την εποπτεία της οποίας είχε, όπως είπαμε, ο Γ. Σωτηρίου. Τα ενδιαφέροντά του εστράφησαν στα παλαιολόγεια μνημεία της Θεσσαλονίκης. Αναφέρω τις μονογραφίες του: "Τέσσαρες μικροί ναοί της Θεσσαλονίκης εκ των χρόνων των Παλαιολόγων" (1952), "Η ψηφιδωτή διακόσμησις του ναού των Αγίων Αποστόλων Θεσσαλονίκης" (1953), "Οι τοιχογραφίες του Αγίου Νικολάου Ορφανού Θεσσαλονίκης" (λεύκωμα με σύντομη εισαγωγή, 1964).

Επί των ημερών του κατέρρευσε το επίχρισμα από το τεταρτοσφαίριο της κόγχης του ιερού βήματος του καθολικού της μονής Λατόμου και αποκαλύφθηκε το λαμπρό παλαιοχριστιανικό ψηφιδωτό. Στο ψηφιδωτό αυτό απεικονίζεται το λεγόμενο "όραμα του Ιεζεκιήλ", δηλ. ο Χριστός εν δόξη περιβαλλόμενος από τους τέσσερις Ευαγγελιστάς. Αυτό όμως που εμείς βλέπουμε και που εκφράζει την άνεση, με την οποία η βυζαντινή τέχνη της Θεσσαλονίκης πλησίαζε και τολμούσε να απεικονίζει τα θεία οράματα, δεν είναι το όραμα του Χριστού, που καταλαμβάνει και το κέντρο της παράστασης, αλλά τους δύο προφήτες, Ιεζεκιήλ και Αβακούμ, να

βλέπουν με τα μάτια τους και τα μάτια της ψυχής των το όραμα αυτό, το οποίο δεν συντελείται σε αφηρημένο αλλά σε ένα συγκεκριμένο χώρο υπαίθρου με δένδρα, βράχους και οικοδομήματα ανθρώπων.

Η αναστήλωση του Αγίου Δημητρίου ήταν το μεγάλο αλλά μοναδικό σχολείο για τη βυζαντινή Θεσσαλονίκη τα χρόνια του μεσοπολέμου. Με το έμπειρο τεχνικό προσωπικό του και με την επίβλεψη του Α. Ξυγγόπουλου αναστηλώθηκαν δύο παρεκκλήσια της Αχειροποιήτου, και αργότερα, μετά τους σεισμούς του 1933, όταν ο Α. Ξυγγόπουλος είχε μετατεθή στην Αθήνα, με την επίβλεψη του καθηγητή της ιστορίας της Τέχνης στο Πανεπιστήμιο Θεσσαλονίκης Δημητρίου Ευαγγελίδη, ο οποίος δίδασκε και βυζαντινή τέχνη, αναστηλώθηκε η Παναγία των Χαλκέων. Εάν στην αναστήλωση των παρεκκλησίων της Αχειροποιήτου είναι έντονη και εμφανής η επίδραση του Α. Ζάχου, στην Παναγία των Χαλκέων οι αναστηλωτικές αρχές απέβλεψαν στην αποκατάσταση της αρχικής μορφής του μνημείου του 11^{ου} αι.

Αν θέλουμε λοιπόν να χαρακτηρίσουμε τη δεύτερη περίοδο της νεώτερης ιστορίας των βυζαντινών μνημείων της Θεσσαλονίκης, αυτή του μεσοπολέμου που λήγει με την κήρυξη του Β΄ Παγκοσμίου Πολέμου, θα την ονόμαζα "περίοδο των αναζητήσεων και των πρώτων θέσεων".

Η πρώτη συστηματική οργάνωση Υπηρεσίας για τα βυζαντινά μνημεία της Θεσσαλονίκης συνδέεται με την τοποθέτηση του Στυλιανού Πελεκανίδη στη θέση του Εφόρου Βυζαντινών Αρχαιοτήτων και τη μόνιμη εγκατάστασή του στη Θεσσαλονίκη το 1943. Η Υπηρεσία αυτή αμέσως μετά την Κατοχή βρέθηκε μπροστά σ' ένα τεράστιο έργο: τη συνέχιση της αναστήλωσης του Αγίου Δημητρίου (1945-1949). Οι αρχές που είχαν τεθή από τον Α. Ζάχο στην πρώτη περίοδο αναστήλωσης του ναού αναθεωρήθηκαν από την Επιτροπή που αποτελούσαν οι καθηγητές του Πανεπιστημίου Αθηνών Γ.Σωτηρίου, Α.Ορλάνδος, του Πανεπιστημίου Θεσσαλονίκης Α.Ξυγγόπουλος και του Μετσοβίου Πολυτεχνείου Π.Παρασκευόπουλος. Σύμφωνα με τα δεδομένα που εν τω μεταξύ είχαν προκύψει από την αρχαιολογική έρευνα του μνημείου και σύμφωνα με τις αναστηλωτικές αρχές που επικρατούσαν στη μεταπολεμική Ευρώπη, αποφασίστηκε κάθε τι παλιό να διετηρείτο, κατά το δυνατόν, και οι νέες κατασκευές του Α. Ζάχου να

προσαρμόζονταν διακριτικά στις παλιές. Από στατικής πλευράς μία νέα στέγη από μπετόν-αρμέ, που εμιμείτο ξυλοκατασκευή, θα στηριζόταν στους ενισχυμένους πεσσούς ενώ οι κιονοστοιχίες δεν θα έφεραν βάρος. Τα λοιπά βυζαντινά μνημεία της Θεσσαλονίκης, ευρισκόμενα έξω από την πυρίκαυστο ζώνη, συνέχιζαν να ζουν, προστατευμένα ακόμη, από το "φυσικό" τους, θα έλεγα, παραδοσιακό αστικό περιβάλλον.

Ο Στυλ. Πελεκανίδης εκμεταλλευόμενος το έμπειρο τεχνικό προσωπικό και τα υλικά μέσα, που παρείχε η αναστήλωση του Αγίου Δημητρίου, προχώρησε στην αναστήλωση δύο ναών, με τους οποίους δεν είχε ασχοληθή ο Α. Ξυγγόπουλος. Πρόκειται για δύο σημαντικούς ναούς μιας λαμπρής περιόδου της Θεσσαλονίκης, παραμελημένης μέχρι τότε, της υστεροβυζαντινής. Είναι η Αγία Αικατερίνη και ο Προφήτης Ηλίας, που έχοντας μετατραπεί σε τζαμιά είχαν χάσει την αρχική τους μορφή. Ο Προφήτης Ηλίας μάλιστα είχε και σοβαρά στατικά προβλήματα, τα οποία ελύθησαν με τη βοήθεια του μηχανικού Αλέκου Σακλαμπάνη.

Στην αναστήλωση των δύο αυτών παλαιολόγειων ναών επεκράτησαν αναστηλωτικές λύσεις περισσότερο προχωρημένες από αυτές του Αγίου Δημητρίου της δευτέρας περιόδου. Ο Στυλ. Πελεκανίδης δεν δεχόταν την εκ των προτέρων λεπτομερή τεχνική μελέτη αναστήλωσης και αναπαράστασης ενός μνημείου, αλλά έδιδε μεγάλη σημασία στον δημιουργικό ρόλο των νέων στοιχείων, που προκύπτουν συνεχώς κατά την αναστηλωτική διεργασία και ανατρέπουν κάθε προγραμματισμένη εκ των προτέρων λύση, γι' αυτό και είχε επιτρέψει τον αυτοσχεδιασμό των μαστόρων στις επιμέρους λεπτομέρειες. Πράγματι, τα μνημεία που αναστηλώνονται με βάση τις αρχές αυτές "βρίσκονται πιο κοντά στη μη ορθολογική ανθρωποκεντρική κλίμακα της βυζαντινής αρχιτεκτονικής, επειδή ακριβώς, θέτοντας αντιμέτωπο τον άνθρωπο με την ούτως ή άλλως χαμένη μέσα στους αιώνες αρχική μορφή του μνημείου, παίρνουν από αυτόν ένα κομμάτι από τη ζωή του και την πνοή του". Από την άποψη αυτή οι αναστηλωτικές αρχές του Στυλ. Πελεκανίδη κάπου συναντούν τις αδιαμόρφωτες απόψεις του Α. Ζάχου, τον οποίον εσέβετο χωρίς να έχει συναντήσει ποτέ του.

Εκτός από τη συντήρηση των παλαιολόγειων ναών ο Στυλ. Πελεκανίδης προχώρησε στη διάσωση ευρέου φάσματος βυζαντινών έργων της Θεσσαλονίκης, του οποίου η περιγραφή δεν είναι της παρούσης στιγμής. Δεν μπορώ ωστόσο να μην αναφερθώ σε τρία μεγάλα έργα της περιόδου αυτής, που έδωσαν νέα ώθηση στην προβολή της βυζαντινής ζωγραφικής στη μεταπολεμική Θεσσαλονίκη: τη συντήρηση των παλαιοχριστιανικών ψηφιδωτών της Ροτόντας, των μεσοβυζαντινών ψηφιδωτών της Αγίας Σοφίας και των υστεροβυζαντινών τοιχογραφιών του Αγίου Νικολάου Ορφανού. Επίσης η ανοικοδόμηση των προσφυγικών συνοικισμών έξω από τα δυτικά και τα ανατολικά τείχη της πόλεως ήταν η αφορμή να αποκαλυφθη από τον Στυλ. Πελεκανίδη μία μοναδική σειρά τοιχογραφημένων τάφων παλαιοχριστιανικών χρόνων. Τα έργα αυτά εμπλούτισαν το πρόσωπο της βυζαντινής Θεσσαλονίκης και όταν το 1953, μόλις λίγα χρόνια μετά τη λήξη του εμφυλίου πολέμου, οργανώθηκε στη Θεσσαλονίκη το 9^{ο} Διεθνές Συνέδριο Βυζαντινών Σπουδών, αξέχαστο για τη φιλόξενη οργάνωσή του, τα βυζαντινά μνημεία της Θεσσαλονίκης και της Μακεδονίας είχαν πολύ αξιοπρεπή παρουσία, η οποία εντυπωσίασε.

Κοιτάζοντας τώρα πίσω διαπιστώνουμε ότι τα βυζαντινά μνημεία της πόλης εγνώρισαν μετά τον Β΄ Παγκόσμιο Πόλεμο την πρώτη δημιουργική περίοδο προστασίας και προβολής τους.

Με την υλοποίηση του τροποποιημένου πολλές φορές λόγω αναγκών και συμφερόντων νεωτέρου ρυμοτομικού σχεδίου της Θεσσαλονίκης άλλαξε και η θέση ορισμένων βυζαντινών μνημείων στον πολεοδομικό ιστό της πόλης. Νέοι δρόμοι ανοίχθηκαν εκεί που δεν υπήρχαν και τα μνημεία άλλοτε χαμένα στον ρεμβασμό της γειτονιάς απετέλεσαν εγωιστικά σημεία αναφοράς, θεατά πανταχόθεν, όπως ο Άγιος Παντελεήμονας, ωσάν η ζωή της πόλης αυτής να περιστρέφεται αποκλειστικά γύρω τους.

Σταθμός στην νεώτερη ιστορία των βυζαντινών μνημείων της Θεσσαλονίκης ήταν ο σεισμός του 1978, ο οποίος προκάλεσε προβλήματα σε πολλά μνημεία της Θεσσαλονίκης. Η Πολιτεία ανέθεσε το τεχνικό έργο της συντήρησης και διάσωσης των μνημείων στην ΥΑΣΒΕ, που προσέλαβε για να ανταπεξέλθει στις πιεστικές ανάγκες πολυπληθές τεχνικό προσωπικό, το οποίο όφειλε να κατευθύνεται από

τεχνικούς, αρχιτέκτονες και μηχανικούς. Οι επεμβάσεις, ωστόσο, ως γνωστόν, στα μνημεία δεν είναι αποκλειστικά τεχνικά έργα και όπου αυτό εφαρμόστηκε είχε αρνητικά αποτελέσματα. Τα μνημεία απαιτούν την αφοσίωση των ανθρώπων και αυτό είναι μία σχέση που χτίζεται μέσα στον χρόνο. Οι αρχιτέκτονες και οι μηχανικοί που στην περίπτωση της Θεσσαλονίκης συνεργάστηκαν με τους αρχαιολόγους της Αρχαιολογικής Υπηρεσίας, δημιούργησαν μια τέτοια σχέση με τα μνημεία, ώστε όσα από αυτά έχουν περατωθή να χαρακτηρίζονται από μία συνέπεια στις αρχές που διέπουν διεθνώς τις αναστηλωτικές εργασίες, και που πρωτίστως είναι ο σεβασμός των μνημείων. Αν θα θέλαμε να χαρακτηρίσουμε την περίοδο μετά τον σεισμό του 1978 θα έλεγα ότι πρόκειται για μία περίοδο "ωριμότητας" στη διάσωση των μνημείων της βυζαντινής Θεσσαλονίκης, κατά την οποία για πρώτη φορά τα μνημεία της, συμπεριλαμβανομένων και αυτών των οθωμανικών και του Επταπυργίου με τη νεώτερη ιστορία του, αντιμετωπίστηκαν ως ένα σύνολο.

Άμεση σχέση με την προβολή των βυζαντινών μνημείων της Θεσσαλονίκης έχει η ίδρυση και η ανέγερση του Μουσείου Βυζαντινού Πολιτισμού στη Θεσσαλονίκη. Πρόκειται για μία υπηρεσία του Υπουργείου Πολιτισμού αφιερωμένη αποκλειστικά στον βυζαντινό πολιτισμό. Τη μακρά και δύσκολη διοικητική και αρχαιολογική μέριμνα για την υλοποίησή του έφερε στο μεγαλύτερο μέρος εις πέρας από τοπικής πλευράς η Έφορος Βυζαντινών Αρχαιοτήτων Θεσσαλονίκης κα Ευτυχία Κουρκουτίδου-Νικολαΐδου.

Στον 21^{ο} αιώνα η ανάγκη επικοινωνίας των ανθρώπων με τις αλήθειες και τις αξίες του παρελθόντος έχει αυξηθή γι' αυτό και οι σχετικοί δίαυλοι χρηματοδοτούνται όσο ποτέ άλλοτε· π.χ. Συμπόσιο με θέμα σαν το σημερινό δεν θα γινόταν ποτέ στο παρελθόν. Συνεπώς σήμερα επανεξετάζονται οι απόψεις περί αποκάλυψης, συντήρησης και αναστήλωσης μνημείων και επιδιώκεται όχι μόνον η διατήρηση της υλικής υπόστασης αλλά και της αυθεντικότητάς των. Η αρχή αυτή αποτελεί εξάλλου επιταγή και του νέου Νόμου 3028/2002 "Για την προστασία των Αρχαιοτήτων και της εν γένει Πολιτιστικής Κληρονομιάς", που είναι ο πλέον εκσυγχρονισμένος αρχαιολογικός νόμος στην Ευρώπη. Ωστόσο σήμερα η διάσωση και η συντήρηση των Αρχαιοτήτων ενίοτε προσμετράται και με τη ροή και την απορροφητικότητα των σχετικών κονδυλίων του Β΄ και Γ΄ Κοινοτικού Πλαισίου Στήριξης και είναι επόμενο

ως εκ τούτου να αμφισβητείται ο ρόλος των αρχαιολόγων, οι οποίοι τείνουν να μειώνουν τον τεχνικό χαρακτήρα των εργασιών διατήρησης των αρχαιοτήτων και να τονίζουν τον εκπαιδευτικό τους χαρακτήρα. Οι αμφισβητήσεις ωστόσο δεν μπορούν να αμαυρώσουν τη δημιουργική δουλειά επί των μνημείων π.χ. της Θεσσαλονίκης δεκαετιών, σχεδόν ενός αιώνος, στην οποία προσπάθησα σήμερα εν συντομία να αναφερθώ· απλώς δημιουργούν πρόσκαιρες εντυπώσεις, κυρίως όμως ένα κενό. Εάν λείψει η ζεστή προσωπική και ανιδιοτελής μέριμνα των αρχαιολόγων τα μνημεία μας υπάρχει κίνδυνος να μετατραπούν σε γραφικά ντεκόρ. Είναι και αυτά σαν τους ανθόκηπους. Θέλουν τον κηπουρό τους. Τα μνημεία δεν διαμαρτύρονται, όταν βλάπτονται ή αδικούνται. Απλώς εκδικούνται με τον δικό τους τρόπο: πεθαίνουν, παύουν να υπάρχουν ως τέτοια και δεν μας συντροφεύουν πλέον όταν θελήσουμε ή αναγκαστούμε να τα αναζητήσουμε.

Αυτό που η Εφορεία Βυζαντινών Αρχαιοτήτων κάνει σήμερα στη Θεσσαλονίκη είναι η διατήρηση των μνημείων και η ενίσχυση της ιστορικότητάς των και του ρόλου τους στην αυτογνωσία των πολιτών και στην αφομοίωση των προσφύγων που τα τελευταία χρόνια έχουν συγκεντρωθή στην πόλη, δικαιολογώντας εκ νέου τον χαρακτηρισμό της από τον Νικηφόρο Γρηγορά ($14^{ος}$ αι.) ως μητροπόλεως.

Τελειώνω με την αφήγηση ενός διδακτικού θαύματος του πολιούχου της Θεσσαλονίκης αγίου Δημητρίου, που σε ολίγους από εσάς ίσως είναι γνωστό: Αναστήλωση του Αγίου Δημητρίου μετά την Κατοχή. Το εργοτάξιο πληρωνόταν κάθε Σάββατο. Το Σάββατο λοιπόν αυτό το ταμείο του Αυτόνομου Οργανισμού για την Αναστήλωση του Αγίου Δημητρίου (ΑΟΝΑΘ) δεν είχε τα χρήματα για να εξοφλήσει το προσωπικό. Η αγωνία του Εφόρου Αρχαιοτήτων μεταφέρθηκε στο μέλος του Διοικητικού Συμβουλίου του Οργανισμού, που από κοντά συμμετείχε στις εργασίες, στον Απαμείας, μετέπειτα Ρόδου, Σπυρίδωνα. Και ο Απαμείας έμεινε σκεπτικός μέσα στο γραφείο του υπό αναστήλωσιν ναού. Ξαφνικά εισέρχεται ο νεωκόρος μεταφέροντας την είδηση ότι η Παναγία θαυμασίως εμφανίστηκε στο τζάμι πόρτας σπιτιού και ότι ο κόσμος συρρέει πανδημεί. Οι καμπάνες του Αγίου Δημητρίου σήμαναν, η πόρτα με το τζάμι μεταφέρθηκε μέσα στον ναό και οι Θεσσαλονικείς με το υστέρημά τους, που κατέθεσαν στην θαυμασίως εμφανισθείσα

εικόνα της Παναγίας, μπόρεσαν να αποπληρώσουν το εβδομαδιάτικο των εργασθέντων μαστόρων και εργατών στην αναστήλωση του ναού του πολιούχου. Η εικόνα αυτή σώζεται και τιμάται έως σήμερα από το πλήρωμα της εκκλησίας αν και ολίγοι ίσως μόνον γνωρίζουν την ιστορία της. Είναι τοποθετημένη στον προθάλαμο του τάφου του αγίου Δημητρίου, αφού για πολλά χρόνια ήταν τοποθετημένη στη δυτική πλευρά του μεσαίου κλίτους, νοτίως του τριβήλου.

Επαναλαμβάνεται το ίδιο θαύμα της αναστήλωσης του ναού του πολιούχου στις αρχές του 7^{ου} αι., όπως αυτό αποτυπώθηκε στις δύο πλευρές του πρώτου νότιου πεσσού, που βλέπουν στο ιερό βήμα της βασιλικής. Στη μία πλευρά απεικονίζεται στο ψηφιδωτό ο φιλόπολις άγιος Δημήτριος να αγκαλιάζει με περισσή οικειότητα από τους ώμους έναν εκκλησιαστικό και έναν κοσμικό άρχοντα, τον αρχιεπίσκοπο Θεσσαλονίκης, που κρατά το Ευαγγέλιο, και τον έπαρχο Θεσσαλονίκης, που κρατά το σακούλι με τα χρήματα. Κάτω η επιγραφή ερμηνεύει: "Κτίστας θεωρείς του πανενδόξου δόμου εκείθεν ένθεν μάρτυρος Δημητρίου / του βάρβαρον κλύδωνα βαρβάρων στόλω(ν) μετατρέποντος κ(αι) πόλιν λυτρουμένου". Στην άλλη πλευρά του ιδίου πεσσού το ψηφιδωτό συνεχίζεται απεικονίζοντας πάλι τον άγιο Δημήτριο να αγκαλιάζει έναν διάκονο, ως εκπρόσωπο των Θεσσαλονικέων και κάτω η επιγραφή να εύχεται "Πανόλβιε του Χριστού μάρτυς φιλόπολις / φροντίδα τίθη και πολιτών και ξένων".

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INTEGRATION OF THE CULTURAL HERITAGE WITHIN THE CITY AS A WHOLE BY REHABILITATION OF HISTORIC BUILDINGS

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Abstract

The sustainable preservation of the Cultural Heritage will be successful if the historic buildings will be in use. This use has to be adequate to the character and the substance of the historic building and part of the living City as well.

It is necessary to preserve the historic buildings not only as museum towns but to integrate into the historic substance the institutions which the contemporary living City really demands.

This premise was the basis for the World Heritage Management of Bamberg to initiate a programme with the target to reuse historic buildings with the most sensible programme. This programme has already mostly been realised:

- ☐ the old hospital became a hotel
- ☐ the old fire-house and the old slaughter-house became part of the university
- ☐ the old power-station became an adult educational centre
- ☐ an old hop-storehouse became apartments
- ☐ an old hotel became the city-library
- ☐ etc.

This programme evoked some important results for the World Heritage:

- ☐ all these institutions are still in the City centre
- ☐ money, land and building-material have been spared be using existing buildings
- ☐ the identification with the City centre and its buildings is extraordinary high

The City of Bamberg is convinced that this programme has initial effects for the management of other World Heritage Cities as well.

The Site

The City of Bamberg is situated in Franconia in the north of Bavaria. Bamberg has about 70.000 inhabitants. The old town of Bamberg in a size of about 150 hectares is listed as World Heritage since 1993. The main reason for the inscription was that the plan of the old town of Bamberg represents until today an early mediaeval structure.

The World Heritage is surrounded by a buffer-zone of 275 hectares. World Heritage and buffer-zone together cover an area of 425 hectares which is protected by The Bavarian Preservation Of Monuments Act.

In this "ensemble" are approximately 2000 buildings individually listed.
In the old town is still one third of the population of Bamberg living.

The Urban Redevelopment Project

Around 1970 the situation of the old town was extraordinary critical:
The increasing expansion of retail outlets began to endanger the historical buildings. The considerable increase in traffic caused the inhabitants quality of life to fall. This in turn slowed down the readiness to invest. Urgent redevelopment came to a halt. As a result of this vicious circle more and more buildings were threatened with demolition.

In view of this situation the council of Bamberg together with the "Working party for the redevelopment of the town" conducted extensive research aimed at preserving the old town. One of the central results was a programme for the reuse of historic buildings.

The Use of Old Buildings

Although the main constitutional reason for the World Heritage inscription was the structure of the town plan this structure can not be kept without preserving the buildings which are forming this plan. Though most buildings in the old town are younger than early mediaeval they all have to be preserved to protect the World Heritage Site. This premise is quite typical for many World Heritage Cities.

The sustainable preservation of the Cultural Heritage will be successful if the historic buildings will be in use. This use has to be adequate to the character and the substance of the historic building.

The sensible use of a building protects it not only in a technical way but also in an economic way. So the maintenance of old buildings is not only a question of money but also a question of uses. To find the optimal use for every old building requires creativity. Creativity is existing world-wide and it is not expensive. It is one of the keys for the protection of World Heritage Cities.

The Living City and its Demands

The use of the old buildings has to be adequate not only to the character and the substance of the historic building but has to be part of the living City as well.

It is necessary to preserve the historic buildings not only as museum towns but to integrate into the historic substance the institutions which the contemporary living City really demands.

The Examples from Bamberg

This premise was the basis for the Urban Redevelopment Project and later for the World Heritage Management of Bamberg to initiate a programme with the target to reuse historic buildings with the most sensible programme. This programme has already mostly been realised:

- one building of the old general-hospital became a hotel
- one building of the old general-hospital became the town archives
- the old slaughter-house became part of the university
- the old fire-house became part of the university
- the old women-hospital became part of the university
- the old power-station became an adult educational centre
- an old hop-storehouse became apartments
- some old mills became a students home
- an old harbour-storehouse became a further education centre
- an old hotel became the city-library
- an old church became an auditory for the university
- the old town archives became a home for elderly people
- an old grain-storehouse became a mixture of fitness centre, arts studio, offices and apartments
- an old monastery became a home for elderly people
- the former military hospital was turned into a building for administration
- an old textile factory will be reused as synagogue
- an old car repair garage will be reused as manufactory for cakes and ice-cream

If one sees these results one has to say that they have been realised quite often on a very high and expensive level. But this high level is just representing the level of completely new buildings for the same use in the same period in Germany. Of course one could have created these projects with less money on a lower level as well. The central key was always the idea for a sustainable use of a building.

Figure 1: An old hotel became the city-library

Figure 2: The old fire-house became part of the university

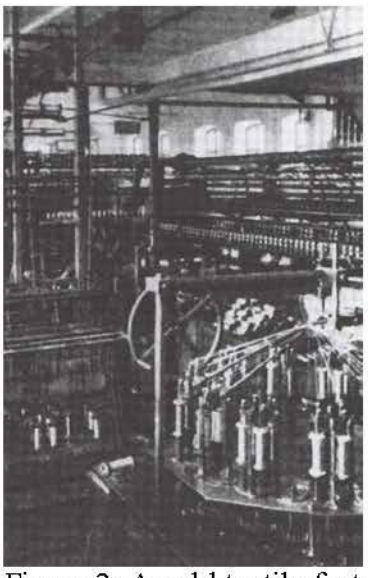
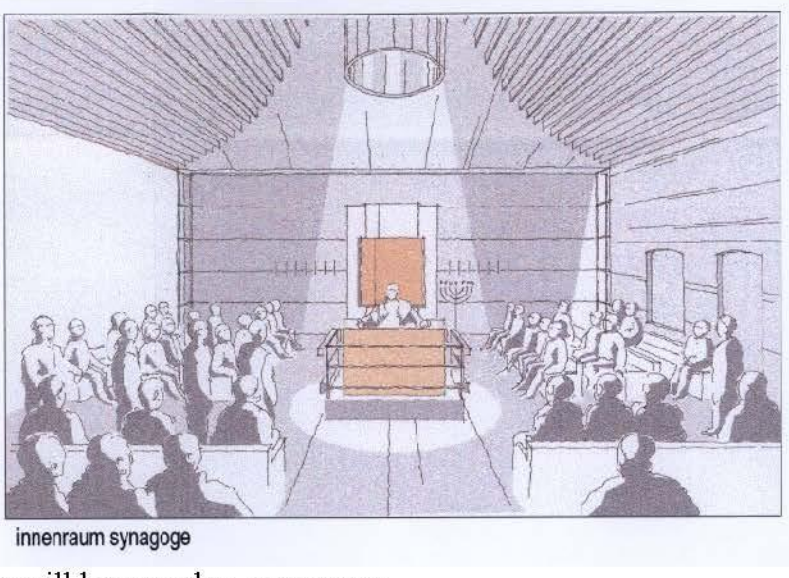

Figure 3: An old textile factory will be reused as synagogue

Figure 4: Hotel in the former hospital and offices in an old grain-storehouse

The Results of the Programme

Apart from preserving many historic buildings from different periods the programme caused some other advantages:

- building-material has been spared be using existing buildings
- sparing building-material meant less energy consumption
- producing less building rubble relieved the waste disposal site
- Because all the institutions in these buildings are in the City centre there is a lot of life in the City
- Life in the City helps to protect the World Heritage
- Institutions in the City centre can be easily reached by public transport, bike or walking. So it has been avoided to provoke new car traffic which would endanger the World Heritage.

So the programme is not only successful in preserving the site but also exemplary sustainable. Protecting the Cultural Heritage protects also the natural resources. This is closely related to the idea of the World Heritage Convention that cultural and natural resources of the World are worth to be protected.

The Results for the City as a whole

The integration of all these uses into existing buildings caused that less land for the erecting of new buildings has been needed. So the World Heritage Management is an integrated part of the sustainable urban and land use planning.

Because so many destinations for all people are in the City centre the identification with the World Heritage and its old buildings is extraordinary high. Even people from the surrounding towns and villages, who are not living in Bamberg in the juridical way, feel as part of the World Heritage.

As result one can say that the development of the World Heritage is integrated part within the development of the City as a whole.

Problems and Perspectives

Most mentioned projects depended on public subsidies. The current situation is characterised by the expectation that the subsidies will decline within the next years. In this situation it will important to review the standards in order to realize as many projects as possible.

Another problem is the economical relation between the historic City and the surrounding villages and towns. Here Bamberg started a pilot project of intermunicipal cooperation. One has to see whether this young strategy will be successful in reaching its targets.

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ORGANISATION DES

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RHODES GRECE.

DOCUMENT COMPLET

POUR UNE NOUVELLE DYNAMIQUE URBAINE EN MEDINA DE MARRAKECH MAROC

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INTRODUCTION

La Medina de Marrakech a hérité d'ensembles historiques d'une valeur architecturale et d'une dimension culturelle inestimable.

Surdensifiée, paupérisée, désorganisée, elle se dégrade, se marginalise. Elle est perçue aujourd'hui comme un espace lourd de signification. C'est un symbole, un enjeu, un héritage à la fois enrichissant au niveau du patrimoine et embarrassant au niveau de l'aménagement.

Les problèmes identifiés sont énormes. La dégradation est arrivée à son point culminant. Les problèmes liés à la paupérisation ainsi que les problèmes de circulation, d'organisation de l'espace se font ressentir avec force.

Aujourd'hui une lueur d'espoir est née grâce aux différentes actions entreprises par les services de l'Etat, la collectivité, le mécénat ainsi que le privé.

Cette lueur d'espoir n'est que le fruit d'une volonté politique qui commence à mettre en place des assises d'une intervention en matière de sauvegarde.

Malheureusement, une multitude d'actions ne retrouvent pas le cadre adéquat, ni l'environnement favorable ni le cadre institutionnel pour s'investir.

Ces actions, par l'intermédiaire de circuits divers ont pu aboutir à des résultats satisfaisants permettant à certains biens du patrimoine de retrouver leur vivacité initiale et d'éliminer les nombreux facteurs qui aggravent le processus de la dégradation.

Dans un premier temps, j'essaierai de mettre en évidence les carences de la gestion du patrimoine, les efforts considérables fournis dans le cadre de la sauvegarde ainsi que le vide ressenti par l'absence d'une structure officielle, indépendante, responsable du patrimoine qui permettra de donner une identité patrimoniale aux déférents bâtiments et de les sortir de l'anonymat, de créer le cadre permettant aux entreprises d'investir une part de leurs bénéfices dans la sauvegarde et y trouver avantage, de favoriser le mécénat par déduction d'impôt, d'encourager les promoteurs privés par des subventions et des exemptions fiscales, de réaffecter les monuments de quartier à des activités socio-culturelles ou économiques adaptées à leur structure et contribuant à leur revalorisation, de coordonner l'ensemble des actions en matière de réhabilitation, d'instaurer le cadre juridique approprié. Bref de mettre en place une politique de gestion du patrimoine au vrai sens du terme.

Dans un deuxième temps, des éléments de réponses à la thématique du colloque seront apporté à savoir : peut-on qualifier le patrimoine de la Medina de Marrakech de vivant ? Les réponses apportées ne sont pas exhaustives, mais elles permettent de démontrer comment des biens du patrimoine de la Medina reprennent vie, de confirmer la prise de conscience des pouvoirs publics, de la collectivité, du privé, des habitants qui se manifeste à travers les différentes actions de sauvegarde.

Des efforts considérables dans le sens de la restauration, de la réhabilitation ainsi que dans les projets de revalorisation urbaine sont relevés, malheureusement le chantier est immense, le phénomène de la dégradation prend beaucoup d'ampleur, d'où la nécessité de sensibiliser d'avantage, les différents partenaires et responsables à la problématique de la sauvegarde.

Une politique de gestion du patrimoine ?

La Medina fait l'objet de plusieurs études, projets et actions, ayant pour objectif premier la préservation du patrimoine ainsi que l'amélioration des conditions de vie au sein du tissu ancien. Ces initiatives sont d'ordre :

1/ * Etatique à travers les services extérieurs de l'Etat : le ministère des affaires culturelles (Palais restaurés et convertis en espace culturel).

2/ * Royale : Feu Hassan II (Roi du MAROC) avait ordonné la restauration de plusieurs sanctuaires et mosquées ainsi que la commande de documents d'urbanisme relatifs à la Medina. Ex : Le mausolée Sidi Bel Abbes.

3/ * Communale : Programme de restauration de la voirie ainsi que des projets d'aménagement d'espaces publics, avec une participation dans les travaux de restauration des remparts et leurs abords.

4/ * Mécènes : Aménagement de Musées et galeries d'art.

5/ * Habitants : Logements restaurés grâce aux opérations de réhabilitation.

Les services extérieurs à travers la régie de distribution d'eau et d'électricité, responsable de la gestion des trois réseaux assainissement, eau potable et électricité participe à son tour à la sauvegarde du tissu ancien. Cette participation se manifeste à travers les actions de réhabilitation des différents réseaux.

*** Assainissement :**

Le réseau est confronté à plusieurs problèmes :

- Tracé parfois trop sinueux des collecteurs avec des changements de direction à angle obtus.
- Les colmatages fréquents du réseau. - Les infiltrations latérales et en profondeur des eaux usées.

Conscient de la gravité de ces problèmes, les pouvoirs publics en collaboration avec la régie responsable de la gestion du réseau ménagent des efforts considérables pour réaliser les recommandations de l'étude d'assainissement réalisée en 1992 par un bureau d'étude spécialisé. Ainsi des opérations sont en cours pour la réhabilitation du réseau en vue d'éliminer les causes du dysfonctionnement constatées, d'améliorer les conditions d'évacuation des eaux pluviales et de généraliser le branchement à l'égout public pour l'ensemble des habitations de la Medina.

*** Eau potable :**

La régie assure la distribution de l'eau potable à l'intérieur du tissu ancien avec un réseau de 130 Km desservant à peu près 30.000 abonnés soit un taux de raccordement d'environ 85 %.

La distribution connaît les problèmes suivants :

- Des fuites d'eau causant des dégâts pour les habitations.
- Des chuttes de pression dues aux fuites et au manque d'altitude du réservoir actuel.

Des opérations sont en cours pour améliorer le réseau. La généralisation de la distribution se fait

progressivement grâce à des mesures incitatives de la régie aux familles à faibles revenus (branchement social).

*** Electricité :**

Malgré les efforts fournis par la régie pour satisfaire les besoins des habitants de la Medina, le réseau électrique connaît plusieurs carences :

- Le taux de branchement : Une enquête réalisée par la régie démontre que 7 à 10 % des habitants de la Medina ne bénéficient pas de l'électricité à domicile.
- Des chuttes de tension duent à l'éloignement des postes de transformation et à l'accroissement de la demande en énergie électrique notamment pendant les heures de pointe. Des travaux sont en cours pour le renforcement du réseau malgré les contraintes physiques à son extension.

*** La voirie**

Le réseau de voirie est caractérisé par :

- Une absence d'homogénéité : certaines voies se rétrécissent d'une manière brusque.
- Des voies sont trop dégradées dans les vieux quartiers (voies non revêtues).
- Accessibilité : La majorité des voies sont étroites, elles varient entre 2.5 et 12 m. Certains quartiers sont inaccessibles.
- Des voies sont embouteillées par les piétons. La circulation automobile devient difficile lorsqu'il s'agit de voies commerçantes.
- Stationnement : La carence en aires de stationnement devient un grand problème pour la Medina notamment dans le centre commercial de la ville.

La commune responsable de la gestion du réseau est en train de réaliser un programme de voirie qui consiste à :

- Goudronner les voies très dégradées (priorité aux voies de quartiers historiques centraux).
- Aménagement des aires de stationnement. - Elargissement de certaines voies pénétrantes.

Un projet d'étude est en cours de préparation concernant l'organisation de l'accessibilité, la héarchisation des voies visant l'instauration d'une réglementation rigoureuse qui permettra d'organiser la circulation en sachant que celle ci est actuellement caractérisée par un encombrement interne causé par les différentes circulations piétonnes, véhicules privées, transports en communs, charrues, motocyclettes et autres.

❖ Documents d'urbanisme :

Trois projets de documents d'urbanisme sont en cours d'élaboration :

1. Le plan d'aménagement. 2. Le plan de gestion de la Medina.
3. L'étude architecturale et plan de sauvegarde.

A l'initiative du conseil municipal, un plan d'aménagement est en cours de réalisation par un cabinet d'architecte. Ses objectifs principaux qui s'inscrivent dans le cadre d'une stratégie à long terme (horizon

2010) peuvent être résumés comme suit :

- Faire le diagnostic des données relatives aux composantes du tissu ancien.
- Mettre en place une nouvelle organisation de l'espace en fonction des nouveaux besoins de la population (cohérence).
- Définir un parti d'aménagement le plus approprié au patrimoine architectural et culturel de la Medina.
- Encourager la réhabilitation des monuments à forte valeur architecturale et symbolique.

Lors d'une discussion avec l'équipe responsable de la confection de ce document, un certain nombres de recommandations peuvent être relevées, ainsi que le souhait de réservation d'un budget assez important pour la réalisation de ce document. Les recommandations principales se résument comme suit :

- Etablissement d'un cahier de prescriptions architecturales (CPA) avec des normes locales d'intervention sur le patrimoine pour maîtriser toute intervention sur les composantes urbaines.
- Instaurer un système d'encouragement aux particuliers désirant restaurer leurs biens.

Un deuxième document d'urbanisme financé par la commune est en cours d'élaboration (phase finale). Il est intitulé : Etude architecturale et plan de sauvegarde. Cette étude s'est fixé de traiter les points suivants :

- La politique du développement économique et touristique. Elle propose la réhabilitation de certains secteurs économiques et la mise en œuvre d'une nouvelle stratégie du foncier par la mise à disposition par la collectivité de nouveaux outils juridiques et institutionnels.
- La pauvreté urbaine : Lutter contre ce fléau qui fait qu'une frange de la population ne peut accéder à un cadre de vie sain et équilibré.
- La sauvegarde des composantes du patrimoine historique, architectural urbanistique et environnemental.

Ce document s'est fixé comme priorités les éléments suivants :

- La lutte contre l'habitat insalubre.
- L'intégration de nouveaux équipements collectifs dans certains quartiers défavorisés.
- L'introduction de mesures d'incitation à fin d'améliorer la qualité des différentes interventions sur le cadre bâti.

Le troisième document initié par l'inspection des monuments historiques sous la tutelle du ministère des affaires culturelles, intitulé "plan de gestion de la Medina" est en cours d'élaboration (phase finale). Son objectif est de coordonner les différents projets et actions dans une perspective de sauvegarde dynamique.

A travers la lecture de l'exposé des différentes études relatives à la sauvegarde, une réflexion s'impose à savoir : Une grande volonté de la part des pouvoirs publics et de la collectivité de sauvegarder le patrimoine accompagné d'une absence de coordination dans les actions. Cette volonté se traduit d'une part par le fait que les principaux monuments historiques font l'objet de restauration soit directement par le ministère des affaires culturelles soit part des mécènes privés. Parallèlement on assiste au développement d'un mouvement de réhabilitation des logements en ruine par les particuliers

essentiellement des étrangers ou riches nationaux et leur reconversion en maison d'hôtes. Ce phénomène qui prend de l'ampleur, contribue à la réhabilitation du patrimoine bâti et produit des effets positifs sur l'emploi : la préservation de certains métiers traditionnels dans le bâtiment. Il nécessite néanmoins un encadrement par une réglementation appropriée pour préserver l'identité de la Medina et gérer d'une manière intelligente la cohabitation des fonctions des usagers et des pratiques sociales et culturelles.

Un patrimoine vivant ?

Quelles preuves peut-on avancer pour démontrer un tel phénomène ?

Lectures, visites, approches, contacts, constats, veçu à travers le temps, depuis ma naissance dans cette ville sont les moyens, les outils qui m'ont permis d'apporter ces quelques éléments de réponse.

*** La dédensification**

Le dernier recensement de 1994 à mis en évidence l'apparition du processus de dédensification de la Medina. Un espace qui se débarrasse du poids lourd de la croissance démographique. Ce phénomène concerne l'ensemble des quartiers.

Trois hypothèses peuvent être avancées sur les causes de ce phénomène :

- La Medina est arrivé à son point de saturation, elle ne peut plus acceuillir davantage d'habitants.
- La politique d'habitat social ainsi que la lutte contre l'habitat insalubre suivi ces dernières années ont attiré une population importante de la Medina vers les nouveaux lotissements de l'Etat situé dans la périphérie de la ville.
- L'achat des maisons par les étrangers a provoqué une spéculation foncière dans les quartiers historiques.

En dépit de la baisse (observée) de la population, le poids démographique de la Medina reste très important. Elle enregistre la densité la plus importante du pays.

*** La hausse du prix du m^2 de terrain en Medina**

Aujourd'hui le marché foncier dans le tissu urbain de la Medina est caractérisé par une grande spéculation. Les propriétaires des maisons ne résistent plus à l'offre d'une clientèle étrangère qui accepte de doubler, tripler voir même quadrupler le prix des maisons.

Cette hausse a permis d'une part l'arrivée d'une clientèle particulière (Etrangers – riches nationaux) qui génère une nouvelle dynamique urbaine, d'autre part le départ d'une population importante soit ne pouvant plus suivre le rythme d'une telle mobilité soit intéressé par l'offre des prix.

*** Un bouleversement profond du paysage social**

La surdensification, le morcellement des maisons, la transformation des Foundouks en habitat ou en lieu de travail, la prolifération des commerces au sein des quartiers résidentiels n'ont pas été sans conséquences sur la structure sociale de la Medina.

Le tissu urbain ou s'est développé une nouvelle organisation économique et sociale a fait l'objet au cours des dernières décennies de profondes mutations sociales. L'exode rural massif qu'a entraîné la

paupérisation des campagnes était à l'origine d'une grande concentration d'habitants dans les anciens quartiers de la Medina.

Aujourd'hui avec l'amélioration du cadre de vie et l'élimination en partie d'un certain nombre de contraintes, font qu'une frange nouvelle de population (aisée) arrive, tandis que beaucoup de familles à revenu faible ont tendance à quitter la Medina, elles se sont dessaisies de leur logement à des prix relativement intéressants pour regagner un habitat dans la périphérie de la ville. L'arrivé d'une nouvelle population (en partie étrangère) aisée ainsi que le départ d'une partie des habitants les plus démunis vont permettrent, malgré le poids démographique, à la Medina de reprendre d'une part sa position centrale dans le fonctionnement de la cité comme centre d'animation et point de convergence des trafics et déplacements, d'autre part de lutter contre les difficultés multiples qui touchent au cadre bâti, aux activités et à son mode de fonctionnement.

*** L'artisanat : Une activité chargée d'histoire**

A travers la lecture de la cité, un élément important occupe une place prépondérante dans l'organisation de l'espace. Non seulement il nourrit le circuit de l'économie marchande mais commande la composition urbaine, l'architecture des quartiers et des rues.

Aujourd'hui plusieurs indices font apparaître l'importance de ce secteur dans la vie de la cité :

- Le nombre d'habitant qu'il entretien (10% population urbaine).
- Une grande contribution aux finances publiques et au développement des activités d'exportation.

La ville toute entière lui paraît redevable d'une grande part de sa richesse et de son opulence.

Si la Medina continue actuellement à être attractive pour le tourisme local et international, elle le doit en partie à la richesse de son artisanat. Ce dernier, dans la mesure ou il véhicule des techniques ancestrales et un savoir-faire millénaire mérite un vaste programme de sauvegarde pour le faire figurer parmi le patrimoine universel de l'humanité.

A noter qu'un certain nombre d'ateliers d'artisanat suscitent beaucoup d'intérêt de la part des archéologues, dont la valeur architecturale n'est pas inestimable,

*** Des actions de mise en valeur urbanistique**

Il y a dans toute composition urbaine l'idée "d'urbanité", d'adaptation de l'espace de vie aux besoins des hommes et du bonheur de vivre. La Medina à connu dans ce sens, dans la dernière décennie un nombre considérable d'actions qui ont permis de redonner à la cité l'ancienne appellation AL BAHJA, la cité de la vie heureuse : Des actions entreprises par la collectivité qui s'inscrivent autour de plusieurs axes d'intervention dans l'espace urbain, tels :

- L'embellissement des rues et des ruelles.
- L'aménagement des places et placettes.
- Les opérations de revêtement des voies.
- L'amélioration de l'éclairage public.
- La réinjection d'équipements socio-éducatifs dans les quartiers sous équipés.

- L'action sur les jardins historiques.
- L'amélioration de la collecte des déchets solides ainsi que des actions spécifiques visant l'amélioration de l'environnement qui permettent de lutter contre la prolifération des points noirs alimentés non seulement par les ordures ménagères mais également par les dépôts de gravas provenant des maisons en ruine.
- Les opérations de pavage des rues et ruelles permettant la revalorisation des espaces publics.
- La mise à des normes satisfaisantes des différents VRD et de l'ensemble des équipements socio-éducatifs.

Toutes ces actions font aujourd'hui de la Medina un espace vivant, dynamique et qui continue à évoluer en s'adaptant à une conjoncture économique de plus en plus difficile. Ces initiatives communales sont complétées par les actions des services externes de l'Etat, du privée et des habitants. L'exemple de certains équipements dont la fonction se limitait au seul rôle religieux ou s'est éteinte complètement, et que rien ne les à remplacé, se voient aujourd'hui attribué le rôle d'animation, de gestion, et de maintenance.

D'autres exemples peuvent être cités :

- La réhabilitation d'un ou deux foundouks. Il en existe 140 occupés d'une manière mixte, artisans et familles se côtoient sur un espace exigu. Cette action a permis leur dédensification et l'installation d'équipements tels W.C, salle d'eau et cuisine.
- Les actions de sensibilisation et d'animation culturelle entrepris par le ministère des affaires culturelles ont permis de sensibiliser les habitants à prendre en charge les actions d'embellissement, notamment la restauration des façades qui doivent être impérativement débarrassées de toutes canalisation apparente, de tyauterie, de tout genre de filerie, de panneaux publicitaires, de câbles aériens ou autres.

L'installation de musée d'art dans des palais, la transformation d'anciennes résidences royales en monument historiques, des maisons particulières qui abritent des collections privées, la protection de petits biens culturels en perpétuel danger devant une spéculation sauvage difficilement contrôlable, font de la Medina de Marrakech un espace qui reste entouré de légendes depuis des siècles mais…

*** Des opérations de restauration et de revalorisation urbanistique en cours :**

En dehors d'une politique de sauvegarde, en absence d'une étude complète (historique, technique, architectural et structurel) sur les bâtiments à restaurer, d'un repère graphique de toutes les richesses existantes et compte tenu de la multitude des monuments et bâtiments présentant une grande valeur architecturale qui sont aujourd'hui en état de dégradation, certains opérations de restauration sont en cours faisant l'objet d'action prioritaire visant a privilégié certains monuments à restaurer compte tenu de leur état très dégradé, nécessitant une urgence d'intervention.

Action sur les portes :

Les portes monumentales sont des repères urbains très importants. Ils permettent de marquer un

territoire, une distance, une limite. Elles ont joué un rôle décisif dans le passé. L'histoire atteste que plusieurs portes ont été infranchissables. Certaines parmis elles sont en cours de restauration :

- **BAB EL KHMIS (la porte du jeudi)**

Etat de dégradation : Dégradation des enduits et des soubassements des murs, les merlons en ruine ainsi que des éléments de structures sont dégradés.

Ce projet est financé par la région. Coût du projet : 400.000 DH. (1 Euro = 10 DH)

- **BAB DBAGH (la porte des tanneurs)**

Etat de dégradation : des éléments de décors sont dégradés ainsi que des éléments de structure. Le projet est financé par un mécène. Coût du projet : 300.000 DH.

- **BAB GUMAT (la porte de la cité des fondateurs)**

Etat de dégradation : Porte en bois très dégradée, dégradation de la structure, du décor de la façade et des enduits avec la perdition de sa fonction. Le projet est financé par la région. Coût du projet : 300.000 DH.

- **BAB EL KASBA (La porte de la cité princière)**

L'Etat de dégradation : Dégradation des tuiles, des enduits et du décor des façades. Ce projet est financé par un mécène. Coût du projet : 60.000 DH.

- **BAB AGNAOU**

L'Etat de dégradation : Dégradation des revêtements de la façade.

Le projet est financé par un mécène. Coût du projet 300.000 DH.

Les fontaines font aussi l'objet de restauration :

- La fontaine CHREB OU CHOUF (Bois et regarde)

L'Etat de dégradation : Usure et vieillissement au niveau des revêtements de surface, les éléments de sculture en bois sont détériorés. Le projet est financé par une fondation étrangère : La fondation ARCH. Coût du projet : 300.000 DHS.

- La fontaine BAB DOUKKALA

L'Etat de dégradation : Dégradation du plâtre, du bois et des enduits. Le projet est financé par un mécène. Coût du projet : 300.000 DH.

- La fontaine Sidi Ben Slimane

L'Etat de dégradation : le bois est très dégradé, le plâtre est détérioré, les Zelliges sont dégradés.

Le projet est financé par un mécène. Coût de projet : 60.000 DH.

- Projet du complexe Ben Youssef

L'objectif de ce projet est de redonner à la place une dimension sociale et culturelle, de faire des recherches archéologiques et de restructurer la zone artisanale. Le projet est financé par la communauté urbaine avec l'aide d'un mécène. Coût du projet : 10.000.000 DH.

- Projet d'aménagement des abords des remparts

L'objectif du projet est de créer de grands espaces de promenade, des espaces verts et de restaurer les parties dégradées des remparts. Le projet est financé par la communauté urbaine avec l'aide de

promoteurs privés. Coût du projet : 3.000.000 DH.

- Projet d'aménagement de l'environnement historique de la Koutoubia

L'objectif de ce projet est d'intégrer la Koutoubia à un environnement plus adapté par une liaison piétonne avec la place Jmaa El Fna. Le projet est financé par la collectivité. Coût du projet : 5.000.000 DH.

- Projet de restructuration des activités dans le Souk

L'objectif de ce projet est d'organiser les activités par secteurs et les regrouper par spécialités.
Le projet est financé par la collectivité avec l'aide de mécène.

- Projet de mise en valeur de la place JMAA EL FNA

L'objectif de ce projet est de la mise en valeur de la place avec la restauration des façades, un revêtement adapté au style ancien, l'agrandissement des accès au souk, le déplacement d'activités non appropriées à la place en les remplaçant par des activités de loisires. Le projet est financé par la collectivité. Coût du projet : 6.000.000 DH.

- Projet de réhabilitation de la zone hôteliere de Sidi Boulouquat.

L'objectif du projet est de réhabiliter les hôtels très dégradés et de mettre en valeur les rues et les façades. Le projet viserait à encourager les promoteurs immobiliers marocains à investir dans les maisons d'hôtes qui sont monopolisés aujourd'hui par les étrangers. Le projet est financé par le ministère du tourisme et des promoteurs privés. Coût du projet : 30.000.000DH.

- Projet de restructuration du secteur artisanal de Sidi Bou Dchich

L'objectif du projet est de restructurer l'espace artisanal de manière à mettre de l'ordre et à rentabiliser les espaces. Le projet est financé par la collectivité, les artisans ainsi que des promoteurs et mécènes.
Coût du projet : 20.000.000 DH.

- Projet de réhabilitation du secteur des tanneries

L'objectif du projet est la mise en valeur et la réhabilitation du quartier des tanneurs.
(Assainissement / revêtement des voies).
Le projet est financé par la collectivité. Coût du projet : 25.000.000 DH

- Projet de restructuration d'un noyau historique et création d'un marché de légumes
  (AZBEZT - Sidi Ishak)

L'objectif de ce projet est de réorganiser les activités de commerces ambulants qui créent un véritable goulot d'étranglement ainsi que la mise en valeur d'un noyau historique très ancien et la création d'un marché de légumes. Le projet est financé par la collectivité. Coût du projet : 1.000.000 DH.
Tous ces projets pouvaient faire l'objet d'un programme de restauration, de revalorisation de l'espace urbain de la Medina, initié par une politique de gestion du patrimoine.

Conclusion : - Un patrimoine vivant mais souffrant

Les opérations de restauration sont aujourd'hui très complexe dans un tissu urbain en mutations permanentes, ou règne insalubrité et pauvreté, d'une importante étendue 640 hectares, composé d'entités urbaines possédant chacune des caractéristiques spécifiques en fonction de leur situation, de leur histoire et des fonctions urbaines qu'elles remplissent.

On ne peut pas nier les efforts considérables entrepris dans les actions de sauvegarde de la part des autorités locales, de la collectivité, du privé, des habitants, malgré les différentes contraintes foncières, financières, législatives et sociales. Cela à permis de donner aux biens du patrimoine valeur et vivacité. Mais en absence d'une coordination dans les interventions sur le plan technique, financier, et organisationnel, les résultats s'avèrent peu concluants. Car aujourd'hui les opérations de sauvegarde ne disposent pas d'outils opérationnels et institutionnels ni au niveau local ni au niveau national. Elles nécessitent des moyens financiers importants d'une part, d'autre part elles demandent une grande technicité de manière à réinstaurer l'aspect original de l'œuvre.

La réhabilitation de certains bâtiments jadis sans fonction, les actions d'intégration de nouveaux équipements collectifs pour réanimer certains quartiers défavorisés, la lutte contre les guettos dans les foundouks et demeures anciennes, les actions de redynamiser les secteurs d'activités artisanal et touristique, la libéralisation de bâtiment à haute valeur architectural grâce à une stratégie financière appropriée, la création de cellule technique pouvant fournir une assistance technique au niveau de la restauration, la participation à l'échange internationale pour profiter des expériences et assurer la formation des cadres spécialisés, l'inscription dans les programmes de soutien aux villes historiques des organismes internationaux, tout cela doit s'inscrire dans un organigramme de circuit décisionnel accompagné de la mise en place d'une entité indépendante de gestion du patrimoine. Cette entité aura pour rôle premier de définir une politique de sauvegarde de la Medina, lui permettant son intégration aux nouvelles exigences socio-économiques nationales et internationales, ainsi qu'une meilleure intégration du patrimoine aux projets de développement local et régional.

Reste la solution du problème spécifique de l'habitat, composante essentielle du tissu urbain ancien. Elle doit s'engager dans les voies suivantes : Ne plus penser le problème du logement uniquement d'un point de vue technique et pragmatique, mais aussi dans sa dimension humaine et sociale. Elle doit s'inscrire dans le cadre d'une stratégie d'ensemble de lutte contre l'habitat insalubre. Elle doit s'inspirer des expériences en cours dans d'autres villes au Maroc ou ailleurs.

CHARACTERIZATION AND PROTECTION OF ANCIENT GLASSES

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Glasses, as other materials, can become altered and ruined after hundred and hundred of years of weather facing. When the glass surfaces are in contact with acidic solutions, like acid rains, a reaction called *leaching reaction* can take place. The result is the migration of alkaline and alkaline-earth elements outside the glass with the formation of a silica rich layer. Basic solutions can destroy the entire silica glass network and reduce the thickness of the ancient glass windows. Microorganisms can ruin the glass windows, too. These and many other phenomena are investigated and studied.

A coating to protect glasses has been checked and the first results are encouraging. It consists in the application of a thin film of silica obtained by sol-gel method. It works well with unaltered soda-lime glasses and it is under test on other kind of modern and ancient glasses. However there are several problems in course of study, i.e. the cleaning procedure necessary to adhere the film to the glass, which must be tailored in relation to state and composition of the glass; monitoring the ion migration, which depends on the glass composition and health. To solve these problems an exhaustive characterization of the glass, before the restoration, and tailored cleaning and coating procedures, in relation to the glass composition, are necessary.

§ 1. Introduction

The glass artworks and windows, as many other materials, can be altered and ruined after hundred and hundred of years of weather facing. The surface layer is undoubtedly the first altered part of an ancient glass by chemical and physical agents because it is just the interface between the glass and the external environment. When the glass is in contact with lightly basic or acidic solutions (pH<9) a reaction called *leaching reaction* can take place [1-4]. The result is the migration of alkaline and alkaline-earth elements outside the glass with the formation of a hydrated silica layer. Basic solutions (pH>9) can destroy the whole silica network and reduce the thickness of the ancient glass windows. The extreme consequence of acid rains is the formation of weathering products like carbonates, syngenite ($K_2SO_4 \bullet CaSO_4 \bullet H_2O$) or gypsum ($CaSO_4 \bullet 2H_2O$) [5-6]. Microorganisms can ruin the glass windows, too [7].

To avoid these phenomena a coating to protect glasses has been checked. In the past many organic acrylic polymers have been used, but the results were not always very good, because those organic polymers may degrade under ultraviolet light and become yellowish [6]. Better results have been obtained by the ORMOCER films [8-10] but they always contain organic chains and may not be completely compatible with the glass matrix.

For this reason, silica inorganic coatings, obtained by the sol-gel method, has been used to protect ancient coloured glasses.

§ 2. Experimental

§2.1 The samples

The samples used for this study are glass samples coming from a window of S. Chiara's church in Vicenza (Italy). They have been dated in the XVI-XVII century. They present a blue colour. They do not have many flaking altered layers, like Roman or early-Medieval glasses [11-12], but their surface seems not too ruined.

§ 2.2 Sample characterisation

Before and after film coating the samples have been characterised by optical reflection microscopy (Jena Jenavert with optical equipments Carl Zeiss), AFM, Atomic Force Microscopy (Autoprobe CP by Park Scientific Instruments at constant force of about 1-2 nN), XPS, X-ray Photoelectron Spectroscopy (Perkin Elmer Φ5600 ci) [13], Ultra Violet and Visible light spectrophotometry (Cary 5E UV-VIS-NIR double beam spectrophotometer), SIMS, Secondary Ions Mass Spectrometry (a custom-built instrument described elsewhere [14] was used).

§ 2.3 Cleaning procedure

To consent a good adhesion of the thin silica film to the silicatic glass substrate, it is necessary to clean the samples until the carbon due to contamination, detectable by XPS, reaches values lower than 30% (atomic abundance) [13].

After many tests the better cleaning procedure, utilised in the present work, is the following:

1) Vapour jet exposition at P= 3 bar, T= 120°C for 15 minutes.
2) Washing with liquid soap diluted in deionising water.
3) Rinsing with abundance of deionised water to eliminate eventual detergent residuals.
4) Dipping in isopropyl alcohol for 10-15 seconds
5) The 2nd, 3rd and 4th points were repeated 10 times and final air-drying.

§ 2.4 Film synthesis and deposition

A solution of precursors has been prepared with the following volumes: TEOS (tetraethoxysilane, $[Si(OC_2H_5)_4]$) 3.5 ml, ethanol (C_2H_5OH) 9.4 ml, deionising water (H_2O milliQ) 0.9 ml and hydrochloric acid (HCl) 17 µl, as described in literature [13, 15]. It was kept onto a closed bottle at ambient temperature and pressure for 9 days.

Then the glass samples were dipped at constant rate by a dipper at ambient temperature and pressure. Finally they have been left in a box for 2 days to consent the film densification.

§ 2.5 Weathering procedure

The samples, after the precedent treatments, were hanged on a wire by metallic pincers. To avoid the direct contact with the metallic pincers, some pieces of parafilm, commonly used to close beakers in chemical laboratories, have been utilised.

The wire with the samples was bound on an external wall exposed to northwest side. By this way the samples were exposed to rains, outside humidity, smog and pollution, just the same climatic environment typical of church's windows.

Not covered samples were hanged on the same wire, too, for comparison. Finally the covered and uncovered samples were analysed after one month and subsequently after two years.

§ 3. Results obtained before sample coating

Before coating the sample surface was not homogeneous: the areas near boundary lines were more dirty and rough, while the central part of the samples was more clean. All the samples present a smooth side, probably the external side of the window, and a rough side, more dirty. The last one was probably the internal side of the window, in contact with the smog of the candles in the church. The samples present also many bubbles and an irregular thickness.

By an optical microscope the presence of crystalline aggregates, especially near the boundary lines and on the rough side, was confirmed. Several cracks and micro-cracks were observed, too, sometimes with crystalline aggregates inside, as shown in Figure 1.

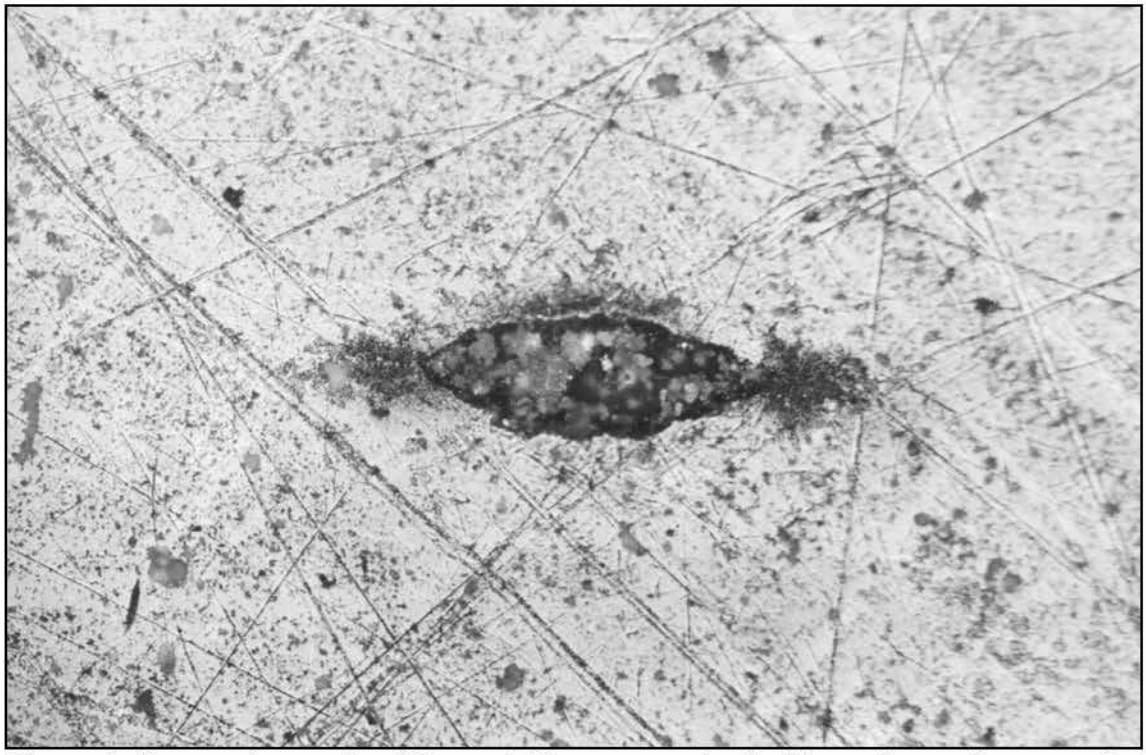

Figure 1. Image of a crack with crystalline aggregates inside on the surface sample before coating. The image was obtained by an optical reflection microscope with the magnification of 60x.

By AFM several measures have been done. Only the central part of the samples was analysed, because otherwise the average roughness was too high. The average roughness and surface area values are reported in the following table (Table 1).

Table 1. AFM results before cleaning and coating. The highest and lowest values obtained are reported.

	Analysed area (μm^2)	Surface area (μm^2)	Average roughness (nm)
Smooth side	100	103-117	10.2-47.1
Rough side	100	112-148	41.5-105.0

By XPS it was observed that the carbon due to contamination of the not cleaned samples is quite high, around 50%. The chemical composition is typical of old silicate glasses. On the smooth side there is more silicon, around 6% (atomic abundance), and less sulphur, due to sulphates. About the other elements the surface composition of both sides is very similar. Iron (1-2%, atomic abundance) and copper (0.2-0.3%, atomic abundance) are present. They probably are the dyeing agents. Nitrogen ascribed to ammonia salts was found, too (1-3%, atomic abundance). It is probably due to the presence of microorganisms.

After the cleaning procedure described before the carbon due to contamination, observed by XPS, was around 20-30% (atomic abundance). The AFM values obtained after the cleaning procedure are shown in the following table (Table 2).

Table 2. AFM values obtained after the cleaning procedure. The highest and lowest values obtained are reported.

Analysed area (μm^2)	Surface area (μm^2)	Average roughness (nm)
100	104-112	11.3-11.5
1	1.05-1.81	4.72-13.50

§ 4. Results obtained after sample coating and weathering procedure

Two days after the film deposition the coated samples presents pores and micro-pores, visible by the optical microscope. However the films were always transparent and the spectra recorded by the spectrophotometer on the covered and uncovered samples were over-layered. It was not possible to record AFM measures because the films were too fresh and rough [13].

After one month of weathering all the covered and uncovered samples have still their transparency and brightness.

By optical microscopy it was observed that the covered samples are smoother than the ones observed two days after the film deposition. The number of pores and micro-pores observed before is decreased. The cracks covered by the film are smoother, too.

By AFM several measures have been done and the average roughness found is about 30-50 nm. It is lighter than the one measured in the samples after the cleaning procedure (Table 2), but lower than the freshly synthesised films (not detectable because too high).

By the optical spectrophotometer it was observed that the spectra are still over-layered. So the optical properties are still unchanged.

By XPS several depth profiles have been done. It was observed that the surface layer is prevalently made of silicon and oxygen with some carbon contamination that disappears after a few sputtering minutes. The silica coating is then well preserved. It was also observed that there is an ion migration from the bulk of the glass to the film. So the interface film-glass is not sharp. The same migration was also observed for the modern soda-lime glasses coated by silica thin film and leached in climatic chamber [16].

After two years of weathering it was observed that the film was still adherent to the glass sample, as shown in the following picture (Figure 2). The adhesion was better in the central part of the sample, that was originally smoother as describe before, and on the smoother side. Sometimes the parafilm was not enough to avoid the contact film-metallic pincers. So some iron oxide was found at the surface, but it was removed by dipping in diluted hydrochloric acid.

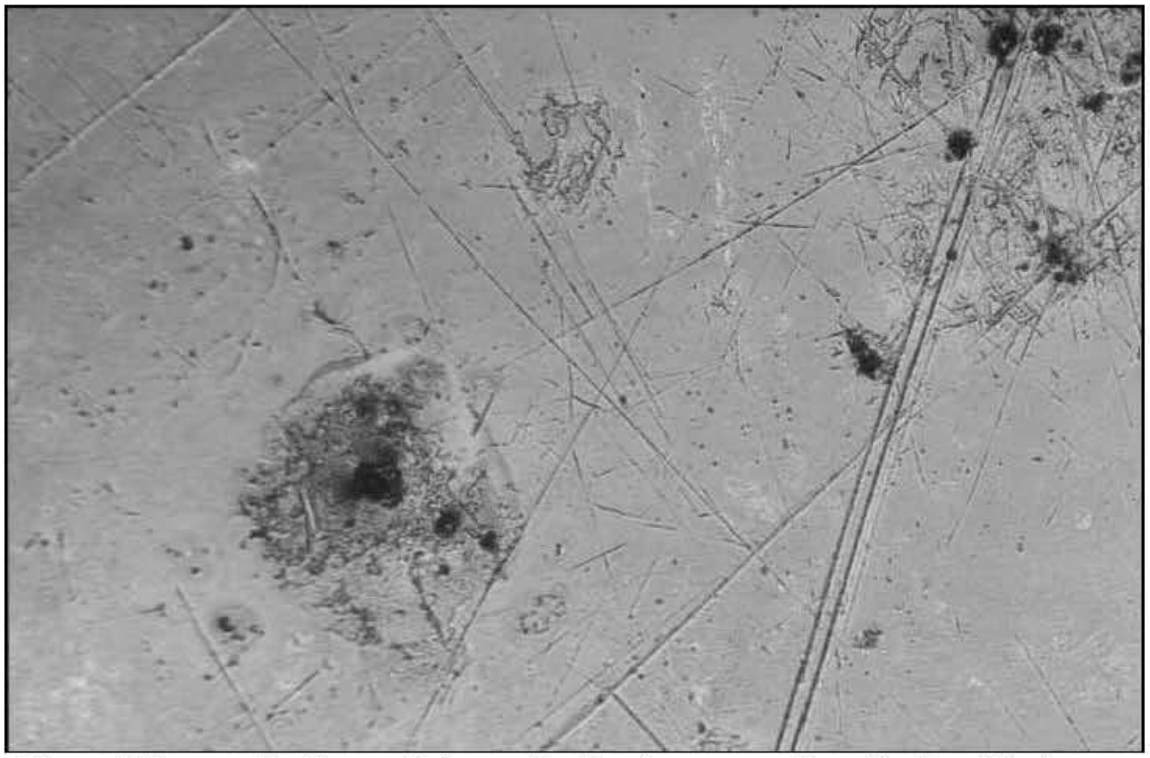

Figure 2. Image of a film coated sample after two years of weathering. The image was obtained by an optical microscope with the magnification of 125x.

By AFM it was observed that the covered samples present lower values of average roughness, as shown in the following table (Table 3).

Table 3. AFM values obtained after two years of out-door weathering. The average obtained values are reported.

	Analysed area (μm^2)	Surface area (μm^2)	Average roughness (nm)
Coated sample	1	1.00	0.319
Uncoated sample	1	1.03	4.75

By XPS it was shown that the film surface is still made of silica, without other alkaline or alkaline-earth ions, as shown in the following figure (Figure 3). The peaks have been ascribed following the literature data [17].

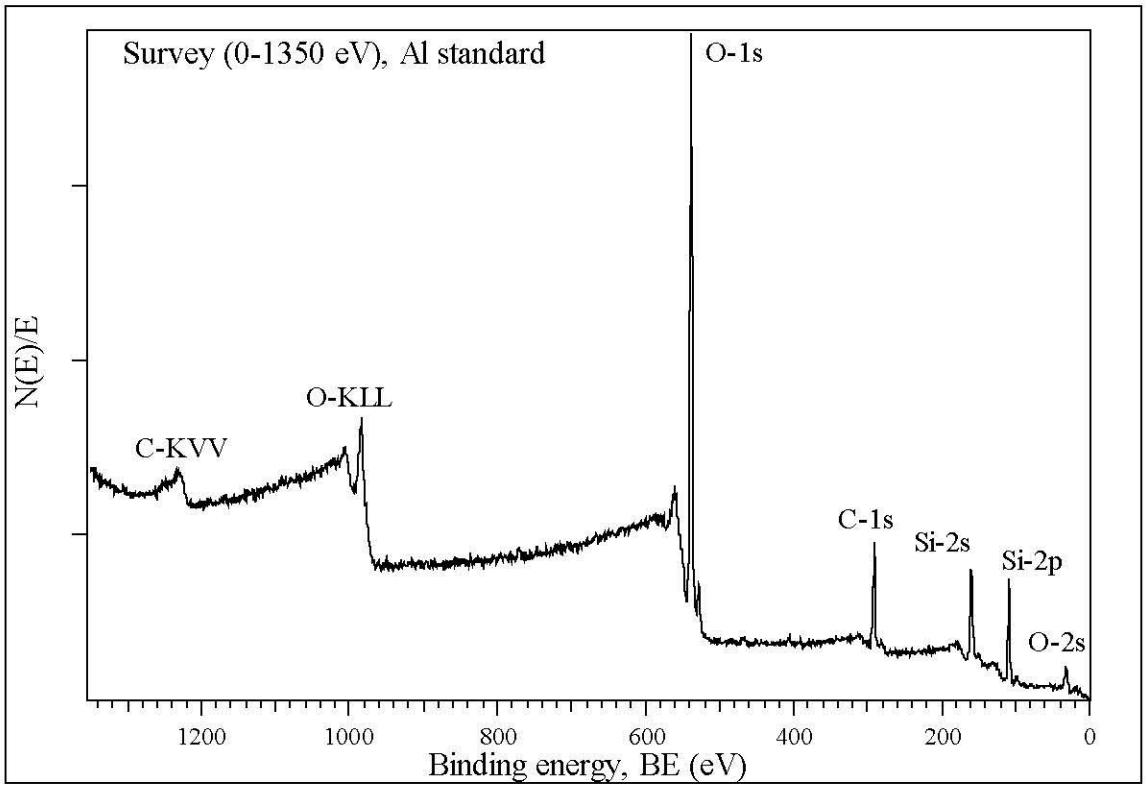

Figure 3. XPS spectrum of the film covered surface sample. A scan in the [0-1350eV] interval was done by an Al X-ray source to observe all the photoelectronic and Auger peaks (the carbon 1s signal is due to carbon contamination).

By SIMS several depth profiles have been recorded. As shown in the following figure (Figure 4) the migration of alkaline and alkaline-earth ions is confirmed. Even in this case the film-glass interface is not sharp.

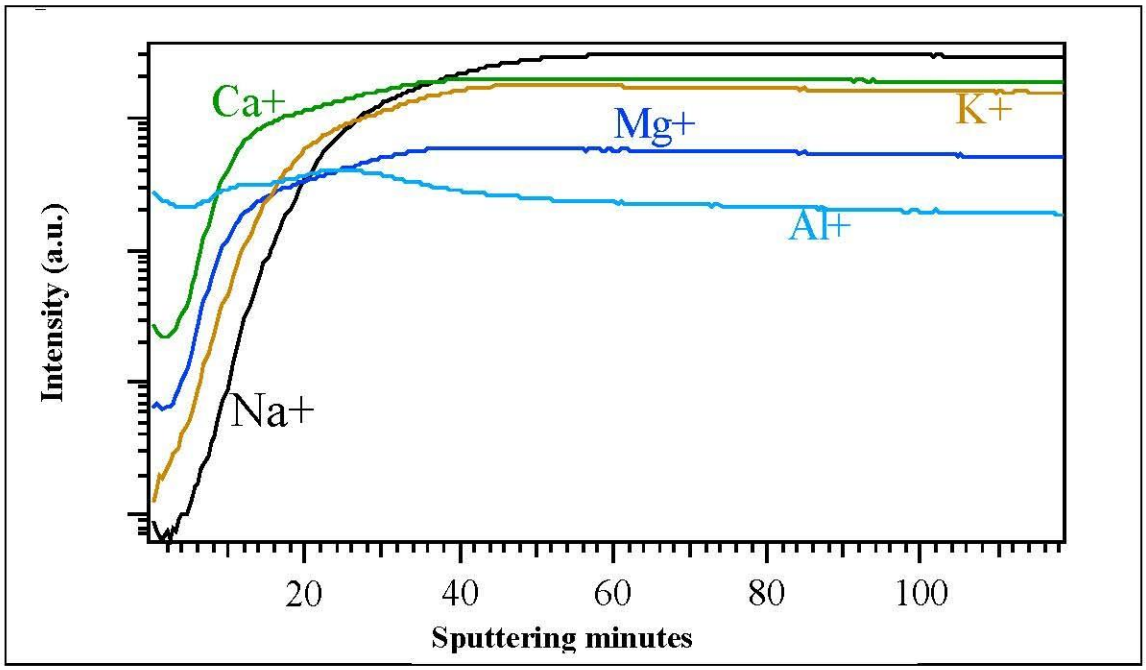

Figure 4. SIMS depth profile of the covered and two years weathering sample.

§ 5. Conclusions

As explained before, an ion migration from the bulk of the glass to the thin film has been observed. So the silica film becomes just like the silicatic glass, with the same structure and composition. For this reason the film is completely compatible with the glass. It evolves just like the glass matrix and it cannot become yellowish or degrade in a different way, like the organic polymers [6]. It may be, after longer weathering times, that the film will become leached and corroded just like the glass and a new deposition will be necessary. This proposed restoration procedure is not reversible because it is not possible to remove the film from the glass substrate. On the other side, however, this approach implies the best compatibility because the deposited film will become just a part of the glass, undistinguishable from the other silicatic glassy parts. On more the low thickness of the film (about 100 nm) is neglectable when compared to the whole window thickness.

Acknowledgements

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The impact of the rising damp phenomenon on the brickwork in Venice in relation to the criteria of intervention

G.Biscontin, G.Driussi, E.Zendri

The city of Venice shows a lot of problems concerning the conservation of building materials, due to the presence of marine aerosol, rising damp of see water on the masonry and the phenomenon of “high water”. These events contribute significantly to the degradation of the materials and require accurate studies on the employment of new building materials and new strategies for the conservation by means of suitable systems.
The knowledge relevant to the rising damp on the masonries permits to describe the phenomenon through models, such as the distribution of soluble salts correlated to the relative humidity and the taking depth and height.
Not so many informations are instead available about the efficacy of the different systems employed for the conservation of the Cultural Heritage and of the civil buildings.
The first aim of this study is to collect knowledges relevant to both the phenomena of the rising damp and the systems used for the preservation of materials from this type of degradation.
The second aim is to examine the efficacy of the applied systems in relation to the times of the interventions.

Innovative technologies for the conservation, repair and preservation of Historic City Centers

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Foreword

The building heritage typical of historic city centres is the element that often most contributes to denoting the entire layout of the city centres themselves, and thus restoration – especially in the sense of renovation and maintenance – is taking on an increasingly significant role in both cultural and economic terms.

Within the framework of the Enhancement Plans for scientific and technological research, the Ministry of Education, University and Research (MIUR) has co-financed a research project called "Innovative Technologies for the Renovation and Maintenance of Historic City Centres," carried out by the Venice Research Consortium in collaboration with its members and outside partners: Arcadia Ricerche S.r.l., Cultural Heritage Institute, Syremont S.p.A, Venezia Tecnologie S.p.A., Ca' Foscari University in Venice, Venice University Institute of Architecture.

Objectives

The main objective of the project is to develop a series of innovative technologies to be applied in the restoration, recovery and maintenance of historic city centres, especially in regard to "*minor construction*".

This objective is pursued through a logic of "*reverse engineering*", i.e. by assessing the behaviour of products used in the past so as to identify the properties they are lacking as well as to define what improvement innovations may be introduced to make these materials more effective, without losing their positive characteristics.

The project looks especially those aspects that most affect, in terms of intensity and extension, the masonry of historic city centres.

Mortars

Historical mortars are certainly the weakest element in the entire masonry system, and their degradation tends to be marked, especially in the parts nearest to the surface. On the other hand, alongside the aspect of durability there is the need – rarely considered in recent offerings by manufacturers – to also consider those aspects regarding compatibility with existing bricks and mortars, especially regarding mechanical characteristics, and specifically the elasticity of the overall masonry system.

Consolidation, re-aggregation and surface finish

Also regarding surface treatments, and finishes in general, there are aspects regarding durability and compatibility, but to these are added the need for aesthetic-formal characteristics, in particular for finishes, as well as ecological aspects regarding the health of application workers and environmental protection.

Rising damp

This phenomenon is widespread and serious enough to make it one of the most pressing problems in renovating historic city centres. Among the various, and often unsatisfactory, reconstruction methodologies usually proposed, the use of breathing plaster – which increases surface evapouration to control moisture rise, seem to augur interesting results, at least in theory.

Structure of the project

The project activities have been structured into three work packages, each aimed at achieving its own overall objective and specific sub-objectives (see *Figure 1*)

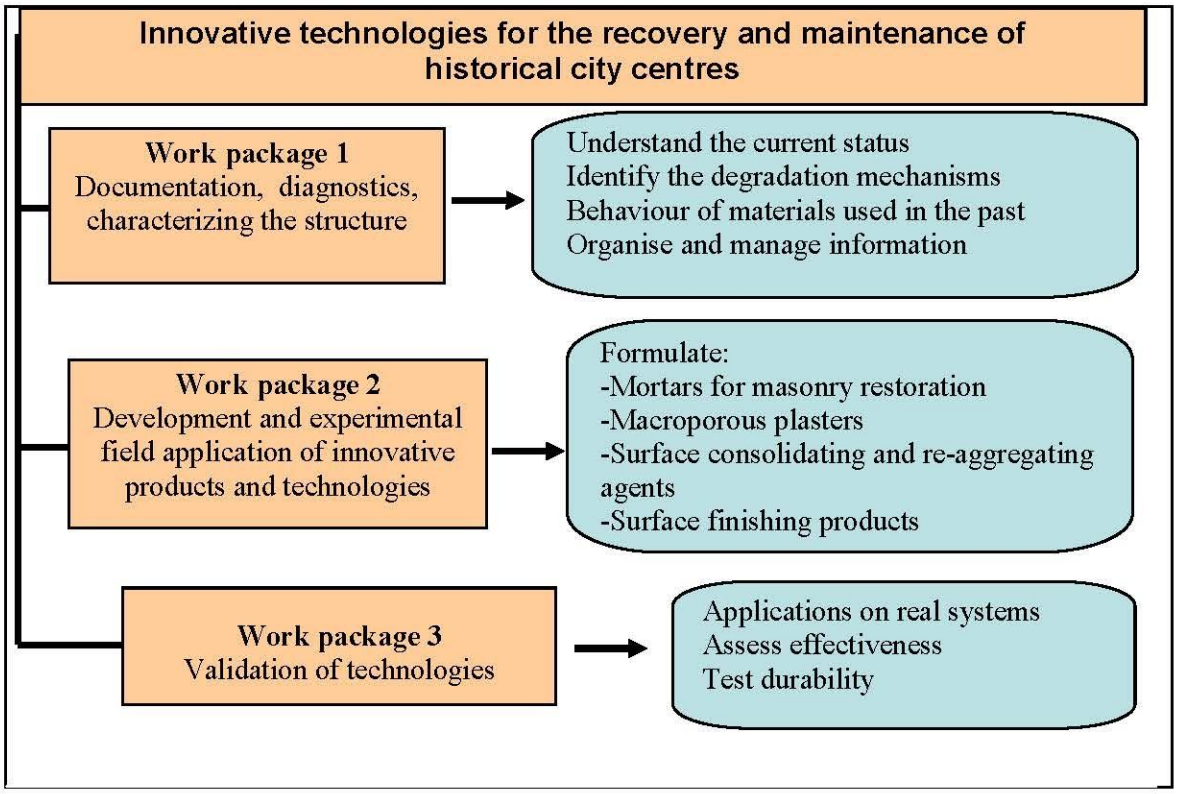

Figure 1 Structure of the project

WP1 DOCUMENTATION, DIAGNOSTICS, AND CHARACTERIZING THE STRUCTURE

Understanding and quantifying degradation phenomena are obviously the starting point for identifying the steps needed in restoration, and defining a set of requirements that products and application methodologies should meet.

The main objective of the primary WP was the "*Development of an Integrated Knowledge Acquisition and Management System*" to, first of all, guide the diagnostics stages to acquire the information deemed indispensable, and to efficiently manage the acquired information both for their use in the planning stages as well as for maintenance monitoring.

In order to achieve this primary objective, three subsystems were developed starting with gathering information about the property in question, adequately organise and manage said information, and provide an operative planning support tool.

a- Historical-Archive Study

For information gathering, a procedure was adopted to combine interdisciplinary research methods with the need for "specific" data about the item, which initially made it necessary to identify certain criteria upon which to build the network of information.

This made it possible to develop *a complex historical-archive study of the sites identified, by gathering information about their evolution, changes, and interventions carried out in the past; this preparation guided the choice of significant areas in which to develop both the diagnostics and knowledge-gathering stages.*

Experimental applications took place on two sites: the former Montecatini plant (property of the City of Venice) in Murano, and Villa Widmann (property of the Province of Venice) on the mainland.

The choice of the Venice area, and specifically an island zone such as Murano, has to do with the unique environmental situation, characterised by significant degradation that may be attributed to

the effects of seawater – both direct, through the consistent rise of heavily salted water, thus particularly aggressive to both mortars and bricks, and indirect, in the form of aerosol.

The Villa Widmann site has instead characteristics more similar to those found in most historic city centres not located on the lagoon, but still showing considerable rising damp phenomena which have led to losing large sections of plaster.

b- Diagnostic Study

This stage is aimed at characterising the materials and technologies used in building, as well as assessing the current state of degradation of the materials and understanding the causes thereof.

To do so, once a research protocol was devised, the most widespread tests and experimental techniques used in the industry were employed, following UNI and UNI-Normal standards where present; the following analysis techniques were used in particular:

-Granulometric analysis of mortar pastes,
-Optical microscope analysis on thin cross sections of mortar and plaster (1,2)
-Scanning electron microscopy (SEM) of surfaces and internal layers (3)
-X-ray diffraction (XRD).
-Thermal analysis
-Infrared Spectrophotometry (FT-IR)
-Mercury intrusion porosimetry (4)
-Water vapour permeability (5)
-Determining the moisture content in masonry by weight (6)
-Proportion of total soluble salts by conductivity (7)
-Quantitative determination of water soluble anions using ion chromatography
-Assessment of the surface distribution of moisture using thermographic analysis.

Simultaneously, the alteration phenomena present on the surfaces at the Villa Widmann site were mapped. This entailed traditional (sight) research methods, also integrated with semiautomatic systems based on digital scanning of surface images and processing through a sequence that may be summarised as scanning, digital correction, photomosaic, image quality improvement, spatial calibration, segmentation, numerical analysis and results return.

Special importance was attributed to the aspects regarding moisture rise and its development. In this sense, 12 areas were examined at the Villa Widmann site, taking samples at four heights and increasing depths, to define the distribution profile of the moisture and soluble salts. This made it possible to understand the actual mechanisms leading to the presence of water, while also representing the first step in monitoring the interventions to be carried out.

c- Documentation and Cataloguing

A computer system was designed to organise, process and manage all of the data collected. This system allows, on the one hand, an overall assessment of the site, and on the other can help guide the choice of analyses needed to develop a restoration project.

The project began by defining a **theoretical model of the database** arranged for a hierarchical data structure. It was especially necessary to develop a structure that would allow easy passage between general information about the entire site to details about each area and/or type of material. The activity therefore continued with encoding the entire computer system in a conceptual prototype, taking into account current cataloguing regulations, while at the same time considering the need to ensure a truly multidisciplinary approach.

The operation of the entire information system and relationships between parts were defined by **dividing the property into five macroclasses**, corresponding to the same number of systems, subsystems and units containing structured information.

The settlement context includes the set of information that locate the complex site within the governmental and administrative territorial organisation.

The real estate makes it possible to correctly and precisely identify the property from a legal standpoint, also according to the provisions of local ordinances and urban planning legislation in general, as well as provide the proper historical notes and information on previous interventions.

The construction organism identifies a specific, structured set of spatial and technical elements regarding the property, which may be complex.

The functional spatial system refers to one of the possible structured sets of the construction organism, characterised from a building standpoint.

The construction element is the spatial unit that, for the purpose of the project, defines the three main elements, i.e. support, covering and finish.

On the basis of the conceptual model, an **open overall form** was created, with a dual function: on the one hand it provides a place to enter the data collected, and on the other it acts as a support tool to guide an inexperienced user in choosing the most useful tests.
This decision was necessary because, starting with the computer forms developed by the ICCD, we realised that these were lacking in relation to Project criteria, as well as in defining procedures useful in determining the overall state of degradation and the materials necessary, or appropriate, for its renovation.

Developing the actual support functions for software design required a significant amount of work. To do so, it was necessary to develop an algorithm that would use a hierarchical organisation of the analysis of the data provided by the mapping and diagnostic stage, leading to identifying the most appropriate type of intervention to restore plastered surfaces.
The first step involved defining the "rules" through which the algorithm processes procedural choices. These parameters were then assigned "weights" which, when applied to the above rules, guide and complete the decision-making process.
The *decision support* system was then augmented by implementing the specification items regarding possible restoration processes for intervention on plaster.

WP2 DEVELOPING INNOVATIVE PRODUCTS AND TECHNOLOGIES

Therefore, the next stage consisted in *engineering and developing various types of products* to meet the needs that emerged from the diagnostic-investigative stage.

Overall, the general orientation was to follow a policy of "*compatibility*" with existing construction; compatibility in the broader sense, thus well beyond the purely material aspect.

Products are designed beginning with knowledge of past materials and, through those properties and behaviours, a "REVERSE ENGINEERING" mechanism identifies new behaviours and new needs to define new products or improve existing traditional products, perhaps through blending or additives.

The products developed have been laboratory tested, assessing their performance and behaviour.

The following problems remained the primary focus throughout the project:

- restoring continuity of the brickwork through partial integration of the masonry using "splicing" or joint sealing techniques
- surface consolidation of the bricks and mortars by applying cohesive re-aggregating agents
- surface finishing, especially as protection of masonry with exposed brickwork
- dehumidification based on the use of dehumidifying plaster

From the standpoint of emphasising, in terms of mortars, compatibility with the existing products, it was hypothesised – at least as a first measure – to use systems based on traditional or pozzolanic binders, without the use of Portland cement. In the case of re-aggregation and protection interventions, fluorinated products were identified as offering the range of systems offering the best prospects for development, also due to the variety of options for using polymers in the aqueous phase.

For finishes, it was decided to develop products beginning with water-based acrylic and/or siloxanic systems. Finally, for the dehumidifying plaster, systems based on aerial binders or natural hydraulic lime were preferred.

WP3 VALIDATION OF INNOVATIVE TECHNOLOGIES

The last, but certainly not least, activity involves testing the behaviour of the systems developed. In particular, this validation considers not so much the products in and of themselves, but the combination of product/masonry.

The validation stage is also used for monitoring which continues until the end of the project.

Table 1 shows the parameters deemed significant in evaluating the behaviour of the various interventions carried out. These parameters derive from field experience and are reported in the literature.

Interventions	Parameters
mortars	Compression strength (visible lesions) Compression strength (maximum) Elastic modulus
Dehumidification with plaster	Moisture content of masonry in relation to the sample height and depth
Surface consolidation of bricks and mortar	Waterproofing capacity Water repellence Colour variations Cohesion
Surface finish (protection)	Waterproofing capacity Water repellence Colour variations Water vapour permeability

Table 1 Intervention assessment parameters

Results and Discussion

WP1 Cataloguing and Diagnostics

The results of the studies regarding the materials used in the masonry at Villa Widmann are briefly listed below.

- Mortars

Table 2 shows the mediated results of the analysis of mortar samples from Villa Widman

Binder	Predominantly lime Rare hydraulic lime
Aggregate	Quartz, calcite, dolomite, silicates
Predominant aggregate dim.	1-0.125 mm
Mortar porosity	32-42%
% Soluble salts	8-10%
Conservation status	Compromised

Table 2 Average characteristics of mortars

The mortars are primarily lime and sand-based, and hydraulic lime is also present, but only locally. The presence of dolomite, also confirmed by XRD tests, indicates the use of materials of local origin.

The conservation status of the mortars is apparent from the porosity values, deemed fairly high and symptomatic of degradation processes in progress, as also evidenced by the presence of significant percentages of soluble salts.

-Plasters
They are generally degraded, and are detached or missing in many spots.
Polished cross-section observation indicates the general presence of multiple layers, the innermost of which is "*opus signinum*", followed by a layer of unevenly textured mortar, then by a "marbled" layer. This outermost layer shows microfractures and detached aggregate following degradation of the binder, consisting of calcium carbonate (limestone). Moss, lichens and atmospheric particulate deposits are also present.
The FT-IR analysis indicates the constant presence of nitrates and gypsum, the latter related to the degradation of the carbonate binder.

-Moisture and soluble salts in the masonry
The diagrams below show the patterns and percentages of moisture present in the masonry, and the corresponding soluble salts content, based on the height and depth of the sample.
The moisture profiles shown are characteristic of the rising damp phenomenon, with decreasing values from the bottom up, with moisture values between 15-20% at a height of 50 cm and 8-9% at approximately 150 cm.
Nitrates are found throughout the masonry and in significant amounts, followed by sulphates, concentrated primarily in the lower sections of the walls. Limited amounts of chlorides are present. The abundance of nitrates may be attributed to the presence of stalls in the past.

The diagnostic stage also made use of a campaign to map the surfaces by producing topical maps and returning numbers regarding the extent of the areas affected by the various alteration processes. Particular importance was given to the need for this mapping to be truly representative of the processes of alteration and degradation; identifying and quantifying possible intervention strategies, as well as the correlation between measurable phenomena and sampling stages for diagnostics studies.

Within this framework the mapping process, which was also supported by a thermographic analysis of the surfaces, primarily considered the following aspects:

- differentiating the coats of plaster still present
- uniquely recognisable resurfacing
- areas with missing plaster
- situations of chalking or surface decohesion
- bubbling and detaching conditions, both in terms of what is visually apparent, and by tapping on the surfaces while listening
- fracture zones
- surface colour alterations, due essentially to deposits of foreign matter.

WP2: Development of Innovative Products and Technologies, and Their Experimental Field Application

The activities carried out made it possible to **design, formulate, and test a series of innovative products**, briefly described below.
Regarding mortars in particular, pastes have been developed in which the hydraulic behaviour of the binding portion derives solely from the use of natural hydraulic lime or the lime/pozzolana reaction, thus eliminating the use of Portland cement.
The pastes formulated also contain fibre, added to the blend in order to improve its physical-mechanical characteristics as well as provide greater workability, while at the same time preventing shrinkage while setting.
Table 3 shows the requirements for the proposed pastes and the characteristics actually obtained.
The requirements are based on what has been reported in the literature regarding mortars generally used in the Venice area, and from personal experience.

	Requirements	Hydraulic lime	Pozzolana lime 1	Pozzolana lime 2
Elastic modulus (kN/mm^2)	1.6-3.8	2.3	3.0	2.3
Soluble Salts (%)	2.5	1.7	1.5	1.6
Water absorption (%)	<25	9.7	21.2	15.3
Workability (hours)	> 1	> 2	> 3	> 4

Table 3 Laboratory performance of the mortars formulated

Three types of paste have been developed which, after the characterisation tests, provided interesting results in terms of physical-mechanical compatibility with the original supports, adhesion and durability (Table 2).

The use of macroporous plasters to dehumidify the masonry requires that these systems possess specific requirements of macroporosity, rheological behaviour and ease of application.
The preference was to use binders based on blends of lime, natural hydraulic lime and active silica. The aggregates were selected by defining their appropriate grading envelope, in line with the theoretical Fuller curves. An aerating system was added to the blend.
The proposed paste has a porosity greater than
350 mm^3/g (see Figure 2), corresponding to a water vapour permeability of 169 g/m^2·24h.
To ensure adequate workability without detracting from the overall mechanical characteristics of the paste, the use of additives acting as water retainers was optimised. Small but significant percentages of fibre were also added to the formula to prevent shrinkage and increase overall elasticity.
In designing the surface consolidating and re-aggregating agents, special importance was attributed to the possibility of obtaining "*water-based*" products, beginning with fluorinated polymers, therefore avoiding the need to use solvents. This offers clear advantages in terms of both worker health and general environmental impact.
The following were developed over the course of the research project:

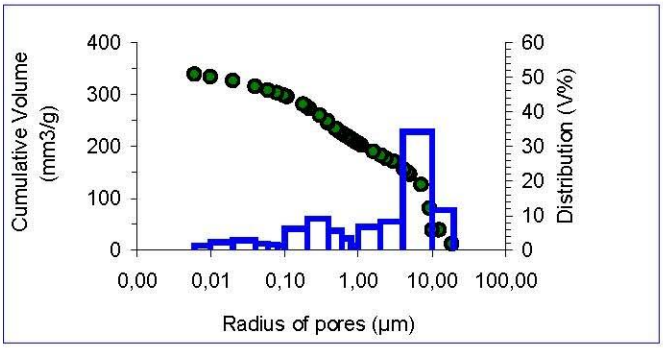

Figure 2 Porosimetric pore size distribution for the suggested plaster

1. A perfluoropolyether functionalised phosphate in hydroalcoholic emulsion
2. B fluorinated polyurethane in cationic emulsion
3. C fluorinated polyurethane in anionic emulsion
4. D fluorinated polyurethane in organic solvent.

These are products which, except for the last, may be diluted with water and have not only the typical properties of fluorinated polymers (chemical inertia, water repellence, light resistance, etc.), but also a series of decidedly innovative prerogatives for the field of Cultural Assets conservation, related to the presence of the polyurethane portion. The resulting polymers in particular show significant re-aggregating, adhesive and consolidating properties, as shown in Table 4.
As in the case of mortars, the requirements derive from what has been reported in the literature and observations from numerous case studies.

Size	Requirements	A	B	C	D

Abrasion Resistance	> 60%	74.1%	91.3%	88.3%	=
Colour variation (ΔE^*)	< 10	1.27	4.2	1.1	0.5
Protective Effectiveness (P.E.%)	> 80%	84.2	91.9	86.5	98.4
Reversibility (%)	> 70%	73.2	97.8	38.5	82.5
Dilutability in water	Yes	Yes	Yes	Yes	=
Penetration	> 4 mm	4	5	2	=

Table 4 Results of the performance of fluorinated products for surface re-aggregation

Within the framework of surface finishing, attention was focused on developing systems to protect parameters in "exposed" bricks.
As for consolidating agents, for this category of products special importance was attributed to the possibility of attaining "*water-based*" products to avoid the need to use solvents.
In this specific instance, it should be pointed out how this requirement is becoming increasingly important from a commercial standpoint as well, with demand for such products gaining in economic importance.
The project made it possible to formulate two types of products:

1-emulsion of an alkoxysiloxane and a water-dilutable acrylic microemulsion, stabilised and with the addition of systems with high bactericidal and algicidal powers
2-water-dilutable acrylic microemulsion, stabilised and with the addition of systems with high bactericidal and algicidal properties

These are "water-based" products characterised by the polymer portion dispersed in a **microemulsion**: the crystallites of the acrylic stage have an average size of less than 200 nm. This produces important properties: the smaller particle sizes allow improved dilutability in water and, on the other hand, ensure more effective dispersion of the particles with better surface coverage.
In the case of the first product, an alkoxysiloxane emulsion has also been added to increase the water-repellent properties of the surface finish product.
The studies to assess these products, with reference to compatibility with supports (in relation to high water vapour permeability) and their durability (in terms of shelf life), provided the results shown in Table 5. Here again the requirements are defined based on what is reported in the literature and experience with many structures.

Size	Required performance	Acrylic microemulsion	Alkoxysiloxane emulsion and acrylic microemulsion
Colour variation (ΔE^*)	< 10	1.5	3.9
Water vap. permeability ($g/m^2 24h$)	> 50	209.2	186.8
Dilutability in water	Yes	Yes	Yes
Shelf life	> 3 months	> 6 months	> 6 months

Table 5 Laboratory performance of surface protection and finishing products

WP3: Validation of Technologies
The final stage of the study involved testing the actual behaviour of the proposed systems once applied to a structure in real field conditions.
Tests and measurements were performed to provide not only information about the performance of the individual products applied in real conditions, but also and especially an assessment of the behaviour of the overall masonry support following the various treatments.
From this standpoint, after an experimental application at the two chosen sites, a series of tests were carried out on samples taken from the sites. Tests that in part echo those carried out on laboratory samples to evaluate the results of the formulation stage, and in part are instead

essentially a matter of monitoring the most significant parameters for the four types of interventions.
The parameters deemed most significant for each type of intervention have been determined and are listed in Table 1.

Mortars
The values for the mechanical characteristics of the overall system (brick and mortar walls) obviously depend on the behaviour and properties of the bricks used.
However, overall, the proposed systems highlight (see Table 6) interesting performance levels that essentially meet all of the requirements set forth during the formulation stage.
In particular, the elastic moduli determined for samples also containing pozzolana, 2700 and 2600 MPa respectively, certainly fall within the range of typical values for historical masonry – on average below 3500 MPa – while for hydraulic lime-based samples the mean elastic modulus (MPa) is instead slightly above this value. However, said increases is still below the 20% set as a limit during the planning stage.

Masonry sample	Compression strength until visible lesions appear (MPa)	Max. compression strength (MPa)	Elastic modulus (MPa)
Paste made of lime, yellow pozzolana and fibre	4.8	6.3	2700
Paste made of lime, red pozzolana and fibre	4.7	6.1	2600
Paste made of hydraulic lime and fibre	6.8	8.1	3700

Table 6 Results of laboratory tests on experimental walls

Concerning the insurgence of cracks and/or shrinkage, an examination of the portions of the pilaster strip rebuilt at the experimental site of the former Montecatini plant (Murano) reveals that no shrinkage cracks were found in any of the three wall sections considered.

Dehumidifying Plasters
Concerning the behaviour of the plaster, or more specifically of the masonry following application of the dehumidifying plaster, tests were run to determine the moisture content and soluble salts at four heights and three depths, according to the test protocol established during the diagnostic stage.
The test cycle was carried out before applying the plaster and six months afterward.
For easier comprehension, the results of the weighted assessment of water leaks from the masonry are shown in a graph, where the moisture content is indicated for the three depths.

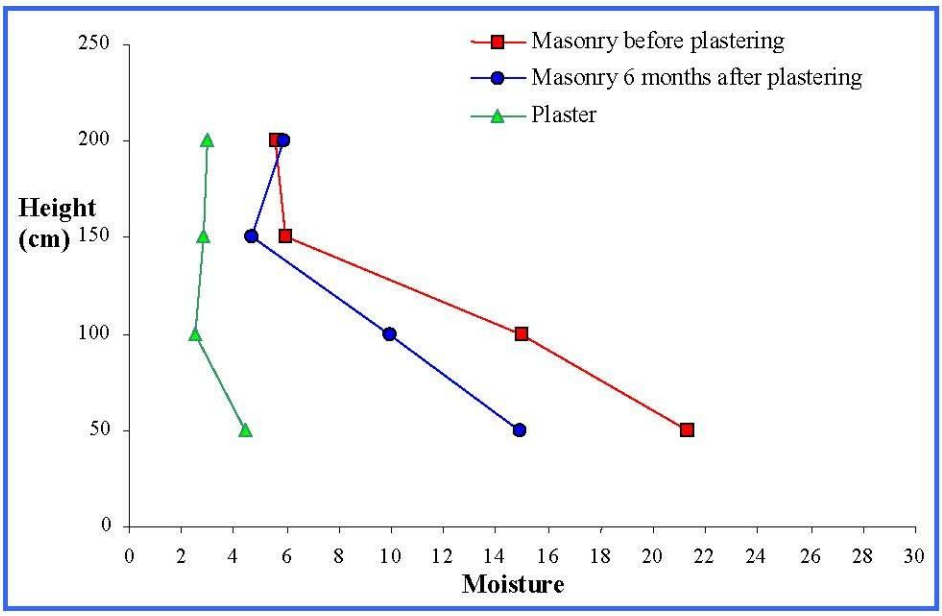

Figure 3 Pattern of moisture content based on height

A review of the graph shows that at the heights most affected by the phenomenon of water rising damp, (h=50 and 100 cm) the moisture content in the masonry is considerably lower after applying dehumidifying plaster, with a reduction of approximately 30% of the initial moisture. The consideration that this assessment was carried out after only six months allows us to predict that the reduction will be even more significant by the end of the year.
Concerning the assessment of microstructural aspects, when the product was applied to the surfaces at Villa Widmann, the same paste was applied to a few tablets that were later used for the destructive tests.

Surface Protective and Re-Aggregating Agents
In assessing the behaviour of brick surfaces treated with the polymer systems developed over the course of the project, particular importance was attributed to checking the ability of these products to reduce water absorption by the bricks to which they are applied.
In this sense, the only measurement that may be carried out on site is the absorption test, using the so-called "dropper" method (8), although, due to its intrinsic procedures, it does not allow a direct comparison with the measures of protective effectiveness carried out on laboratory samples via capillary absorption (9).
Thus, at both experimental sites two sets of tests were carried out according to this method, one on the surface as is and one after applying the various products.

PRODUCTS	SITE	UNTREATED	TREATED
A	Villa Widmann-A	0.25	0.13
B	Villa Widmann-B	2.02	1.03
C	Villa Widmann-C	0.77	0.20
D	Villa Widmann-D	1.02	0.52
A	Murano-A	0.87	0.03
B	Murano-B	2.19	2.16
C	Murano-C	0.48	0.36
D	Murano-D	1.97	1.43

Table 7 Water absorption index detected for the various areas

A review of the water absorption indices (ml/cm^2) for the surfaces in question (Table 7) shows, in general, a sharp decrease in the amount of water absorbed by surfaces after treatment, confirming that the products applied actually limited water absorption. The exception was the area of the former Montecatini plant in Murano, treated with product B, for which there was no significant reduction in the amount of water absorbed.

A subsequent stage of fieldwork validation was tested for any colour variations in the surface following treatment.
In this case the assessment is made by comparing the colour co-ordinates of each sample area before and after applying the various products. For this purpose, we refer to the regulations used in the industry (10) and consider parameter ΔE^* regarding total colour variation.
The colourimetric analysis carried out on the treated surfaces shows that the colour variations (ΔE^*) caused by the treatments are always well below 10.
The product that produces the least colour variation is C, with a value of $\Delta E^* = 0.85$, while the one most affected by exposure to the outdoor environment is product A, with ΔE^* of 3.29.
Moving on to the assessment of penetration depth, the test findings indicate that the products applied penetrated to a depth of around 3-5 mm.

Surface Finishes
Also regarding surface finishing products, the systems proposed were validated by assessing the suggested parameters directly on site, on the masonry identified at the two sites.
As these are systems aimed especially at limiting interaction between the original material and the environment, the assessment began by comparing the water absorption (using the "dropper" method) of the surfaces before and after treatment, then the colour variations were measured.

SITE	PRODUCTS	SURFACE NT	TREATED SURFACE
Villa Widmann	Fin 1	1.29	0.87
	Fin 2	0.48	0.26
Former Murano plant	Fin 1	2.69	1.43
	Fin 2	3.85	0.67

Table 8 Water absorption index of the surfaces treated with finishing products

Once again there is evidence of significant reductions in water absorption after applying the finish.

For this type of product, the colour variations caused by the surface treatment is fairly limited, with ΔE^* values between 2.55 and 7.44, thus always within the limit of $\Delta E^* < 10$, set during the planning stage as the maximum acceptable limit.

For polymer (consolidating and finishing) materials, durability was evaluated by means of accelerated ageing cycles using Xenotest. The instrumentation used, XENOTEST 1200 by Heraus Instruments, makes it possible to program lighting cycles with a Xenon lamp (visible radiation and UV component) associated with cycles of rain with demineralised water.
Regarding the parameters to follow to define the durability of the system, it was deemed appropriate to differentiate the tests to be carried out based on the type of product.

	Consolidation and re-aggregating agents	Surface finishes
Colour variations	X	X
Water repellence	X	X
Cohesion	X	
Water vapour permeability		X

Table 9 Tests carried out during the ageing cycles

The first test cycle had to do with the behaviour of the systems subjected to simulated ageing in relation to possible colour alterations. The results obtained (fig.4) show, first of all, that the behaviour of products formulated for surface consolidation and re-aggregation is, on average, less sensitive to radiation effects. This is highlighted by the colour variations, which were found to be limited even after 1000 hours of ageing.

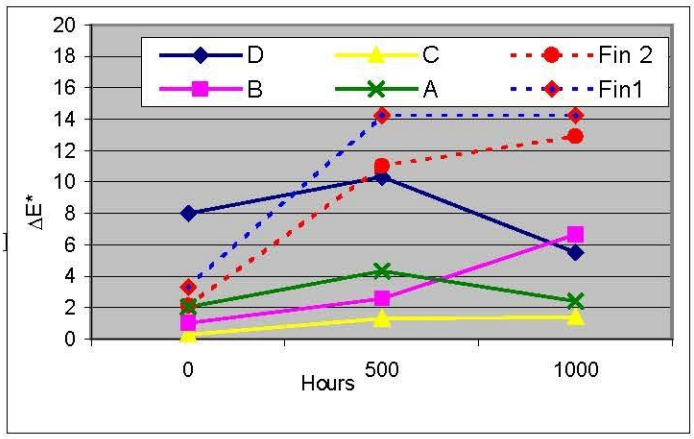

Fig. 4 Total colour variation based on hours of artificial ageing

This situation confirms the initial choice made during the planning stage, to use systems based on fluorinated polymers also due to their high photoresistance.

Within the framework of finishes, there were instead more significant increases in ΔE*, though still not excessive. This may be attributed especially to the very nature of the polymers used, and in particular to their less regular distribution over the surface of the bricks achieved when applying them to the actual system. From this standpoint, comparing the values attained during this ageing test with those during formulation, it emerges that the laboratory samples (thus with a decidedly more controlled application) had significantly lower values of ΔE*.

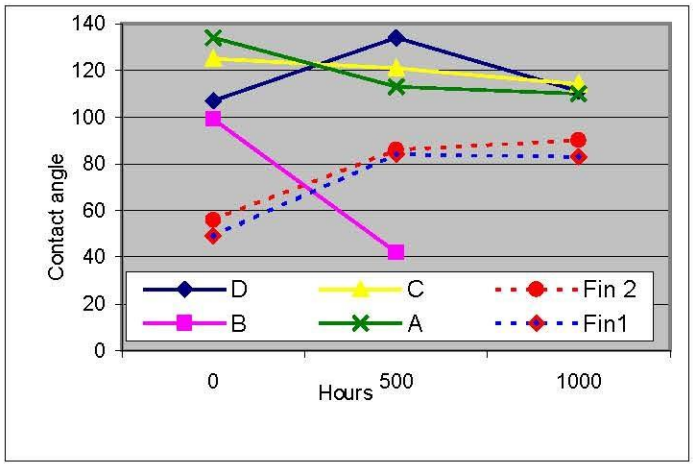

Fig. 5 Contact angle variation based on hours of artificial ageing

These observations are also confirmed to some extent in the water repellence assessment, carried out by measuring the contact angle. This test shows that, for consolidating and re-aggregating products, as ageing progresses there is a smaller reduction in the contact angle, which however remains sufficiently high (figure 5).

As for finishes, though, the processes caused by ageing bring about – during the initial exposure period – an increase in the contact angle and thus in water repellence. It is quite likely that radiation (especially its UV component) encourages the complete polymerization of the system, thereby increasing its water repellence. But once the process is complete, it does not bring about any further significant changes. The behaviour of the finishes during the ageing cycle was also evaluated by determining the permeability in relation to the hours of exposure to the

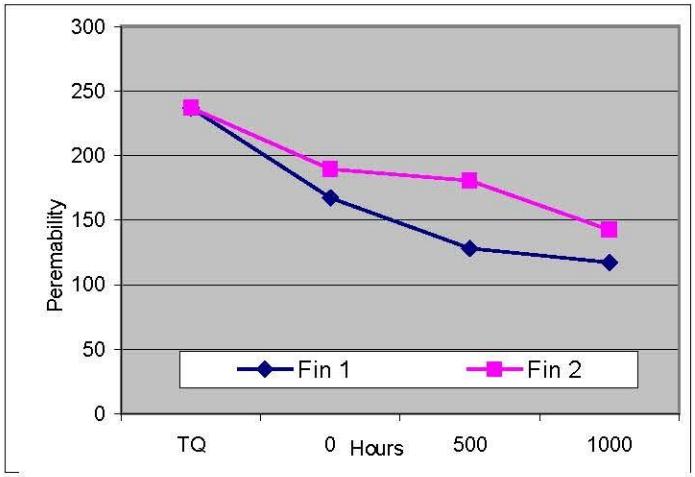

Fig. 6 Permeability variation based on hours of artificial ageing

accelerated ageing system.

As appears evident from figure 6 although both types of finish formulated suffer from reduced permeability due to simulated ageing, the level still remains always above 120 g/m^2 24h.

Monitoring of dehumidifying plasters already available on the market

In order to evaluate the proper methodology for using breathing plaster to control moisture rise, and test its behaviour over time, a series of experimental applications was also developed using commercial products formulated by mass-market manufacturers.

The possibility to carry out such applications even at an early stage of the project, thus when the products conceived during the project had not yet been formulated, made it possible to monitor their performance adequately for an extended period of time.

To this end, activities began by searching for similar products already present on the market. The market study led us to identify six of the largest companies in the industry who manufacture reconstruction plasters, either regularly or experimentally:

- Colourificio San Marco S.p.A – Marcon – (VE)
- Fassa Bortolo S.p.A. – Spresiano – (TV)
- Mac S.p.A.-Treviso – (TV)
- Torggler S.p.A. – Marlengo (BZ)
- Volteco S.p.A. – Villorba – (TV)
- Weber & Broutin – Italia S.r.l. – Fiorano Modenese – (MO)

Fig. 6 Experimental Applications of macroporous plasters

Said manufacturers accepted to take part in an experimental application of their products, following the development of an **application and testing protocol**, to standardise the measurements to be taken and ensure comparable results.

The moisture content and proportion of soluble salts were measured for each of the sample areas, referring to the industry regulations (6,7), both immediately before the experimental applications and one year later.

Figure 8 shows the pattern of moisture content found in the various areas.

Essentially, beyond modest behaviour differences, all of the products applied bring about a real reduction in the water content of the masonry, and especially, the various plasters always remain decidedly dry.

This would seem to confirm what was already found in previous studies on the nature of matter transfer that takes place in this type of plaster. The results match the hypothesis by (11) that, in macroporous systems, water is transported more in a vaporous than in a liquid phase.

intonaco after 1 year

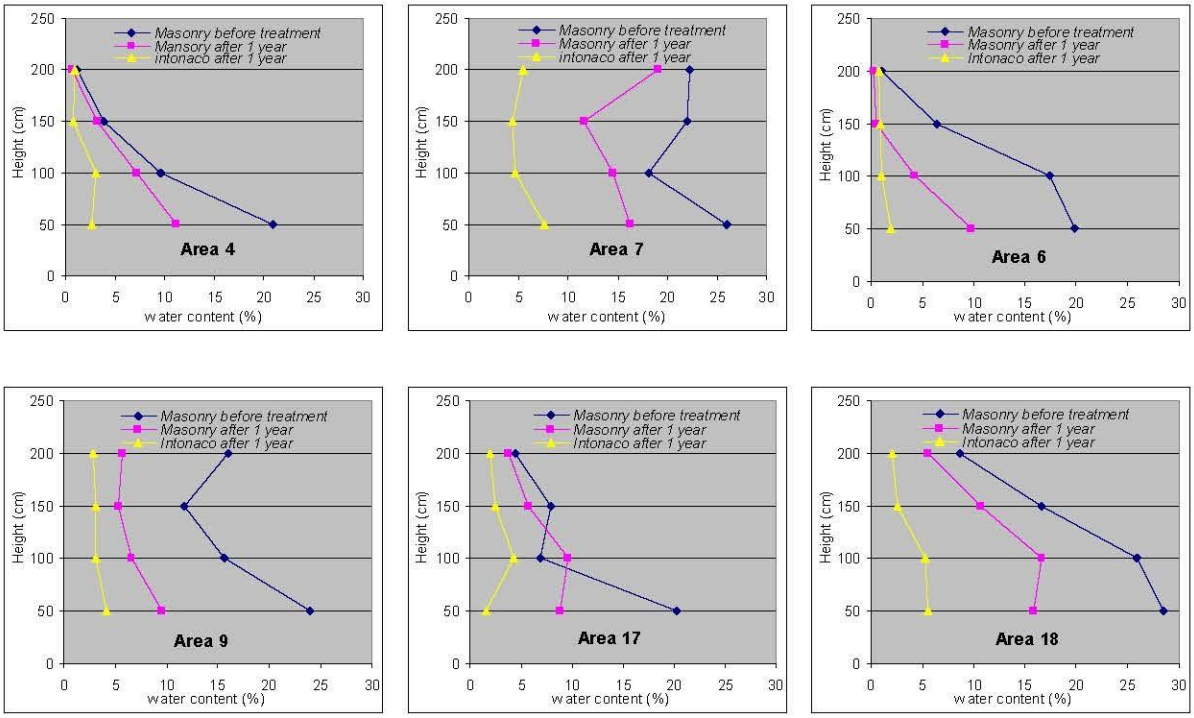

Figure 8 Pattern of moisture content found in the various areas

CONCLUSIONS

The project described made it possible to meet a few very important objectives, which largely confirm its validity.

Pastes were produced with very good mechanical characteristics, especially elasticity, as can be seen from the behavioural analysis of the masonry overall.

The development of consolidating–re-aggregating products made up of mixed fluorinated/polyurethane polymer systems, using water as a solvent, produced positive application results in terms of characteristics of water repellence, colour variation and durability.

The validity of dehumidification systems based on the use of macroporous plasters was confirmed, both specially made products and those already available for sale.

A software system was developed to catalogue property, which may be used in planning restoration interventions.

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[1] Normal 14/83, Polished slide sections of stone materials: preparation techinque, CNR-ICR, ICR Publishing Centre, Rome 1983.

[2] Normal 12-83, Artificial aggregates of clasts with non-clay binder: descriptive diagram, CNR-ICR, ICR Publishing Centre, Rome 1983.

[3] Normal 8/81, Examination of morphological characteristics by scanning electron microscope (SEM), CNR-ICR, ICR Publishing Centre, Rome 1981

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[6] Normal 40/93, Misura ponderale di umidità nelle murature [*weight measurement of moisture in masonry]*, CNR-ICR, ICR Publishing Centre, Rome 1983

[7] Normal 13/83, Proportion of soluble salts, CNR-ICR, ICR Publishing Centre, Rome 1983

[8] Normal 44/93, Water absorption at low pressure, CNR-ICR, ICR Publishing Centre, Rome 1993

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[10] Normal 43/93, Colourimetric testing of opaque surfaces, CNR-ICR, ICR Publishing Centre, Rome 1993

[11] Cremona thesis

THE USE OF STAINLESS STEEL IN RESTORATION WORKS. INTRODUCTORY STATEMENTS AND EXAMPLES OF APPLICATION

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Abstract

There is evidence that in historical buildings the use of metals – iron, but also copper, bronze and, more recently, cast or chilled iron or steel – has played a very interesting role. Connecting structures, linking together distant parts, stones or timber among the mas well as firming buildings after construction has rapresented an important part in the atr of building; beside that we should mention gates, staircases, windows and all the different kinds of connectors, used since ancient timesAlthough it is now an accepted fact that metals, in their different forms, have long been used in construction works, throughout the ages their role seems toh ave been often complained and even played down.
Some kinds of prejudice seem to persist even when we act nowadays, expecially referring to the use of steel and stainless steel in restoration works, where the nature of an ancient building may hardly seem to match with new applications.
Nevertheless steel and particulary austenitic stainless steel (AISI class 300) is taking on an increasingly important role in the conservation of buildings of historical value due to his clear advantage: reduced bulks, limited cost(in a life-cycle perspective), excellent strenght, the possibilità of immediate recognition and reversal of restoration work, and lastly durability comparable with the structure in which it is used.
The paper will present some case-studies in wich the use of stainless steel in restoration provided an efficient answer to the main questions: maintenance, control over tiem, calibrated approach to the structure.

Outlines on the use of metals [I]

When we think about the most used materials in history of architecture through the centuries it is easy to imagine, at a first step, building materials such as stone, bricks, timber, plaster or glass. Nevertheless there is another important category that has been sometimes neglected, but has often been of primary importance: metals in their different kinds, shapes and applications.
Most ancient buildings used iron or bronze expecially for connecting distant parts, linking together stones or timber mostly by means of bars. Ancient Romans, masters in the art of building, used metals parts with thriftness. In many other examples that can be choosen among ancient times, such as for example in Gothic architecture, the use of iron became increasingly important, and lead and iron cramps were necessary to this daring architecture - specially if we think about the impressive cathedrals of this period with their arches and cross- vaults.
In 15th century, the blast fornace enabled ore to be smelted continuosly and with other production progress it enabled the realization of wider and well made bars.

During the 16th and the 17th centuries iron was used massively in buildings; ironworkers used to stay on the site of construction, using semi-elaborated products such as square irons, and later on progress in the field of mechanization enabled to obtain flat sheets, very used for instance in Paris even in the nailing of roofing tiles.
In later times, from the 18thcentury on, the examples spread out in a wide range of applications. Mostly due to early industrial production and new foundry techniques that enabled the fabrication of objects in cast iron of large dimension, and the improvements in laminating and puddling techniques, iron and cast iron pieces were increasingly used in buildings. Iron columns, roof beams and floor joists became common and the new applications in most modern buildings of the day, such as train stations, greenhouses or exibition halls are well known.
The late 19th century may thus in many respects be considered the apotheosis of iron, at least in France, with the construction of such icons as the Eiffel Tower.
It is important to notice that progress in fabrication techniques favoured the dissolution of carbon and the production of an iron-carbon alloy, which constitutes steel. Although this led to the gradual generalization of the use of steel rather than iron, it was not untill the early 20th century that the new material definitively nudged out the old.
These are only few notes of a very interesting history that could cross the centuries and teach us how different materials and techniques has played a fondamental role in architecture. Particularely, the use of different metals can be an interesting lecture-key to which we refer the reader [1].

Anyway one of the most interesting aspect when approaching to this subject is to understand the role that any metal structure or device played when compared to the other parts of the building.
It is to notice that in most ancient buildings all metal parts were seldom left in sight, and more often were hidden inside the structure. There are two separate reasons for this attitude; on one hand there was the problem to protect iron or bronze parts from decay. On the other hand, the point is whether or not these parts had enough dignity to be shown.
Nevertheless in Gothic architecture, for instance, it is very common to see all these parts clearly. Regarding to this point, authors like F. Milizia [2] said that "well-maid buildings don't need this connections". Architects top the list among the detractors of the materials, Philibert Delorme (1514-1570) detested the way in which the Parisian master builders of his days used "large iron bars and huge keys". He pointed out, not without reason, that rusting iron caused stone to split. And even at the close of the 18th century, when iron was very used in construction, its opponents were loud in their disapproval.Rondelet for instance claimed that "irons should only be used when necessity makes them indispensable"

As pointed out there is evidence that metals, in their different forms, have long been used in construction works; so it could be logical to think of their use also in

restoration works. But sometimes a kind of prejudice seems to persist. The question actually goes back in times, and the use of iron in 19th century restoration works poses the question of the way in which restorers reacted to medernity and technological progress.
We should say that the 18th century had estabilished iron as a material to be used for adding stability of stonework or reinforcements of wooden frames. There are many examples of this application: the most spectacolous restoration worksite of this type is the restoration at Chartres cathedral in 1837-39, with the installation of an iron roof frame, subsequent to the fire of 1836. Beside the fact it was non-combustible, iron was chosen for its character of solidity and durability.
But after the work of Viollet-le-Duc, the use of iron tie rods and reiforcements was increasingly called into question. He pointed out that rusting clamps caused the splitting of the stones. He mantained that since they were made of wood and not iron they were only measures temporarely used to assist the construction work. His opinion had a great influence on his contemporaries, and his thought became the official doctrine, whose influence carried over well into the 20th century.
In the following periods we see different attitudes toward this matter. Somethimes the ideas of Viollet-le-Duc influenced the restoration choises, but other times some architects seemed to take distance from this point of view.

The use of stainless steel [II]

If we refer to the actual practice in restoration works there is evidence that a growing interest is shown toward the use of stainless steel.
Like all steels it is, as well known, an iron-carbon alloy in which the chromium presence enables it to passivate spontaneously with a protective oxide film. The increasing quantity of chromium as well as the presence of parts of nickel and molybdenum are as well useful to avoid corrosion.
As a "young" material, born on the Eve of the First World War, stainless steel was used in restoration works from the 60's on, and nowadays its use has greatly increased. The main reason is the possibility to improve static performance avoiding all normal steel defaults. Over the years, in fact, corrosion of normal steel come to act as a real "stone breaker" creating cracks and rust dripping as a result of the increased volume.
The use of stainless steel enables to avoid this problem: moreover, it is available on the marked in a wide range of shapes - like bars, pipe, sheet and band - and it is easily workable and weldable.
It is important to notice that the word "stainless steel" should better specified when giving advices on a restoration work, as its chemical composition should be properly known. Normally the austenitic series (chromium-nickel and chromium-nickel-molybdenum) is used in most applications as well as duplex ones (Austenitic-ferritic). Different environmental situations and significant structural diversity in monumental buildings leads to a careful selection of the type of material to use , its shape and dimension to be carefully evaluated.

Table 1 – Chemical analysis (percentage) according to EN 10088-1

EN \ el. %	C max	Mn max	P max	S max	Si max	Cr	Ni	Mo	Altri
1.4301	0,07	2	0,045	0,015*	1	17÷19,5	8÷10,5	-	N≤0,11
1.4401	0,07	2	0,045	0,015*	1	16,5÷18,5	10÷13	2÷2,5	N≤0,11
1.4016	0,08	1	0,040	0,015*	1	16÷18	-	-	-
1.4462	0,03	2	0,035	0,015	1	21÷23	4,5÷6,5	2,5÷3,5	0,10≤N≤0,22

*For bars, rods, sections and the relevant semi-finished products, a maximum content of 0,030% S applies

Table 2 – Indicative physical-mechanical properties of stainless steels according to EN 10088

	Materials - EN			
	1.4301	1.4401	1.4016	1.4462
Structure	Austenitic	Austenitic	Ferritic	Austenitic-Ferritic
0,2% proof strength $R_{p0,2}$ min. [N/mm^2] *	190	200	240	450
Tensile strength R_m [N/mm^2] *	500÷700	500÷700	400÷630	650÷880
Modulus of elasticity at 20 °C [kN/mm^2]	200	200	220	200
Elongation after fracture A % min. (long.) *	45	40	20	25
Mean coefficient of thermal expansion between 20 °C and 100 °C	16,0	16,0	10,0	13,0
Thermal conductivity at 20°C [W/m×K]	15	15	25	15

* According to EN 10088-3

Back to nowadays

When approaching to a restoration work many primary information are needed to enable a good project. As well known, each monument is unique, because of elements of its material culture, its historic nature and the relationship that links it to many different events.

Therefore every restoration project should attempt to achieve a number of objectives aimed to maximize building respect. First of all, to maximize the amount of original material that remains, limiting transformations and using devices not too invasive or of big dimensions. Then ensuring that work may be recognized and reversed whether it is added to or erected alongside existing structure. Also important is establishing a correct plan for ongoing maintenance with a continuous awareness of the evolution of phenomena over time. Then, last but not least, recognizing the time variable in a correct perspective. As the cost of stainless steel is about 3.5 times the cost of ordinary steel, its lifetime and durability is proportionately much greater. The preservation of heritage buildings involves working with materials with an extremely long lifetime, comparable to the one in which they are hosted, that allows monuments to survive over centuries. From this point of view only we learn to consider time as a variable with a positive sign, that can add value to the building rather than taking it away.

For all the reasons mentioned there is evidence that the use of stainless steel in restoration works is of big interest.

Case studies

Here we mention some case-studies, chosen between some interesting recent italian examples, to illustrate different possibilities in the use of stainless steel in restoration works

Structural reinforcement

An interesting example is the recent restoration of the Medici Castle in Melegnano.

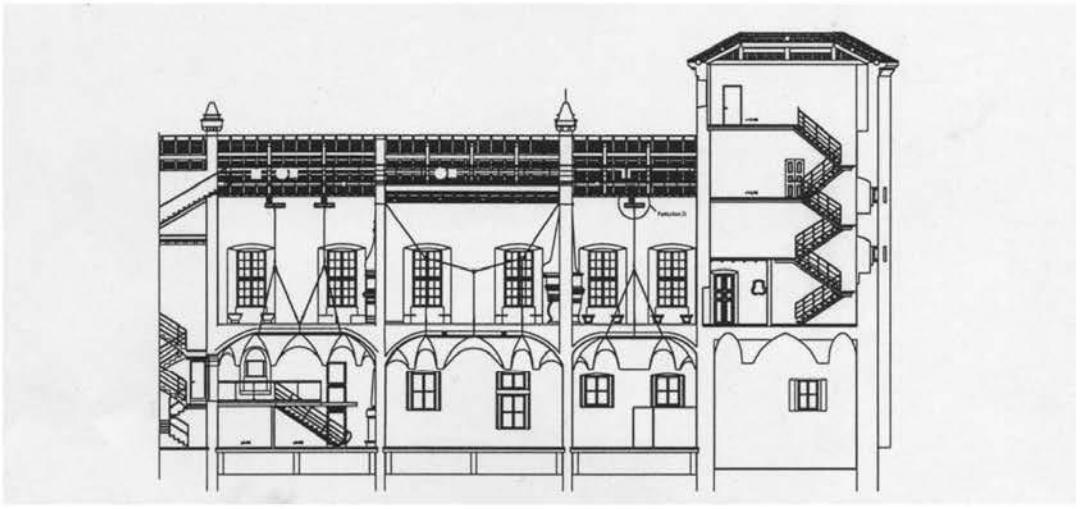

Figure 1 – Medici Castle in Melegnano

To allow public access it was necessary to restore part of the vaults of the castle. In this case-study the original wooden chains in the extrados were replaced, in the past, by a smaller number of metal chains positioned at the elevation of the pavillon, without actually restoring completely the load bearing capacity of the vaults and therefore its safety. The wooden chains interrupted the vaults continuity and decreased its resistance; they were left in place even when no longer had a structural function, creating a joint between various adjacent portions of the vaults.

The intervention involved the restoration of the monolithic nature of the vaults by demolition of the wooden chain in stages, replacing it with new masonry scarfed with the existing masonry. To make the structure safe during the works, steel cables were used to form a catenary, hanging the vaults to the upper roof structure.

A special technique was suggested to increase the load-bearing capacity and safety of the vaults: a series of perpendicular extrados stainless steel cables are used in a technique referred to the so called "reinforced arch". All this cables are connected to the main structure by threaded bars, thimbles, fasteners, and eyebolts all made of stainless steel.

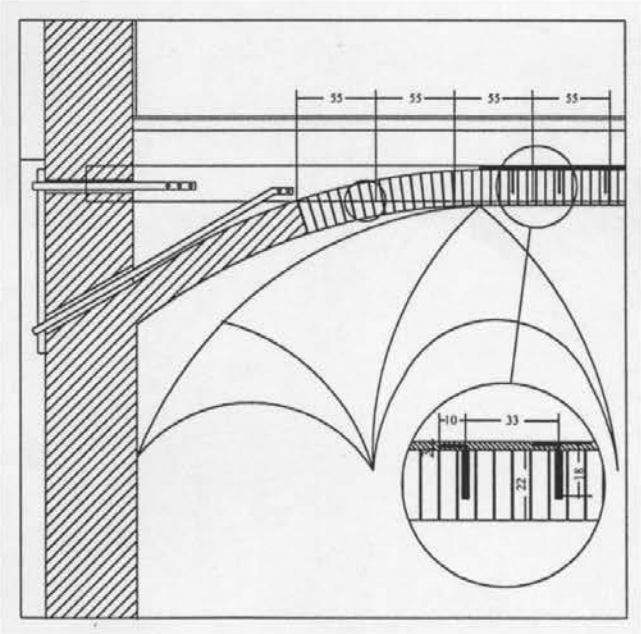

Figure 2 – Consolidation of the vaults of the castle using a stainless steel application

An other interesting case-study in the application of stainless-steel is the recovery of big statues, once used on the top of some peculiar building. Normally these statues, sometimes tens meters high, were made of an inner structure of iron holding an outer surface, generally made of copper or bronze. The worsening of atmospheric conditions and the increasing aggressiveness of polluted air are the main causes of the deterioration, due to galvanic corrosion, of the inner structure of these statues, with severe prejudice to their stability.
The intervention strategy is to substitute the damaged iron structure with a new one made of stainless steel - often interposing teflon seals between the two parts – avoiding successfully any corrosion. In the last ten years has been rescued this way the Statue of Liberty in New York and the Madonnina on Milan's Dome.
Another interesting case-study is the Angel on the top of Castel S. Angelo in Rome. Built in 1753 by G.B. Verschaffelt has been recently restored using an inner framework made of austenitic stainless steel bars (AISI 316L) holding the bronze cladding. The bars are linked to the basement to ensure stability; the sworn as well, once made of iron and hardly damaged, has been substituted by a new one made of stainless steel.

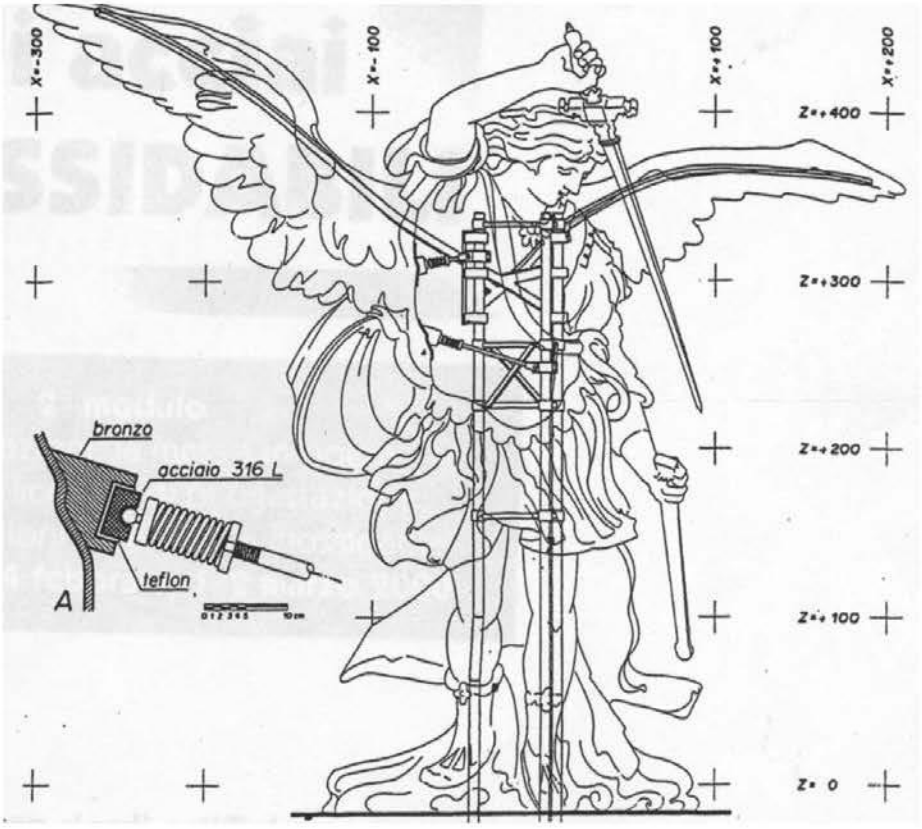

Figure 3 – Castel Sant'Angelo statue

New realizations

Another case study group deals with interventions that do not disguise the use of stainless steel parts in an important heritage building.

The case study to which we refer is the restoration of the old abbey in Monreale.

To update the spaces to modern needs the main guideline was to obtain maximum confort without damaging the existing structure. It is to notice that new parts are built inside the existing structure but paying attention to the recognizing and the reversibility of the new parts.

In this restoration project stainless steel has been used in different ways. First of all in reinforcing structural walls, using round stainless steel bars of different diameter. Stainless steel stub are used in the new wooden walls with a decorative intention.

New parts, like the new wall of structural glass, has been realized using a system of pillars and cables all made of stainless steel (AISI 304), according to the special Pilkington CIP system. Special care has been posed when connecting the new structure to the old brickwork.

The final aspect of the building after restoration is very pleasant, combining the fulfilment of the committee's requests whit a project of accurate technology and accuracy in details.

Figure 4 – The new structural glass wall

To complete these short notice it could be interesting to remind that has recently been realized a restoration project in a very famous masterpiece of Roman times, the "Anfiteatro Flavio" better known as Colosseo. In this project a portion of the arena floor has been reconstructed to allow temporary exhibitions.
Even in this "holy" space stainless steel has been used in many parts; somehow we can read this use as the falling of the last prejudice on the opportunity to use stainless steel in heritage buildings.

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THE CASBAH OF ALGIERS,
PLEADING FOR AN URGENT CONSERVATION STRATEGY

The Casbah of Algiers, a landmark of Algerian history in the heart of the capital city presents an urgent case for urban conservation. UNESCO inscribed the Casbah of Algiers on the World Heritage list in December 1992, but since then there has been continuous degradation in this historic center. This paper attempts to highlight the obstacles that have prevented any comprehensive conservation plan from being implemented since the country's independence in 1962. This study aims as well to make an urgent appeal to conserve the Casbah of Algiers, a "world heritage site" in danger.

The Casbah is situated on the coast to the north of the city and lies on an area of 70 hectares. While the number of houses was reducing due to dereliction and collapse the density was rising and reached 4,000 persons/ha, making it one of the highest densities in the world. In addition to high density, lack of services and poor sanitation has accelerated the dilapidation of the Casbah. This has accentuated the decline of the area as a whole and making it an urban slum. In spite of all this, the Casbah is still historically significant and retains its traditional character, which enabled it to become a World Heritage Site ten years ago.

The Casbah is characterised by a tight network of narrow and tortuous streets and lanes, cut with stairs laid out on the sloped site. Occasionally, it opens up into small urban squares, usually equiped with fountains and mainly used for neighbor's gatherings. The two main defense elements of the site were, the citadel on the highest point of the hill, and the harbour which fixed the lower limits of the town with its bastions.

The town's border being fixed by fortifications, it developed vertically into a high-density settlement. The city grew through the spread of more built-up areas, particularly two and three stories houses inside the walls. Its striking urban aesthetics were defined by the interlocking masses of white, geometric houses with roof terraces opening onto the bay. In this dense fabric, three main districts can be distinguished, the Marine, Higher and Lower Casbah.

The present paper starts by highlighting the significance and role of the Casbah, then a discussion follows on the main causes that led to its decay and disrepair. The last section examines the conservation dilemma, which lasted over the last 40 years; and concludes by proposing an urgent action to rescue the Casbah from vanishing.

Keywords: urban conservation, strategy, training, management.

Introduction

Algeria gained its independence in 1962, during the early years that followed the state embarked on colossal projects, such as education, industrialization, housing, and so on. The idea was to change the image of the colonized country to a new facelift of the independent nation. In 1962, Algeria had only one architect, and the government had to commission foreign architects and planners to deal with the new development projects. The Casbah of Algiers gained also a specific consideration; this is due to the settlement's role in the war of decolonisation and to its unique urban and architectural character.

Algiers has an area of 276 Km^2 and a population of more than 3 million. The Casbah is situated on the coast to the north of the city; the complex labyrinths and a fortress from the 1500s remain as reminders of the past. The Casbah of Algiers was founded in the 6th Century BC, and was constructed on a steep slope (118m.high), facing the harbour bay and the Mediterranean Sea. Its historical function was military and trade. The population of the Casbah grew from 60,000 in 1969 to reach 70,000 in 1980, a double of what was in 1830. While the number of houses was reducing, the density was rising and reached 4,000 persons/ha in few districts, making it one of the highest densities in the world. Lesbet [1]

Figure 1. A general view of the Casbah of Algiers seen from the lower part of the Casbah.

The Casbah reflects the essence of Algerian cultural identity. The "authenticity" of its form, its resilience to colonial interventions, as well as its legendary status in the war made it an obvious symbol of national culture. As Frantz Fanon pointed out, "native intellectuals" searched eagerly for "a national culture which existed before the colonial era", both as a precaution against being overwhelmed by western culture and as a matter of pride and self-respect. Lesbet, an Algerian native of the Casbah, Sociologist and Architect-Planner, established a strong link between the Casbah and Algerian identity: "it is there that Algerian identity is forged and constantly reinforced". The Casbah expresses a triple artistic, cultural and political dimension, which gives it a national importance". CeliK [2]

Since independence, the original urban and traditional families have been progressively abandoning the Casbah and moved to modern villas and flats on the outskirts of the city. In 1962 there were about 1,200 traditional buildings in the Casbah, going back to the Ottoman

era. Thirty years later, 250 traditional dwellings disappeared, giving an average loss of 20% of the initial number. Ministry of Culture [3]. The old houses have been rented to rural families migrating to the city. In the meantime the number of houses rapidly diminished due to deterioration and collapse, about 50 dwellings collapsed between 1975 and 1979. While the number of dwellings was diminishing, the density in the remaining areas grew progressively, in the whole area (2,200 person per hectare, 3,000 in some areas). Lesbet, [4]

In the Casbah, houses are rented out room by room to be occupied in patterns they were not designed for. This resulted in the scarcity of services, poor hygienic provisions, and lack of maintenance of the already fragile built fabric. Ancient plumbing systems are rotting and leaking and need to be repaired. In addition to subdivision of houses, the Casbah tenants changed and modified the existing dwellings by adding new rooms on the roof. In many cases one storey was added on the roof, without any consideration of the capacity of load bearing walls or foundations underneath. This affected dramatically the structural stability of the entire buildingleading to its collapse.

With the absence of any legislation and planning control to protect the Casbah, each time a house is demolished, it is replaced by an apartment block, which dominates the surrounding horizontal skyline and obstructs the view of the sea for the neighbours. The *Basse Casbah* in particular, is dwarfed by modern high-rise extensions. The historical pattern, whereby all buildings were terraced to the sea and enjoyed scenic views, has been distorted. The destruction of heritage buildings opened the way to the emergence of alien buildings, such as the high multi story parking facing the old mosque *Djemaa el Kebir* and the new music institute facing the *Bastion 23* monument.

The 1967 legislation restricted the preservation to monuments and archeological sites only. Little attention has been given to historic cities and urban centers. The lack of such legislation created more difficulties in the regulation of new development work. Furthermore, lack of planning control encouraged industrial and economic activities to be injected haphazardly in the historic center. These have brought about additional problems of degradation through pollution, vibration, demolition to install new equipments and so on. In addition to the problem of dwellings collapse, many traditional public facilities disappeared. From 130 mesdjed (mosques) and 18 (*Zaouias*) only 10 *mesdjed* and 2 *zaouias* survived, while only six public baths (*hamams*) remained from an original number of one hundred. Faghih [5].

Figure 2 and 3, showing the threatening cycle of deterioration and dilapidation in the Casbah

The doubts about the future of the Casbah was marked by the continuous demolition of traditional buildings. One of the obvious examples of this situation is the *Lalahoum* district which was completely razed by the authorities in 1983. This occured despite the protests of

architects and UNESCO experts, who saw no reason to perpetrate such destruction. A total of 70 houses were demolished, only one house survived as the owner resisted and refused to leave his house and was then rescued. (Lesbet, 1987, p.66) The cycle of deterioration did not stop, as if these demolitions were not sufficient, that a decision was made to open three roads inside the Casbah. Algerie Actualité [6].

Today, the Casbah is perceived as an urban slum in the heart of the capital. It is seen as the home of low income and desperate families, a place of misery, overcrowding, violence and insecurity. The present population of the Casbah is 70,000 concentrated on 37 hectares (13 hectares of representing the loss of its dwellings), with an average occupancy of 12 persons/per room. The traditional house originally designed for one family, now is sheltering around 6 families, an average of one family per/room, even the common spaces, such as the *Wast Eddar*, kitchen and *Eshine* have been occupied and subdivided. Of the 1,200 traditional dwellings dating from the Ottoman era, only 945 dwellings remained.

The Conservation Dilemma

Retrospective of Actions: 1962-2002

The "*Atelier Casbah*" the first body in charge of conserving the Casbah was created in 1968. Since its establishment, the "*Atelier Casbah*" faced many obstacles in trying to carry out its action plan, it was being shifted from one agency to another. The COMEDOR, a body in charge of the urban planning of the city of Algiers, was also created in the same year, 1968. This institution was also assigned the task of conserving the Casbah. Therefore, the Casbah issue was tackled by two bodies in parallel without any coordination between them. In 1972, The *Atelier Casbah* was transferred to COMEDOR, the *Atelier Casbah,* was then disrupted 3 times in less than 4 years. Lesbet [7]

In 1975, the COMEDOR published the General Orientation Plan of Algiers (POG: *Plan d'Organisation General*). This document recommended the preservation of all the traditional buildings, and restructuring the Casbah according to its original traditional pattern. In order to implement this orientation plan a call for the UNESCO experts was made. In 1978 an important delegation of UNESCO experts came to the Casbah. After undertaking the necessary studies a complete report was submitted to the Algerian authorities. This contained enough detail to allow work to be embarked on the basis of the (POG) proposals. However for no reasons the report was totally ignored, and no further steps were taken.

Due to the staggering housing crisis, and the poor living conditions of the Casbah dwellers, in the early 1980s major riots occurred in the Casbah. In the of purpose finding an appropriate solution for this uprising, the authorities found it easy to demolish entire historic districts and rehouse their inhabitants in the outskirts of the city. In July 1982, the authorities decided to demolish the *Lalahoum* and *Souk El Djemaa* districts. This action was accomplished despite the opposition shown by various technicians, artists, intellectuals. Furthermore, UNESCO prepared an urgent proposal for rescuing the Casbah, and to discourage the authorities from demolishing these two districts. Despite all these efforts, in 1983, the *Lalahoum* district was totally razed, its inhabitants were scattered out to many parts in the periphery of Algiers.

In fear of more demolitions, in 1983, UNESCO made proposals to include the Casbah on the world heritage list. At that time, the Algerian Government did not show any enthusiasm for this initiative. In 1984, another decision from the presidency office was taken to destroy the *Bastion 23* historical landmark to construct a road along the sea. A general mobilisation was

then mounted to stop this decision, as a result this project was abandoned. In 1985, the OFIRAC (The Office of Intervention and Regulation of the Planning Operation of the Casbah of Algiers), was created to replace the *Atelier Casbah*. Zadem [8]. This organisation was established in order to tackle all the problems related to the Casbah (social, economic, legislative, and technical, etc).

In order to reduce the tension rising amongst the Casbah inhabitants claiming better housing conditions, about 3,800 new apartments were provided for the needy people during the period (1985-1987) in the outskirts of Algiers. Had they been wisely distributed, this number of units would have been sufficient to reduce the population of the Casbah from 70,000 to 40,000 inhabitants. This operation raised the tension amongst the Casbah inhabitants, which showed their anger of the way these apartments were distributed.

In October 1988, social explosion broke out and many people went out to streets and organised riots to claim better living conditions, more democracy and freedom. In order to ease the population's tension and uprising the state decided to revise the national constitution, and thus allowed the formation of opposition parties and public associations. In this context, many public associations were created, and a number of them positioned the protection and safeguard of the national cultural heritage and particularly the Casbah of Algiers as their main priority. Since the early 1990s, the main role of NGO's was awareness through differents medias and newspapers. They played a major role in listing the Casbah as a heritage site at the national level in 1991, and they continued their efforts to add it on the world heritage list.

In December 1992, UNESCO inscribed the Casbah on the World heritage list. This meant that the Casbah would be in a safer position. However this classification coincided with the beginning of the "Black Decade" that Algeria underwent afterwards. The Casbah, was a dangerous area to go to as it formed a ground for many armed turbulences and riots. This had a negative impact on the state of the Casbah, most of the restoration work stagnated for about 10 years. In 1997, the Municipality (*Wilaya*) of Algiers was given more territorial competence and became a "governorate". While the OFIRAC was still existing a parallel institution was created called the Delegation of the Casbah.

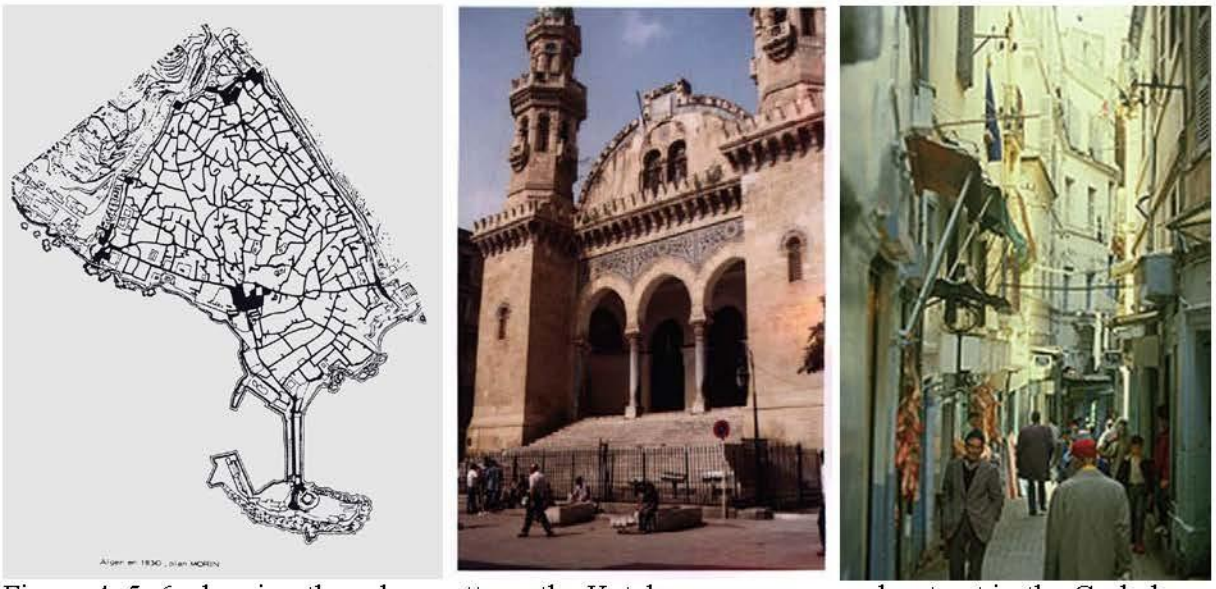

Figure 4, 5, 6, showing the urban pattern, the Ketchaoua mosque and a street in the Casbah.

After a decade of stagnation, the 23rd February 1998 marked the restart of the conservation work in the Casbah. In the same year, the Municipality of Algiers organised an international colloquium on the rehabilitation of the Casbah. This was followed by the organisation of an international competition for the rehabilitation and safeguard of the Casbah. The CNERU, (Centre *National d'Etudes et Realisations en Urbanisme*), a state urban planning consultancy was selected to prepare the new Casbah safeguard plan.

On 15 June 1998, the Governement issued an important ordinance concerning the protection of cultural heritage, (No 98-04) replacing the previous ordinance 281/67 established in 1967. This new ordinance inculdes the provisions for the legal protection of listed monuments, historic cities and centres, as well as movable and non material heritage. RADP [9]. The Delegation of the Casbah was replaced in January 2002 by another stakeholder called (Functional Unit in Charge of the Rehabilitation, Safeguard and Management of the Casbah of Algiers). At present, this new institution is the main link between the municipality, the public associations, and the various ministries involved in the Casbah.

Table 1. The main heritage players intervening in the Casbah of Algiers

Period	The Heritage Body	The Institution in Charge	The Body Status		
			State	NGO's	Private
1968	Atelier Casbah,	Ministry of Culture	-		
1968	COMEDOR	Presidency Council	-		
1972	Atelier Casbah,	COMEDOR, Presidency Council,	-		
1985	OFIRAC, The Office of Intervention and Regulation of the Planning Operation of the Casbah of Algiers,	Ministry of Housing,	-		
Since 1990	10 Public associations such as Association of the friends of Algiers, "safeguard the Casbah",			-	
1997	Delegation of the Casbah	Governorate of Algiers, 1997	-		
2002	Functional Unit in Charge of the Rehabilitation, Safeguard and Management of the Casbah of Algiers,	Algiers Municipality,	-		

As can be seen from Table 1, a myriad of institutions were created since 1962 to deal with the Casbah problem. Moreover, apart from the state heritage players and the NGO's there has been no involvement of the private sector in the Casbah. Despite all the shortcomings and obstacles stated above, it is necessary to present the main restoration attempts that have been accomplished during the last 40 years.

Restoration Projects

The citadel built in 1556, was the first restoration project undertaken in the higher part of the Casbah. This heritage complex encompasses the Dey Castle, castles of the Beys, two mosques, gardens and annexes lying over an area of 11,000 m^2. The restoration work started in the late sixties and is still underway. The restoration of the historical monument (Bastion 23) was the second major operation; it was launched in July 1988 with the assistance of Italian experts, and it is now open for public as a museum. This historic monument is an ensemble composed of three palaces, nine houses and defense batteries. It represents the last testimony of the destroyed marine district and lies on an area of 4,000 square meters.

Figure 7 and 8, showing the restoration of the Bastion 23 and a public fountain in the Casbah.

In addition to these two major projects, around 40 dwellings were restored. Some new facilities were introduced in the Casbah, namely 3 libraries, 2 kindergartens, and 16 open- air areas. Furthermore, two main streets in the Casbah (Rue *Rabah Riab*, and *Sidi Driss Hamidouche*) were rehabilitated along with the reconstruction of five public fountains. (The Ministry of Culture, 1992) Despite the problems of insecurity encountered during the last ten years, the Ministry of Culture and Communication managed to implement 11 restoration projects during the period 1994-2000. These are mainly monuments: (10 mosques, one castle (*Dar Aziza*). In addition, few refurbishment work were undertaken on the main buildings in the Basse Casbah, in an effort to recreate the original physical link between the Casbah and the sea. Zadem [10].

It can be noticed that there has never been any comprehensive intervention in the Casbah. Most of the work was piecemeal without any considerable effect, and not worthy of the world heritage status of the Casbah. Unsignificant number of buildings have been restored and rehabilitated since 1962, most of them are monuments, while dwellings were left to face their fate alone.

The Need for an Urgent Conservation Strategy

In order to change the image of the urban slum, there is an urgent need to implement a sustainable development approach in the Casbah. It is important to stress that the residents of the Casbah have the right to live in a decent shelter, work and be proud to care for their historical setting. Therefore, the first action to be taken is to stop the drift of rural migrants to

this historic center. The second one should aim to reduce the occupancy of houses from 6 to 3 families per house, which can be achieved by rehousing these families in the reconstructed dwellings on the vacant lands.

The right to work is another imperative of sustainable development; there is a need to encourage the revival of the traditional crafts in the Casbah. These will give a new breath of life to the Casbah, and will regenerate the economic and social life of the quarter. In addition, it will enable the creation of jobs for the many people unemployed. Furthermore, heritage tourism can be a catalyst to sustaining the heritage center by introducing the hard currency, creating jobs and thus extending life for the historic city.

The present alarming situation of the Casbah demonstrates that the fundamental problem in urban conservation is the establishment of an appropriate heritage management policy and community development actions. These measures can play a major role in sustaining the conservation and regeneration of this historic city. Obviously this can be achieved by encouraging a solid partnership between the private and public sectors, as well as the NGO's associations, for the safeguard of these non renewable historic resources.The following guidelines might help pave the way for a salvage action in the Casbah.

1. In order to avoid diluting responsibilities there is a need to set up one body in charge of conserving the Casbah. The new heritage player (Functional Unit in Charge of the Rehabilitation, Safeguard and Management of the Casbah of Algiers) should have the freedom and the necessary means to intervene in the Casbah.

2. Before it is late, it is crucial to document and survey the remaining 945 buildings of the Casbah, especially those under threat of demolition. This will form a basic resource for future infill and reconstruction projects.

3. There is a need to stop the external rehousing process for the Casbah families. The solution should be found inside, by a parallel process of reconstructing the demolished buildings and on site rehousing of the Casbah inhabitants.

4. With the establishment of the cultural heritage law in June 1998, there are no further reasons for delaying the implementation of the recent Casbah Safeguard Plan. There is an urgent need to lay out the necessary means to implement this project and no delay is permitted for action.

5. During the last 40 years the Casbah inhabitants have been marginalised and ignored for participating in the future of their quarter. It is highly believed, that without a strong collaboration between the inhabitants, especially the owners, the associations and the state players, the Casbah of Algiers will not be saved.

6. One of the elements that contributed to the failure of conserving the Casbah, is the lack of specialised enterprises in the techniques of historic restoration and rehabilitation. Due to the richness of cultural heritage in Algeria, there is an urgent need to establish special training schools in heritage conservation. The latter will form specialised manpower who can contribute in safeguarding the remaining heritage buildings.

7. It is vital to establish an integrated strategy that will encompass the various heritage players to rescue the Casbah. Now that the Casbah is on the "world heritage list", it should not be left to become a "world heritage at risk".

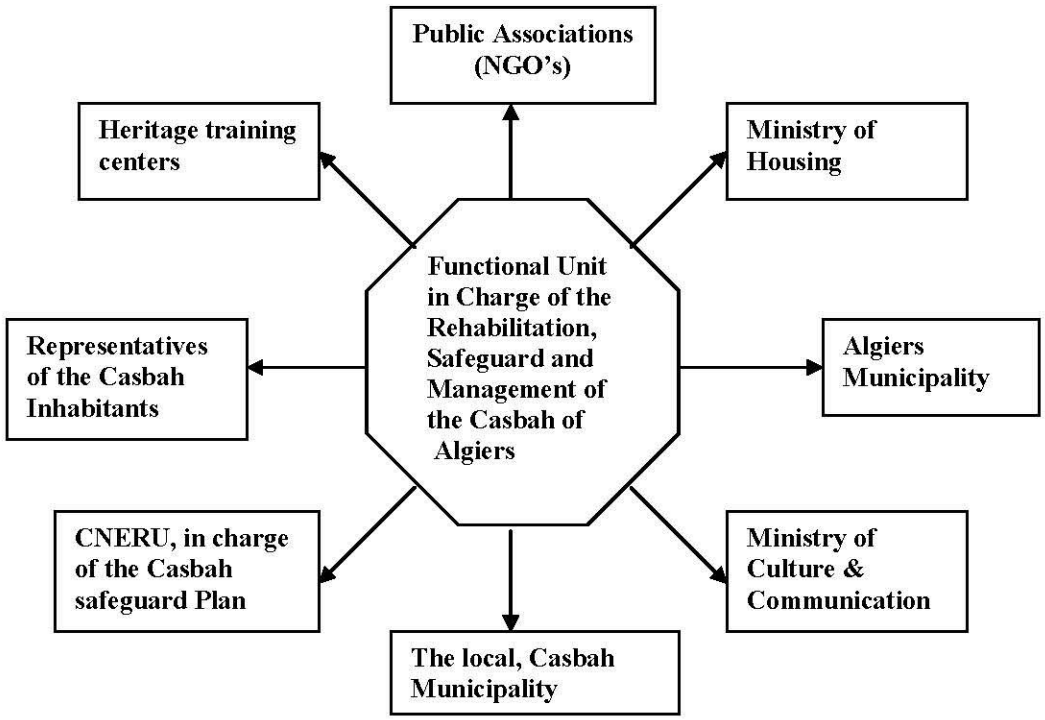

Diagram 1. A proposed Organisational Framework in the Casbah of Algiers

The above Diagram 1, attempts to propose a management framework for the conservation of the Casbah. The Functional Unit in Charge of the Rehabilitation, Safeguard and Management of the Casbah of Algiers is the main coordinator body between the other heritage players. In order to implement the recent Casbah Safeguard Plan, this coordinating body should be in close contact with the Algiers Municipality, the ministries of Culture and Housing and the CNERU. In addition, this unit should be open to the Casbah inhabitants and the general public, the different associations, as well the training and research centers. Therfore, It should be located in the heart of the Casbah quarter.

Epilogue

Conservation of historic centers usually faces one main difficulty: housing of the existing dwellers and keeping a mixed socio-economic population. In other words, and as the common saying states: "it is easier to deal with stones than with human material", there is little meaning in restoring historical buildings if they are not accompanied with the strong social and economic effort in favor of the local inhabitants.

The dilemma of conserving the Casbah is too complicated; it presents one of the rare dichotomies between providing a decent shelter to the low-income inhabitants and the need for urgent urban conservation. It has been reviewed how housing shortage influenced the state of buildings in the Casbah. Therefore, the issue of the Casbah cannot be solved at the local level but should be dealt at the regional and national levels. In the light of the problems facing the Casbah of Algiers, further study and research is needed. The idea that effective action to

promote the conservation and management of historic centers requires the implementation of a common strategy which can be based on the following assumptions:

- Historic centers are meaningful only if inhabited; they are the reflection of the past and the people who live and work there,

- Consuming and marketing heritage resources should be kept to the level of not threatening the identity and distinctiveness of the historic cities,

- Historic centers must work in a way to upgrade the living conditions of the low income families that inhabit them, and should therefore contribute to ensure their basic needs.

The objective should be to rationalize the past with the present and future needs of the community. Historic centers provide an inheritance of the past and the product of change that society has required for its needs. This process should continue so that the present generation lives its own mark on the historic environment for future generations. However, the most important question is to look to the long term and plan the balance of permissible change and ensure the rehabilitation and revitalization of the historic center in a sustainable way.

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HERICARE - DOCUMENTATION SOFTWARE AND ONLINE-DATABASE FOR CONSERVATION

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Abstract

An innovative online database and documentation software titled hericare has recently been developed by the Hornemann Institute, Center for the Preservation of World Cultural Heritage. hericare serves the proper documentation of preservation projects and offers easy worldwide access to practical and up-to-date information from all lines of specialization in the field of conservation-restoration.

hericare's online database provides the data on examinations, methods and materials, it is possible to retrieve complete sets of additional information on the documented conservation projects. A variety of features help to search the reports: the results are displayed by chapters, a summary of the report adds to clarity, previous searches are listed and can be relaunched and refined. The Forum facilitates the exchange of comments, ideas and further information on techniques and products related to a project.

By way of hericare's documentation program, projects can be easily and quickly documented on the user's local PC or online. In order to simplify the user's input, the typical documentation record structure will be a pre-determined standard: Object Identification, Object History, Materials and Methods, Condition, Measures, and Summary. Pull-down menus facilitate specialist term entries. The user can attach additional files, tables or existing texts. Addresses, literature, digitized images as well as examinations and products can be archived, in order to revert to this information during later documentation work. A conversion tool allows the user to continue working on the documentation in his own text processing program if necessary.

1. Idea and concept

The acronym hericare stands for heritage conservation and restoration experience. hericare consists of two components, an online database called „hericare-database„ and a documentation software called „hericare-docu„. In accordance with the aims of the Hornemann Institute the purpose of hericare is to collect and to provide complete conservation reports (and results of research projects) to experts in the field of conservation and restoration, and therewith to support the international exchange of information and quality of preservation. Experience concerning materials, methods of treatment, products for conservation and results of examinations gained working hands on in a project, could be very valuable information to other experts, if it is available

without loss of (sometimes particularly) important details due to summarizing or editing it for publication.

The idea of providing complete and detailed information was derived from MONUFAKT, a database containing conservation reports, exclusively dealing with monuments damaged by immissions. MONUFAKT, set up in 1987 and formerly run by the German Umweltbundesamt, Berlin, was intended to make the reports searchable and to interrelate the information. Input, retrieval and output of information was done by the staff at the Umweltbundesamt.

The Hornemann Institute inherited the 250 conservation reports and extended the concept:

- To reach a larger audience and to fasten the information retrieval, the database was designed as online database (being accessible all over the world at relative low costs) with multilingual user interfaces in English, German, French (in preparation) and Spanish (in planning).
- To include all lines of specialization in cultural heritage conservation (offering a lot of interdisciplinary information for different specialists), the structure of the documentation scheme was simplified.
- To facilitate the documentation of preservation projects the documentation software *hericare*-docu was developed. Thus to assist and encourage the user in his documentation work and to enable the Hornemann Institute to easily introduce the resulting reports to *hericare*-database.
- To keep information up to date, the *Forum* gives users the opportunity to make comments and/or suggestions to every report (the *Forum* is accessible with the report and can be searched too).
- To facilitate the use of the software and the access to the database to the greatest extend, every action is described in the help files. All buttons are linked to the Context Sensitive Help. Additionally several master reports and a user manual for download are available.

hericare intends to complement the existing databases on conservation literature and the conservation reports and research published on some institutions website, such as the Bibliographic Database of the Conservation Information Network [BCIN 2003] and the Art and Archaeology Technical Abstracts [AATA 2003] as well as the Conservation Information database run by the Canadian Conservation Institute [CCI 2003] or the Getty Conservation Center PDF Publications [Getty 2003].

The documentation records created by means of *hericare*-docu will be taken over unabridged from their respective authors, conveying their expertise and useful details without any alterations. The required minimum of information is indicated above the input fields in *hericare*-docu. Incoming reports are checked and sent back in the case the required fields are not completed.

Furthermore, the *Forum* permits the exchange of information, ideas and comments on the described techniques and products between colleagues even if a user has not handed in a complete report of his own.

The concept for *hericare* was developed in the Hornemann Institute between 1999 and 2001. During the developmental phase, experts working in the fields of conservation (of monuments and sites, as well as in museums), database development, software ergonomics and library systems supported the institute. Hericare is accessible since February 2002.

2. *hericare*-docu - documentation software

With the help of the documentation program hericare-docu, conservators, restorers, architects and other specialists in the field can easily create documentation records of their current preservation projects in their workshop or in situ. Particular emphasis has been put on intelligibility and user-friendliness in order to assist users from of any cultural background. Therefore a layout was chosen that has the most resemblance to the wellknown Microsoft products.

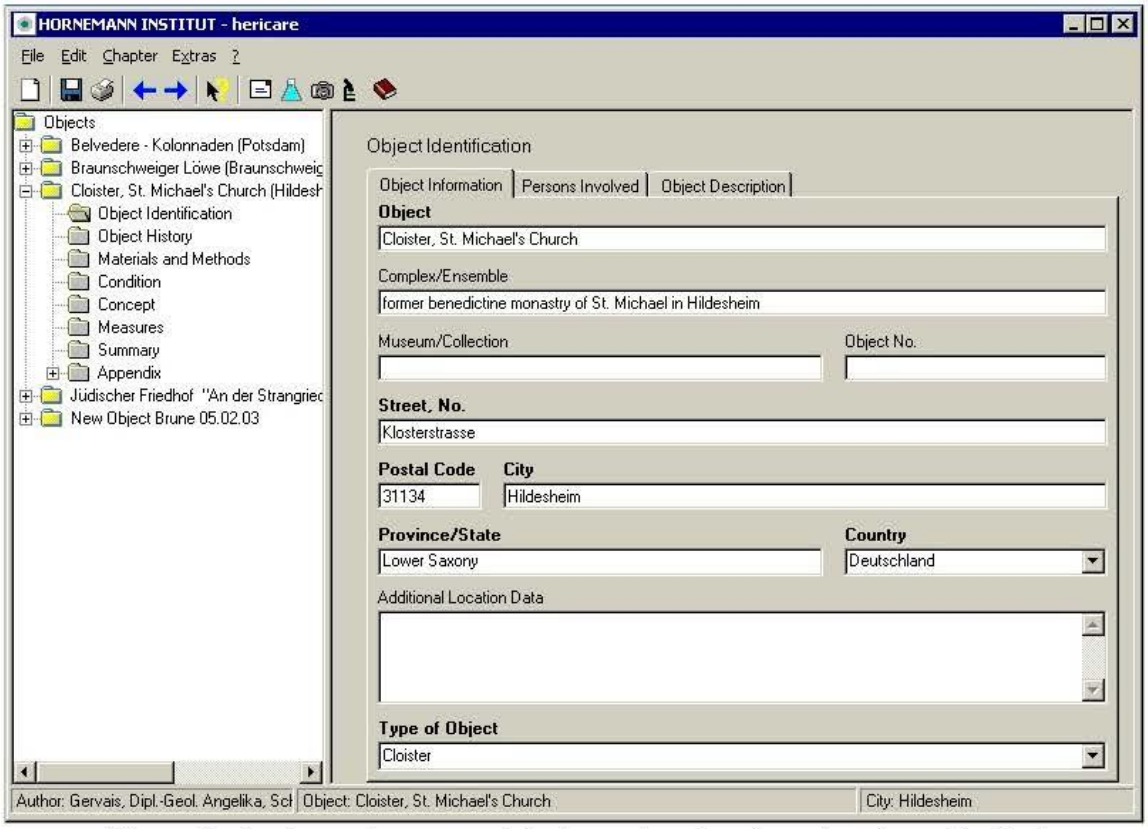

Figure 1: hericare-docu user interface, showing tree structure of objects and chapters (left side) and user input fields (right side)

Navigation on the level of the objects is possible by means of the tree of folders, like it is on the level of the chapters of one object, additionally the chapters can be navigated through by the blue arrows in the icon bar *(Fig. 1)*. Within a chapter there are up to 4 tabs, with the input fields on them, to click at. The number of tabs depends on the amount of input fields that are necessary to that chapter *(Fig. 1)*.

2.1 Structure of reports

The structure (scheme) of the reports keeps a general level, so as to guarantee that all areas of specialization can be covered. In accordance with the standard structure of documentation records, each report is divided into the chapters: Object Identification, Object History, Materials and Methods, Condition, Treatment Plan and Measures.

The chapter Condition, as well as the chapter Measures, can be subdivided into subfolders describing specific damages and actions taken respectively, if this should be required due to the amount of the available information. Each new Condition and Measures subfolder contains the same specific input fields on its tabs.

An Appendix lists all figures, examinations and literature cited in the input fields of the report. A summary adds to clarity when the conservation report is published online in *hericare*-database. To report on extensive projects or large objects, several „parts of an object„ (subdivision of the main object) with the same (predefined) structure as described above can be created.

Hericare-docu offers therewith a scheme to follow during documentation work. It might not fit for every purpose and some specialists eventually will miss a field. But the general level structure allows to introduce every information to the predefined input fields. At this moment hericare is a first launch and we will keep on developing it with the help of the users expertise.

2.2 Working with the software

In order to enhance the usability of the software, the program has among others the following features:

- Input fields of different size: single row fields for one term or fields up to 60000 letters were necessary.
- Listing fields: for adding authors *(Fig. 1)*, citing products, literature etc..
- Internal databases assist the user in archiving and citing addresses, products, images, description of examinations and literature *(see icons at Fig. 1)*.
- Fields with drop-down menus: to choose from a list of terms. The menus can be edited by the author. In future special drop-down-lists will be available for the different lines of specialization using different terms.
- Users can copy text blocks from existing text files and paste them into the input fields. It is also possible to attach complete files to some of the fields.

- Import and Export functions enable the transfer of data between several, locally separate participants in one project.
- Complete reports or parts thereof can be converted into RTF files, allowing the user to edit them in his own text-processing program. The records can thus be adapted to a corporate design or to any form of layout which customers or clients may use.

hericare-docu is available as a single user and as a network version with unlimited number of users. The latter enables institutions and companies with several workstations to use the internal database, for example the addresses database, commonly and reducing the amount of double input.

The users can not only use *hericare-docu* for publishing their work in *hericare-database*, but also as a tool for everyday documentation. In such case the scheme can be filled out partly only with the information favoured. To find objects the list of objects displayed in the file tree can be sorted alphabetically by the name of the object or by the name of the city.

When a report is completed and wished to be published, it can easily be exported from the software and send to the Hornemann Institute by email or by postage. The institute will check if all required fields (with bold titles) are filled out and load the report to the database by a click. Reports will not be reviewed, but incomplete reports will be send back to the author to be completed.

3. *hericare*-database

hericare-database contains the documentation records created by means of the *hericare*-docu software. These can be retrieved throughout the world via Internet. Any registered user can view the reports in the database, get valuable information and exchange technical experience with their authors.

3.1 Information Retrieval

There is a variety of options to search the inventory of records, thereby making detailed information about the condition of objects, applied measures and products and experts involved in conservation-restoration available. By combining terms in the Advanced Search new aspects of information can be generated out of the data.
The query options consist of

a) the 'Standard Search': a single input field combinable with the chapters of the reports,
b) the 'Advanced Search': four input fields each combinable with a section of the report to be chosen,
c) refining a search by searching the result (whole reports) again,

d) the 'Search History', that lists all previous searches of the session,
e) searching a period or a dating by entering special operators

Moreover, a list displays all reports in the database sorted either alphabetically by name or city (location) or by date.

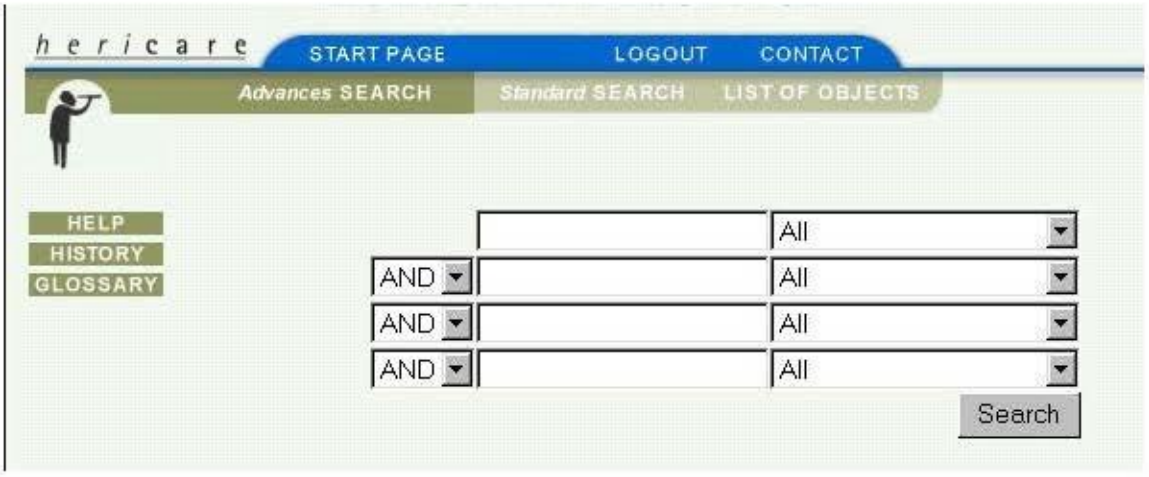

Fig 2 hericare-database: Advanced Search features

3.2 Display of information

A search result lists the reports with the chapters in which the searched term(s) have been found. By clicking the chapter the report is opened and the term(s) are highlighted.
The reports are displayed in the database with chapters accessible by buttons *(Fig. 3)*. For viewing the database please see "4. Access to hericare" for a link and the access data.

3.3 Contents of the Database

hericare-database contains around 350 conservation reports on monuments and objects. Among these all conservation projects that have been sponsored by the Deutsche Bundesstiftung Umwelt (German Federal Environment Foundation). So far, subject matters tend to focus on the conservation of stone, wall paintings, glass and metal. Currently, the majority of datasets are in german language, but more english reports are following from the already existing co-operation with polish universities teaching conservation. The Hornemann Institute seeks to find more co-operating partners from all countries.

Fig. 3 hericare-database: Search result: conservation report on Cloister of St. Michael's Church

4. Access to *hericare*

The ***hericare*-docu** software, is available on CD-ROM or for download on Internet, both for the single user and the network version. While the software has been designed for Windows platforms, the Hornemann Institute also prepared an online version that is independent from the type of operating system used. It is accessible by internet at the hericare homepage (www.hericare.com)

A possibillity to access hericare-database has been installed exclusively for the participants of the OWHC Congress at the hericare homepage. The temporarily user name is OWHC-Congress and the password is U2faxs.

5. Conclusions

hericare demonstrates how information on preservation projects can be made accessible to all for the benefit of the cultural heritage as such.?

Since the Hornemann Institute wishes to contribute to the global transfer of knowledge, the inventory of reports in *hericare* is projected to increase throughout partnerships with other institutions, such as museums, conservation authorities, universities and schools. The structure and the programming of *hericare* have been custom-tailored to permit extensive co-operation between different entities in the field of cultural heritage.

This presentation may help to establish such partnerships to the better under-standing and preservation of the world's heritage.

Currently, the documentation software and the database are available in English and in German. A French version is being developed. Depending on the funding a spanish version is intended to be realized later.

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PROTECTION AND REHABILITATION OF HISTORIC CORE OF PRIZREN (KOSOVA)

Turning back to life and re-owning cultural identity through joint actions of Department of Culture (Ministry of Culture) of Kosova, Polytechnic University of Bari (Italy), UNMIK and Municipality of Prizren

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Abstract

The author is a member of the board of experts that coordinates the preserving action of the Historic Core of Prizren (Kosova), inscripted in the WMW.
Prizren Old Town represents both unique and universal values. The fabric gives the town outstanding values. Prizren houses the only city core in Kosovo with a remaining pre-industrial pattern and vernacular architecture of high cultural value. At the same time Prizren is a symbol for Kosovos long lasting and multiethnic history which gives the town universal values.
The complexity of the Old Town of Prizren, especially the southern side, demands new tools for planning and preservation
The study will indicate the methods of surveying and of implementing the proposals of the plan. This paper also aims to expose activities that are coming up, concerning education and training facets related to the methods here adopted for on-site survey: specially close and effective are the relations among the institutions involved that make this work possible

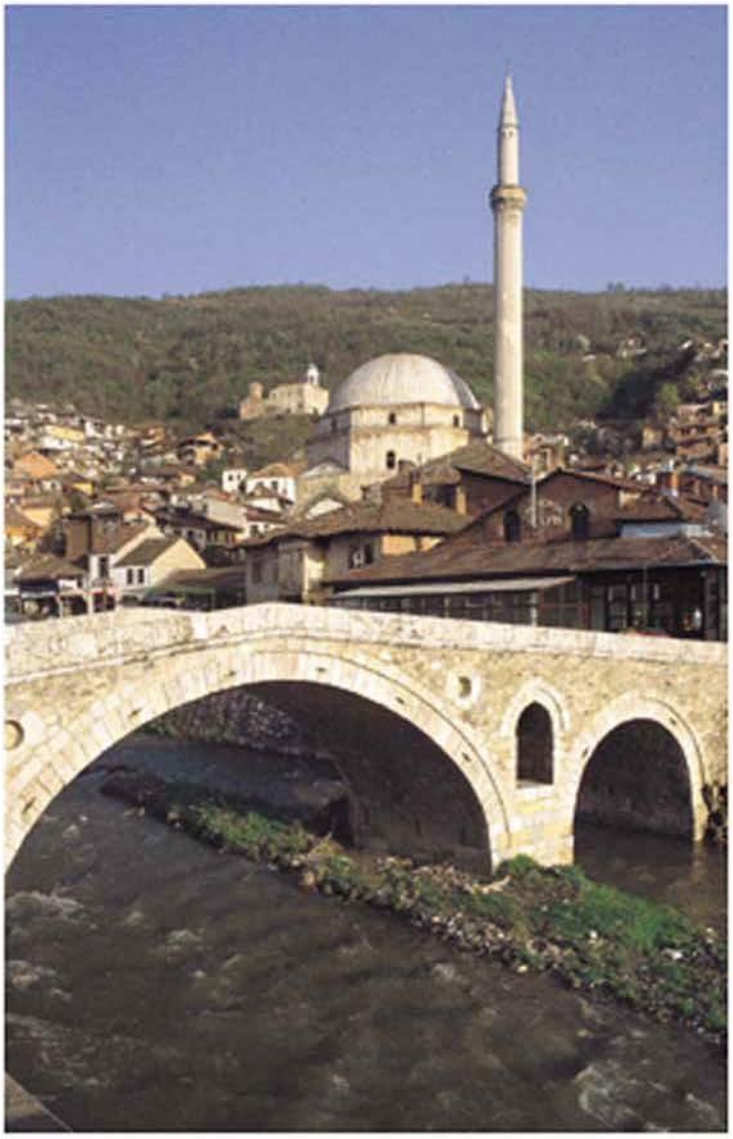
Description of the historical and environmental characters

The historic city centre of Prizren is one of the most important in Kosovo and it's one of the less damaged in the recent war.

However, it's possible to observe that some wide zones in the historic city centre are menaced in their own integrity by many collapses due to not natural reasons.
Moreover, the generally low construction quality of buildings, joined to the lacking attention to maintenance issue, generally noticed in this context, leads to frequent events of marked degradation of the materials, streets and public spaces.
The minor building contributes, in a considerable way, to determine the full value of historical city centre, but the lacking materials and the simplicity of building techniques hold a richness of contents regarding the close relationship between the citizens and the natural environment, and between this one and the urban space.
Infact, the town's identity cannot be separated from the particular country condition in which it grew.

Prizren was one of the chief towns of Ottoman Empire in Balkans, but its territory keeps some important traces of a past that begins with Romans until the conversion to Christian period (with some important buildings still present) and goes to Serbian period and the following Ottoman Age.
This testifies the exceptional historic and architectonic value of this town and its irreplaceable role for Kosovo culture and for the whole mankind.

Today the cultural meaning of Prizren, its main richness, is in a serious and immediate danger because of the lack of rules able to promote urban development in harmony with the urgency of preserving the most important elements of its own culture, history and identity.



Known since ancient history as Theranda, from roman foundation, the town developed along the trade road that crossed the Balcans called *Egnatia*. During the byzantine period the city became known as *Prisdriana*. In XIII century it subsumed into the kingdom of Stephan Provencani. It was at the same time a city of free trade, a capital city, a bishop's residence and a nest of art and culture, protected by two sturdy fortresses.

At the end of XIV century, conflicts and political disruption caused its decline, and in 1455 the town came under Ottoman administration.Then the city flourished again: that is testified by the construction of several Mosquees, one Hamam and three or four *tekka*.

In recent decades, rapid growth of population, pressure of building and traffic, the recent war, the weakness of both regulations and institutions and a deep lack of funds

posed a severe and urgent threat to this fabric of history as well as to the quality of life of the people of Prizren.
Prizren Old Town represents both unique and universal values. The fabric gives the town outstanding values. Prizren houses the only city core in Kosovo with a remaining pre-industrial pattern and vernacular architecture of high cultural value. At the same time Prizren is a symbol for Kosovos long lasting and multiethnic history which gives the town universal values.

A method of study and planning

It appeared as a very close and useful way to approach this issue by the methods already implemented by the same group of experts in the case of the plan of rehabilitation of historical core of Mostar(Bosnia)

The plan for the safeguarding of monuments of the entire town of Mostar and for the reconstruction of the historical core of Mostar, called *stari grad,* was carried out over a brief period of five months, between March and July of 1997, thanks to funding coming from the Italian Government.

UNESCO had seen the urgency of a quick delivering of the plan for the safeguarding of the historical and the architectural heritage damaged by the war and for the reconstruction of the ancient town. It was needed because of the fear that, the degradation due to time or to poorly coordenated interventions, might bring to irreparable losses or to works inconsistent to the characteristics of a town of art as precious as Mostar.

UNESCO wanted the project to be worked out by an international team of project experts as a sign of the worldwide interest in the town of Mostar.

Starting from historical survey, the method implemented in this case was based on steps gradually carried out.

Describing-understanding

The way used to read and to interpretate the identity of the bhistorical centre is based on a close survey of main subjects

- Morphology of the city:

typical traits of the area; general characters of the built site; the sectors (districts) of the town; main elements of the urban pattern

- Historical notes

The reading of historic photographs
Map of historical buildings to be safeguarded

- Digital processing of façades:
  Comparing new/old façades;
  Rectified imaging of façades
- Materials of Mostar architecture:

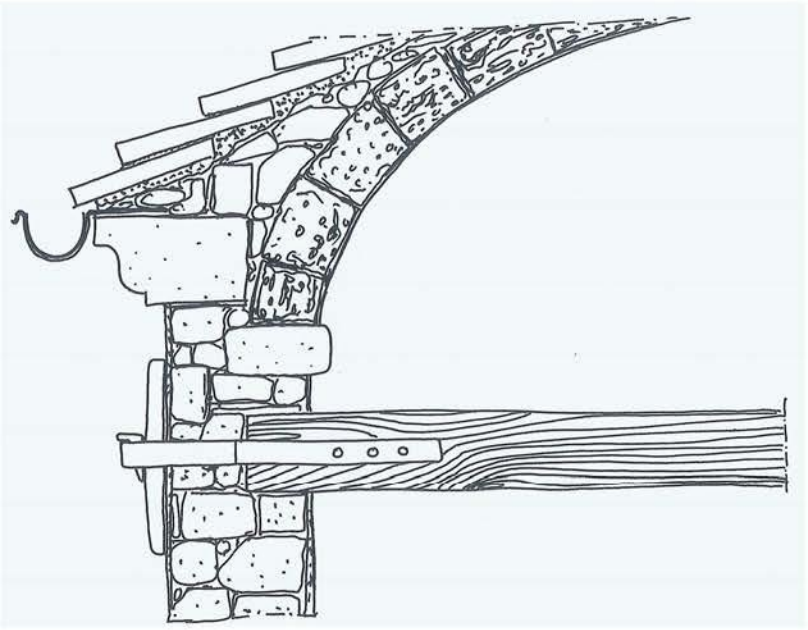
Stone; Brick; Wood; Iron

- Classification of Buildings by type:

Elementary buildings (traditional houses); Shops (bazaar); Water mills; Austro-Hungarian dwellings; Official buildings of Austro-Hungarian period; Religious buildings (mosques, churches, monastries)

- Construction technologies and finishing methods:

Stone Masonry: walls, vaults, domes; - Brick Masonry: walls, vaults; - Wood structures: ceilings, roofing



Evaluating:

- Classification of building decay
- Classification of the architectural features and qualities
- Classification of the use of buildings
- Outlining of built/open areas:
- Urban facilities: water/ electric supply, sewerage

Planning/ruling the rehabilitation

- Levels of intervention: a) complete restoration; b) restoration and reassembling;

c) restoration and reassembling of the façades and roofing – internal reestructuring;

d) reestructuring and rebuilding; e) building substitution; f) demolition; partial demolition.

- Unitary projects (pilot projects on a few high historically valuable buildings)

After the description of those steps and by the presentation of significant examples of drawings extracted from the plan, it is evident how the experience in Mostar could be used as a valid framework to approach the theme of rehabilitation of the historical core of Prizren.

LA RESTAURATION : C'EST L'ART DE RECEVOIR, COMPRENDRE, TRANSMETTRE, EN UN MOT « VEHICULER LA CULTURE ».

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Paris, France.

Résumé :
La décision de restauration d'un bâtiment est l'aboutissement d'une analyse épistemologique sur la valeur que représente l'ouvrage (architecturale, historique, technique, culturelle, etc…). La relativement récente prise de conscience de la sauvegarde du Patrimoine a fait découvrir l'ampleur du problème. L'évolution de l'Architecture est de fait « la trace vivante » de l'histoire et de l'évolution de la ville. Cette action de préservation du « bâti ancien » c'est savoir recevoir un ouvrage dans un état donné, le respecter et le préserver des outrages du temps et des agressions humaines afin de le transmettre à nos descendants. L'examen de l'état de la construction et les travaux qui en découlent, sont très délicats et exigent une dichotomie poussée faisant appel à la teratechnologie compte tenu de la multitude des problèmes que pose ces édifices. Le diagnostic doit impérativement remonter aux diverses causes d'endommagement en dissociant celles « normales et sans risques » et celles « anormales ». Cette tâche impose des connaissances techniques pluridisciplinaires et très poussées sur les méthodes utilisées à l'époque de l'édification ainsi que sur les matériaux mis en œuvre. Avant d'émettre un avis et un choix de solution, il faut « écouter et comprendre l'œuvre » pour réaliser un travail discret, efficace et durable. Pour ce faire la trilogie DIXI-PERSPICIO-NEMATOS a été conçue pour guider, assister et documenter le technicien chargé de la phase « analyse – préconisation » de la restauration. Cet ensemble permet aussi la conservation, la transmission des données recueillies ainsi que la réalisation de dossiers, documentaires ou guides.

LA RESTAURATION : C'EST L'ART DE RECEVOIR, COMPRENDRE, TRANSMETTRE, EN UN MOT « VEHICULER LA CULTURE ».

Catalafini, Ingénieur
Paris, France.

Si « l'Art le plus complet est celui de construire » (Paul Valéry), la Restauration c'est en plus celui de rester simple, efficace et discret (Règle de « Ne varietur »). La relativement récente prise de conscience de la sauvegarde du Patrimoine a fait découvrir l'ampleur du problème. La décision de restaurer un édifice au sens large du terme est la conclusion d'un examen rigoureux et poussé. Cette analyse est impérative pour connaître la « valeur » (au sens étendu du terme) que représente l'ouvrage considéré (c'est la notion de Recevoir – Ecouter – Transmettre) et l'envergure des travaux nécessaires (Rapport coût – Importance dans l'héritage culturel).

La prise de conscience de plus en plus forte rend nécessaire la compréhension des spécificités du patrimoine culturel. Le « Patrimoine de Pays » qui à la base peut être de plusieurs types : un site, un mode de culture, un hameau, un village, un quartier. C'est la facette essentielle de son identité dans la chaîne : Paysage → Environnement →Symbolique → Rural → Urbain. La base étant à l'origine toujours la même : l'Homme, son habitat et son mode de vie. *Exemple : en Bretagne, dans la région de Névez (carrières de granit) les maisons dites en « pierre debout ». Cette conception architecturale est la démonstration frappante de ce lien.*

Dans certains cas, la protection d'un ouvrage peut être une action indirecte. A titre d'exemple, dans la région de San Marin, un château de type féodal accroché à la crête d'une roche calcaire était menacé de disparition par suite de la désagrégation de la roche par les eaux de ruissellement. Le mur de soutènement qui fut réalisé à un parement de brique de la teinte de la roche et de plus l'appareillage mis en œuvre offre un « trompe l'œil » saisissant et permet de confondre cet ouvrage confortatif moderne avec la nature. Dans l'exécution de cette tâche, la trilogie DIXI II – PERSPICIO – NEMATOS permet de guider, assister, documenter les techniciens chargés de la mission de restauration.
Cette action de préservation du « bâti ancien », c'est savoir recevoir un ouvrage dans un état donné, le respecter et le préserver des outrages du temps et des agressions humaines afin de le transmettre à nos descendants. Pour ce faire, il est impératif d'observer, voir, écouter et comprendre le bâtiment, certains édifices étant réalisés sur une très longue période (Ars longa, Vita brevis) ce qui provoque dans un certain cas une évolution ou un mélange de styles et/ou techniques.
Dans cet esprit et pour parachever cette œuvre, il faut penser au « repérage » ou « signalisation » qui procède de la volonté que l'on veut donner pour mieux voir, faire connaître de façon plus ou moins fine afin que le chalant puisse en goûter pleinement toute la quintessence, la saveur et se pénétrer de l'histoire de la ville. A titre d'exemple, le cliché présenté donne une idée de réalisation de ce « guide ».
Lorsqu'un bâtiment est restauré, il faut penser à sa « nouvelle vie » et « ses nouvelles fonctions ». Ceci est d'autant plus vrai pour le patrimoine industriel avec comme but final trouver une destination en rapport avec ses origines. Dans certains cas, on se retrouve devant un monument « mémoire du passé » d'une région bien que non en liaison directe avec l'industrie dont il est le vestige. *Exemple : en Meurthe et Moselle à Crusnes (au nord de*

Thionville), les mines de fer ayant données son essor industriel à cette région, l'église est entièrement métallique (prototype du « procédé Fillot » - le montage étant réalisé par simple emboîtement des divers éléments).

- L'OBSERVATION de l'ouvrage est impérative pour s'imprégner de sa richesse culturelle. Il faut se souvenir qu'il a été « édifié sur le Pays » par les « hommes du cru » avec les matériaux qu'offre la nature sur le site ou à proximité selon des techniques rodées par l'expérience et les ans.
  A titre d'exemple dans le Nivernais, le pignon des maisons anciennes, bâties en calcaire, laisse voir des pierres dont la tête fait saillie sur la maçonnerie. Ces pierres dites « pierres passantes » ont une utilité primordiale car elles relient les deux parements du mur, le cœur de celui-ci étant réalisé par un blocage pierres et cailloux. De fait sans ces pierres, les 2 parois se désolidariseraient.
- La VISION est pour l'homme moyen privilégié d'investigation. De plus, « le meilleur moyen d'exciter la mémoire est de frapper la vue » (Cicéron). Encore faut-il savoir voir, réfléchir, traduire ce que l'on découvre, puiser dans sa mémoire pour interpréter et comprendre ce livre qu'est l'Architecture.
- L'ECOUTE de l'œuvre, c'est s'efforcer de transcrire les signes que les bâtisseurs nous ont laissés, afin de lire leurs pensées au même titre que des écrits, d'accéder à la connaissance de l'œuvre et en déduire les conditions dans lesquelles elle a vue le jour.
- La COMPREHENSION des messages que nous livre l'édifice est une tâche énorme. En effet, l'enquête épistémologique justifiant la valeur du bâti considéré implique la recherche, l'analyse et l'évaluation de nombreux paramètres de valeurs :
  - Sociale : Connaissance du climat économique, le mode de vie de l'époque de réalisation, l'influence des règlements sur le développement architectural.
    Prenons l'exemple de la baie :
    Impératifs techniques : c'est un point de fragilité de la façade d'où réduction du nombre et de la grandeur. Au point de vue climatique, c'est un passage de froid ou de chaud – méconnaissance de l'étanchéité - ; risque d'agression d'où étroitesse est synonyme de sécurité.
    Directives réglementaires : en France, impôts sur les baies (1798 – 1895 avec comme effet pervers la condamnation d'un certain nombre de baies) ; urbanisme d'Haussmann (hauteur variable d'étage, dimensions des ouvertures, réglementation sur les balcons).
    Dans le Wissembourg, les maisons anciennes comportent, dans de très nombreux cas, des fenêtres dont les vitres sont bombées vers l'extérieur, interdisant au passant de regarder dans les pièces par suite de l'effet miroir engendré par le galbe, alors que l'occupant peut lui voir sans que l'on puisse l'observer.
  - Culturelle : Connaissances diverses notamment influence de l'évolution industrielle, matériaux mis en œuvre et façon de les utiliser, etc …
    Par exemple, la démocratisation du verre et de son usage avec l'évolution industrielle :
    A l'origine, petit verre = petite croisée,
    Evolution industrielle de fabrication = verres plus grands et moins coûteux,
    Croisées à 1 ou 2 vantaux et à 1 ou 2 verres.

Conséquence : verre = fragilité de la protection contre les agressions d'où naissance des volets.

- Historique : Influence dues aux courants de pensées, invasions, colonisation, migrations, les bases régissant l'Art de construire venant du passé (toutes les constructions du passé sont régies par le triple sceau « l'Analogie / le Nombre / l'Eurythmie).
  Par exemple, la démocratisation du verre et de son usage avec l'évolution
- Architecture : Elle permet de connaître l'évolution des connaissances techniques de l'Art. Elle comporte 2 volets distincts : l'un « rural / bourgeois » influencé par les données géologiques, climatiques et économiques *(exemples : les « toitures citernes » du Larzac, nées de par la nécessité de récupérer les eaux de pluie, les sources manquant ; les églises en « bois debout » de Norvège)*, l'autre « civil / religieux / militaire » qui évolue sous l'emprise des impératifs politico-historiques *(exemple : expansion des cadrans solaires, en France, à la suite de la décision de l'état d'interdire les cloches d'églises pour rythmer la vie).*

Dans le cadre de cette protection du Patrimoine, la Restauration se heurte à divers problèmes :

- L'absence d'archives sur les interventions antérieures ce qui justifie un examen très poussé, afin d'établir un bilan général et mettre au point la chronologie des opérations.
- La précipitation dans le passé pour effectuer des interventions dites de protection (absence de diagnostic réel et valable, non adaptation de la préconisation) sans essais ni contrôle des résultats. Cet état de fait a provoqué une cascade d'absurdités tautologiques aux effets lourds de conséquences pour la pérénité du Patrimoine (ex. : étanchement en périphérie d'ouvrages, protections erronées des rez-de-chaussées, toutes actions non réfléchies génératrices de désordres sévères).
- Le diagnostic est l'élément de base de cette action (bon diagnostic = bonne préconisation) et nécessite un personnel hautement qualifié. C'est aussi la pierre d'achoppement de la trilogie « Qualité – Tenu – Garantie » (la durabilité d'un subjectile, enduit ou peinture, dans son double rôle de protection – décoration) objectif des travaux réalisés dans les « Règles de l'Art ». Cette action est régie par l'application des règles relatives à la qualité :
  - Normes ISO 9000 / 9001 / 9002 / 9003 qui définissent à l'échelon européen les règles relatives à la qualité : Conception / Application / Essais -Contrôles.

  Cette opération est basée sur la chaîne de questions : qui – quoi – où – comment – par quels moyens – pourquoi – de quelle façon.

D'autre part, en restauration, il est de plus en plus impératif de prendre en compte de nombreux paramètres aux interactions multiples. Cet état de fait implique de travailler à des nouvelles échelles de précisions, de fiabilité. En corollaire, il faut fonctionner en « orgware » (organisation mentale et culturelle dans la mobilisation des intelligences) complément direct et logique du software et du hardware, de plus l'analyse du bâtiment à restaurer demande :

- Un niveau de connaissances approfondies (historiques, architecturales, techniques) nécessitant de plus une formation teratechnologique.
- Une compétence totale sur le site.
- Un sens poussé du détail (il faut notamment savoir : analyser la compatibilité et la liaison des matériaux entre eux avant de fixer son choix ; préciser les limites de

chaque intervention, le mode d'action); afin de réaliser un diagnostic sans faille. L'évolution du patrimoine culturel *(classement à des titres divers d'ouvrages modernes : Eglise de Royan, Halles de Reims, Tour de grande hauteur (IG H), etc…)* implique la mise en œuvre de nouveaux types d'analyses et de techniques.

Ce dernier exemple est typique de la nécessité de glissement de la règle de « Ne Varietus » vers celle « Mutadis – Mutandis » pour la pérennité de l'ouvrage, tout en préservant l'aspect de l'édifice.

Celui-ci doit comporter :

- La nature détaillée des supports et subjectiles (enduits avec liants minéraux naturels ou artificiels, peinture à la chaux aérienne ou hydraulique, etc…).
- Le mode constructif (y compris les interventions postérieures à la réalisation) et les matériaux divers mis en œuvre (pan de bois avec remplissages variés : torchis, plâtre, brique, etc…).
- La conception des éléments de parements (enduits à la chaux hydraulique naturelle, stuc, etc…).
- Les désordres classifiés avec leur cause d'origine. Ce travail nécessite la dissociation des endommagements en deux volets : ceux dits « naturels » et sans risques dûs à des lacunes dans les connaissances technologiques de l'époque *(à titre d'exemple, l'absence de « goutte d'eau » en sous face des appuis de baies et bandeaux a provoqué des « cernes » ou moustaches qui soulignent l'architecture. Ce type de désordre doit être conservé)* ; les autres détériorations dites « graves » ou anormales doivent être, elles, traitées techniquement afin d'y remédier à titre définitif.
- Les données relatives à l'environnement : réaction climatique, modifications des conditions relatives aux altérations dues à la pluie et l'air (aggravation de la qualité de l'air par suite de l'évolution industrielle : usines, circulation automobile, etc…).
- Les réactions diverses notamment cyclage thermo-mécanique dues à des modifications d'utilisation du bâtiment ou variation de microclimat par suite de modification de l'environnement.
- La quantification des dits permettra de décider dans la phase préconisation entre la mise en œuvre d'un produit ancien (celui d'origine si possible) s'il ne s'agit que de reprise partielle (en y ajoutant en final une protection contre les agressions atmosphériques) ou la reprise totale à l'aide d'un produit moderne agréé qui remplira les mêmes fonctions et aura un aspect identique.
- De plus, il est nécessaire de prendre en compte la richesse de la polychromie traditionnelle des parements (valeur culturelle) dûe à la palette chromatique qui a évoluée avec la technique, avec comme base la couleur même des matériaux, puis l'influence des pigments minéraux, et aussi celle des nécessités techniques : murs blancs (badigeon à la chaux), enduits teintés selon les régions, soubassements en goudron teinté (certaines régions du Nord compte- tenu des conditions climatiques). Quelque soit l'élément moteur du choix (technique – artistique – religieux ou simplement traditionnel), les couleurs de maisons régionales narrent le mode de vis de nos ancêtres, c'est un véritable livre d'images que l'on pourrait appelé « les riches heures de nos provinces ».

Cette analyse détaillée de la pathologie des matériaux anciens *(ex. : le torchis, le pisé, les chaux anciennes, les stucs, staff, etc…)* nécessite une dichotomie poussée. Celle-ci permet par son arborescence de dissocier les diverses causes de désordre, cette forme de dissécation

permet d'éviter les omissions. L'origine réelle peut dans certains cas être occultée par d'autres causes qui présentent des symptômes analogues.
L'étude cognitive des divers éléments qui interviennent dans le processus d'établissement du diagnostic (réponse à la question compatible – incompatible) a débouché sur une forme d'audit qualité et permis la mise au point de la trilogie DIXI II – PERSPICIO – NEMATOS ; Elle est composée d'un système d'élaboration informatisé du bilan technique (DIXI II) guidant l'analyse des besoins, d'une unité d'assistance au diagnostic par investigation non destructive (PERSPICIO) et d'une base de données (NEMATOS) qui complète cette assistance.

1 – DIXI II

Il traite essentiellement de la Restauration et de la Protection des monuments et bâtiments du Patrimoine culturel et historique. La conception de DIXI II, développement de DIXI I (bâtiment courant) a été réalisé sous la forme d'un double tryptique avec possibilité de dissociation des phases « Analyse » et « Solution ».
L'étude de l'interaction entre l'image et le langage (composants essentiels de l'équipement cognitif humain) dans le processus des mécanismes mentaux a permis la concrétisation informatique du passage de la prise d'informations (analyse in situ), à l'action (diagnostic) et à la décision (préconisation de travail), tout en préservant la bibliothèque que représente le savoir-faire pratique et l'acquis de l'ancien.
La conception de DIXI II est basée sur la convivialité du programme et de son processus d'analyse, la réduction du « gap » ce fameux temps de réponse et la fourniture dans un laps de temps des plus réduits des éléments recherchés.

En pratique, le technicien est guidé par le « menu déroulant de références » équipant son « laptop », qui lui suggère, au fur et à mesure, les questions auxquelles il doit répondre. Il examine le support et/ou le subjectile, visualise chronologiquement sur l'écran de son portable les données, trouve la concordance terminologique à ce qu'il a constaté, « scroole » la ligne choisie et passe à la rubrique suivante. Cette procédure est effectuée rubrique après rubrique, cas par cas. Le programme pilotant l'analyse prévoit :

- Toutes possibilités de visualisations successives, correction, effacement, reconduction des divers éléments saisis ; les contrôles de cohérence, éliminant ainsi les erreurs les plus communes.
- En fin de traitement d'analyse, la totalité des critères choisis apparaît pour vérification et validation avant envoi des données.

L'ensemble des éléments ci-dessus est alors transmis aux décideurs pour réalisation de la phase finale « définition de la méthodologie de travail », la décision relative aux travaux à réaliser est basée sur :

- l'ensemble des données fournies (analyse, diagnostic) ;
- le souhait et l'optique envisagés pour cette restauration, en suivant le « menu » annoncé par le programme qui pilote la recherche.

En fin de traitement, la totalité des éléments choisis apparaît pour vérification et validation avant impression. La fiche de préconisation sortira sur l'imprimante laser sous la forme suivante :

- rappel des codes choisis ;
- en clair et suivant les codes correspondants : les titres, sous-titres et éventuellement détail, les caractéristiques retenues et les travaux à exécuter (préparatoires et finition).

Il faut rappeler que les responsables de l'opération de restauration, pour prendre leur décision, sont aidés par les documents techniques fournis par l'unité d'investigation (PERSPICIO) au cours de la phase « diagnostic » (volet 2 – phases 2 et 3).

2 – PERSPICIO

La vision est pour l'homme le moyen privilégié d'examen et de compréhension des phénomènes de toutes sortes (la vidéo endoscopie en est une des formes les plus évoluée). Cette technique permet de s'affranchir d'un certain nombre d'impératifs et problèmes :

- non détérioration des éléments contrôles ;
- non annulation de preuves par manipulations diverses afin d'accéder à la zone souhaitée.

De plus le programme informatique permet de procéder aux diverses analyses nécessaires au diagnostic.
Elle permet l'accès visuel pour les contrôles à l'intérieur de matériaux ou éléments quelconques.
Cette aide pour l'établissement du diagnostic (pièce maîtresse de la pathologie) peut être utilisée de deux façons : en indépendance totale ou en liaison avec DIXI II et la « banque de données » dans la cadre de l'assistance et du contrôle.

3 – NEMATOS

Il est basé sur le fait que « le meilleur moyen d'exciter les connaissances est de frapper la mémoire visuelle » et possède trois fonctions :

- l'assistance technique ;
- la formation professionnelle ;
- l'information (banque de données).

L'évolution de la banque documentaire est simple, compte tenu du chaînage prévu avec le système « DIXI II » et la technique « PERSPICIO ». Toute demande émise, déclenche l'intervention d'investigation non destructive, provoque en aval la mise en mémoire des nouveaux renseignements, dans la mesure où leur utilité générale est admise. Le principe ci-dessus fonctionne dans tous les cas d'intervention « diagnostic ou contrôle.

La restauration : c'est l'art de recevoir, comprendre, transmettre, en un mot « véhiculer la culture ».

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Appendice

Lors de la décision de classement « monument historique » d'un ouvrage, il ne faut pas perdre de vue que derrière cet acte, il est impératif de réfléchir aux moyens financiers qui seront nécessaires à sa conservation. En effet, l'acte de recevoir, protéger, transmettre une œuvre implique de la préserver des outrages du temps afin d'en assurer sa pérennité. Cette forme de pensée implique la réalisation d'un dossier « diagnostic » et l'établissement d'un planning d'exécution par ordre d'urgence, ce qui n'est pas toujours évident, logique et facile.

En effet, en fonction du type de construction, de son utilisation d'origine et de celle future, il y a une variation énorme des coûts à prévoir. Ce problème est encore aggravé lorsqu'il s'agit d'une construction récente. De fait, si pendant très longtemps l'évolution des modes constructifs et matériaux n'a pas provoqué de bouleversements, il n'en n'est pas de même avec l'avènement de l'ère industrielle. Cette brutale accélération des innovations technologiques (technique de construction, produits, matériaux) a provoqué en contre partie la disparition rapide

de certaines (phénomène dû à un problème de compétitivité, délai d'exécution, et de coût). Dans ce contexte, la sauvegarde « à l'identique » peut déboucher sur de sérieux problèmes. L'exemple ci-dessous résumé en est un vivant exemple.

Ce bâtiment témoin de l'envol du modernisme des années 1960 est constitué d'une charpente extérieure en tubes acier remplis de béton et de poutres en profilé HE soudées au niveau des planchers. Le chaînage réalisé dans les bandeaux (saillie profilée des dalles de planchers), armés par des aciers (Ø 8mm) soudés sur les fûts, ce qui rigidifie l'ensemble, « bloque » tous mouvements, les dalles ne comportant aucun joint de dilatation ou de rupture. L'enveloppe extérieure, en retrait, d'une épaisseur de 70 mm est constituée de cadres en chevron et de 2 peaux en « multiplis », la face vue de celui extérieur ayant en parement un panneau en acier inox nervuré collé. Les ensembles menuisés en profils acier UTMM sont de type « italo-anglais » à translation horizontale (sur pivot de tête et biellettes). Les dormants étant recouverts d'un « gainage » en acier inox faisant fonction de frein sur les pointeaux guides bas.

Dans le cheminement analytique du diagnostic, c'est grâce à une étude dichotomique poussée (et dans certains cas très complexes à l'aide d'analyses abductives) qu'il a été possible de dissocier les origines multiples des altérations, dégradations, leurs interactions, les rapports de causalité, ainsi que les endommagements dus à des interventions inadaptées, tirer les enseignements de ceux-ci afin de maîtriser la totalité des problèmes, étudier les phénomènes hydroaéroliques particuliers à ce type de bâtiment et répondre de façon précise aux divers cas par des études spécifiques. Cette analyse a pu être effectuée grâce à DIXI 1 (bâtiment classique) et DIXI 2 (monuments historiques).

La restauration de la peau extérieure de cet immeuble ainsi que les difficultés rencontrées pour tenter de se rapprocher le plus possible des normes et règlements en vigueur, notamment au point de vue de la sécurité et du confort (isolation thermique et phonique), nous ont amenées à créer certains éléments afin de respecter l'œuvre. Cette décision a été prise tout en veillant à la manière de transmettre en tenant compte de la complexité des différentes valeurs attachées à l'œuvre (valeur esthétique, architecturale, historique, valeur d'ancienneté éventuelle, et valeur d'usage, cette dernière étant intimement liée à la fonction de bien culturel). Un seul élément étant restauré à l'identique (avec plaque indicatrice) pour mémoire.

Avant toutes analyses, l'étude a débutée par l'examen des phénomènes spécifiques de turbulences créés par et autour des bâtiments de grandes hauteurs.

Entre autres études, il a fallu :

- rechercher un matériau à base hydraulique respectant un certain nombres de critères (aspect, teinte, granulométrie) ayant des caractéristiques physiques, mécaniques et chimiques se rapprochant le plus du béton actuel avec en plus la possibilité de stabiliser le « ph » et un très fort pouvoir d'adhérence.
- examiner les diverses altérations et endommagements constatés sur le parement inox dus à de multiples causes : erreur dans le choix de la qualité du matériau (présence d'un trop fort pourcentage de fer « inox F17», interventions inopportunes et inadaptées aux problèmes à traiter. De ce fait, il a été nécessaire de procéder à un examen très poussé (analyse de l'air, étude du microclimat et des phénomènes aéroliques particuliers de ce bâtiment) afin de déterminer le choix du matériau le plus adapté aux divers problèmes ainsi qu'à la pérennité de l'ouvrage (quel est l'acier inox de remplacement offrant le plus de garantie au point de vue de sa composition chimique : le AISI 316).
  De plus, une étude complémentaire a dû être faite en ce qui concerne le traitement de protection de type biodégradable ainsi que le cycle d'entretien, l'encrassement du parement risquant de déclencher un nouveau processus d'altération (choc thermique, fixation de particules diverses en suspension dans l'air, effet de pile, corrosion, ...).
- calculer et créer des profiles spéciaux en acier à partir de tubes pliés pour les menuiseries en respectant les encombrements actuels ainsi que les volumes vitrés et le principe « dormant inox » ouvrants peints par thermolaquage. De même, en ce qui concerne la « peau » inox nervuré, il a été nécessaire de prévoir la fabrication de la machine et de l'outillage afin de façonner à l'identique les panneaux de remplacement. De plus, pour concevoir la technologie de dépose simple et efficace, sans risque pour le support, il a été, après analyse, pris appui sur les causes des décollements actuels. En ce qui concerne les bandeaux béton, ceux-ci ont été l'objet d'une étude spécifique Dans l'analyse des bétons, les caractéristiques de conception de l'ouvrage, les absences et omissions techniques diverses (joints de rupture ou de dilatation) et éléments annexes (planchers chauffants), ainsi que l'étude du relevé détaillé des endommagements (fissures : type, orientation, section, profondeur, mouvements, ..., éclats, épaufrures, ...) afin d'obtenir en final un aspect identique à l'existant et ce malgré les multiples reprises.

D'autre part, il a été nécessaire de prendre en compte l'emplacement de ce bâtiment notamment de l'orientation de la face sud ouest et étudier spécialement l'aspect (brillance de parement). Cette dernière donnant sur une place à très forte circulation (« effet miroir » avec risque d'éblouissement). Le choix de l'aspect s'est porté sur BAT P5 ou G9.

Dans le cas de restauration de la fresque (en sous face du plafond de la « terrasse intermédiaire ») peint sur « l'isolant : héraklite 1ère génération », il a fallu tenir compte (en plus des caractéristiques du subjectile et du support existant) des conséquences du pont thermique existant ainsi que du couloir à vent dû à l'architecture et l'orientation de l'ouvrage. Une fois déterminé la classe des produits de restauration, il a été nécessaire de trouver le « feuil protecteur » à appliquer (pour freiner l'encrassement) celui-ci ne devant altérer en rien l'aspect de la fresque.

Toutes les technologies étudiées pour cette réalisation ont été mises au point et validées par les directions techniques et laboratoires des Fabricants et Bureaux d' Etudes et de Contrôles y compris les mises en œuvre. La couverture en garantie décennale réelle a été étudiée avec les compagnies d'assurances des divers intervenants.

LAS CIUDADES HISTORICAS, ¿PATRIMONIO CULTURAL DE TODOS?
Aideé Tapia Chávez

ABSTRAC / Resumen

Av. Francisco I. Madero, avenida principal de la ciudad histórica
y eje rector de su trama urbana desde el siglo XVI
Morelia, fundad el 8 de mayo de 1541 y es declarada en Patrimonio de la Humanidad en 1991.

La ciudad de Morelia, en México, como todas las ciudades históricas patrimonio mundial, se enfrentan permanentemente a arduas dificultades para su preservación integral, lo cual conlleve a mantener vivo su patrimonio. Desafortunadamente es solo una minoría de la sociedad que vive y habita las ciudades históricas la que tiene conciencia de lo que representa vivir en una ciudad patrimonio cultural de la humanidad; ésto ha sido y es un factor que dificulta los proyectos y las acciones de conservación, además de que aleja a los principales actores de la conservación; es decir, a la sociedad en general de su patrimonio. Pareciera que la responsabilidad de mantener vivo y de conservar el patrimonio solo le confiere a algunos sectores de la sociedad, como a las autoridades municipales; sin embargo, debemos de asumir y concientizar que es una tarea que corresponde a toda la sociedad. Así pues, hoy es una realidad que la difusión y la educación son acciones primordiales para la conservación inmediata y a futuro del patrimonio, mismas que deben ser dirigidas a todos los sectores de la sociedad que habitan de manera permanente o temporal las ciudades históricas; desde los niños hasta los ancianos; ésto con el objetivo de generar una cultura de conservación del patrimonio, ya que no se puede conservar lo que no se valora. Pero ¿cómo valorar algo que no se conoce?.

Así pues, es necesario implementar trabajos conjuntos de carácter interinstitucional con políticas orientadas a la educación y difusión del patrimonio cultural, en las cuales se involucren coordinadamente tanto los gestores, los formadores, los técnicos, los obreros y los habitantes en general.

Vista Interior de la cúpula del Santuario de Guadalupe, construcción barroca del siglo XVIII.

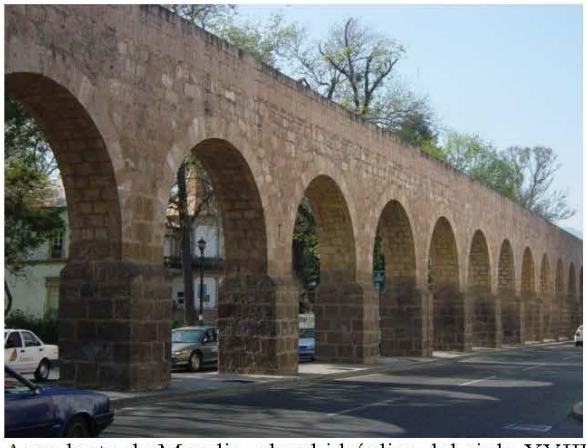
Lo anterior, debido a que pareciera que las instituciones son las dueñas del patrimonio, tal es el caso de las universidades que si bien generan importantes investigaciones y propuestas con sustentos científicos, la gran mayoría son únicamente en beneficio personal acrecentando los currículos de los profesionistas, pero dejando completamente de lado el compromiso de difundir el conocimiento producido en los centros de investigación y universidades, en beneficio de la sociedad en general. En tanto, pareciera que habría que hacer una llamada de atención para concientizar a los investigadores como a la sociedad en general que el patrimonio cultural "es de todos".

LAS CIUDADES HISTORICAS, ¿PATRIMONIO CULTURAL DE TODOS?

La reflexión sobre el camino que ha tomado, está tomando y tomará el patrimonio cultural, es hoy una cuestionante permanente para las sociedades que habitamos, manejamos e investigamos dicho producto cultural.

Catedral de Morelia.
Construcción barroca iniciada en 1760.

Vivir en una ciudad patrimonio mundial, con características testimoniales únicas e irrepetibles, representa asumir y tomar actitudes particulares hacia dicho patrimonio; sin embargo, hoy en día, el conocimiento y manejo sobre los recursos patrimoniales con los que cuenta particularmente la ciudad de Morelia, es todavía una actividad que se lleva a cabo de manera asilada y dividida por cada una de las instituciones que directa o indirectamente intervienen en su preservación y desarrollo.



Acueducto de Morelia, obra hidráulica del siglo XVIII constituida por 253 arcos.

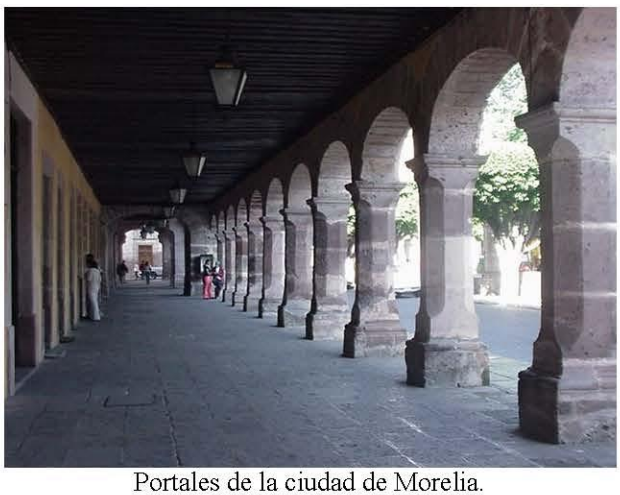
Así pues, hoy "todos" nos "preocupamos" del destino del patrimonio cultural, pero en muy poca medida nos ocupamos verdaderamente de su conservación integral, en algunas ocasiones solo se intervienen aspectos materiales realizando obras de conservación o restauración en inmuebles, o bien se dota de servicios para hacer "más" habitables dichas áreas monumentales que cada día pierden más su vocación como centros habitacionales, dando paso a centros comerciales y administrativos.

Por otra parte, quienes intervienen "profesionalmente" los arquitectos o ingenieros civiles que actúan sobre las estructuras arquitectónicas del Centro Histórico de Morelia, lo

hacen sin la más mínima conciencia del respeto que amerita intervenir en espacios con preexistencias materiales testimoniales, modificando sustancialmente tanto las cualidades tangibles como las intangibles; al respecto, no se puede dejar de lado que desafortunadamente son los mismos usuarios, propietarios o arrendatarios los que solicitan dichas modificaciones, mismas que son impulsadas por los profesionistas o técnicos que a su vez violan las normatividades.

A todo esto, surgen cuestionantes ¿Cómo nos estamos ocupando del patrimonio cultural, del urbano arquitectónico? ¿Estamos manteniendo vivo el patrimonio? ¿Estamos educando y Estas cuestionantes que hoy son motivo de reflexión, tan solo son el reflejo de los problemas formando a las sociedades a favor de la preservación del patrimonio cultural? ¿Se está informando a las comunidades sobre el valor de su patrimonio como estrategia de conservación y desarrollo del patrimonio? ¿Cómo lograr simultáneamente la preservación y el desarrollo de los centros históricos? más latentes que advierte el patrimonio cultural de la humanidad, particularmente el patrimonio urbano arquitectónico de las ciudades históricas; ciudades que cada vez están en mayor riesgo de perder dicho patrimonio, como es el caso del Centro Histórico de la ciudad de Morelia.

Si se considera que el patrimonio -en este caso el urbano arquitectónico del Centro Histórico de la ciudad de Morelia-, debe ser el núcleo condensador que articule bajo una perspectiva común las políticas culturales no solo las gubernamentales, sino también las comunitarias bajo la conciencia de intervenir sobre un bien común, se puede ir avanzando en la gestación y posteriormente en la consolidación de una cultura de conservación que asegure la preservación y el desarrollo del patrimonio cultural urbano arquitectónico de valor testimonial de Morelia.


Portales de la ciudad de Morelia.

Hoy, la tarea de revertir el deterioro que afecta particularmente al Centro Histórico de Morelia, no es una tarea que solo le confiera al gobierno, por lo contrario es una tarea que nos confiere a todos los que habitamos y hacemos uso de dicho espacio patrimonial, sin embargo; para llegar a crear una conciencia social sobre la importancia y la necesidad de preservar el patrimonio cultural, se requieren de estrategias que involucren de manera coordinada y no segmentada a todos los sectores sociales -el publico y el privado- haciendo de la preservación y el desarrollo del patrimonio urbano arquitectónico una responsabilidad común, pero con vocación no solo en el presente, sino también en el futuro.

Involucrar a la mayor variedad de los actores sociales, es decir tanto a las organizaciones de gobierno como a la sociedad civil en sus distintos sectores, es una de las

estrategias que hoy pueden contribuir a generar un cambio en la actitud hacia la preservación del patrimonio urbano arquitectónico. Así pues, ante la preocupante perdida de identidad y de apropiación del patrimonio, es imperioso considerar en las políticas de recuperación, de preservación y de desarrollo de los conjuntos históricos la participación conciente de la sociedad, ya que ésta, es el principal recurso que asegurará la conservación del patrimonio arquitectónico; solo que para ello, es necesaria la participación permanente y coordinada de las instancias gubernamentales y educativas; asumiendo que lograr una actitud social de conservación únicamente será posible cuando la sociedad sienta y asuma el patrimonio, como "su" patrimonio, como parte integradora de su identidad y no como un producto ajeno su propio ser y desarrollo social.

Todos hablamos de patrimonio cultural, pero pocos sabemos y menos aun asumimos lo que realmente es, y lo que representa como objeto sustentante del desarrollo cultural y social, lo anterior aunado a que cada sector social le otorga un significado diferente acorde a sus intereses o desintereses ante el mismo.

Cúpula del Templo de las Monjas.
Conjunto Conventual para mujeres del siglo XVIII.

De esta forma, mientras que para unos es en verdad su patrimonio, para otros es un sencillo objeto de valor económico; dicha dicotomía de valores, genera tensiones sobre cualquier tipo de intervención sobre el mismo patrimonio, dicotomía que es producto de la falta de conocimiento y de apropiación del patrimonio como parte de su pasado de su presente y de su futuro, y no como un producto ajeno a su realidad y a su identidad.

Por otra parte, en la medida de que se vaya más allá de intervenciones parciales y segmentarías por cada uno de los diferentes sectores de la sociedad sobre el patrimonio arquitectónico, sin asumir un proyecto integral, y se continúe utilizando el patrimonio como un objeto catalizador de beneficios exclusivos para las elites sociales, se corre el riesgo de generar la paulatina perdida de identidad y de interés por conservar los bienes patrimoniales, en este caso en particular los urbanos arquitectónicos, de tal forma que es imperante generar estrategias que conlleven a sociabilizar el patrimonio urbano arquitectónico para generar una cultura social de conservación del patrimonial cultural.

El Centro Histórico de Morelia, es un conjunto urbano arquitectónico cargado mensajes y testimonios del pasado, pero desafortunadamente la responsabilidad de cuidar dichos testimonios hoy se presenta mas como una tarea desagradable y pesada, que una

actitud entusiasta, puesto que solo es una minoría de la sociedad la que está comprometida con su patrimonio cultural espacial, dejando de lado la participación y el compromiso social como practicas y actitudes ineludibles para conseguir su conservación.

La preservación del Centro Histórico de Morelia, no puede quedar exclusivamente en manos del gobierno, a éste deben de unirse los otros sectores sociales como los especialistas y la sociedad en general, lo cual conlleve a generar una postura de conservación permanente sustentada principalmente la apropiación social que asegure a su vez el desarrollo del patrimonio.

Jardín de Villalongín.

En este sentido la educación de la sociedad es tarea fundamental en la revaloración y preservación del patrimonio, lo cual se debe de considerar dentro de los proyectos y programas municipales, estatales y federales, así como también debe ser abordado en los distintos niveles de educación, desde el nivel básico hasta el superior, lo cual genere un proyecto compartido de preservación.

Para lo anterior, es necesario también concientizar a los investigadores del patrimonio urbano arquitectónico, para que dejen de utilizar al patrimonio exclusivamente como un objeto de investigación, para aumentar grados académicos o bien sus puntos curriculares, olvidándose que la investigación también debe de tener fines sociales, y más aun en este caso se deben de traspasar los ámbitos académicos y permear la difusión de los trabajos de investigación a todos los sectores sociales, en beneficio del mismo patrimonio y de la sociedad, actitud con la que regresarían al patrimonio un poco de lo que éste les ha dado como recurso de investigación y fuente de crecimiento intelectual y profesional

Plaza Valladolid. Antiguo atrio del conjunto conventual de San Francisco del siglo XVI.

Así pues es necesario vincular a los especialistas en la conservación y restauración del patrimonio urbano arquitectónico, con los responsables de los tres niveles de gobierno y a la sociedad en general, con el objeto de sensibilizar y acercar a la sociedad en su totalidad a las tareas de conservación.

Lo anterior en la búsqueda de generar procesos compartidos de conservación, en donde los funcionarios de gobierno, especialistas y los habitantes formen una reflexión colectiva sobre los valores culturales que les son comunes, reflexión que conlleve a una corresponsabilidad hacia la conservación integral de sus bienes patrimoniales, en este caso, los urbanos arquitectónicos

Detalle Templo de las Monjas.
Siglo XVIII.

En tanto es necesaria la implementación de programas de educación que estimulen a la sociedad a través del contacto con su patrimonio para generar en esta una participación activa en las tareas de conservación, lo cual conlleve al conocimiento, valoración y conservación de su patrimonio; y que crear una corresponsabilidad conciente sobre el patrimonio como una postura estratégica para la conservación integral, aprovechando con ello el recurso de la sustentabilidad social del patrimonio.

Para concluir, solo resta decir que el Centro Histórico de Morelia, al igual que muchas de las ciudades históricas del mundo, tiene como contrapartida la confirmación de nuestra deuda con las sociedades pasadas, entendiendo dichos espacios como estructuras vivas en las cuales pueden interactuar el pasado y el presente.

Detalle. Catedral de Morelia.
Siglo XVIII.

Hoy, las Ciudades Históricas deben asumirse no solo como contendores habitacionales o recursos turísticos, sino también como lugares aptos para constituirse en laboratorios experimentales de nuevas acciones encaminadas a construir sociedades más comprometidas con la conservación y el desarrollo de su espacio vital, acciones que conlleven al mejoramiento material de la ciudad y en consecuencia al mejoramiento de la calidad de vida de las sociedades que las habitan, pero a través de la recuperación de la historia, de la afirmación de la identidad de la comunidad y de una permanente visión hacia el futuro.

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LE MANUEL DE REHABILITATION DE L'ARCHITECTURE MINEURE » : OUTIL PRIVILIGIE DE VULGARISATION, DE FORMATION ET D'INTERVENTION DANS LES SITES HISTORIQUES

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Abstract

Si certains éléments majeurs du patrimoine architectural sont objets de reconnaissance et d'attention particulières grâce aux lois de protection des monuments et sites historiques, un grand nombre d'édifices « mineurs » dotés d'une valeur patrimoniale historique et architecturale, sont livrés à l'usure du temps sans protection réelle. Ces édifices assurent pourtant plusieurs fonctions importantes dans l'appréhension d'un centre historique.
Cet article qui résume des travaux de recherche menés à l'Ecole Polytechnique d'Architecture et d'Urbanisme d'Alger, en Algérie, pose le problème de la négligence dont soufre l'architecture « mineure » ou « courante » au détriment de l'architecture « monumentale ».
Il propose une tentative méthodologique pour l'élaboration d'un instrument de contrôle et de gestion des interventions de conservation de la qualité architecturale et urbanistique d'un centre historique, à travers une expérimentation sur la ville de Miliana, en Algérie.
En proposant l'élaboration d'un manuel de réhabilitation qui, contrairement à la conception de la restauration monumentale, se présente comme un projet pour une activité globale de manutention, développé à travers la proposition des matériaux et des techniques de mise en œuvre traditionnelles, cette recherche se veut aussi une occasion pour redécouvrir un lexique architectural disparu ou en voie de disparition, d'abord comme terminologie ensuite comme matériaux et techniques traditionnels de l'art de bâtir artisanal. Ainsi, le manuel proposé est aussi un outil de vulgarisation, de formation.
Par ailleurs, le manuel de réhabilitation qui se présente comme un condensé regroupant l'ensemble des matériaux et les techniques de mise en œuvre dans l'art de bâtir artisanal, nécessaire à toute intervention sur l'édifice historique mineur, ne se restreint pas aux opérations de conservation, mais peut être développé pour devenir un instrument de contrôle des interventions à l'extérieur du périmètre du centre historique, c'est à dire aux niveaux des périphéries urbaines et des zones nouvelles.
Finalement, en se présentant comme un répertoire des matériaux, des techniques, des structures et des formes typologiques de la construction historique organisés dans des dessins exécutifs détaillés et par des indications écrites claires, le manuel est aussi un instrument d'information à grande diffusion dans les revues et les répertoires des matériaux, produits et techniques de construction.

L'édifice historique mineur dans les opérations de préservation et valorisation

Si certains éléments mineurs du patrimoine architectural ne répondent pas aux critères de classement en tant que monuments pour valeur exceptionnelle d'œuvre artistique et historique, ils définissent néanmoins un caractère à l'ensemble et influent sur l'environnement immédiat des édifices majeurs qu'ils sous-tendent.
L'argument de base dans ce cas étant qu'une pièce en soi, peut théoriquement ne pas avoir de valeurs intrinsèques, mais elle se distingue par sa valeur de témoignage sans laquelle elle peut disparaître ou être consciemment détruite.
Par ailleurs, caractérisé par une construction et une forme spécifique, chacun des édifices mineurs du centre historique existe en mode univoque et définitif par rapport à tous les autres composants de sa structure urbaine; par conséquent cette trame complexe de composantes ne peut être modifiée par d'arbitraires substitutions, soustractions ou additions sans porter atteinte à l'organisme architectural, urbain ou territorial dans lequel se trouve l'édifice mineur.
En effet, l'édifice mineur constitue la matière substantielle physique (consistance matérielle) essentielle du centre historique. Chaque élément de l'environnement urbain du centre historique est une partie de l'ensemble des éléments constructifs et de finition dans lesquels se concrétise la valeur dite historique et de témoignage; elle en constitue par conséquent l'expression d'un langage dans lequel les personnes se reconnaissent et où se définit « un lien étroit entre la substance et l'apparence de l'édifice »Di Romagna[1].
Ainsi, cette recherche part du principe que chaque site historique, est doté de valeurs témoignant d'une technologie constructive traditionnelle menacée d'altération et de disparition et donc, nécessite un instrument de contrôle et de gestion permettant de préserver la substance matérielle et promulguant l'intérêt culturel de ce site.

Le manuel de réhabilitation

L'élaboration d'instruments d'intervention et de contrôle de la qualité historique des édifices mineures n'est pas nouvelle dans le domaine de la réhabilitation du patrimoine historique.
En France, la ZPPAU (Zone de Protection du Patrimoine Architectural et Urbain), est une expérience lancée par la Mairie de la ville de Quimper, pour l'élaboration d'un véritable « plan de référence du patrimoine » Chatauret [2]. Elle s'appuie sur la connaissance précise de l'histoire de la ville et de sa formation, comme guide au projet urbain. La ZPPAU n'est cependant pas un projet opérationnel, mais un cahier des charges contractuel conditionnant les opérations d'aménagement urbain. Elle est basée sur le respect du cachet historique et culturel de la ville et permet une évolution harmonieuse du centre historique ancien sans se préoccuper de l'édifice en tant que consistance physique historique.
En Italie, l'idée du manuel de récupération est née suite à la prise de conscience relative à la difficulté d'élaborer des instruments de sauvegarde active des biens culturels autres que les monuments et suite à la conviction que les normes en vigueur ne protégeaient pas la substance des édifices historiques et leur composition matérielle. C'est dans ce but que le laboratoire des théories et des techniques de récupération intercommunal italien, a initié un travail de recherche pour promouvoir la connaissance des caractères constructifs des édifices historiques sur la base des travaux de Panella et Dogliono [3], en 1970, lors de l'étude du centre historique de la ville de Pesaro.
Le précis de restauration de Pesaro fut rédigé suite à l'expérimentation de nouveaux instruments de développement de la standardisation du processus de connaissance des édifices anciens, à travers le relevé critique et la définition des réquisitions homogènes pour leur restauration.

Depuis, l'expérience de l'instrument de récupération du centre historique à travers la réhabilitation de l'édifice mineur, a été tentée dans trois villes, à Rome, Castello, Giovanetti[4] et Palerme, Giovanetti[5].
Dans le cas de l'expérience algérienne, le manuel est conçu, non seulement comme un instrument qui interprète l'intervention de la conservation et de mise en valeur sur l'édifice mineur utilisant un langage architectonique compatible avec l'existant, mais il se veut aussi un guide à la lecture de la construction historique qui reprend la tradition réalisée en proposant des solutions alternatives.
Le manuel de réhabilitation est donc conçu comme :

- un répertoire détaillé des éléments de la tradition constructive artisanale prise dans un contexte local.
- un condensé des règles de l'art de bâtir, des procédés de réparation, d'adaptation et d'amélioration des éléments constructifs de l'organisme historique bâti. Il propose des suggestions indiquant une voie alternative à la conservation et la mise en valeur du patrimoine historique bâti.

Le manuel de réhabilitation : contexte d'application

L'architecture du 19ème siècle constitue l'enveloppe physique de l'environnement urbain de plusieurs villes algériennes. Elle constitue « l'expression la plus haute de sa civilisation » Petruccioli [6], le fruit d'une sédimentation des matériaux et des techniques de construction qui n'a pas empêché une infinité d'éléments préexistants de persister dans la même localisation, avec la même technique et servant de référence à la production du 19ème siècle.
Après l'indépendance, la ville du 19ème siècle est devenue une partie de la mémoire collective, un patrimoine important puisqu'il constitue le support effectif du lexique architectural historique d'une grande partie des villes algériennes. Ce patrimoine est aujourd'hui en péril et a besoin d'interventions d'entretien avant que la dégradation de sa consistance matérielle n'impose des travaux plus radicaux et plus onéreux.
A Miliana ville moyenne située sur un promontoire à mi-hauteur du mont Zaccar, à environ trente kilomètres à l'ouest d'Alger, la ville du 19ème siècle (coloniale) fut un projet de l'urbanisme néo-conservateur.
Son tracé a été réalisé par la superposition de la trame urbaine du 19ème siècle sur le tissu urbain de la ville traditionnelle. En effet, Miliana est un établissement de l'époque romaine (Zuccabar), reconstruite au dixième siècle, par un prince berbère de la confédération Sanhaja en même temps qu'Alger et Médéa, El Bekri [7].
L'intervention coloniale a introduit dans la ville les caractères de l'architecture occidentale classique tels que la perspective urbaine, les rues larges et bordées de plantations, les ouvertures sur les façades.
Le tracé de la trame urbaine de la ville du 19ème siècle a nécessité des éléments de conformation tels que: l'escarpement, le lit de l'oued, les portes urbaines et des édifices majeurs (le palais de l'ancienne ville). Ce tracé a été réalisé en plusieurs phases, d'abord des places urbaines ont été créées dans le tissu urbain traditionnel ; la place du Zaccar au nord a été réalisée par la démolition d'un agrégat de maisons, la place de l'horloge par la démolition de la mosquée turque El Batha dont seul le minaret a été préservé et surmonté d'une horloge et l'esplanade est devenue le belvédère de la ville.
La deuxième phase de la réalisation de la trame urbaine fut la percée des grandes rues dans le tissu compact. La rue saint Paul fut conçue comme la perspective urbaine de la ville et le minaret préservé de la place de l'horloge a été interprété comme obélisque marquant le point de fuite de cette perspective. Son trace crée la jonction entre la place du Zaccar et la place de l'horloge.

La deuxième tranche de cette rue fut décalée de son axe pour préserver le palais de la ville traditionnelle, qui est devenu la subdivision de la ville et le lieu où a été reçu l'empereur Napoléon III lors de son voyage en Algérie en 1865. Cette tranche à été nommée la rue Saint Jean et relie la place centrale de la ville (place de l'horloge) au belvédère.
La deuxième direction de la trame urbaine de la ville du dix-neuvième siècle a été obtenue par un tracé parallèle au lit de l'oued qui limitait la ville à l'ouest. La trame urbaine ainsi obtenue est constituée d'îlots de forme quadrilatérale mais jamais carré ou rectangulaire.
La ville a ensuite, subie des extensions et des transformations multiples . La première extension fut obtenue par le dédoublement de la ville et la création de la ville jumelle contenant le quartier des casernes ; cette extension a été possible par le remblai et la canalisation souterraine de l'oued qui constituait une limite naturelle à la croissance urbaine de la ville.
La ville a connu aussi, une extension moderne vers 1954. Celle-ci a été possible par le dépassement de l'enceinte urbaine du coté Nord qui constituait une limite artificielle à sa croissance urbaine.
Depuis la ville n'a pas connu une planification rigoureuse, et a été l'objet d'un projet d'aménagement territorial qui a été à l'origine de la création des zones de grands ensembles dans la ville vers les années soixante dix. Vers 1985 la ville a connu un autre projet mais cette fois ci, de restructuration urbaine qui a proposé la totale substitution des îlots. Heureusement seuls deux îlots sur les soixante et un îlots ont subi l'opération de substitution. Vers les années quatre vingt, l'échelle du projet a diminué et les interventions sont passées à l'échelle du projet d'architecture par la substitution des édifices historiques mineurs. Les alignements dans le centre historique ont été préservés mais la matière physique historique a disparue.
Ce phénomène risque de faire disparaître jusqu'au dernier témoignage de la ville d'où l'urgence de penser à une politique de sauvegarde active gérée par un instrument favorisant la conservation de l'architecture mineure exprimée dans sa matière physique c'est à dire matériaux, techniques de mise en œuvre: l'art de bâtir traditionnel.
L'instrument, le manuel de réhabilitation permettra d'orienter les interventions dans le centre historique, de les contrôler et de les gérer en suggérant ce qu'il faut faire plutôt que de prescrire ce qu'il ne faut pas faire.

Le manuel de réhabilitation du centre historique de Miliana : méthodologie d'élaboration

Contrairement à la conception de la restauration monumentale, le manuel de récupération s'offre comme un projet pour une activité globale de manutention, développé à travers la proposition des matériaux et des techniques de mise en œuvre traditionnelles. Son élaboration est caractérisée par une analyse approfondie des différents aspects (à différentes échelles) des éléments du bâti à réhabiliter de la ville de Miliana.
Dans notre contexte, l'étude de la conservation des éléments de la substance matérielle des édifices historiques mineurs, s'est fait grâce à une longue analyse allant de la définition du périmètre de l'aire d'étude du centre historique, passant par la décomposition de l'organisme bâti en éléments constructifs, leur recensement et leur classification jusqu'à l'individualisation des types récurrents et significatifs existants dans les différentes constructions historiques du contexte considéré.
L'ensemble des éléments constructifs ainsi sélectionnés sont soumis à une analyse détaillée basée sur de sage destructions, conçues pour pénétrer la structure de l'élément et d'en identifier sa logique constructive. Le moment le plus important de ce parcours cognitif est constitué de deux opérations conséquentes - le relevé et la restitution- où le dessin devient un moyen privilégié de connaissance et de transmission des informations techniques.

L'identification de l'aire du centre historique

Le centre historique constitue la partie urbaine la plus chargée en témoignages historiques culturels architecturaux, et de mémoire. Sa valeur est constituée par les édifices mineurs qui le composent, indépendamment de celle de ses édifices singuliers. Son identification a été possible à travers l'étude du processus de formation et de consolidation de son assiette urbaine à travers une analyse diachronique, complétée par une analyse synchronique à travers sa décomposition en entités urbaines pour la reconnaissance du schéma historico-morphologique de la ville. De ces deux analyses complémentaires a été déterminée la partie urbaine dite « centre historique » avec un périmètre clairement déterminé.

Identification du bâti historique

A partir du début du 20ème siècle, le centre historique de Miliana a connu plusieurs opérations de substitution de son bâti. Donc une opération d'identification du bâti historique support de la tradition constructive traditionnelle était nécessaire. Elle a été possible à travers une étude typologique exhaustive des îlots formant le centre historique de la ville. L'analyse détaillée a permis d'identifier huit (08) types d'îlots dont un (01) est caractérisé par la coexistence de deux logiques constructives artisanales: c'est un type d'îlot caractérisé par un cœur constitué par un bâti datant d'avant 1840 (de la ville musulmane) et une bordure constituée d'un bâti du 19ème siècle ; mais dans les deux cas le bâti témoigne d'un savoir faire artisanal disparu ou en voie de disparition.

A travers une évaluation et une classification selon des critères relatifs à la valeur historique, architecturale, certains îlots ont été jugé d'un très haut degré d'authenticité historico-architecturale et donc considérés comme le support de la construction historique. Ce sont ces îlots qui ont été sélectionnés pour l'étude de la consistance matérielle du bâti.

L'étude de la consistance matérielle du bâti historique

L'étude de la consistance matérielle du bâti historique s'élabore en deux phases :

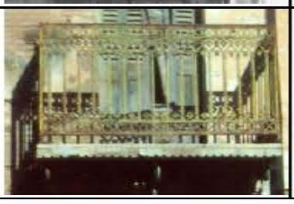
L'identification des éléments constructifs du bâti historique puis l'identification de leur typologie constructive.

L'identification des éléments constructifs d'un édifice est une opération de connaissance qui peut se résumer par des fiches d'identification. Le contenu de la fiche dépend du niveau de l'analyse et de l'objectif qu'elle vise. Dans le cas du manuel de réhabilitation de la ville de Miliana, la fiche est un moyen de connaissance pour une éventuelle proposition d'intervention et donc elle peut même contenir des indications directement opérationnelles (Table 1).

Une fois les éléments constructifs identifiés, une typologie constructive peut être établie, bien sûr grâce à des critères de classification tels que les matériaux utilisés, l'appareillage, les outils, et autres. Ce niveau de connaissance permet d'identifier la richesse de l'art de bâtir de la ville. Les informations et les indications obtenues dans les fiches d'identification par le relevé et même par de sages destructions permettant de pénétrer la structure interne de l'élément constructif, sont organisés sous forme de dessins et d'indications :

- en forme de proposition : le répertoire signale les éléments que le projet est tenu à sauvegarder ainsi que ceux qui sont invisibles et qui émergent lorsque le chantier est lancé.
- en forme de suggestion: il assure la valeur d'une discipline d'exécution dans laquelle sont proposées des indications opérationnelles aux techniciens.

Table 1. Fiche d'identification du lexique archit historique à Miliana

SOUBASSEMENT						
CORPS DE LA FAÇADE	Appareillage		+			
	Crépissage + Peinture				+	
	Chaîne horizontale			+		
	Chaîne verticale					
CHAMBRANLE DES OUVERTURES						+
BALCON	Appui		+			
	Plancher				+	
	Balustrade		+			

Ce second aspect (suggestion) est plus efficace lorsqu'il est appuyé par des exemples de projection et d'analyse détaillée des travaux prévus, développés en accord avec des critères indiqués dans le texte qui accompagnent les tableaux. Les dessins fournissent des connaissances de causes permettant d'opérer sans dommage dans le cas de la manutention et la réparation. Ils servent aussi de guide à la reconstruction des parties à réintégrer dans le cas de la réparation mineure (figure 1).

Dans le cas de la substitution de l'élément, les alternatives à suivre sont au nombre de deux:

1. celle de la répétition adaptée à un contexte de conservation pour remplacer les morceaux qui manquent en les distinguant de l'original.
2. celle de la révision de l'élément constructif à la lumière des techniques en usage aujourd'hui, marquant en ce mode, la différence avec l'original sans altérer ni le contexte ni l'organisation structurelle.

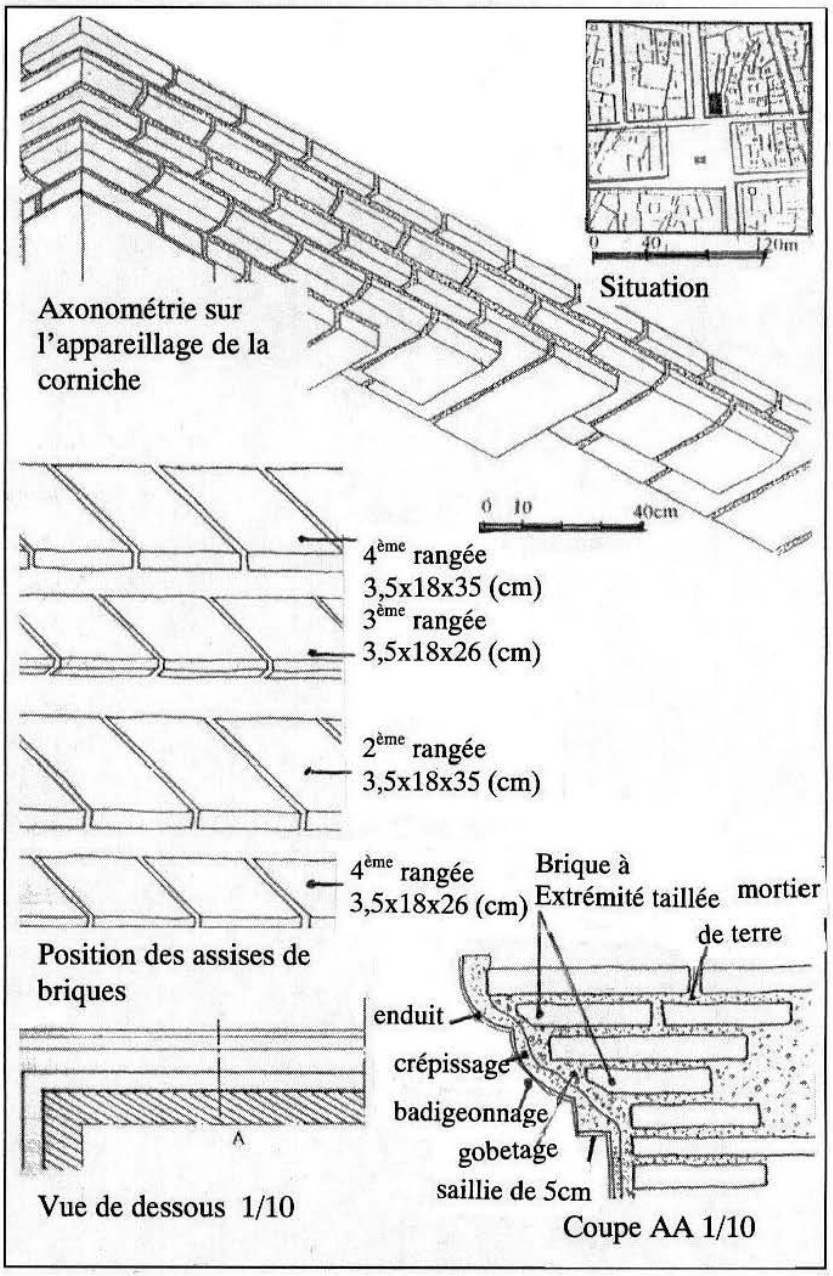


Figure1. Typologie constructive de la corniche à Miliana (19ème Siècle)

Dans le cas de la substitution de l'élément, les alternatives à suivre sont au nombre de deux:

1. celle de la répétition adaptée à un contexte de conservation pour remplacer les morceaux qui manquent en les distinguant de l'original.
2. celle de la révision de l'éléments constructif à la lumière des techniques en usage aujourd'hui, marquant en ce mode, la différence avec l'original sans altérer ni le contexte ni l'organisation structurelle.

Perspectives et destinations du manuel de récupération

Le manuel de récupération s'utilise comme un approfondissement des connaissances de la construction historique, le travail artisanal. Il favorise la conservation à travers l'appréciation et le respect de la substance matérielle du bâti historique. Il est aussi, une contribution pour combler la négligence, et l'oubli qui ont caractérisé la pratique des constructions traditionnelles.

Le manuel de réhabilitation permet aussi la reconstruction philologique des principes et règles exécutives du savoir technique disparu. La connaissance ainsi obtenue n'est pas cependant une fin en soi. Elle vise à réactiver la dynamique interne de l'évolution et de l'amélioration de l'art de bâtir traditionnel et à réintroduire le lexique et les techniques dans l'environnement actuel.

Le manuel de récupération est destiné aux:

- Techniciens et autres ouvriers puisqu'il s'offre comme une acception corporative qui unit le projeteur et l'exécuteur. Il se propose comme une méthode pour l'apprentissage de l'art de construire pour tous ceux qui affrontent la manutention concrète et la restauration des éléments constructifs. Ainsi, le manuel s'offre comme un répertoire de la construction historique pouvant être utilisé sans une particulière contre indication à condition de tenir compte des valeurs spécifiques et contextuelles de l'élément constructif en considération.
- Propriétaires et tous les autres habitants, vu qu'il est d'ordre empirique et a un intérêt de vulgarisation et de valorisation de la substance matérielle des édifices historiques exposés aux regard de tous, mais souvent, négligés, tels que les que planchers, les toits, les voûtes, les coupoles, les pavements en briques, les portes, les fenêtres, les crépissages des mures, les corniches.
- Le manuel peut être aussi un instrument d'information à grande diffusion dans les revues spécifiques et les répertoires des produits et des techniques de construction.

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Mots-clés : Architecture mineure – manuel de réhabilitation

LE TOUB : RETOUR AU SOURCES DE LA CONSTRUCTION AU M'ZAB.

« Je vous comprend d'admirer l'homme qui a travaillé, au M'zab, avec ses propres mains. Il a lutté avec les matériaux, les contingences, avec sa culture. C'était un duel avec la matière, et lorsqu'il a résolu son problème : il avait créé la beauté. Ce ne pouvait être laid, car cela ne pouvait se faire autrement……..

La beauté d'une forme vient des forces conciliées pour la produire. Au M'zab, les formes concilient toutes les forces : sociales et techniques. L'équilibre de la société elle-même s'y exprime ; l'unité, l'égalité sociale, religieuse, d'après la foi. Ainsi toutes les maisons ont la même hauteur, pareil à la Mosquée….

La forme exprime aussi la vérité dans les moyens, la forme structurale. ». (Ainsi s'exprimait Hassan Fathy dans sa préface, « De l'implicite en architecture », pour le livre d'André Ravérau « Le M'zab , une leçon d'architecture ».

L'austérité de l'homme se retrouve dans la nature qui l'environne et peut-être est-ce elle qui a déterminé son comportement !

PHOTO

*La législation urbaine intercommunautaire au M'zab a limité la hauteur maximum des maisons à Sept mètres, avec des restrictions draconiennes dans les cas de respect du voisin, de quel coté qu'il se trouva, surtout par rapport au soleil levant (la Quibla) Sud-Est, coté vers lequel sont orientés toute les terrasses et vérandas des maisons au Ksar comme à l'oasis ; d'ailleurs c'est grâce à ce code « déontologique & architectural » que les Sept Cités du M'zab on acquis leurs formes pyramidales ce qui caractérise leur singularité.

Ainsi, les Mozabites (nom donné aux habitants de la vallée du M'zab), en voulant se « moderniser », depuis sept ou huit décennies , ont abandonné les méthodes ancestrales de constructions et surtout l'utilisation des matériaux locaux : simples, beaux, pas cher et surtout très fonctionnels pour les spécificités de la région (Hiver très rigoureux et été très chaud, avec de très grands écarts entre la nuit et le jour, suivant les saisons), et ont opté pour le béton et le parpaing de ciment qui ont prouvé leur non adaptation au climat Saharien, (les maisons construites en béton et en parpaings de ciment sont très froides en hiver, leurs locataires sont obligés de se chauffer « mécaniquement » à partir du Mois d'Octobre jusqu'à la moitié du Mois de Mai, et en été la climatisation « artificielle » est obligatoire à partir du Mois de Juin jusqu'à la fin Septembre, alors que dans les maisons dites « traditionnelles » construites en briques de terre, ou avec de la pierre locale, l'utilisation des moyens mécaniques de climatisation (chaud et froid) ne sont utilisés qu'aléatoirement et pendant une très courte durée (1 à 2 Mois pour la saison). Il suffit de fermer les portes, de supprimer les courants d'air pour que la maison se réchauffe naturellement, bien sûr par

rapport à la température extérieur, et en été, il suffit de filtrer la rentrée du soleil à la maison et de réguler les courant d'air pour avoir des maisons assez fraîches, naturellement.

La maison « traditionnelle » au M'zab, est « grande » (c'est assez subjectif, car ne dépassant jamais 120 à 150m²). Elle l'est d'une part, car les matériaux sont sur place et la main d'œuvre est en principe communautaire « Touiza » donc non rémunérée, et d'autre part, afin d'offrir plusieurs possibilités climatiques selon les heures et les saisons.

La longueur des pièces ne dépasse guère 3 à 4m sur une largeur de 2m à 2,50m ce qui correspond à la portée moyenne des solives de palmier. La hauteur sous plafond est faible, en général de l'ordre de 2,20m à 2,50m. Elle peut être inférieur à 2m dans les maisons très anciennes, particulièrement à l'étage.

Rappelons, comme nous l'avons cité plus haut, que la limitation des hauteurs n'est pas due aux matériaux utilisés, mais provient des règles d'urbanisme que les Mozabites se sont volontairement données.

PHOTO

Les bâtiments autres que les habitations sont réalisés de la même façon et ont les mêmes proportions. Dans les Mosquées la hauteur sous plafond est souvent plus importante, parce qu'il n'y a pas d'étage sauf une terrasse entourée d'un acrotère de 1,50m à 2m de hauteur. L'espacement entre deux arcatures y correspond à un module défini par la dimension d'un homme prosterné pour la prière.

Dans les maisons traditionnelles du M'zab, les fonctions n'imposent ni forme ni localisation précises. Par exemple le coin cuisine qui comporte généralement un âtre, un lieu pour l'aiguière et des étagères, est différent pour chaque maison. Les pièces n'ont ni forme précise, ni destination déterminée (tantôt chambre, tantôt réserve alimentaire, tantôt garde robe …). La liberté de plan entraîne une grande diversité de conception des espaces et de réalisation.

Les espaces sont complètement utilisés : aucune place n'est perdu dans le cadre, parfois exigu, d'une petite maison du Ksar. Tous les espaces disponibles sont récupérés (par exemple :le dessous d'escalier devient litière pour la chèvre, armoire de rangement, moulin traditionnel, …etc). Le mobilier est en grande partie intégré à la maçonnerie : niches, étagères, banquettes, lits, récipients de réserve (eau et grenier à datte surtout).

Les formes et dispositions que trouve chaque architecte, qui visite les villes du M'zab, belles et réussies, sont dues au hasard de la mise en œuvre, à la volonté du propriétaire, au savoir faire et à la fantaisie du constructeur : le fonctionnel prime sur l'esthétique dans l'élaboration de la maison traditionnelle. La construction suit les besoins, et c'est ainsi que très souvent l'étage ne se superpose pas au rez-de-chaussée.

La construction est définie culturellement autant que techniquement. Le résultat est le reflet du mode de vie et de la philosophie de toute une population.

La maison mozabite bénéficie d'une organisation sociale intimiste, et, cet intimisme est présent dans les réalisations communautaires de grande envergure comme dans l'organisation de la cité. Présent depuis plus de dix siècles jusque dans la limitation de sa population. Ce qui prouve un haut degré du sens de la responsabilité.

Malheureusement, depuis une quinzaine d'année, avec l'arrivé de l'intégrisme en Algérie, et par ricochet au M'zab, un marasme a envahie la famille mozabite dans ses détails et la structure communautaire dans son ensemble.

L'Ibadisme (rite sunnite de l'Islam et la plus modérée des trois écoles théologiques nées du Kharidjisme en 65 H/ 685 de l'ère chrétienne) ; a façonnée la société Berbéro - Ibadite en Algérie, et ceci depuis plus de Douze siècles.

A ses débuts, et malgré son rigorisme, l'Ibadisme reçu un accueil enthousiaste au sein des plus grandes tribus berbères de l'Ifriqiya, car il a prôné à son orée une doctrine égalitaire et démocratique nouvelle, à l'inverse des régents Oumeyades qui exploitaient leurs populations.

D'ailleurs, se mettant en porte à faux dans plusieurs concepts avec le reste des rites en Islam, tel la non vision de Dieu le jour de la résurrection et d'autres préceptes, les Ibadites ont rejeté la polygamie, et ils le notifient très clairement dans leurs actes de mariage (dont voici un proto type original, en l'occurrence le mien !).

Les économistes estiment à cinquante mille personnes la population de la ville idéale, en delà, elle ne peut fonctionner correctement.

Les Mozabites, depuis longtemps ont opter pour des villes de moyenne importance en implantant progressivement des ksours le long de l'Oued M'zab à chaque fois que la nécessité se faisait sentir, et en même temps pour préserver les terres agricoles et les oasis, prolongement logique et naturel de ces villes.

PHOTO

Ainsi, le phénomène des résidences secondaires, accessibles, en occident, aux seuls privilégiés, était un mythe déjà vécue, et qu'il est même encore vivant chez les Ibadites, organisés selon ce principe depuis prés d'un millénaire.

Intellectuels à la ville durant les Mois d'hiver, tout en gardant le contact avec les palmeraies proches, ils redeviennent campagnards l'été ; et tout le monde devient, de fait, maçon, agriculteur, puisatier ...etc. Personne n'est au dessus de la besogne générale, malgré son grade hiérarchique dans la société, l'Imam (autorité suprême politique et religieuse), n'est pas dispensé de réparer la terrasse de sa maison avec ses propres mains et l'aide de ses enfants, de guider son âne sur le chemin de halage pour arroser ses palmiers, et de laver son linge au bassin de son puit.

Ainsi, le M'zab fut par la volonté des hommes, avec des mains nues et des matériaux locaux constamment enrichis.

Depuis quatre décennies, le M'zab a éclaté, envahie par le monde moderne et ses images faussement fascinantes. Les inégalités y sont devenues

patentes ; la surpopulation aidant, les fondements moraux de la société ne sont plus une contrainte pour le respect du mode de construction, de l'architecture et des moyens de construction.
La société Ibadite si longtemps équilibrée et harmonieuse s'est disloqué progressivement, surtout après l'annexion du M'zab et la perte des pouvoirs des Imams sur les populations au profits des Cadis et Bachaghas alliés de l'armée coloniale.
Après l'indépendance, l'arrivé du socialisme niveleur et la perte de la jeunesse pour ses repaires fondamentaux accentua cette dislocation, et, bien sûr, les fondements de la société furent ébranlés et en premier lieu l'architecture avec son mode et ses moyens de construction. Les Mozabites, fascinés par les nouvelles constructions édifiées au Nord, renières carrément la beauté de l'architecture de leurs villes au M'zab, et n'y virent que pierres, Toub, absence de confort et inadaptation à la vie moderne.

Depuis une dizaine d'année, et avec l'arrivée sur le terrain d'une nouvelle génération de bâtisseurs intellectuels (Architectes, Urbanistes, ...etc), et l'échec pour l'utilisation de matériaux importés (Ciments, Poutrelles métalliques, briques en ciment ...etc), la population se tourne doucement et progressivement vers les matériaux locaux, même si le mélange est encore largement utilisé.

L' ARCHITECTURE AU M'ZAB : LA MAISON TRADITIONNELLE.

PHOTO

1 – *Les matériaux :*

Les matériaux ne déterminent pas la forme de la construction : ils permettent seulement l'utilisation de telle ou telle technique et la combinaison d'éléments architectoniques originaux.
Pendant presque un millier d'année, la construction au M'zab faisait appel exclusivement aux matériaux locaux, dans un esprit de pur rationalité ; et c'est ces matériaux que nous allons décrire.

- ***La pierre*** : Des blocs, de dimensions variables, sont extraits des strates régulières de calcaire blanc (des carrières sont créées en ce sens et pour l'utilisation commune). Ils sont mis en œuvre sans avoir subi de taille spécifique, de simples équarrissages ont lieu sur le chantier au moment de leur mise en place. (Il existe aujourd'hui à Ghardaïa une usine de taille de pierre, mais ses prix sont trop élevés et la majorité des constructeurs utilise toujours de la pierre brute). Les pierres plates sont réservées aux agencements horizontaux (pavage des placettes, des ruelles, des chemins de hallage, et aussi pour la fermeture des tombes.)

**La brique crue (ou la brique de terre)* : De la taille d'un parpaing, elle est fabriquée à partir des sols les plus argileux (Le Toub). La terre mouillée,

pétrie et moulée, est ensuite séchée au soleil. Parfois on ajoute de la paille à la patte pour lui donner plus de cohésion et de solidité.

PHOTO

La brique de terre peut résister à une pression de 15 kg au cm², or elle n'est pas exposé à plus de 2kg de pression au cm² dans les maisons du M'zab (à cause des normes pré-établies par la communauté), pourquoi donc ajouter quoi que ce soit pour qu'elle supporte 60 kg au cm² ? Pourquoi introduire une résistance au-delà de ce que l'on peut obtenir simplement et qui suffirait ? Nous avons des briques, au M'zab, qui datent de plus de Mille ans et qui n'ont pas changé, pas même été altérées. Pourquoi cet effort qui ne résout pas les problèmes mais en crée ? Chaque changement comporte ce risque. La solution juste, elle, résout des problèmes au-delà de ceux que nous prévoyons, des problèmes auxquels nous n'avons pas pensé, comme l'isolation thermique par exemple

**Le Sable* : Argileux, il est utilisé directement comme mortier. Non argileux, il entre dans la composition de certains liants.

PHOTO

- *Le Timchemt* : Sorte de plâtre traditionnel, de couleur grise ou rosâtre, obtenu à partir d'un gypse hydraté de la chebka du M'zab. Ce gypse, extrait du plateau calcaire dans lequel il forme des amas lenticulaires ou des strates horizontales à 1m environ de profondeur, est calciné dans des fours partiellement enterrés, remplis de combustible (touffes de plantes sèches, bois, troncs de palmiers .etc.) Les morceaux de gypse sont disposés en voûte au dessus sur une épaisseur de 1.50m environ. Au bout de 24h de combustion, le bois est consumé, les pierres devenues friables se sont écroulées. Le Timchemt est alors séparé des résidus de sa fabrication.

  Ainsi obtenu, il aurait la composition chimique suivante :

  +Carbonate de chaux : 88%
  +Argile (silicate d'aluminium) : 11%
  +Impuretés (fluorure de calcium) : 1%

La majorité des gisements sont aujourd'hui épuisés, et de ce fait, l'utilisation du Timchemt a presque complètement disparu.

- *Le Plâtre* : Utilisé depuis très longtemps, il était produit en grande quantité, dans une seule usine artisanale à Noumerate, localité située à 15 Km de Ghardaïa, aujourd'hui quatre usines modernes produise du plâtre de très bonne qualité, dans la Wilaya de Ghardaïa.

Son utilisation a supplanté celle du timchemt et pour lequel il a pris le nom (communément, à Ghardaïa quand on parle de timchemt c'est le plâtre qui est désigné. Comme, d'ailleurs, le terme « platna » du nom de la première usine de plâtre.

Il est à prise très rapide. Très apprécié dans la maçonnerie au Sud, et utilisé au Nord dans tous les enduis. Sa demande est telle que les

quatre usines, tournant en H24 n'arrivent pas à satisfaire une demande national toujours croissante.

PHOTO

*__La Chaux :__

Mélangée avec du sable, la chaux est utilisée comme liant dans la construction (pierres ou briques de terre), comme enduit et comme peinture pour les badigeonnages intérieurs et extérieurs (utilisée, le plus souvent, avec sa couleur d'origine : blanche, ou colorée avec des teintes surtout le bleu indigo).

La chaux est obtenue à partir de carbonates extraits de la Chebka du M'zab, et s'y trouvant en abondance. Ces pierres sont calcinées dans des fours de différentes grandeurs, utilisant comme combustible, dans l'ancien temps, et pour une production artisanale, de grosses quantités de bois, très souvent importées du Nord. Aujourd'hui on utilise des brûleurs fonctionnant au gasoil ou au gaz naturel pour une production industrielle de la chaux.

*__Le Palmier__ : Deuxième pilier fondamental de la création du M'zab (dans la mythologie Mozabite, le Minaret (AÃssas : Nom masculin) de la grande Mosquée de Ghardaïa était désigné comme le père, et, le palmier (Tazdayit : nom féminin) était désigné comme la mère de la nation Mozabite en vue des rôles très importants qu'ils ont eu à assumer durant toute l'épopée de la création du peuple et des villes du M'zab).

Du palmier on utilisait la totalité, et chaque membre ou morceau avait son utilisation spécifique ou général.

Certaines parties, enlevées saisonnièrement, sont utilisées le long de l'année dans la nourriture, l'artisanat, la construction, et comme combustible, sauf le tronc qu'on ne peut utiliser qu'après la mort du palmier (car il serait sacrilège d'abattre un palmier sain et producteur).

La construction emploi le stipe (ou tronc), le régime, la palme et la gaine qui est la base de nervure de la palme.

+__Le stipe__ : Il est utilisé entier pour réaliser de grosses poutres. Il peut être scié, dans le sens de la longueur, en 2, 3 ou 4 parties qui donneront des poutres présentant une face plane de 20 à 30 centimètres de coté sur 2 à 5m de long (pour les plafonds).

+__La palme__ : (Touffa) Elle est d'abord séchée pour être utilisée entière ou dépouillée et réduite à la nervure (Taghda) (très appréciée pour la réalisation de l'arc dont est réputée l'architecture du M'zab).

+__La gaine__ (Tahjourt) : De forme triangulaire et relativement résistante est le plus souvent utilisée comme appui et dans le remplissage des dalles.

+__Le régime__ (Azioua) : après l'avoir dépouillé de toutes ses dates on le fait sécher et on l'utilise pour le badigeonnage, au mortier de

chaux, des façades et des terrasses (technique utilisée jusqu'à nos jours).

PHOTO

+*Autres arbres* : Les troncs de tous les autres arbres fruitiers ou non (Orangers, citronniers, pêchers, Abricotiers, acacias, eucalyptus ..Etc.) Peuvent servir de poutres.

2- *Les Techniques de construction* :

Chaque homme qui veut construire sa maison détermine d'abord le type de construction qu'il veut réaliser en fonction :

+Des contraintes sociaux- culturelles de la communauté.
+De ses besoins, de ses aspirations, de son idée de la maison,
+Des maisons qu'il a vue ailleurs
+En générale de sa culture et de sa conception de la vie familiale et de son intimité.

Depuis des siècles, c'était la Touiza (volontariat) qui prévalait dans toutes les constructions au M'zab (maisons, mosquée, magasin, tours de garde, barrage, pavage des ruelles, des placettes, travaux dans les cimetières etc.), Mais depuis 6 ou 7 décennies, des artisans maçons spécialisés sont apparus et la construction leur fut confiée, utilisant des ouvriers assez bien formés dans le bâtiment. Lorsque le propriétaire ne construit pas lui-même, il participe néanmoins à la conception générale de l'habitation et à tous les stades de la réalisation.

Chaque homme de la communauté peut aider ces maçons ou les remplacer carrément, sans pour autant que la Touiza ne disparaissent complètement surtout pour les travaux d'intérêt général (Barrages, digues, Mosquées, cimetières..etc.)

PHOTO

Les matériaux utilisés ne suffisent pas à expliquer les particularités de l'architecture Mozabite ; aucun d'eux n'implique un seul type de mise en œuvre : les techniques sont multiples. Les seules contraintes d'utilisation sont d'ordre mécanique (limite de résistance à la compression, à la traction, à la flexion, à la torsion, au flambage etc.)

**Les Fondations* : Elles n'existaient pas en tant que telles. Le sol naturel des Ksars ou villes (en berbère : Agherm, pl. Ighermène) est en grande partie constitué par la roche affleurante, dans ce cas le mur de moellons (construit ou coulait dans un béton de mortier de chaux et de sable) commence directement.

Dans les palmeraies et sur sols sablonneux, on creuse une rigole, (large de 30 à 80cm et sur une profondeur variant entre 30 et 70cm), qui permet d'asseoir le mur sur le sable compact (avec une coulée de mortier de chaux et de sable, ou plus récemment du béton de ciment et de sable avec des gros moellons hourdés de différentes tailles).

La roche est toujours assez proche de la surface (pas plus d'un mètre).

***Les Eléments Porteurs :**

A) ***Les Murs :*** (berbère : Marou, pl. Imourane), sont composés de moellons plus ou poins gros qui forment une maçonnerie irrégulière. Très traditionnellement, l'épaisseur des murs varie de 40 à 80cm, pouvant atteindre 1m à la base pour se réduire sur la terrasse à un acrotère de 15cm (les acrotères sont de véritables clôtures de terrasses mesurant 1,50m à 1,80m de hauteur.

La construction des murs se fait par coulage progressif d'un mortier de chaux et de sable avec les moellons, ou par construction (Deux parements sont liaisonnés ou non par des boutisses, avec un rembourrage au cœur du mur, fait de petits éléments et de mortier, plus souvent terre que chaux. La mise en œuvre se fait par assises horizontales, simultanément sur les deux faces et au cœur, sur lit de mortier préalablement étalé.

Les murs de cloisonnement sont réalisés en briques crues (Toub) montées au sable argileux ou au mortier de chaux (utilisé aussi pour les habitations à l'oasis) après un soubassement en pierre et mortier de chaux.

B) ***Les Piliers*** : (berbère : Ammoud, pl. Ammoudène)

Les piliers sont constitués de moellons liés parfois au sable argileux, mais plus fréquemment au mortier de timchemt et sable, ou au plâtre seul (prise rapide). Leurs dimensions sont très variables, de 20cm à 1m de coté. Ils peuvent être de base, approximativement, carrée ou rectangle avec une reprise au milieu en arrondi, et s'appuient directement sur le sol avec ou sans fondation.

Reliés avec des arcs entre eux, on les retrouve dans toutes les habitations et surtout les grands édifices (Mosquées, placettes, places du marché, cimetières .. etc.).

Des pilastres de toutes formes (arrondis, carrés ou rectangulaires) peuvent se trouver engagés dans l'épaisseur des murs. Leur définitions et leur constructions sont identiques à celles des piliers.

PHOTO

LA STRUCTURE HORIZONTALE DE FRANCHISSEMENT :

Nous avons deux types de franchissement d'espace :

+Le franchissement linéaire (poutres, linteaux, arcs)

+Le franchissement surfacique (dans deux directions)
ou couverture (planchers, voûtes et coupoles)

A) *Le franchissement linéaire.*

**Poutres et linteaux*

On utilise les madriers brutes de palmiers (solives) coupés longitudinalement en deux ou en quatre qu'on appel tmalaft, pl. Timoulaf en berbère. Leurs extrémités sont noyées dans le timchemt. Ces poutres qui

supportent des murs, et souvent une partie de l'infrastructure de l'étage sont placées le cœur en dessous. L'utilisation du palmier est assez délicate en raison de sa texture fibreuse et de sa moyenne résistance. Ces poutres permettent de franchir 2 à 4m. (Leur vieillissement est assez normal 3 à 4 siècles)

**Les Arcs* (berbère : Lķous , pl.Laķouas)

Ils sont réalisés en moellons posés en « assises » successives, face à face, au moyen d'un coffrage perdu : entre les piliers devant supporter l'arc, on cintre des nervures de palme que l'on scelle au timchemt, puis on monte les moellons. Ce coffrage, très résistant, est soit noyé, soit apparent

Du fait de la longueur variable des nervures, de leur flexibilité, du cintrage peu contrôlable (l'extrémité plus fine se cintre d'avantage), on obtient une arcature irrégulière formée d'arcs en plein cintre, ou parfois outrepassés. Ce qui donne un grand charme et un plus grand humanisme à la construction ainsi réalisée.

PHOTO

A) Le Franchissement Surfacique

a) Les Planchers (Berbère : Lgharf ; pl. Lghroufa)

La structure porteuse des planchers est constituée de solives (berbère : Tmalaft, pl. Timoulaf) en stipe de palmier scié dans la longueur. Ces solives sont espacées de 30 à 40cm en moyenne.

Le plafond est constitué soit par un lattis serré de nervures de palmes, souvent recouvert de palmes complètes, soit par des pierres plates, soit par des voûtains formés de pierres liées au timchemt entre les solives. Cette base est ensuite recouverte d'une couche de sable damé d'épaisseur variable pouvant atteindre 30cm sur les terrasses exposées à l'air, au soleil, à la pluie et sert alors d'isolant thermique, protégée elle-même par une chape de mortier de chaux. Cette chape est fouettée à l'aide du balai que forme le régime de dattes dépouillé de ses fruits, ou d'une palme verte, pour réduire les interstices qui résultent de la simple mise en œuvre des matériaux, en assurer la cohésion et obtenir une meilleur étanchéité . On badigeonne finalement la chape au lait de chaux.

Certaines maisons présentent des encorbellements sur la rue. Les solives placées à cette fin ne permettent guère d'obtenir des portes à faux de plus de 40 à 50cm.

+Les Voûtes (berbère : El ķous)

C'est la double situation de pénurie et d'abondance qui développe la technique et son intelligence : pénurie de bois et profusion de terre et de timchemt.

Les stipes de palmier, courbées et calées en force entre deux solives en un tapis continu, forment l'intrados d'un voûtain composé de moellons et d'un mortier de timchemt. Ce sont de voûtes de faible portée, souvent moins d'un mètre. Quand elles

sont renforcées par des arcs doubleaux, on peut dépasser les 1.50m.

PHOTO

+*Les Coupoles.*

Elles s'appuient sur des piliers ou des murs par des pendentifs. On les réalise en moellons et timchemt. Leurs formes sont en général aplaties à cause de l'affaissement des nervures lors de la pose des moellons.

Les coupoles sont très rares au M'zab, on les trouve principalement dans les édifices que l'on trouve sur les cimetières (tombeaux, Mosquées ..etc).

ENDUITS ET REVETEMENTS :

Ils ont pour rôle de boucher les interstices laissés entre les moellons. Les enduits sont constitués (pour les anciennes maisons) d'un mortier de timchemt et sable, et donnent au bâtiment son aspect définitif de couleur ocre ou rose selon la teinte du sable utilisé. Plus généralement et à nos jours les enduits sont fait d'un mortier de sable et de chaux, après l'enduit, on applique obligatoirement une ou plusieurs couches de lait de chaux blanc ou teinté en jaune, ocre, grenat ou bleu. Ces badigeons renouvelés tous les deux ou trois ans sont passés à l'aide de balais de palmiers, ou actuellement à l'aide de grosses brosses ou de pulvérisateurs à main.

Lorsque le sol ou les murs sont constitués par un dallage de pierres plates, la surface est généralement laissée nue, car c'est la pierre, élément noble, qui sert de décoration extérieur et intérieur.

PHOTO

LES ESCALIERS (Berbére : Tssaneinn't , pl. Tissounane)

Ils sont construits, soit sur un blocage de pierres, soit sur deux murettes, soit sur un arc, soit encore sur des poutres de palmier.

La maçonnerie est formée de moellons liés au timchemt additionné ou non de sable. La cohésion et l'équilibre de l'ensemble sont assurés par la bonne résistance et la grande adhérence du timchemt. Les marches finies sont brutes d'enduit ou badigeonnées.

LES CONDUITS DE VENTILATION (Berbère : Elmadouiat)

Permettent essentiellement d'évacuer l'air des caves en rez-de-chaussée par une ventilation naturelle. La prise d'air est en partie haute du local, le conduit est souvent encastré dans l'épaisseur du mur.

LES CONDUITS DE FUMEE (Berbère : Eddoukhanat) Sortes de cheminées qui dépassent de la terrasse en souche et sont couverts partiellement par deux pierres dressées l'une contre l'autre qui déterminent deux ouvertures triangulaires verticales.

LES FENETRES (Berbère : Ettaḳḳat)

Des fentes de forme triangulaires, genre meurtrières, font office de fenêtres (Berbère : Oulloune, pl. Oullounane). On les obstrue avec des chiffons quand il fait froid. On trouve parfois de petites fenêtres qui possèdent un volet en bois : elles sont situées à l'étage au dessus de la porte d'entrée, et correspondent le plus souvent au salon des hommes (Berbère : Edouiryait).

PHOTO

LES PORTES (Berbère : Tawourt, pl. Tiouira)

La porte d'entrée (berbère : Tawourt ainewouattaf) sont faites de planches de palmiers grossièrement assemblées par des clous forgés à des traverses en branches d'arbres fruitiers. La fermeture est assurée, soit par une serrure de bois (Berbère : Ouainnass), soit par une grosse serrure de métal que ferme une clef lourde et encombrante qui peut atteindre vingt-cinq centimètres de longueur. Des anneaux forgés servent de poignée.
Certaines chambres possèdent aussi une porte de même fabrication mais bien plus petite : on est obligé de se courber pour franchir l'ouverture.

LES EVACUATIONS :

*Les Latrines (en berbère : Ta'nssifra)

Le plancher des lieux d'aisance est percé d'une fente rectangulaire (50cm x 15 à 20cm) sur une fosse sèche. Une ouverture au bas de la façade, sommairement obstruée par des briques de toub (terre) liée avec de la terre argileuse, permet l'évacuation périodique des matières sèches, qui sont utilisées comme engrais dans les jardins.

*La douche (berbère : El maghssael)

L'évacuation de la douche traditionnelle se fait vers une petite fosse, circulaire, de 1,20m à 2m x 0.50m à1m de diamètre. La quantité d'eau ainsi déversée (la valeur d'une ou deux aiguières par douche), est négligeable. Ce petit puit ou fosse reçoit aussi l'eau de la cuisine et des ablutions quand elles se font à la maison.

PHOTO

Conclusion :

Nous avons décrit très brièvement le mode ancestral de construction des berbères Ibadhites du M'zab dont le génie urbanistique a fait ses preuves à Sedrata (à coté de Ouargla) et à Tihert au Nord (Tiaret actuellement). Ces puritains du désert qui ont su s'adapter à toutes les natures et réussit à domestiquer le désert le plus aride et le plus dur au monde, ont faibli devant l'image fascinante du monde moderne, et leurs enfants n'ont pu résisté à la tentation et ont sombré dans le mimisme sans

aucune étude ni savoir conséquent pour la maîtrise de ces nouvelle technologies, le résultat a été « la laideur et la catastrophe urbanistique » pour le pourtour des villes du M'zab.

Une reprise, très lente, est amorcée. Malheureusement, les dégâts sont d'une telle ampleur que la récupération de certains « quartiers ghettos » nés après l'arrivée de la colonisation et grand comme des villes, ne pourra se faire que par un rasage systématique de ces quartiers, ce qui est matériellement impossible.

Différentes actions sont menées, depuis 7 ans, pour une certaine récupération du bâti actuel et dans le cadre de la réhabilitation du patrimoine architectural ancien.

Grâce à un montage financier entre l'Etat, les collectivités locales, l'OPVM et les citoyens une grande opération de restauration du cadre ancien bâti est réalisée sur les habitations des vieux Ksars (réparation des maisons et ravalement des façades), et ceci sur une période qui s'étalera de 1997 à 2003 : « 620 opérations dans le Ksar d'El Atteuf, 1ère ville du M'zab ; 485 opérations dans le Ksar de Ghardaïa, 330 opérations dans le Ksar de Guerrara (en dehors de la vallée du M'zab) ; 191 opérations dans le Ksar de Mélika ; 162 opérations dans le Ksar de Béni Isguen, 123 opérations dans le Ksar de Bounoura ..etc).

Des opérations de « replâtrage ou maquillage, si on peut utiliser ces termes », sont réalisées au niveau des artères principales de la ville de Ghardaïa (reprise de la décoration des avenues en utilisant les matériaux locaux et les techniques anciennes « Aardjoune » ; décorations en utilisant des motifs du vieux patrimoine (arcs, minarets, formes triangulaires ..Etc.).

Ces opérations, assez spectaculaires, ont agis comme un déclic sur les consciences des citoyens, surtout ceux habitants dans les vieux Ksars, qui pratiquaient la destruction totale de leurs anciennes habitations pour reconstruire en béton armée, sans aucun respect des modes et systèmes de l'ancienne architecture et la non utilisation des matériaux locaux.

A ce jour, presque 30% des nouveaux constructeurs se tournent vers l'utilisation des matériaux locaux, jumeler avec l'utilisation du ciment aux niveaux accessibles à l'humidité et à l'eau :

PHOTO

+ Les fondations et soubassements sont réalisés en mortier de ciment et de sable avec des gros moellons hourdés de différentes tailles
+ Les murs extérieurs sont réalisés en maçonnerie de pierre et mortier de Sable et de chaux.
+ Les murs de cloisonnement sont réalisés ou bien en briques crues (Toub) montées au mortier de chaux et sable. Ou bien en briques de Plâtres montées avec une colle spéciale faite à base d'enduit de plâtre.
+ Les ceintures et les piliers du 1er étage, qui est le plus souvent

une terrasse à moitié couverte, sont réalisés en béton armé.

+ Les acrotères de la terrasse et les cloisons du 1er étage sont réalisés en briques crues (Toub).
+ Toute la construction est enduite avec un mortier composé de sable et de chaux tamisés
+ Les murs extérieurs reçoivent un deuxième enduit, très brute, réalisé à l'aide du balai que forme le régime de datte dépouillé de ses fruits.
+ Chaque deux à trois an un badigeonnage à la chaux vive est nécessaire pour maintenir les constructions dans un état assez parfait.

L'espoir est grand pour un réveil des conscience sur les bienfaits de l'utilisation des matériaux locaux dans la construction , et ce qui est encore plus important c'est la prise en charge de l'ancien patrimoine bâti, sous toutes ses formes et mode de construction par les générations montantes.

PHOTO

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STRATEGIES FOR THE SEISMIC PRESERVATION OF HISTORICAL CENTRES

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Abstract

The preservation of the historical centres must pass through the characterization of the seismic input, by means of the so-called microzoning, and the analysis of the seismic performance of the structures, which can be suitably performed by means of the experimental analysis. In the last decades new technologies have been developed in order to improve the seismic resistance of structure, such as base seismic isolation systems, energy dissipation systems, shape memory alloy devices and semi-active and active control systems of vibrations. In this paper a review of the above-mentioned subjects is presented as some results of the study carried out for the site of *Cerreto di Spoleto* in Central Italy, where a complex building of the historical centre has been chosen for the seismic analysis.

Introduction

In the past, but also recently, earthquakes caused relevant damages to historical centres and to the cultural heritage in general. The recent earthquakes that struck Campania and Lucania in 1980, Umbria and Marche in 1997 and finally Molise in 2002 in Italy, are only a few, well-known examples. In order to guarantee the conservation for the future generations of the cultural heritage arrived up to our age, it is important a suitable prevention politics thatrequires a big effort and contribution of several national and international institutions. The first step is a complete knowledge of the area of interest and the existing structures. In the selected areas a detailed analysis is needed to understand:

- the characteristics of the seismic input, by means of hazard analysis and microzoning, in order to define the maximum expected event; this can be done only by means of a suitable monitoring of the area;
- the seismic performance of buildings and their contents, such as historical books and documents; the knowledge of the dynamic behaviour under seismic actions of structures of interest should also be performed by means of the seismic monitoring.

In the last decades new technologies have been developed in order to improve the seismic resistance of structures. These are: base and floor seismic isolation systems, energy dissipation systems consisting of various types of passive devices (elastic-plastic, viscous, viscous-elastic and electro-inductive dampers), hydraulic coupling systems using innovative shock transmitters, systems formed by shape memory alloy devices and, more recently, semi-active and active control systems of vibrations. The practical application of such new technologies is quite different for cultural heritage structures with reference to civil buildings.

This paper contains a review of the above mentioned subjects and presents some results of the study carried out for the site of *Cerreto di Spoleto* in Central Italy, where a complex building of the historical centre has been chosen for the seismic analysis.

Figure 1 – View of the investigated area

Seismic hazard and microzoning

Referring to hazard maps for the evaluation of the seismic hazard of the selected area is not enough in order to study its seismicity. In fact, local effects, due to the geological characteristics of the site, could increase the seismic hazard. Therefore it is important to analyse in detail the site in order to perform the so-called microzoning. This is the study of the seismic input in the selected area, which is influenced by the geological, geomorphological and geotechnical characteristics. These can change considerably even in short distances, so the effects in adjacent and similar buildings can be very different.

A methodology aiming at the seismic microzoning was recently developed and tested in a small area located in the Central Apennines in Italy, close to a calcareous ridge, 550 *m a.s.l.* high, and to the *Nera* River alluvial valley, 200 *m* lower (Fig. 1). The studied area is characterised by a relevant seismic hazard and by a high frequency of medium (VII-VIII *MCS*) intensity earthquakes. In particular, the site is affected by nearby earthquakes, which were felt with intensity up to IX *MCS*. The study was developed in the following steps:

- A detailed geological survey was performed in an about 5 km^2 wide area; mesozoic limestones outcrop all over the ridge, intensely folded and faulted as a consequence of a polyphasic tectonic due to the Apennines orogenesis. The alluvial deposits are represented by silt and fine to coarse grained sand with interlayered gravel, geognostic drillings pointed out small travertine deposits under the alluvial layers; debris taluses and alluvial fans can be found at the foot of the slopes.
- Geomechanical surveys were moreover performed along the ridge: the rock mass joint conditions were analysed in 21 scanlines. The obtained geomechanical indices pointed out remarkable areal variability of the joint conditions; anyway most (68%) of the rock masses outcropping in the ridge are characterised by three joint sets at least.
- Seismic refraction prospecting was carried out along the ridge, where different joint conditions had been recognised. Both compressive (*Vp*) and shear (*Vs*) seismic wave velocities were directly measured: the *Vp/Vs* ratio for intensely jointed rock mass turned out to be about 2, which is rather greater than the typically expected value for massive rock. Seismic refraction prospecting in the alluvial plain allowed to directly measuring *Vp*

and *Vs* values related to the different alluvial deposits and contributed to the geometrical reconstruction of the gravel and travertine deposits as well as the calcareous bedrock and the water table. Geoelectrical prospecting pointed out a wide travertine lens under alluvial covers along the northern side of the *Nera* River valley.

- Two temporary triaxial velocimetric arrays were installed at different times along the ridge (7 stations) and in the plain (5 stations), in free-field sites where particularly interesting geomorphological or geotechnical features had been recognised. Due to the seismic activity of the area, each array has been operating for about three days in STA/LTA acquisition mode, recording on the whole about 40 local small-magnitude earthquakes. Environmental noise, sampled for 10 *min* at different hours of the day, was moreover recorded. Significant differences in the local seismic behaviour were pointed out. In particular, a 6-7 *Hz* velocity pulse was repeatedly observed, after the *S*-wave arrival, in a ridge station: it could be related to a seismic trapped mode, caused by a 100-200 *m* intensely jointed fault zone. All the stations located in the plain, compared to the "reference" station, show a significant 2 *Hz* amplification, clearly related to the alluvial deposits. Relevant differences in amplitude and duration, as well as frequency content, were moreover observed between the records obtained above the travertine and those obtained on the alluvial deposits.
- A finite difference numerical model was implemented by *FLAC 4.0*, aiming at the local seismic response evaluation along a geological section of the plain: both the velocimetric records obtained by the temporary array and the strong motion records from a local ENEA array are being used for the dynamic analysis.

Figure 2 – The Centre for Anthropological Documentation and Research in Valnerina

The research pointed out the existence of local features that can induce seismic wave amplification. They are represented by geological limits between heterogeneous lithologies in the alluvial plain and discontinuities related to disjunctive tectonic elements or different joint rock mass condition in the carbonatic ridge. It is worth to remark that these local features can be observed in many other mountainous areas in Central Italy.

Vulnerability of buildings and experimental analysis

Buildings of historical centres are usually masonry construction, often characterised by materials with very low strength, very poor mortar, not effective connections between

orthogonal walls and between the walls and the floors. The analytical study and the numerical modelling of such kind of structures are very hard. Therefore, especially if the attention is focused on the seismic behaviour, the experimental dynamic analysis becomes of great importance and often is the only way to investigate their actual behaviour.

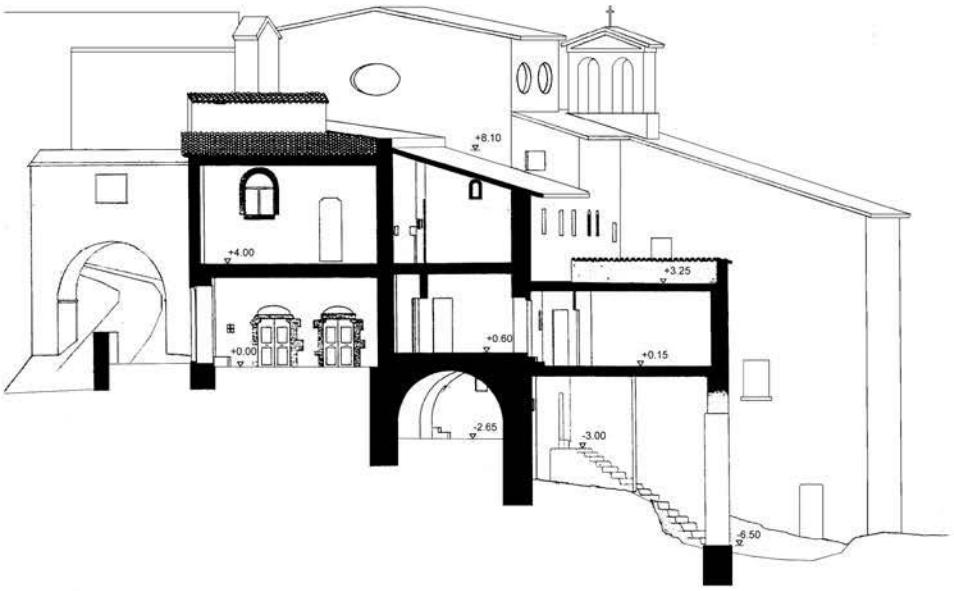

Figure 3 – Vertical section of the investigated building

The dynamic response of a structure can be analysed in presence of both free and forced vibrations. It is worth to remind that use of forced vibrations it is not always possible for monumental buildings. In fact, the construction could be damaged, especially if it is in bad conditions or is already cracked, so a very particular attention must be paid in the definition of the maximum force level in soliciting the structure.

A complete analysis, as described above, was carried out on an historical building in *Cerreto di Spoleto*, which contains the *Centre for Anthropological Documentation and Research in Valnerina* (CEDRAV – Fig. 2). The building presents a very irregular geometry both in plan and elevation (Fig. 3). Three levels can be individualised, the underground floor, the ground floor and the first floor. The main entrance is on the ground floor, from which you can go down to the underground floor and to the first floor where is also S. James' Church that has also an independent gate. Two smaller parts are connected to the church. The structure was damaged by the Umbro-Marchigiano earthquake of September 26th and October 14th 1997 (00:33 and 9:40 GMT; epicentres 43° 01' 00''N 12° 55' 00''E, 43° 05' 00''N 12° 48' 00''E, 42° 58' 00''N 12° 55' 00''E and magnitude M_s=5.6, 6.0 and 5.4). Most of the cracks were opened by the event of October 14th, because the epicentre was closest to the site and the structure had been already damaged by the previous shocks.

The experimental analysis of the building was carried out in two phases. In the first one, a seismometer network was installed in the building in different configurations, in order to have a first glance at its dynamic behaviour. Several seismic events of low intensity have been recorded. The spectral analysis allowed individualising the structural resonance of the building, most of them associated to rotational movements. In fact, different amplitudes were found in spectra of sensors at the same level. This occurrence my also be due the absence of a

rigid diaphragm, i.e. a rigid floor, between the walls. In the second phase an accelerometric network, composed by 36 accelerometers, was installed. Several seismic events were recorded in almost one year. They were classified on the basis of the Scalar Arias Intensity at the basement of the building. It is worth to underline that seismic events in Umbria are characterized by frequency content containing the structural resonance of the selected building. The structural response to earthquakes of different intensity was pointed out also by setting a finite element model of the building.

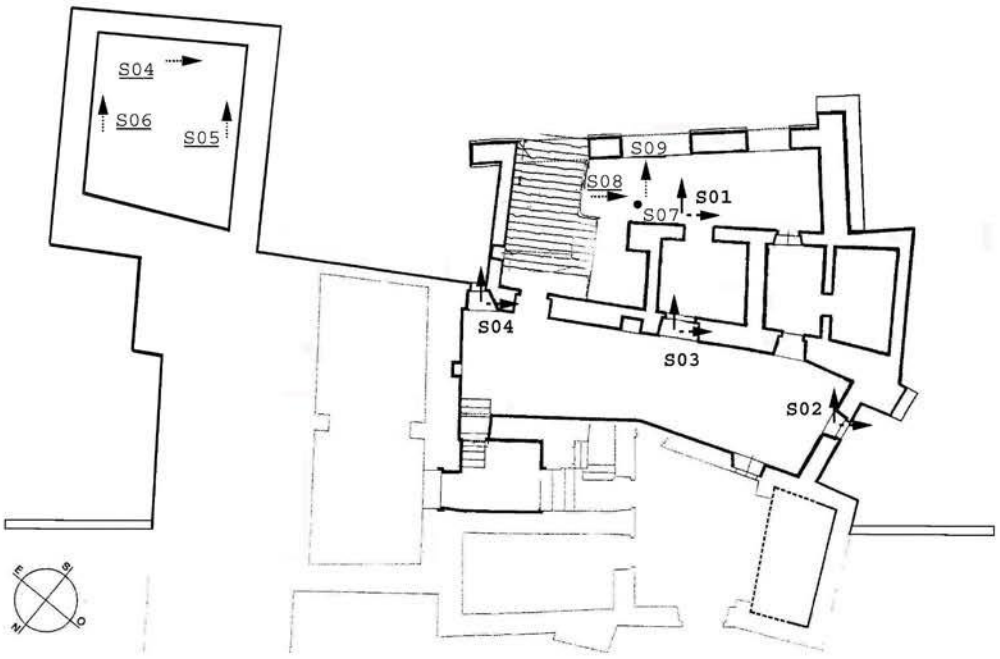

Figure 4a – First level: sensor locations in configuration 1 (continuous arrows), 2 (hatched arrows) and 3 (dotted arrows and underlined numbers)

Data analysis

The main results of the seismometers records are reported in the following. Figure 4a, b and c show the seismometer locations in the three configurations here used. The analysis of the first configuration pointed out that seismometers on upper levels show peak values higher than those along the same vertical alignment but on lower levels. Time histories on the same level have different amplitudes due to rotational modal shapes or to the absence of a rigid floor so that the building does not behave as a whole. The power spectral analysis confirms the results of the time domain analysis. In fact, S10 and S13 show different main frequencies, equal to 9.75 and 8.80 *Hz* respectively, this behaviour being typical of buildings that suffered in the past several, often irregular, additions. From the records of the first configuration three resonance frequencies are apparent, relative to three portions of the structure: 9.75 *Hz*, which interests the S-E lower zone, to the valley; 8.80 *Hz*, which characterises the upper portion of the building and is also a frequency of the input, being also present in the records at the foundations; 17.2 *Hz*, which characterises the area of the church (PSD of sensors S5 and S15). All these frequencies seem to be associated to rotational movements. Other resonance peak, such as those at 2.4 *Hz* and others between 4.5 and 5.7 *Hz*, associated with translational movements, which interest the whole building.

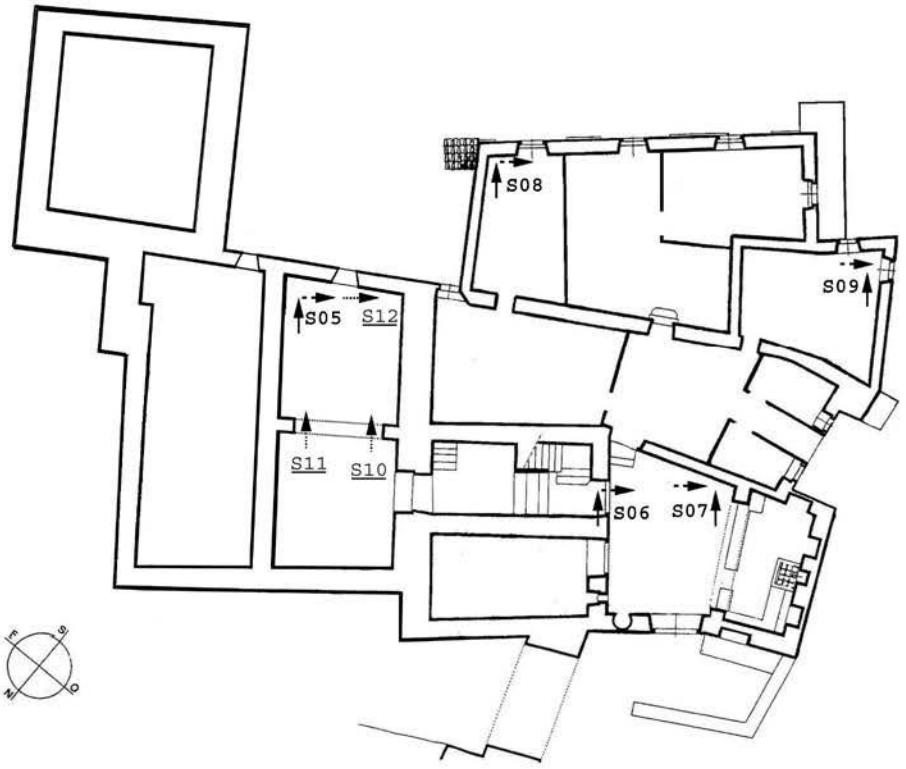

Figure 4b – Second level: sensor locations in configuration 1 (continuous arrows), 2 (hatched arrows) and 3 (dotted arrows and underlined numbers)

The spectral analysis of the record in the second configuration (hatched line in figures 4a, b and c), relative to a impulse vibration test (obtained by dropping a mass on the road near the building), shows peaks at 6.3 and 6.8 *Hz*, but also at 1.9 and 5.6 *Hz*. Records at some locations show resonance frequencies at 12.6 *Hz* (sensors S7, S8, S10). The cross analysis did not give any evidence of rotational movements associated to those frequencies and demonstrated that the movements of the church are quite independent of those of the other portion of the building.

In the third configuration sensors were deployed in the church and the adjacent part (dotted line and underlined numbers in figures 4a, b and c). Peaks at 6.7 e 7.0 *Hz* are apparent in the records of the sensors deployed in the adjacent part, the first one due to a rotational movement (S1 and S2 180° out of phase), the second one associated to a translational movement in the NW-SE direction (S1 and S2 in phase).

We conclude that the structural behaviour is typical of historical constructions in which several changes, repairs and additions have been made during the centuries. The experimental analysis allowed to analyse some aspect of the structural behaviour, not observable by means of other kinds of analysis, such as: the presence of resonance frequencies in small intervals, and the dynamic coupling between two frequencies very close one to the other. An intervention to improve the seismic behaviour of the building should obtain the separation of the two modes, for example by increasing one of them by means of suitable structural stiffening or by increasing the damping.

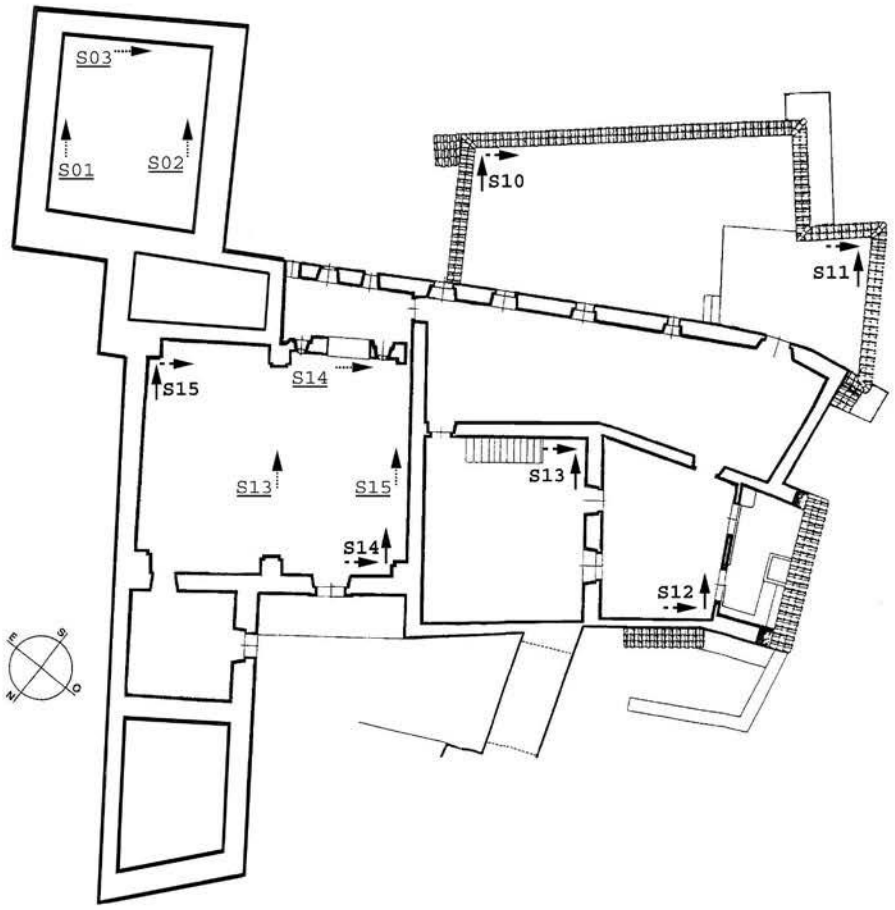

Figure 4c – Third level: sensor locations in configuration 1 (continuous arrows), 2 (hatched arrows) and 3 (dotted arrows and underlined numbers)

Advanced technologies in the seismic protection of historical centres

Seismic codes are usually based on the assumption that structures should be resistant enough to stay up after low to medium intensity events, the stresses remaining in the linear-elastic range. In the case of strong earthquakes they could be damaged seriously but they were not allowed to collapse. In any case the only important goal was to preserve human lives but not the integrity of buildings. This philosophy turned to be economically unsustainable because of the very high costs of the reconstruction after a strong but also medium event.

On the other hand, an anti-seismic building could be too much expensive, if it is designed resistant enough to support the earthquake effects in the linear-elastic range. This problem is amplified in the case of ancient buildings, characterised by high values of the masses. Therefore in the 80's researchers from all over the world begun to devote their effort to better investigate new technologies in the fields of earthquake engineering, up to then used only for nuclear power plants or particular constructions. These are: base and floor seismic isolation systems, energy dissipation systems consisting of various types of passive devices (elastic-plastic, viscous, viscous-elastic and electro-inductive dampers), hydraulic coupling systems using innovative shock transmitters, systems formed by shape memory alloy devices and, more recently, semi-active and active control systems of vibrations.

The practical application of such new technologies is always suitable for new buildings, while their use for the seismic improvement of cultural heritage structures is not easy. It is worth to remind that the most common traditional restoration technique, used in the past to enhance the seismic behaviour of monumental structures, was the introduction of localized reinforcements (traditional devices, usually steel bars or cables). They increase the overall capacity of the structure to work as a whole, providing important links between discontinuous elements and thus conferring increased ductility. Anyway, in many cases these devices are inadequate to prevent collapse. Among the new techniques we focus our attention onto seismic isolation, energy dissipation devices and shape memory alloys devices.

Seismic isolation is based on the idea of reducing the energy transmitted from the earthquake to the structure by changing the structure's dynamic characteristics, i.e. increasing its natural period, in order to make it farther from the period of the main harmonic components of the seismic actions. This change is usually achieved through the use of special devices – the "isolators" - with very low horizontal stiffness and appropriate damping, which separate the structure from the motion induced by the earthquake. So seismic isolation allows the mitigation of the effects of the earthquake not only on the structure itself, but also on its contents. That is why it is irreplaceable for all those structures whose contents are more valuable than the structures themselves (museums, frescoed buildings, hospitals and other strategic buildings, etc). Seismic isolation is named base isolation when the isolators are interposed between the building and its foundations. But it is also possible to isolate only part of a structure, or its floors, or even single objects within it. Isolators are structural devices able to support the vertical loads, provided with very low horizontal stiffness and some damping. The isolators most commonly applied in buildings are laminated rubber bearings, quite often constituted of high damping rubber compound. Many other types of isolators are available.

Hundreds of buildings, bridges, as well as industrial and nuclear plants have been protected from the effects of earthquakes through seismic isolation. Its use for repairing old building is quite complex. In fact, it must be compatible with conservation requirements, such as low invasivity and full reversibility. Besides, ancient structures are frequently not well known, and each of them is different from the others - this makes necessary to develop specific systems for each intervention of restoration. Finally a sub-foundation is necessary to allow for the use of seismic isolation. Relevant examples are the City Hall in S. Francisco, damaged by the 1989 Loma Prieta earthquake, the Asian Art Museum in San Francisco and the Berkeley Civic Center. They are all in California and have been retrofitted by using rubber bearings. In Italy very interesting applications of seismic isolation to cultural heritage structures are being designed for S. Giovanni Battista Church in Apagni (Sellano - Fig. 4) and for Santa Lucia Church in Aggi (Nocera Umbra). The study performed showed that this kind of intervention is feasible and it is the only way to avoid that the same damage reappears in the next earthquakes.

System isolation can also be used for the seismic protection of single masterpieces. Such application have been made for the precious objects in the Paul Getty Museum at Santa Monica (USA), the Bronzes of Riace (Reggio Calabria, Italy) and bronze equestrian statue of Germanicus Emperor (Perugia, Italy). A project for a 3D system seismic isolation of the wooden Roman ship excavated at Ercolano (Naples, Italy) is in progress.

Recent studies showed that Passive Energy Dissipation devices have also a great potential for reducing the seismic risk of several types of structures. In particular, great interest arose in

the research activities for the development and optimisation of energy dissipation systems of various types: viscous, elastic-plastic, viscous-elastic and electromagnetic systems. The strategy consists in dissipating a part of the seismic energy in specified zones of the structure, expected to experience important relative displacements during an earthquake. Energy dissipation devices concentrate in themselves most of the energy to be dissipated, preserving other structural elements from major damage. Energy dissipation devices are sometimes used in parallel with base isolation devices, with the main aim of reducing base displacements. Energy dissipation technique, recently applied in some buildings of new construction, was proposed also for an historical steel building. Studies on active, hybrid and semi-active vibration control techniques, and their progress has already led to many applications, mainly for controlling wind-induced and man-made vibrations, such as traffic-induced vibrations, are in progress.

Shape Memory Alloys (SMAs) are metallic materials endowed with unusual properties associated with the reversible transformation between two crystalline phases, known as *Austenite* and *Martensite*. Amongst the very unusual SMA thermo-mechanical properties, the super-elastic behaviour is the most useful feature for the seismic protection of monuments. A typical super elastic cycle of a SMA wire subjected to tension is shown in Figure 6. After an initial, almost linear portion (corresponding to the elastic deformation of the material in its austenitic phase) the curve shows a "plateau" (*i.e.:* a section where stress remains nearly constant with increasing strain), usually known as the super elastic loading plateau. Despite the similarity of this plateau with the one seen by yielding (*e.g.* mild steel) here it is not due to yielding but to the stress-induced phase transformation from *Austenite* to *Martensite*. The removal of the stress induces a reverse phase transformation from *Martensite* to *Austenite*, which allows almost complete strain recovery. In view of said reversible phase transformation, a very large number of similar cycles may be applied without any damage of the material. The absence of sensible residual deformations allows the realization of Shape Memory Alloy Devices (SMADs) in which no permanent displacements are present when they stop working. Conversely, using traditional devices, it is possible to exploit their yielding and the consequent force-limiting characteristic, but permanent residual displacement are present when forces are removed. SMAD should behave as follows: a) under service loads, the SMAD does not apply any static force to the structural elements that connects (and consequently it is called “self-balanced”); under low intensity horizontal actions (wind, small intensity earthquakes), the SMAD is stiff, as a traditional device, and no displacements are allowed; b) under higher intensity horizontal actions (strong earthquakes) the SMAD stiffness reduces, allowing "controlled displacements"; they should permit the masonry to dissipate part of the energy transmitted by the earthquake, mainly thanks to micro-cracks formation in the brick walls, taking care to avoid dangerous macro-cracks; in the meantime, due to SMAD reduced stiffness, smaller forces are transmitted to the cultural heritage structure and it, consequently, should be able to sustain a high intensity earthquake without collapse; c) under extraordinary horizontal actions, the SMAD stiffness grows up, in order to prevent from excessive displacements and instability. The NiTi SMA has very good characteristics of resistance against the corrosion and that, apart from ensuring their durability, prevents phenomena of deterioration that could affect the materials (masonry) composing the cultural heritage structures. The properties mentioned above suggest that said materials can be usefully utilized to realize SMADs to be installed in the zones of the buildings in which, during seismic actions, important deformations and relative displacements are predictable, e.g. the connections of roofs or floors to the walls, the connection between transversal walls, etc. Moreover, the use of SMAs as structural connection elements is coherent with the criteria

of reversibility of the intervention and compatibility with the original structures. As regard integrity, it must be noticed that the SMADs installation, being an additive intervention, produces just a minimum disturb on the cultural heritage structures. Finally, durability is ensured by the mechanical characteristics of the SMA used. Shape memory alloy devices have been used for the restoration of the Basilica of San Francesco in Assisi, seriously damaged by the 1997 earthquake, where the devices connect the tympanum and the roof of the transept and the Bell Tower of S. Giorgio Church in Trignano, damaged by the 1996 earthquake and seismically improved by means of the insertion of four steel bars, in series with the devices, at the four corners, pre-tensioned between the basement and the covering.

Conclusions

The results obtained in the study of the historical centre of Cerreto di Spoleto in Umbria, Italy, as part of its seismic preservation effort have been shown.

The hazard analysis and microzoning of the selected area, pointed out a 6-7 *Hz* velocity pulse related to a seismic trapped mode, caused by a 100-200 *m* intensely jointed fault zone. A significant 2 *Hz* amplification, clearly related to the alluvial deposits, was shown at all the stations located in the plain. Relevant differences in amplitude and duration, as well as frequency content, were observed between the records obtained above the travertine and those obtained on the alluvial deposits.

The experimental analysis of the building pointed out that its structural behaviour is typical of historical constructions in which several changes, repairs and additions have been made during the centuries and allowed to analyse some aspect of the structural behaviour, such as the presence of resonance frequencies in small intervals, and the dynamic coupling between two frequencies very close one to the other.

Acknowledgements

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Keywords

Historical structures, masonry, experimental analysis, local seismic response, microzoning.

"110 AÑOS DE CAMINOS DE FIERRO EN OAXACA..."

LA ANTIGUA ESTACION DEL FERROCARRIL MEXICANO DEL SUR DETONADOR DE LA CONSERVACIÓN DEL PATRIMONIO Y DE INTEGRACIÓN HISTORICO-CULTURAL DEL BARRIO DEL EXMARQUESADO A LA DINAMICA DEL CENTRO HISTORICO DE OAXACA.

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Abstract.

El objetivo general del Programa es desarrollar un Programa Integral de Conservación del Patrimonio Cultural a partir de la participación de la Comunidad para evaluar y difundir los valores culturales del Centro Histórico de la ciudad integrando al Barrio del ExMarquesado (1529) , a 470 años de la fundación de la ciudad, a través de un Corredor Urbano, teniendo como detonador el Nuevo Uso Adaptativo de un Parque Urbano en la Antigua Estación Oaxaca del Ferrocarril Mexicano del Sur. (1892).
Fundamentando el proyecto de acuerdo al Plan Municipal de Desarrollo 2002-2004, en el cual se diagnosticó en materia de Conservación del Patrimonio que: "*las exigencias de la vida urbana contemporánea, traen consigo una falsa noción de progreso, que sustituyen, destruyen o depredan al patrimonio cultural. La construcción de edificios contemporáneos en el centro histórico acentúa las contradicciones entre los afanes modernizadores y la conservación mal entendida, pues en muchas ocasiones existe falta de armonía de éstos con el conjunto urbano tradicional.* Y en materia de Infraestructura entre otros aspectos que: "*el área de parques y jardines en Oaxaca es de aproximadamente 60,000 m2, lo que significa un promedio de 0.23 m2 por habitante que en comparación con los 3.15 m2 requeridos por habitante, revela un déficit, que irá incrementándose en relación con el crecimiento de la población. Existe un total de 34 instalaciones de parques y jardines. Su distribución en los cuatro puntos cardinales del antiguo casco urbano, siguiendo la estructura original de la ciudad y en relación con los monumentos religiosos y solo hacia la parte norte del centro existe una relativa concentración de áreas verdes*". Puntos citados, entre otros, fundamentan este Programa de promover la mejora de calidad de vida de la población a través del disfrute de espacios abiertos. El programa incluye la rehabilitación del inmueble histórico, promover el patrimonio cultural dentro del desarrollo de la ciudad en su conjunto, innovar en la aplicación de métodos de preservación y de conservación. Así mismo se subraya la relación con la educación y la formación para asegurar la protección del patrimonio representado por el polígono de la Antigua Estación en virtud de la participación de escolares desde la educación primaria hasta niveles de Doctorado así como la formación continua de los funcionarios para la preservación, el mejoramiento y la gestión del patrimonio cultural, convirtiendo así a la Ciudad Histórica, el Barrio y el Polígono de la Antigua Estación del Ferrocarril en laboratorios de investigación abiertos y de educación.

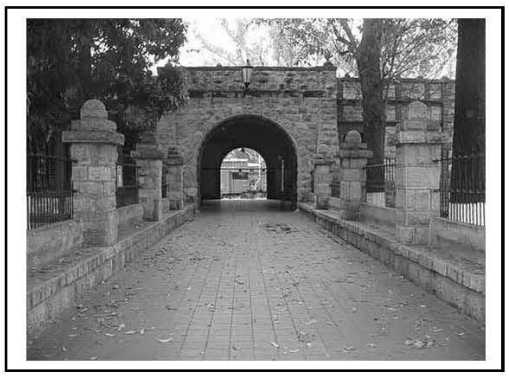
El Programa promueve objetivos específicos a las siguientes acciones estratégicas:

- Mantener el Patrimonio Vivo.
- Educar y formar a favor de la preservación y la gestión del patrimonio cultural.
- Promover el mejoramiento visual y el equipamiento urbano en barrios y espacios alternos al Centro Histórico.

1. Fortalecer el rescate y fomento de tradiciones y expresiones culturales en barrios y colonias.
2. Promover la participación de inversiones públicas y privadas tendientes a la ampliación de atractivos turísticos.
3. Promocionar circuitos turísticos arquitectónicos, artesanales, gastronómicos y tradicionales.

Así mismo, los objetivos particulares del proyecto de basan en el desarrollo de las cuatro líneas de investigación previstas:

CONSERVAR EL PATRIMONIO EDIFICADO QUE REPRESENTA PARA LOS OAXAQUEÑOS LOS INMUEBLES PRODUCTO DE LA ÉPOCA PORFIRIANA, ESPECIALMENTE LOS RELACIONADOS A LA CULTURA DEL FERROCARRIL.



La Antigua Estación Oaxaca del Ferrocarril Mexicano del Sur, se encuentra ubicada en las inmediaciones del Barrio del ExMarquesado, zona integrante del Centro Histórico de la ciudad. Fue inaugurada en el mes de diciembre del año 1892 con la presencia del entonces Presidente de la República, el Gral. Porfirio Díaz. La selección de su emplazamiento correspondió a las excelentes condiciones que presentaba el Barrio; terreno alargado – entre el Cerro del Fortín y el Río Atoyac – cercano a la ciudad de Oaxaca, quedando así como antesala al principal acceso desde la ciudad de Puebla de los Ángeles y con la facilidad de suministro de agua para el correcto funcionamiento de las máquinas de vapor. La construcción de la Estación del Ferrocarril Mexicano del Sur y de las líneas hacia los diferentes puntos seleccionados de contacto, cubrieron todas las expectativas de calidad arquitectónica y urbana, destacando la visión de trazar las vías sin alterar la traza original de la ciudad histórica. El Patrimonio Edificado a conservar está constituido por los edificios

(la Estación y el Anden, edificio ecléctico, robusto, sobrio y funcional; el tanque o depósito de agua de estructura metálica, en funciones con capacidad de mas de 150 mil litros, los talleres con su majestuosa estructura metálica de diseño francés y la bodega de carga constituida por una crujía de mas de 180 metros lineales.), así como por la traza del conjunto, que genera los diferentes espacios abiertos y la disposición de las líneas férreas. A través del Colegio de Arquitectos de Oaxaca, del Posgrado en Arquitectura de la Universidad Regional de Sureste y el Tecnológico Regional se cuenta con especialistas en permanente supervisión de la aplicación de criterios propios de la conservación del patrimonio edificado.

CONSERVAR EL PATRIMONIO REPRESENTADO POR LOS BIENES MUEBLES.

La época ferrocarrilera se identifica, entre otros aspectos, por la gran variedad de elementos muebles que se generaron, desde el uso de nuevos materiales y sistemas constructivos representativos tardíamente de la revolución industrial, equipos, herramientas, elementos propios de la operación mecánica de las vías, materiales y sistemas constructivos de las líneas férreas, sistemas de comunicación como el telégrafo, mobiliario urbano, señalización con diseño gráfico propio e incluso equipaje y uniformes para el personal. El inventario y la catalogación de todos los bienes patrimoniales que se encuentran en los diferentes inmuebles promueven su valoración, algunos como elementos únicos. Así mismo sirve de guía para la configuración de un guión museográfico para exposiciones de sitio y temporales. Objetivos como este han dependido de la invaluable participación de especialistas en restauración de bienes muebles privados y del INAH, sin omitir mencionar a residentes de la zona que clarifican la identificación y valoración de piezas.

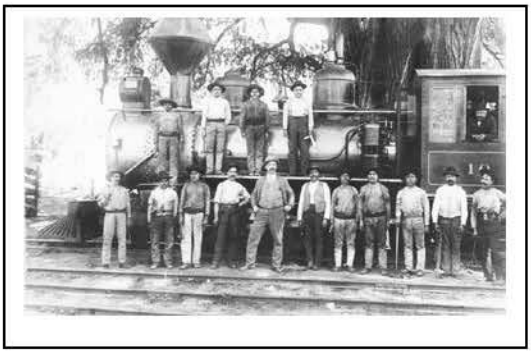
CONSERVAR EL PATRIMONIO NATURAL COMO ELEMENTO BÁSICO DE LA COMPOSICIÓN DE LOS ESPACIOS URBANOS

El área en uso por el Gobierno Municipal es de mas de 39,681 m2 en la cual se encuentran diferentes ecosistemas coexistiendo debido a la disminución de la frecuencia y uso del ferrocarril (actualmente con tres corridas por semana del tren de pasajeros a la ciudad de Cuicatlán, Oaxaca y de carga a la ciudad de Puebla), diferentes especies animales y vegetales han proliferado, logrando un desarrollo ordenado del sitio para contar con un vivero municipal, un aviario y un centro de cría de ardillas para poblar el sitio e incluso otros parques y jardines de la ciudad.

La Dirección de Ecología Municipal, la Regiduría de Ecología, la SERNAT y el Tecnológico Regional permiten el desarrollo profesional de los subprogramas mencionados.

CONSERVAR EL PATRIMONIO INMATERIAL REPRESENTADO POR LOS AUTÉNTICOS RESIDENTES DE LA ANTIGUA ESTACIÓN.

Por diferentes situaciones, Ferrocarriles Nacionales de México permitió la ocupación de las áreas de patios en las Estaciones, Oaxaca no fue la excepción. Actualmente se encuentra una zona ocupada por familias que representan en su mayoría, un valor patrimonial inmaterial incalculable por el conocimiento profundo de la cultura que representan y transmiten a través de la historia oral así como sus costumbres, su gastronomía y sus valores emergidos de su profesión. Algunos residentes nacieron en la zona e incluso en vagones hace mas de 80 años, y han vivido y convivido en espacios arquitectónicos efímeros y reversibles desde entonces. Dedicaron su vida al desarrollo nacional que el ferrocarril atrajo, viajaron, tuvieron accidentes, algunos murieron otros resistieron reparaciones y ahora se disponen a descansar como el ferrocarril; sus memorias enriquecen la historia de la comunidad. Se valora su integración y no se discute su mejora de calidad de vida, su residencia en mejores condiciones y una mejor expectativa del futuro. El trabajo comunitario les ha devuelto su importancia, se promueven eventos culturales, para todas las edades a través de las Coordinaciones de Desarrollo Social y el DIF Municipal y el apoyo de la iniciativa privada. Ellos se han involucrado y comprometido con el mantenimiento de la zona, realizan jornadas intensas de trabajo los domingos donde participan además vecinos de colonias cercanas y grupos sociales que coinciden con la filosofía de perpetuar el valor del sitio.



La Conservación del Patrimonio Cultural se inicia con el conocimiento profundo de los bienes, la divulgación de sus valores y su correcto uso. La Antigua Estación Oaxaca del Ferrocarril, hasta el 27 de julio de 2001 (fecha de inicio del Programa con la firma del Contrato de Comodato de Uso) era uno mas de los recuerdos de la ciudad, olvidada, estrangulada por esta, prácticamente sin uso, con residentes temporales sin oficio ni obligaciones y convertida en un sitio de guarida de maleantes. El Barrio del ExMarquesado por su parte, aislado de la ciudad, en cuanto a su desarrollo socio-económico y dinámica urbana.

Desde 1892, con breves interrupciones, la Estación ha mantenido su uso original, actualmente el Ferrocarril se prestó el servicio para carga hasta la ciudad de Puebla y de pasajeros a la ciudad de Cuicatlán, Oaxaca la cual se encuentra insertada en una Zona Declarada como "Reserva de la Biosfera", recorrido que contempla diferentes parajes con un importante legado natural, histórico y artístico además de beneficiar a diferentes comunidades que tienen como único medio de transporte el ferrocarril.

Dentro del polígono se desarrollan diferentes actividades propias del mantenimiento a las máquinas y vagones, acciones que pueden continuar reforzando el Proyecto de Uso .

Está claro que el Municipio de Oaxaca de Juárez, ha saturado su espacio urbano sin prever las áreas abiertas requeridas para parques y jardines así como de calles con mejor calidad de imagen urbana, hecho percibido por la población y por quienes visitan la ciudad.

Anteriormente servicio prestado en un inmueble prácticamente abandonado y ahora con otro aspecto y márgenes de confort aunque se continua en proceso de conservación de los diferentes valores patrimoniales naturales y culturales.
La situación que se presentaba antes del programa era de abandono en el mantenimiento de la infraestructura, desorden en la imagen urbana y la falta de integración social de los habitantes del Barrio a la dinámica de la ciudad de Oaxaca.

Los grupos ciudadanos beneficiados directamente son los residentes del Barrio del ExMarquesado, las cinco colonias populares aledañas a la Antigua Estación, los vecinos que integran el acceso a la ciudad de Oaxaca a través de la Calzada Madero y específicamente los asentados en el Corredor Urbano que integran la Avenida Independencia y la Calzada Madero *(La ubicación estratégica de la Estación del Ferrocarril en el Barrio del Ex Marquesado permite que desde esta se genere el "acceso" a la Zona Histórica de la ciudad, permitiendo recepcionar a la población y visitantes en este inmueble y desde ahí iniciar recorridos a diferentes puntos de atracción turística como las Zonas Arqueológicas cercanas y los atractivos del Centro Histórico. El Corredor se integra por el recorrido sobre la Calzada Madero y Avenida Independencia, uno de los ejes principales de la ciudad en el cual existen 25 viviendas, 77 comercios, equipamiento de salud, oficinas gubernamentales, de educación y equipamiento urbano).*
El 8 de diciembre de 1892 en que se inauguró la Estación del Ferrocarril Mexicano del Sur en la ciudad de Oaxaca convirtiéndose en uno de los principales detonadores del progreso de la región. Actualmente el área urbana que la Estación ocupa se encuentra dentro de la Zona de Influencia del "Plan Parcial de Conservación del Centro Histórico de la ciudad de Oaxaca" conformando una zona de amortiguamiento entre el área Monumental Declarada "Patrimonio Cultural de la Humanidad". Con la desincorporación de los bienes de Ferrocarriles Nacionales, se acordaron dos Contratos de Comodato entre Ferrocarriles Nacionales de México y el H. Ayuntamiento de Oaxaca de Juárez con fecha 27 de julio de 2001 en base a los cuales, después de haber cumplido con los requisitos de los mismos de presentación de un Proyecto Ejecutivo de Uso; se tomó posesión para el uso de las instalaciones por parte del H. Ayuntamiento con la visión del desarrollo de un Proyecto Urbano de equipamiento que beneficia a la población y eleva su calidad de vida.

Los Contratos de Comodato marcan específicamente dos áreas: el área sur de forma longitudinal al trazado de las vías denominada DERECHO DE VIA dividida en dos polígonos: uno de 16,089.24 m2 y otro de 11,242.08 m2 y el área norte denominado de la ANTIGUA ESTACION OAXACA con un área de 12,350.62 m2 donde se encuentra el acceso principal; la suma total de estas áreas es de: 39,681.94 m2. Áreas que se dispusieron para el desarrollo del Proyecto Ejecutivo de Uso el cual se Convocó a Concurso a la participación de miembros del Colegio de Arquitectos de Oaxaca, acción sin precedentes con el resultado de 17 participantes y 7 propuestas evaluadas por jurados de reconocido prestigio internacional y un Plan Maestro acorde a la realidad regional.

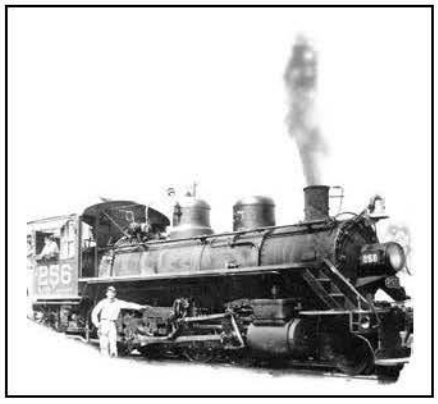
Las evidencias mas claras de que el programa ha sido exitoso, es el **uso** que se da actualmente al inmueble y la sinergia que provoca como detonador del mejoramiento en general del Barrio. Actualmente es motivo de atención de los mas importantes grupos socio-culturales y órganos de profesionistas colegiados de la ciudad quienes promueven la salvaguarda del sitio y sus valores patrimoniales.

Su conservación se inició con la participación de los diferentes sectores sociales al intervenir el sitio con el desarrollo del "Programa de Acciones Inmediatas" para dar Mantenimiento a las diferentes áreas que componen el polígono así como el acondicionamiento de espacios para instalar oficinas centrales donde se desarrollan los Estudios y Gestiones del Proyecto Urbano por especialistas en Conservación el Patrimonio Arquitectónico y Urbano, Urbanismo, Diseño urbano e Informática.

El programa es una muestra de cómo la sociedad organizada se apropia ordenadamente de los espacios urbanos y con pocos recursos económicos realiza las adecuaciones necesaria para adaptar diferentes actividades a los espacios que el inmueble presenta. Una vez dignificados los espacios, lo que antes era la sala de espera de la Antigua Estación, se utiliza como Sala de exposiciones de los bienes muebles relevantes encontrados en el polígono o como espacio para reuniones de los vecinos, para aula de cursos de verano de dibujo y pintura o sala de proyección para películas infantiles. Las bastas áreas ajardinadas han servido para el desarrollo de talleres ecológicos incluyendo ceremonias y desayunos servidos a los participantes. Se han tenido talleres de reforestación y floricultura e incluso muestras de equipos de cocción de alimentos con energía solar, acción que presentó una interesante alternativa para el ahorro de energía y recursos a residentes de la zona.

Como espacio Cultural se desarrolló un imponente concierto con la "Orquesta Primavera de Oaxaca" institución musical reconocida por su alta calidad interpretativa y al cual asistió un gran número de vecinos de la zona evento que dará puerta a otros de similares características previendo uno en el mes de noviembre para festejar "El Día del Ferrocarrilero".

Durante el período vacacional niños residentes en la zona asistieron a Cursos en variados temas como, modelado en barro, dibujo y pintura, ajedrez, juegos organizados y ecología entre otros.



La oportunidad de abrir este espacio ahora de convivencia entre los exferrocarrileros residentes en la zona y la población en general ha dado la pauta de conocer de fondo el valor que estas personas significan en la historia de México, porque gracias a su esfuerzo la comunicación y el transporte se tendió por todo el país trayendo consigo el desarrollo.

Paulatinamente el sitio y su zona de influencia urbana van tomando relevancia y se convierten en un punto claro de atención de propios y extraños, las cuatro líneas de investigación abiertas han recibido la aceptación de los grupos organizados de la sociedad civil, en la Conservación del Patrimonio Edificado por primera vez se cuenta la actualización del levantamiento topográfico del Conjunto y de los edificios que lo componen, quedando registrado el estado a la fecha de recepción y sirviendo de base para la realización de los levantamientos arquitectónicos, fotográficos, de materiales, de deterioros, diagnósticos de arqueología histórica y propuestas de intervención. En la línea

de Conservación del Patrimonio representada por los Bienes Muebles se ha montado de manera temporal una exposición, con la colaboración del Museo Nacional de los Ferrocarriles se seleccionan los elementos mas relevantes considerando la instalación de un Museo de Sitio. El Patrimonio Natural del área reviste gran importancia y aceptación de la participación ciudadana porque si bien existen árboles históricos de mas de quinientos años, árboles frutales que formaron parte de la huerta de la Iglesia de Santa María del Marquesado se han reforestado espacios que así lo requieren, fomentando la valoración del ecosistema existente integrado por una biodiversidad única en la ciudad. Y el Patrimonio Inmaterial que representan los residentes de la Estación, ferrocarrileros pensionados y herederos que guardan los mas interesantes recuerdos relacionados con la cultura del ferrocarril los cuales se registran para salvaguardarlos así como por primera vez se cuenta con un "Censo de Población y Vivienda de los Residentes de la Zona de la Antigua Estación del Ferrocarril".

El H. Cabildo del Municipio de Oaxaca de Juárez ha declarado, en el mes de diciembre, a la Antigua Estación Oaxaca del Ferrocarril Mexicano del Sur y a todos los elementos urbano arquitectónicos generados en la época Porfiriana, como "Patrimonio Cultural de los Oaxaqueños" en el marco del 470 Aniversario de la Ciudad y el 110 Aniversario de la Inauguración del inmueble; hecho relevante para la historia de la ciudad, considerando que*:" el ferrocarril en Oaxaca dio impulso a la ciudad y al Estado, la Antigua Estación es un bien histórico con todas las características necesarias para elevar su categoría a monumento municipal y es imprescindible incorporarlo a la categoría de "Patrimonio de los Oaxaqueños" estableciendo que es de utilidad pública la protección del conjunto y su conservación con todos sus valores"*[1].

"110 AÑOS DE CAMINOS DE FIERRO EN OAXACA..."

En diferentes etapas, el Proyecto está integrado por:

- El fomento al uso del ferrocarril como medio de transporte de pasajeros y de carga, incluyendo el desarrollo turístico de las diferentes poblaciones que se encuentran en la ruta.
- Difusión del patrimonio edificado que el inmueble representa para generar su conservación a través de un proyecto de restauración arquitectónica de los edificios históricos y la traza de vías.
- Conservación de los bienes muebles y consolidación de un Museo de Sitio
- Operación del vivero municipal para la producción de especies destinadas a la reforestación de la zona y diferentes parques del Municipio.
- Desarrollo integral del Aviario Municipal.
- Creación de un Parque Urbano de alto impacto social que promueva la mejora de la calidad de vida de la población del Municipio de Oaxaca de Juárez. El cual incluya la

promoción de la identidad cultural oaxaqueña a través de la generación de un espacio tradicional para verbenas populares y ferias.

- Conversión del espacio para crear un centro de recepción de la ciudad, promoviendo desde este punto la salida de diferentes tours turísticos hacia el interior del Centro Histórico y zonas de alto potencial turístico de la región.
- Generación de un Parque Interactivo de la Ciencia y la Tecnología a través del uso de los diferentes espacios en proceso de intervención y la selección de furgones de ferrocarril que pueden ser adaptados para salas de exposición
- Consolidación del Corredor Urbano Turísitico- Cultural "Del ExMarquesado a la Alameda" integrando el Barrio a la dinámica del Centro Histórico de la ciudad de Oaxaca.

LA EXPERIENCIA PROMUEVE QUE SE ATIENDA LA PROBLEMÁTICA DE LA GESTIÓN PÚBLICA EN LA QUE SE RECONOCEN VARIOS ELEMENTOS QUE SON DETERMINANTES PARA LOGRAR UNA ESTRUCTURA EFICAZ:

- *Involucramiento del equipo de trabajo en el proceso de toma de decisiones.* El imperativo democratizar y tomar decisiones conjuntas sin imposiciones.
- *Consideración sistemática.* Ver el sitio como un problema complejo que requiere de un esfuerzo debidamente planificado, que tome en cuenta todas y cada una de las partes que lo componen y los riesgos que se corren al no darle una solución integral.

- *Participación social.* Elemento necesario para la estabilidad de un buen gobierno, ya que fomenta que los funcionarios públicos no olviden de dónde provienen los recursos con los cuales llevan a cabo sus tareas y aumenta el interés por parte de la población sobre el destino y beneficios de sus contribuciones.

- *Administración adaptable y creativa.* Condición vital que deben cumplir los organismos públicos, pues requieren de una flexibilidad permanente para responder y adaptarse a los constantes cambios que enfrenta la sociedad, con la creatividad e innovación suficientes para la resolución eficaz y eficiente de problemas y conflictos.
- *Pensamiento estratégico y visión de futuro.* La administración pública municipal debe entender y adoptar un enfoque basado en la administración estratégica duradera que se formalice en una planeación seria y con visión de largo plazo que abra nuevas perspectivas a la comunidad, permita delinear esquemas de negociación exitosos, sin que el cambio de autoridades municipales sean una restricción en el proceso de identificar, proponer e instrumentar programas y proyectos de mediano y largo plazo con características sustentables y detonadoras de desarrollo. En este caso es importante mencionar que el Programa nace en la Administración Municipal 2000-2002 siendo Presidente Municipal Interino el Arq. Carlos Melgoza Castillo y es adoptada, consolidada y en proceso de concretización por el Primer Gobierno Municipal Ciudadano presidido por el Lic. Gabino Cue Monteagudo.
- *Personal calificado con vocación de servicio.* Los servidores públicos municipales deben cumplir con un perfil idóneo y tener la capacidad, actitud y preparación necesarias para ofrecer orden, calidad y compromiso a la ciudadanía. En el caso de este Programa equipo de trabajo que lo coordina se compone por Doctores y Maestros en Urbanismo, Conservación del Patrimonio Arquitectónico y Urbano, Planeación y Estudios y gestión de la Ciudad.

- *Normatividad.* Aunado a la importancia de conocer y establecer los mecanismos que permitan la gestión de la actividad comercial de carácter informal, se reconoce la relevancia de fortalecer las funciones de la administración municipal para aumentar su capacidad de gestión, por lo que se propone consolidar lo que funciona y promover una transformación apropiada a través de las siguientes estrategias generales.

Estrategias :

- *Descentralización de las funciones.* Mientras en la estructura tradicional se logra una comunicación indirecta, adoptar progresivamente una estructura de trabajo horizontal puede resultar más eficiente, dado que mientras más próximo se está a los problemas, mejor se les conoce y por lo tanto la solución es más cercana a lo previsto.
- *Capacitación e incentivos a la fuerza de trabajo.* Es una forma de invertir en el capital humano y valorar sus resultados, pues la atención del personal será la mejor imagen que se pueda dar al ciudadano, alguien motivado y capacitado. Al involucrar a los mas destacados representantes de la cultura ferrocarrileros se reafirma el compromiso de servicio por parte de ellos y se evidencia la revaloración de ese sector social..
- *Promoción de las alianzas con organismos privados y representaciones sociales.* La participación económica, técnica y de consulta de entidades ajenas al servicio público legitima y confirma la participación plural de los gobernados en los programas y proyectos de desarrollo, por lo que la intervención de representaciones

sociales, en la forma de consejos o comisiones podrían ser un equipo de apoyo externo y de carácter autónomo, para llevar a cabo labores de investigación y estudios que aporten soluciones e incluso evalúen el desempeño de las autoridades. Función que actualmente cumplen las Universidades a través de sus posgrados en arquitectura y los colegios de profesionistas.

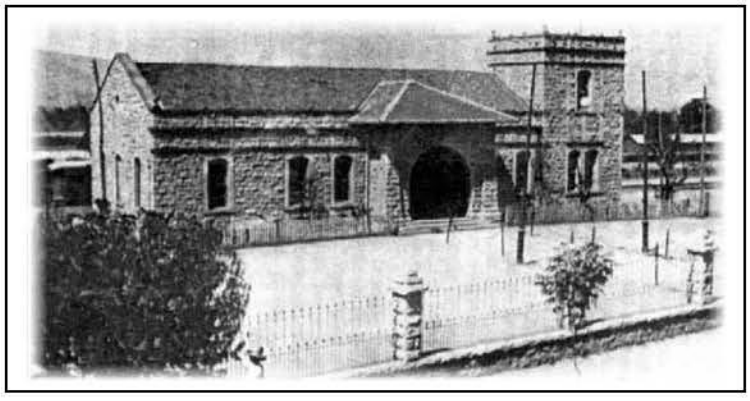
Justificación :

Este tipo del proyectos :

- Implanta un modelo de preservación capaz de sobrevivir en el largo plazo y convertirse autosostenible.
- Será adoptado por la comunidad beneficiaria.
- *Abre canales de participación a la filantropía como alternativa de financiamiento público para acciones de preservación que requieran subsidios a fin de ser sostenibles.*
- Promueven la colaboración público-privada en la ejecución y el financiamiento de la preservación.
- Mejora el entorno regulatorio y la administración de las funciones públicas relativas de la preservación.
- Previene perdidas irreversibles de activos patrimoniales y promueve reformas para evitar el deterioro.

Pudiendo aportar a las experiencias de los Gobiernos Municipales las siguientes acciones:

- Promover nuevas actividades económicas en las comunidades donde se localizan los bienes patrimoniales.
- Poner en uso los bienes patrimoniales, destinándolos a usos con demanda social y de mercado y que puedan mantener los bienes rehabilitados en buenas condiciones.
- Hacer uso eficiente de los recursos públicos que se destinaran a la preservación del Patrimonio Cultural.
- Mejorar la gestión del patrimonio al promover el uso más intenso y sostenible de bienes patrimoniales rehabilitados.
- Viabilidad técnica, económica, institucional, financiera, ambiental y social.



7º COLOQUIO INTERNACIONAL DE LA OCPM RODAS, GRECIA

"EL FORO SOBRE LA PROTECCIÓN DEL PATRIMONIO CULTURAL DE LA CIUDAD DE OAXACA" Y LA "CARTA CIUDAD DE OAXACA"

MUESTRA TANGIBLE QUE HA PERMITIDO ELABORAR POLÍTICAS ESTRATÉGICAS PARA COMPRENDER, DIFUNDIR Y CONSERVAR LOS VALORES DEL PATRIMONIO CULTURAL OAXAQUEÑO

"Con creatividad y determinación habremos de contribuir a la solución de los problemas que aquejan a los diferentes sectores de nuestro municipio. El Plan del GOBIERNO DEL CAMBIO CON SENTIDO, construirá puentes hacia el progreso de nuestra ciudad, fundamentándose en nuestra identidad y valores patrimoniales"

Gabino Cue Monteagudo
Presidente Municipal Constitucional de Oaxaca de Juárez, Oaxaca. México.

"EL PATRIMONIO CULTURAL DE UN PUEBLO COMPRENDE LAS OBRAS DE SUS ARTISTAS, ARQUITECTOS, MÚSICOS, ESCRITORES Y SABIOS, ASÍ COMO LAS CREACIONES ANÓNIMAS, SURGIDAS DEL ALMA POPULAR, Y EL CONJUNTO DE VALORES QUE DAN SENTIDO A LA VIDA, ES DECIR, LAS OBRAS MATERIALES Y NO MATERIALES QUE EXPRESAN LA CREATIVIDAD DE ESE PUEBLO; LA LENGUA, LOS RITOS, LAS CREENCIAS, LOS LUGARES Y MONUMENTOS HISTÓRICOS, LA LITERATURA, LAS OBRAS DE ARTE Y LOS ARCHIVOS Y BIBLIOTECAS"

Adriana Zenteno Fernandez/Gerardo Corres Tenorio
Municipio de Oaxaca de Juárez, Oaxaca. México

"EL FORO SOBRE LA PROTECCIÓN DEL PATRIMONIO CULTURAL DE LA CIUDAD DE OAXACA Y LA "CARTA CIUDAD DE OAXACA"

MUESTRA TANGIBLE QUE HA PERMITIDO ELABORAR POLÍTICAS ESTRATÉGICAS PARA COMPRENDER, DIFUNDIR Y CONSERVAR LOS VALORES DEL PATRIMONIO CULTURAL OAXAQUEÑO".

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Abstract:
A partir de la Ley sobre Protección de Monumentos Coloniales, Artísticos e Histórico y poblaciones Típicas del Estado de 1942, el Centro Histórico de la Ciudad de Oaxaca ha sido considerado como una área "digna de ser conservada y protegida".
El concepto de Patrimonio Cultural ha evolucionado, ampliándose de lo histórico, edificado y artístico, a lo tangible.
Por la conservación de dicho patrimonio, afirmamos nuestra conciencia de identidad colectiva y procuramos la defensa de nuestros más claros valores, considerándolos como propiedad social y tesoro común.
Es muy importante identificar los problemas que afectan y deterioran a nuestro Centro Histórico, así como determinar con precisión el compromiso que debe asumir la propia ciudadanía y todas las autoridades competentes. De igual importancia resulta priorizar estos problemas y especificar las propuestas de solución a los mismos, que emanen de la voluntad de quienes convivimos y padecemos de la paulatina destrucción de nuestro patrimonio, con el único propósito de detener esta y de protegerla. Por ello, se programó la realización de un "FORO SOBRE LA PROTECCIÓN DEL PATRIMONIO CULTURAL DEL CENTRO HISTÓRICO DE LA CIUDAD DE OAXACA", mismo que tuvo verificativo del día 7 al 12 de octubre del año 2002, y en donde se analizaron cinco capítulos de primerísima importancia, a saber:

I. Conservación del Patrimonio Cultural tangible e intangible.
II. Infraestructura y Servicios Públicos.
III. Problemática Social.
IV. Comercio y Servicios
V. Marco Jurídico.

Los resultados del Foro, han complementado al PLAN MUNICIPAL DE DESARROLLO 2002-2004 PARA EL MUNICIPIO DE OAXACA DE JUÁREZ, permitiendo, EVALUAR Y DECIDIR A FAVOR DE LA PRESERVACIÓN Y LA GESTIÓN, ADEMÁS PROMOVER LA EDUCACIÓN Y LA FORMACIÓN PARA ASEGURAR LA PROTECCIÓN DEL PATRIMONIO CULTURAL.
A fin de lograr un auténtico espacio de participación social, se realizó una encuesta tendiente a conocer la opinión de los ciudadanos sobre las causas del deterioro que se

observan en el Centro Histórico, así como para recabar sugerencias e ideas sobre su conservación, restauración y protección.

Este proceso logró captar en forma aleatoria, más de 7,000 cuestionarios, distribuidos en el mismo Centro Histórico y que fueron contestados por habitantes del municipio de Oaxaca y de su zona conurbada.

Fue de especial importancia destacar la afluencia convergente de ciudadanos al Centro Histórico, motivada por muy diversas causas, como se apreció en la descripción estadística final.

POR PRIMERA VEZ, LA PARTICIPACIÓN CIUDADANA FUE EL FACTOR ESENCIAL DE LAS ACCIONES PARA LA SALVAGUARDA DEL PATRIMONIO CULTURAL DE LA CIUDAD DE OAXACA.

El valor de identidad del Patrimonio Cultural para la afirmación de la conciencia colectiva de un pueblo, en una época de despersonalización pasiva y de comercialización, vulgarización y destrucción indiscriminadas de los valores auténticos locales impuestos por la globalización, otorga a la filosofía del mencionado Patrimonio Cultural, una importancia estratégica fundamental en toda campaña de defensa activa de la personalidad histórica y cultural de todo pueblo.

La conservación del Patrimonio Cultural tiene como uno de sus principales enemigos la abundancia de dinero y la codicia que genera. Por ello, ha de evitarse el derroche y ponderarse la prudencia en las actuaciones, encaminadas fundamentalmente a preservarlo con intervenciones mínimas y que sirvan siempre de manera clara a los intereses colectivos.

PERCEPCIÓN QUE TUVIERON LOS MAS DE 7000 PARTICIPANTES, SOBRE LAS CAUSAS QUE GENERAN EL DETERIORO DEL CENTRO HISTÓRICO

Las causas a las cuales se les asigna el primer nivel de importancia en el deterioro del Centro Histórico, se refieren a los plantones y manifestaciones políticas y son seguidas por el comercio en la vía pública. Estas dos causas sobresalen por mucho el resto de los demás factores considerados. La basura y suciedad, así como la contaminación ambiental, ocupan también lugares significativos.

OBSERVACIONES SOBRE LA PARTICIPACIÓN QUE DEBE TENER LA CIUDADANÍA PARA EVITAR EL DETERIORO DEL CENTRO HISTÓRICO

- Los participantes manifestaron que el mantenimiento y buen aspecto del Centro Histórico en corresponsabilidad de los propios usuarios, lo que incluye no tirar basura y no realizar pintas.

- Es importante que la ciudadanía tome conciencia del significado del patrimonio cultural, dado el respeto que se le debe a éste y a su uso y aprovechamiento sustentables. Todo ello nos confirma el interés que observa, para consolidar una

conciencia de identidad colectiva y para defender el sentido de propiedad social, con que debe concebírsele,

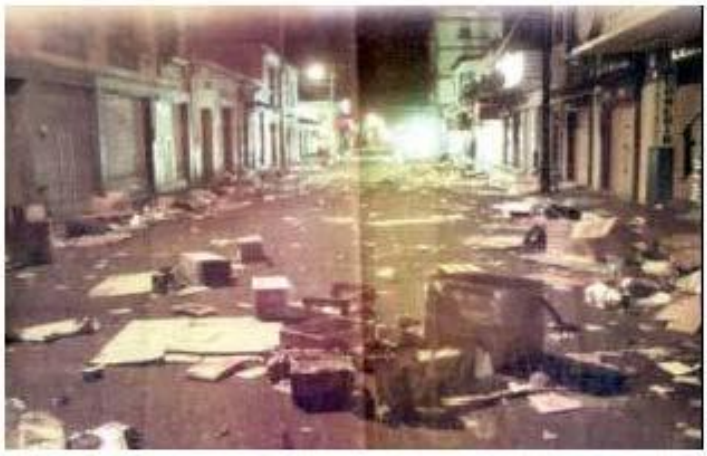
- El ciudadano debe de observar las leyes y reglamentos que representan alternativas sobresalientes en la defensa y conservación del patrimonio cultural; se precisa que deben desembocar en la confirmación de los foros y los canales de expresión de la ciudadanía.

- El 69% manifestó: no vivir ni trabajar en el Centro Histórico de la Ciudad de Oaxaca.
- De la población, el sexo femenino fue ligeramente de mayor participación que el masculino.
- Con relación a la ocupación, se identificó una mayor participación de estudiantes, empleados, amas de casa y profesionistas.

- El 45% expresaron que se dirigen al Centro Histórico solo ocasionalmente, lo que incide en una concepción diferente de la problemática que presenta este espacio, a la que tienen aquellos que lo hacen regularmente.
- El 55% restante hace el uso de este lugar diariamente o al menos los fines de semana.
- Un 25% fue gente muy joven, menor de 18 años; el 72% está entre los 30 y 55; y solamente el 3% tiene 56 años o más.

ACCIONES QUE EL GOBIERNO DE LA CIUDAD HA TOMADO PARA LA CONSERVACIÓN DEL CENTRO HISTÓRICO.

- La aplicación irrestricta de leyes y reglamentos, se revela como la principal exigencia de la ciudadanía.



- Otorgar mas vigilancia y seguridad, al igual que el ordenamiento del comercio informal y la reglamentación de manifestaciones, fueron las siguientes prioridades señaladas a las autoridades publicas, con un nivel porcentual muy similar entre ellas.

- Así también, uno de cada diez informantes considera imprescindible una administración publica más eficiente, en particular la recolección de basura.

- La conservación, restauración y protección del patrimonio cultural fue percibida por cuatro de cada diez ciudadanos como tareas esenciales de la administración publica.
- Finalmente la planeación y ordenamiento urbano, la promoción de una mayor conciencia cívica y participación ciudadana, son acciones consideradas necesarias para frenar el deterioro del Centro Histórico.

La gestión del Patrimonio Cultural, en vez de ser una carga, ha de propiciar formas de desarrollo sostenible, para lo cual, es fundamental, por un lado, la conservación de los bienes mediante la aplicación de sistemas de acción preventiva que ahorre actuaciones elitistas de falso prestigio y reconstrucciones falsificadoras y por otro, desarrollar actuaciones que favorezcan el uso social del Patrimonio Cultural y la participación de la propia comunidad en su disfrute y gestión.

Repartir responsabilidades técnicas en las intervenciones del Patrimonio Cultural, en una eficaz labor en equipo, otorgando en cualquier caso el mismo nivel de reconocimiento a todos los profesionales del patrimonio, tanto a arquitectos como a historiadores, historiadores del arte, geógrafos, arqueólogos, ingenieros, filósofos, filólogos, músicos, etc. Dependiendo de la naturaleza del bien patrimonial sobre el que se va a actuar, la tipología e importancia de las mismas.

En Oaxaca se requirió de un detonador que genera la convocatoria para hacer una revisión ciudadana de lo que el patrimonio cultural significa y de las limitaciones y alcances para que este cumpla su ciclo como tal, de trasmitirse a futuras generaciones.

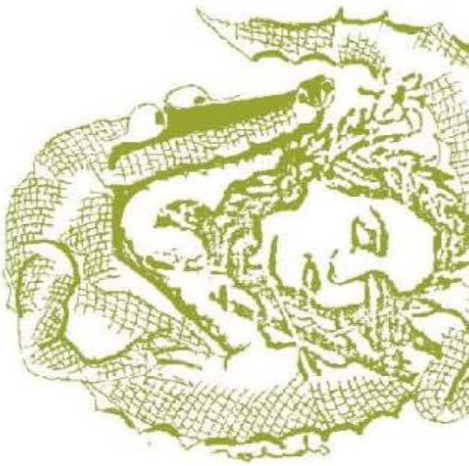
La primera recomendación surge al enunciar que no debemos esperar a desastres

sociales, políticos o naturales para actuar.

"Algunas de las opiniones vertidas en el FORO, pudieron oírse audaces o imper pero la realidad es que lo impensable es seguir así máxime si sabemos que nos autodestruyendo".

Las participaciones se expusieron en mesas abiertas, con una extraordinaria partic de la ciudad, en jornadas completas donde se tuvo la oportunidad de atender a las po de especialistas, funcionarios públicos, estudiantes, comerciantes y la población en en una variedad increíble de propuestas.

El modelo de recepción de las participaciones fue a través del FORO propiamente dicho, relacionado con los temas la presentación de 110 ponencias y la asistencia de mas de 2000 personas a las sesiones. Las encuestas abiertas a la población, recibiendo 7230 formatos llenos y además, se busco, la participación de instituciones u organizaciones que estén ubicadas en el Centro Histórico con una fuerte incidencia y otras ubicadas fuera del centro histórico y que inciden, incluso mas que las primeras.

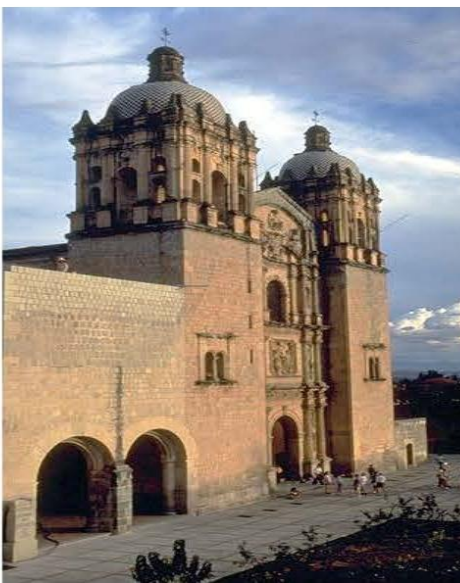


Se ha integrado una COMISIÓN DE SEGUIMIENTO ciudadana, donde pa activamente las Universidades y que revisará el alcance de los objetivos y metas ejercicio.

Toda la acción ha quedado documentada y ahora pertenece a la ciudad, la informac abierta y se continúan recibiendo propuestas y proyectos pero sobre todo inscrip grupos sociales y personas para participar en obras y actividades como nunc sucedido en la ciudad.

Existen ya SUBCOMISIONES que iniciaron sus labores inmediatamente desp concluir el foro.

Los recursos esta en proceso de administrarse a través de una FUNDACIÓN CIUD OAXACA encabezada por benefactores particulares nacionales y extranjeros que han encontrado en Oaxaca eco a las inversiones de sus capitales. Los recursos se encaminaran a obras de beneficio común de los Oaxaqueños buscando ser "UNA CIUDAD AUTENTICA Y POR CONSECUENCIA TURÍSTICA, NO UNA CIUDAD TURÍSTICA CON PATRIMONIO CULTURAL".



Esta síntesis llega después de analizar lo que la población desea de su Centro Histórico:
¿Un centro para la ciudad?
¿Un centro del Centro Histórico?
¿Un Centro Histórico de la ciudad? O la conclusión de
¿ Un centro del patrimonio cultural de la ciudad?
Dentro de las acciones realizadas con una brillante participación social están:

LA CUSTODIA CIUDADANA ENCABEZADA POR EL RECONOCIDO PINTOR,

MAESTRO TOLEDO Y LA ASOCIACIÓN "PROOAX, A.C",. PARA LA NO

INSTALACIÓN DEL RESTAURANTE DE COMIDA RÁPIDA MC DONALD´S EN LA

PLAZA MAYOR DE LA CIUDAD, CORAZÓN DEL CENTRO HISTÓRICO DE

OAXACA.

Atrayendo la atención mundial, porque se defendió mucho mas que la inserción de un uso del suelo ajeno a la identidad de la población o la intervención física en un inmueble patrimonial, sino la presencia de una cultura globalizada que invade y arremete a la esencia del patrimonio cultural intangible.

EL NUEVO USO DE LA ANTIGUA ESTACIÓN OAXACA DEL FERROCARRIL

MEXICANO DEL SUR/CORREDOR CULTURAL "DEL EXMARQUESADO A LA

ALAMEDA"

El objetivo general del Programa es integrar a las actividades turístico - culturales del Centro Histórico de la ciudad al Barrio del ExMArquesado, a través de un Corredor Urbano, teniendo como detonador el Reciclaje a un Parque Cultural en la Antigua

Estación del Ferrocarril (Conjunto de mas 45,000m^2) actualmente sin uso.

Promover el mejoramiento visual y el equipamiento urbano en barrios y espacios

alternos al Centro Histórico.

1. **Fortalecer el rescate y fomento de tradiciones y expresiones culturales en barrios y colonias.**
2. **Promover la participación de inversiones públicas y privadas tendientes a la ampliación de atractivos turísticos.**
3. **Promocionar circuitos turísticos arquitectónicos, artesanales, gastronómicos y tradicionales.**

Los objetivos particulares se basan en el desarrollo de las cuatro líneas de

investigación:

Conservar el Patrimonio:

- **edificado que representa para los oaxaqueños los inmuebles producto del S.XIX especialmente los relacionados con la cultura del ferrocarril**
- **el representado por los bienes muebles**
- **el natural como elemento básico de la composición de los espacios urbanos**
- **el inmaterial representado por los auténticos residentes de la Antigua Estación**

EL PROGRAMA INTEGRAL DE CONSERVACIÓN DEL PATRIMONIO CULTURAL

DEL CENTRO HISTÓRICO DE LA CIUDAD DE OAXACA

La actual dinámica social, la migración del interior del estado y de otros estados, la conurbación con 17 municipios, una comunicación más fácil y rápida como es el caso de la supercarretera, han provocado una gran demanda de servicios: Como consecuencia de esto, nos encontramos ante presiones comerciales que han propiciado un acelerado cambio de los usos de suelos, expulsión de la vivienda del centro histórico y una desmedida especulación. Al cambiar el uso del suelo, de habitacional a comercial, se presentan otro tipo de problemas, por mencionar algunos:

La contaminación visual, consecuencia de anuncios y propaganda fuera de norma, alteraciones a los inmuebles patrimoniales, copias de elementos de la arquitectura tradicional que se convierten en escenografita para el turismo, pintura en fachadas que no corresponde a la tipología de los edificios, el uso de esmaltes, texturizados y colores agresivos al propio inmueble y al entorno, el retiro o edificación de rejas para dar acceso a locales, las modificaciones de los vanos y la exhibición de productos colgados de las rejas, son algunas de las consecuencias de estos cambios de uso de suelo desde otro punto de vista, la incuria, el abandono, la destrucción intencional, la flora nociva, pero sobre todo la ignorancia, son factores que provocan el lento, pero seguro deterioro de nuestro patrimonio construido y su irreparable pérdida.

El derecho a manifestarse, consagrado en la Constitución Política de los Estados Unidos Mexicanos, ha sido aprovechado para realizar actos de vandalismo. Los plantones, marchas y manifestaciones, no solo causan serios problemas viales, con la natural irritación de la ciudadanía los pintarrajaos, grafitos, consignas políticas y pega de propaganda, son agresiones directas al patrimonio y a la propiedad, con un costo muy elevado para revertirlas, costo que impacta directamente a la economía de los ciudadanos.

Por lo que se refiere a nuestro patrimonio intangible, cualquiera de los presentes que tenga dos décadas de memoria, estará de acuerdo conmigo, en que nuestras celebraciones tradicionales, fiestas religiosas, costumbres de barrios, fiestas civiles, que las que no han desaparecido, se han modificado hasta convertirse en simples tianguis, donde igual se compra comida que contrabando.

Y que decir de nuestras plazas, jardines y espacios públicos, actualmente invadidos que nada tiene que ver con nuestras costumbres o nuestras tradiciones y que sin embargo provocan daños al mobiliario urbano y convierten las áreas verdes de nuestros jardines en sanitarios, particularmente las verbenas y los plantones, en conclusión todo lo anterior lo podríamos resumir en una sola palabra: desorden.

La autoridad y la normatividad existen, pero no podrán proteger con la efectividad necesaria nuestro patrimonio cultural sin la participación ciudadana.

ACCIONES TANGIBLES:

RESTAURACIÓN DE LA "CASA DEL CIUDADANO".

Intervención en un inmueble de alto valor patrimonial en el Centro Histórico, de propiedad municipal, con la participación de la sociedad quien también aporta recursos económicos, para así crear el MUSEO DE LA CIUDAD o CASA DE LA CULTURA MUNICIPAL. Inversión programada de 800 mil dólares.

PROGRAMA DE CONTROL VEHICULAR.

Equipamiento a las vialidades peatonales, a fin de mejorar su funcionalidad y accesibilidad, además de renovar y mejorar la imagen urbana.

PROYECTO URBANO "SISTEMA DE PLAZAS"

Con la asistencia de especialistas en Diseño Urbano, Urbanismo, Conservación del Patrimonio Edificado, Estudios y Gestión de la Ciudad, Botánicos y Artistas Plásticos, se viene desarrollando el primer registro digital del Corazón del Centro Histórico: SISTEMA, CATEDRAL, ALAMEDA, PLAZA MAYOR Y LOS TEMPLOS DE SAN AGUSTÍN Y LA COMPAÑÍA DE JESÚS. Permitiendo así desarrollar un Plan Maestro de Mejoramiento y Renovación de la Imagen Urbana.

MOBILIARIO URBANO (MÓDULOS PARA VENTA DE REVISTAS Y PERIÓDICOS, DEPÓSITOS PARA RESIDUOS SÓLIDOS – PAPELERAS -) (REHABILITACIÓN DE 47 FUENTES HISTÓRICAS DE OAXACA)(CONSERVACIÓN DEL KIOSCO DEL ZÓCALO DE LA CIUDAD)

Programa integral de conservación del mobiliario histórico existente (fuentes y kiosko de la ciudad) y la sustitución de mobiliario urbano, siguiendo patrones de microarquitectura que se adecuan a los diferentes requerimientos: placas de nomenclatura, mobiliario para identificación de la Zona de Monumentos, cedulas de identificación de los principales inmuebles históricos de la ciudad, nuevos módulos para la venta de periódicos y revistas, nuevos módulos para información turística, depósitos para captación de residuos sólidos, rampas para personas con discapacidad, entre otras acciones.

PROGRAMA "ANTIPINTAS Y GRAFFITIS"

Con la participación social se desarrollan acciones puntuales para la aplicación de pintura en las fachadas de inmuebles afectados por "pintas" y "grafitis", de manera sistematizada, en un esquema en el que el propietario aporta el material y niños de edad escolar en coordinación con personal del Ayuntamiento literalmente "borran" las agresiones a las fachadas de los inmuebles.

ORGANIZACIÓN SOCIAL "CUSTODIOS DEL CENTRO HISTÓRICO"

Custodios DEL CENTRO HISTÓRICO

Coordinación General de Turismo y Fomento Económico

García Vigil 517, Centro Histórico
Tel: 514-66-33 / 514-66-44 / Fax: 514-65-50

Los niños y jóvenes suman sus esfuerzos, para de manera voluntaria ofrecer obras de acción inmediata encaminadas al mejoramiento y renovación de la imagen urbana del Centro Histórico, generando así plena conciencia de los valores patrimoniales y de identidad.

INVERSIÓN INMEDIATA PARA LA APLICACIÓN DEL SISTEMA MUNICIPAL DE RECOLECCIÓN DE RESIDUOS SÓLIDOS (SIMARS)

Formando parte de un Plan Integral con una inversión de mas de 400 mil dólares, la Zona de Monumentos cuenta ahora, con un sistema adecuado de recolección de basura acorde a su infraestructura. Destacando un sistema de aspiración móvil y cerca de 600 papeleras.

PROGRAMA DE INSTALACIÓN SUBTERRÁNEA DE LÍNEAS DE TELÉFONO, ELÉCTRICA E INSTALACIONES ESPECIALES e ILUMINACIÓN DE ARQUITECTURA RELIGIOSA (TEMPLOS CATÓLICOS)

En colaboración con los diferentes niveles de Gobierno, se ha logrado renovar la imagen urbana de 27 calles, eliminándole cableado aéreo, con lo cual se suman mas de 50 calles que cuentan con pavimentos mejorados, rampas para discapacitados y libres de elementos ajenos a la imagen urbana original.

PROGRAMA DE CONSERVACIÓN A INMUEBLES PATRIMONIALES ANTE LA PRESENCIA DE FLORA NOCIVA

El clima benigno de la ciudad, resulta ser ideal para la proliferación de flora nociva, trayendo consigo haber formalizado un programa de conservación permanente en los inmuebles patrimoniales.

REORDENAMIENTO DEL COMERCIO EN LA VÍA PÚBLICA

El comercio en vía pública está controlado, en esta administración no se ha ofrecido ningún permiso adicional a los existentes, se han reubicado grupos de artesanos a inmuebles rehabilitados como centros comerciales y de promoción artesanal. Se promueven ferias artesanales en sitios públicos ajenos a la Zona de Monumentos.

PROGRAMA "SÚMATE A OAXACA Y QUE FLOREZCA TU FACHADA"

Con la valiosa participación de la comunidad, se logró realizar un "Concurso de Arreglo de Fachadas con Flores", reviviendo la tradición local de complementar la arquitectura con elementos naturales.

PROYECTO DE RESTAURACIÓN URBANA EN EL BARRIO DE XOCHIMILCO y PROYECTO DE CONSERVACIÓN EN EL BARRIO DE JALATLACO

Una de las bases fundamentales de la convivencia en la ciudad es la generada en los Barrios Históricos; el Gobierno de la Ciudad ha sumado voluntades y desarrolla obras de mejoramiento y renovación de la imagen urbana lo que promueve conservar a los residentes en las zonas patrimoniales.

"El Centro Histórico es el reflejo de nuestras raíces y costumbres, las actividades humanas, los edificios, la estructura espacial y las zonas a su alrededor hacen que tenga un valor digno de respetar.

La cooperación de todos es necesaria para lograr su protección, cada generación no dispone de este patrimonio más que como depositaria y es responsable de su transmisión a generaciones futuras"

Lic. Gabino Cué Monteagudo

Presidente Municipal Constitucional de Oaxaca de Juárez, Oax.

[i] [i]El siete de octubre de 2001 dio inicio un proceso de cambio político y social en la historia pródiga y vigorosa de Oaxaca. Esta fecha marcó el inicio de un gobierno ciudadano, inspirado en los más puros anhelos democráticos, en la más firme convicción participativa y en la mas necesaria e imprescindible tolerancia política. El Primer Gobierno Ciudadano emanó de un movimiento cívico que rompió con atavismos políticos y determinó como columna vertebral de su propuesta, la recuperación del poder municipal a favor de la ciudadanía y para la ciudadanía. Gobierno Municipal de Oaxaca de Juárez, Oax. 2002-2004

[ii] **Adriana Zenteno F**. Es Licenciada en Ciencias de la Comunicación por el Instituto Tecnológico de Estudios Superiores de Monterrey. México. Ha colaborado en diferentes administraciones gubernamentales en las áreas de Comunicación Social y Relaciones Públicas.
Gerardo Corres T. Desarrolla su proyecto de tesis para obtener el grado de Doctor en Arquitectura con Especialización en Restauración de Sitios y Monumentos en la UABJO. México. Es Maestro en Arquitectura por la Universidad Autónoma del Estado de Puebla y Maestro en Estudios y Gestión de la Ciudad por la Universidad Iberoamericana Puebla. Participó en los Coloquios de Santiago de Compostela y de Puebla, México. Colabora en el Gobierno Municipal de Oaxaca coordinando los PROYECTOS DE LA CIUDAD.

A PROJECT FOR THE CREATION OF A CATALOGUE OF ARCHAEOLOGICAL-INDUSTRIAL RESOURCES IN THE PROVINCE OF LECCE (PUGLIA, ITALY).

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** CNR- Istituto per i Beni Archeologici e Monumentali (ex IsCOM) – Lecce, ITA*
[o] Faculty of Cultural Resources at the University of Lecce, ITA

Abstract

Old industrial buildings that have been restored are today an important resource for this area. In order to know them, study them and plan new uses for them that may differ from their original functions, it is necessary to identify them (via a "census"), catalogue them scientifically and treat them as "monuments of industrialization". Carrying out a census of these resources and drawing up a catalogue are not to be understood as mere "cultural activities" for their own sake, but rather as the means used by local authorities for the analysis and planning of the industrial archaeology of their areas. The census and the catalogue will make it possible to put these structures and the various new uses to which they have been converted on the web, to draw up itineraries for environmental tourism, to tackle issues of sustainable development and, most importantly, to provide resources for the professional training of those who work in the management of the territory. From the operational point of view the project includes the creation of a Catalogue of Archaeological-Industrial Resources linked to the web portal of the Lecce Provincial Administration (*Provincia di Lecce*), operating as an "open system" for web-based consultation. The data will be of the hypertext type, but will also include multimedia elements.

Figure 1. Novoli, alcohol distillery

Introduction

The image of an active and hardworking industrial Puglia, the daughter of the "race of ants" so well described by Tommaso Fiore, is gradually taking shape: *"[...]. Tu devi dunque sapere che la Puglia, [...], è conosciuta pel suo passato, bello o brutto, ma ben passato e perciò venerando fin nei suoi cocci rotti. [...]"* (1).

Figure 2. Maglie, "Casa Piccinno" furniture factory

The subject of this study is precisely the "cocci rotti", the "terracotta fragments" of industry in Puglia. In recent years there has been a renewal of interest, in Italy and Europe as a whole, in the architectural legacy of industry. The emergence of the problem of the de-commissioned industrial areas, a new availability of resources and a greater cultural emphasis on the phenomenon of pre-existing archaeological-industrial structures have refocused attention on an issue which, after a promising start in the 1960s, subsequently languished. The factors that have contributed to bringing this process about are numerous, and may be summarised as follows:

1. As an effect of the crisis that has hit certain production sectors, the number of de-industrialized areas has increased, and industrial plant has been decommissioned. Across the whole of Puglia and in particular the Province of Lecce – practically coterminous with the Salento peninsular which forms the "high heel" of Italy – there are numerous factories (wineries, quarries, distilleries, underground olive presses and other oil-making plant, flower mills and pasta factories, warehouses for processing tobacco, furniture workshops and so on) that used to produce for the domestic and international market but which, due to the processes of concentration and standardization, have closed – not however without leaving behind significant traces of their activity.
2. This has made it necessary to tackle the problem of how to reclaim these areas and the buildings present in them, which would otherwise become subject to speculative building or urban blight. Thus the conviction has grown that these areas could become the jumping-off point for a process of renewal in urban and outlying areas.
3. A series of "good habits" have thus been activated, often benefiting from European funds (*POP., Interreg, Leader-GAL, PRUSST, PIS, POR and PRU*) which enable

the recovery and renewal of the areas in question and which, with the help of new planning measures and regulations (such as the Complex Urban Plans), facilitate collaborative ventures between the public and the private sector, avoiding the wasteful use of land and/or the disruption of the delicate balance built up over the course of decades that characterises many areas.

Figure 3. Sanarica, plant for the extraction of oil from olive husks

4. This has led to renewal schemes such as those that have taken place in Bochum, Sheffield, Manchester, Barcelona, Turin, Bologna, Parma, Prato, Naples, etc. which have made it possible to revitalize areas that would otherwise have been destined to suffer inevitable decline. There have been few such recovery projects in Puglia (the ex *Manifattura di tabacchi* (tobacco processing works) in Bari, a few old stone quarries in Apricena in the province of Foggia, a brickworks converted into a theatre workshop in Lecce, a tobacco warehouse converted to a students' hall of residence in Monteroni di Lecce, some underground olive presses in the Salento, another tobacco warehouse in Lecce converted to university offices, a tobacco growers' village transformed into a holiday camp and a few other examples); Puglia is still in the phase of discovering and spreading public awareness.
5. The relevance of the industrial experience has led to machines, factories and infrastructures being considered as true cultural heritage items, a testimony to material culture able to enrich our understanding of a historical epoch.
6. All this has reopened the debate over museums, itineraries and archaeological-industrial parks, it has boosted the process of conversion to new uses, especially cultural purposes with a bearing on the historical remains of industrialization.
7. As part of the general attention to the landscape, a new sensitivity to industrial and urban landscapes and to the question of how these may be reclaimed and protected has emerged.

Cataloguing as an instrument of knowledge and planning in a specific area.

It is in this context that the problem of cataloguing should be considered. Intervening in industrial sites, planning their conversion to other uses and reclaiming them for purposes other that those that they were originally intended for, means launching a campaign of awareness. This in turn makes it necessary, as a first step, to identify - by

Figure 4. Castrì di Lecce, underground oil press

means of a "census" as it were - and to scientifically catalogue industrialization's monuments. The implementation of a census and a catalogue are not merely cultural operations but practical resources for local authorities, a technical-scientific support for the analysis and the planning of regional development. The implementation of a census and a scientific catalogue also make it possible to publicize structures and new forms of conversion on the web, to construct eco-tourism itineraries, to tackle issues of sustainable development, to create opportunities for the training of those who operate in the territory and the education of the residents. In an epoch of profound changes it can also offer a way of partly or entirely rebuilding identity and cultural/social cohesion, of reaffirming productive vocations or of rediscovering older ones (think of the whole issue of ancient occupations and the emphasis placed on these by the European Union). In sum, cataloguing, from this point of view, represents an instrument for a fresh approach to planning, especially for those areas where the speed of change is not accompanied by robust productive and urban-regional structures. Finally, it should be noted that archaeological-industrial resources are often characterized by the presence of buildings of medium to large dimensions. It is for this reason that the conservation project described below, which is founded on the need to find new uses for the areas - typically different from the original ones, is inevitably difficult: the new function must meet criteria of compatibility in aesthetic-formal and material terms, as well as respecting principles of sustainable socio-economic exploitation. Seen from this viewpoint, a census and a scientific catalogue represent the essential foundation for any initiative aimed at the conservation and promotion of archaeological-industrial resources.

Puglia, and the Salento in particular, as previously mentioned, is currently involved in the initial phase (discovery) of this long and gradual process of "rehabilitation".

Taking a closer look at the industry of the Salento we may say that at the beginning of the last century manufacturing was oriented mainly to traditional activities linked to the supply of local and distant markets. It was above all the transformation of agricultural products which made up the hard core of the productive structure. The oil–wine–tobacco triad, together with production of flour-based foods and pasta, represented the main engine of production in the Terra d'Otranto area (comprising today's provinces of Lecce, Brindisi and Taranto) and dominated exports. Traditional manufacturing here carried on in the presence of activities that were industrial in the modern sense of the term, which also drove the modernization of "old-style" companies. This process was also seen in other regions of Italy, both in the South and the Central-Northern regions, and led to the expansion of other types of production, of which alcohol is an important example. An industrial dimension emerged in which tradition and innovation were intertwined, where the decline of production and industrial plant was gradual and where small companies and cooperative or associative forms of enterprise (for example in tobacco cultivation) were the norm. These situations may be described, with a certain degree of licence in the use of the term, with reference to the concept of *productive* and/or i*ndustrial districts*. The term is used here to refer to areas characterized by processes and products, which influenced technical progress, the market and the social context. In general this took place thanks to the presence of a plurality of small companies all operating in the same field, similar in methods, procedures, training of personnel, market, and socio-economic conditions. In other words, the relevance of the productive dimension does not depend directly on the size of the company and/or the factory/plant. We are dealing here with small but highly articulated urban or rural areas, in which productive plant was generally not large scale and for which recovery and conversion require generally small-scale investment.

Forms for surveying and cataloguing

The cataloguing of cultural heritage items is a preliminary step for their subsequent protection, conservation and exploitation. Specifically, as far as items belonging to the industrial legacy are concerned, the census operation and the resulting process of cataloguing are fundamental, both of these being occasions (or actions) which serve to physically concentrate attention on the item and to consider the socio-cultural repercussions.

The instruments used to survey the territory are important here; these make it possible to gather data that are useful to focus on and analyse specifically every item in the industrial legacy. In order to create an exhaustive catalogue it is necessary to have a support, an inventory card (summarising the research carried out) which will serve both as an objective in itself and as a jumping-off point for further analyses, the result of a particular situation and an opportunity to gain knowledge of it. In this regard it would be as well to consider the main European and Italian cataloguing models.

The English inventory card is very simple, a result of the homogeneity of the process of industrialization and of a greater archaeological-industrial knowledge in general. Also simple is the American inventory card, the Historic American Engineering Record (HAER) aimed at the re-conversion of industrial sites that are no longer active (2). The French system of cataloguing involves a plurality of cards and reflects the complexity of the items. Similar to the French situation is the Italian, for which it is inconvenient to adopt a single inventory card, because different types of information emerge from

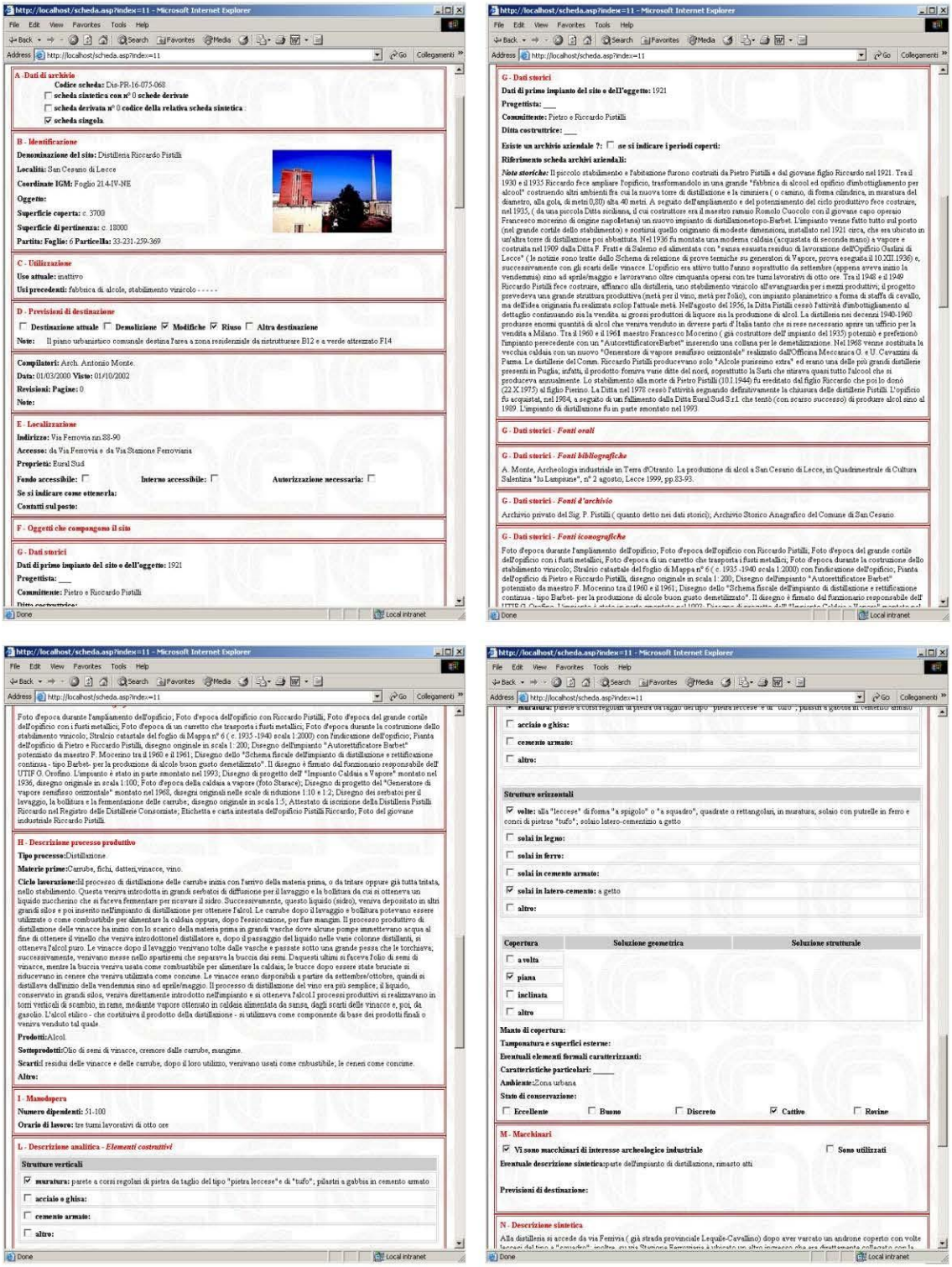

Figure 5. Layout of the IsCOM Database

different and geographically separate contexts. The differences between the numerous inventory cards shows the diversity among the individual cultures, periods and types of industrialization.

The Lombardy Region was the first in Italy (1982) to launch a census of its archaeological-industrial sites; the result of this research is a Multimedia Database which provides information on 830 sites, catalogued in the period from 1982 - 1998 (3).

The Veneto Region and the University Institute of Architecture in Venice have launched a preliminary reconnaissance operation which has led to the identification of around 800 sites in the province of Vicenza alone; now, using a specially prepared inventory card, a census operation is now in progress (4). The Lazio Region and the Regional Documentation Centre (CRD) have carried out a historical-environmental survey of the sites and buildings, and the material thus produced has been computerised with a view to creating a Database (5). The Faculty of Engineering at the University of Genova, the Liguria Cultural and Environmental Heritage Authority (Soprintendenza ai Beni Ambientali e Architettonici) and the Ansaldo Foundation have carried out the mapping of the buildings and industrial plant that are of historic and architectural interest in Liguria, using a streamlined inventory system that will lead to the identification of the most important examples. All the documentation gathered in this way will constitute a bank of data and images for the region (6). The City Council of Naples has carried out a preliminary census of the industrial legacy in the Eastern part of the city; The research was carried out by R. Parisi and A. Buccaro under the guidance of G. Alisio and A. Vitale, on the basis of an agreement signed between the City Council of Naples and the Industrial Archaeology Association of Naples (7). The Department of Cultural Heritage of the Umbria Region, via the Umbrian Regional Centre for Economic and Social Research (CRURES) decided to carry out, as part of the regional catalogue, a survey of all the remains of industrial civilisation in the region. Thus began a meticulous in-the-field operation which led to the preparation of an inventory card that was then tried out across the territory. The Umbria Region, equipped with this card, carried out a census operation leading to the production of around 200 cards (8). The ICSIM Documentation Centre might acquire these cards and computerise them and publish them on the web (9). In Tuscany too, on the basis of important studies carried out between 1980 and 1990 (Cresti, Tognarini, *et al.*) for some years the University of Pisa has been building up a database that includes archive sources, contemporary bibliographic references, historiography, cartography and the drawing up of a census form (10). The job of surveying and cataloguing the industrial heritage items present in Puglia since 1994, has been the task of the Institute of the CNR (National Research Council) for Archaeological and Monumental Heritage (ex Is.COM) in Lecce and the Chair in Industrial Archaeology in the Faculty of Cultural Heritage, Lecce University (11). At the current time more than 230 items of archaeological-industrial interest have been surveyed and catalogued, and 130 inventory cards concerning workshops in the Salento have been prepared. All of the documentary material gathered is being placed in a database. Finally, the AIPAI (Italian Archaeological and industrial Heritage Association) has been promoting a large-scale project, on the national level, for the construction of a database that will contain documents, sites of industrial archaeology and sources, with the use of an inventory/survey card that has yet to be drawn up (12).

Before deciding which inventory card to use as a guide or point of reference in the Salento a systematic analysis of all the cards produced on the national level was carried out; among these the most interesting were those of:

- the Italian Industrial Archaeology Society (SIAI), Lombardy section;
- the Ministry of Cultural and Environmental Heritage, Central Institute for Cataloguing and Documentation (ICCD), card Aii;
- the Veneto Region P.T.R.C., card for the census of sites and buildings pertaining to Industrial archaeology;

- the National Institute for Material Culture and Industrial Archaeology, "VIRGINIA WOOLF" State Professional Institute in Rome, ICMAI.
- the Catalogue Office of the Umbria Region.

The inventory/survey card that was adopted is that of the Catalogue Office of the Umbria Region, which was chosen for its functional nature and completeness of the information it contains (13). Taking this as the starting point, it was then necessary to make it "compatible" with the situation in the South of Italy, so as to better respond to the specific character of the region and the socio-cultural implications. It was assumed that the inventory card should facilitate the gathering of data by ensuring a correspondence between the model of the card and the type of industrialization. In order to highlight the specific characteristics in this case the "Umbrian Card" was enriched with the following new sections:

- **Historical Data**: to the pre-existing historical data section was added a field called Oral Sources.
- **Description of the productive process**: with the fields Type of Process; Raw Materials; Processing Cycle; Products; By-Products; Industrial Residues/Waste; Other.
- **Workforce**: with fields for the Number of Employees; Working Hours.

At this point, considering the wealth of information that derives from more detailed knowledge of an item, the print resources were computerised via the creation, organization and management of a Microsoft Access Database.

Implementation of the Database

The objective of this task was to fine tune a multimedia information system for the storage in an electronic archive of bibliographical and iconographical materials, and the paper archive documents present in the IsCOM library, regarding the archaeological industrial sites of the Salento and Puglia. The system aims to make available to the scientific community and local authorities a database which is as complete, accurate, easy to consult and update, and simple to manage from any computer with access to the internet, as possible. The necessity of allowing access to the Database via Internet both for consultation and for modification with the insertion of new data, obviously derives from the great development and expansion that the "web" has enjoyed in recent years and from the ever-growing penetration of this instrument all over the world. Web and database are two technologies that have great success because they allow the instant publication of information all over the world and because they allow the storage and retrieval of large quantities of information contained in one or more electronic archives.
In the choice of the instruments necessary for realization and implementation various aspects of the question were taken into consideration. In particular, it was important to design a system that guaranteed ease of research, selection and retrieval of the information contained in the electronic archive, utilizing both interactive geographical maps, and key words inserted in the main fields of the catalogue cards of the archaeological-industrial heritage items.

During the initial phase of the work a choice was made of the products which allowed the data to be placed in the archive with greatest ease, considering that the available data were of greatly differing types but all fundamentally belonging to these categories: textual documents - images – hypertexts – video recordings –audio recordings – books. The quantity of data already available and the volume of data that

could be made available in the short term were considered, along with the necessity of providing an interface between the archive and a web server to allow the interactive presentation of the information and the management and insertion of data from a remote location.

The prototype implemented, now at an advanced stage of development, is based on an Access Database in which the information relative to each single catalogue card is memorized in the form of tables which are connected to each other; the catalogue cards are managed and updated via procedures that may be activated in the form of dynamic web pages (whose informative content depends on the choices made by the user).

To create an interface between the Database and the web server there are various solutions, as many as there are possible database – web server combinations; we used ASP technology together with an IIS web server. The web site which emerged, after a page presenting the archives, allows access to a screen where it is possible to carry out a search by key words in the various fields of the catalogue cards. Alternatively, it is possible to run through the archives card by card or (groups of cards) with the faculty of obtaining ever more detailed information for each card, and it is also possible to carry out searches by type of data or by geographical area.

Figure 6. IsCOM Database: example of Internet interface

The Project for a Catalogue of the Archaeological - Industrial Heritage of the Province of Lecce

The Project is part of the "*Archaeology and Industrial Heritage. Development of research, promotion and planning*" agreement, and is a premise to the preparatory "*Pilot Project for the conservation and exploitation of archaeological - industrial heritage in Puglia*". The referents here are again the University of Lecce (Faculty of Cultural Heritage, Chair in Industrial Archaeology), The CNR (Institute for the Archaeological and Monumental Heritage of Lecce), the Piero Manni publishing house and the City Council of San Cesario di Lecce The project includes the creation of a Catalogue of archaeological-industrial heritage which, together with the Portal of the

Province of Lecce, will be constantly enlarged, interacting with other forms of cultural heritage cataloguing.

The objective is to join the aspects of knowledge pertaining to the exploitation and conservation of resources with the methodologies of information technology, via an "open" system of web-based consultation with remote access. The hope is that knowledge of archaeological-industrial heritage can be disseminated at all levels of interest and understanding.

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PILOT PROJECT FOR A BETTER AWARENESS AND EXPLOITATION OF THE ARCHAEOLOGICAL-INDUSTRIAL HERITAGE OF THE SALENTO (PUGLIA, ITALY).

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Abstract

The Pilot Project set up by the San Cesario di Lecce municipal administration for the promotion of its industrial past became a reality three years ago. The project's first step was an agreement signed by the CNR-IBAM in Lecce, the Chair in Industrial Archaeology at the University of Lecce and the Manni Editori publishing company. The Project has been financed by the Province of Lecce within the Salento Inter-provincial University Consortium.

The specific objectives of the Project are:

- to increase the awareness of the Public Administrations in the Salento concerning the importance of industrial archaeology;
- to promote a better exploitation of the area's resources while respecting its historical and economic character;
- to create a research model that can be applied to other situations in other areas.

These objectives are to be achieved via the publication of a series of research articles, the holding of seminars and conventions on specific issues, the training of specialist personnel and above all via the creation of "virtual museums" for those places not accessible directly. We are dealing here with the conversion to "products" of study and research methods which for the time being are restricted in scope but will be extended subsequently to the Puglia Region as a whole.

1. Industrial archaeology, its origins and growth

The Catalogue Central office, today the I.C.C.D. (the Catalogue and Documentation Central Institute), before carrying out a census of national cultural heritage items, in the mid 1970s raised the question of an exact but broader definition of cultural heritage. Together with the Regions it was decided that the term should also refer to the remains of the industrial past and more precisely the objects and the monuments of the history of labour. Industrial cultural heritage items are the object of study of Industrial Archaeology, a discipline whose purpose is the "reconstruction of the history of industrial civilisation and culture via material evidence, tracing the formative process of the phenomenon". Industrial development has left indelible traces in the central and outlying districts of every city, giving rise to what may truly be termed *industrial monuments,* imposing structures once teeming with workers which are part of the Cultural Heritage of the nations. Industrial archaeology was born in the Anglo-Saxon countries in the 1950s and arrived in Italy in the 1970s. The buildings housing the machinery, the workers' dwellings (often concentrated in particular districts or villages), the infrastructures of the means of transport, the service structures, the raw materials, the technologies used in the production and commercialisation of the products are all significant signs that the process of industrialisation has left its mark

on our culture and on our surroundings. The historical period corresponding to this process is usually considered to have begun with the invention of the steam engine and continued up until the last century, although in countries that were host to ancient civilisations such as Italy there are traces of industrial processes and products that go back much further. There are even those who hold that Industrial Archaeology should embrace all artisanal activities that flourished in the pre-industrial epoch.

Figure 1. Frontispiece of the brochure and cover of the CD-Rom

The criterion for assessment here is, broadly, obsolescence, that is to say whether a given edifice, object, or even an entire industrial site has been "decommissioned", has abandoned its original function or has a historical *background* such as to have acquired the status of archaeology, a reminder of the past, a monument. Buchanan defines as an industrial monument "anything that remains of the obsolete phase of an industrial or transport system, from the Neolithic flint mines to the aeroplane of a type no longer used". It may be said then that Industrial Archaeology is the study of what remains of the work of human beings. In fact, the issue of the temporal boundaries of what constitutes the object of study of this discipline have been the subject of long and repeated debates and to this day there exist many different schools of thought.

The deciphering of the language of industrial monuments is thus the special object of study of Industrial Archaeology, which analyses the phenomena from an overall standpoint, taking in the historical, anthropological, social, economic and scientific aspects. It is thus

Figure 2. Screen scene of presentation

the synthesis of many "histories". Consequently, "it is not possible to provide a self-contained interpretation of each individual industrial monument"; rather, it is necessary to tackle the study in all its complexity, to reach an "understanding that is at once technological, artistic, architectural and social, a cultural synthesis of given physical remains". In other words "what interests us is not the factory or the worker's dwelling in itself, nor the machine or the artefact considered separately from the mass of interrelations which are built up around them, but the industrial monument as a clue, a spy that will speak to us of these relations". Not for nothing does the protection of industrial monuments come within the concept of "integral protection" (monument-environment) propounded by the modern methodology of Restoration. And not for nothing does the study of the productive phenomenon imply investigation in the field, with the methods and techniques of traditional archaeology (the "dig" *in loco*) in the search for "disciplinary convergence".

In the light of these new tendencies, the classification of Industrial Archaeology as a sub-discipline of the history of architecture focussing on the architectural aspects of industrial monuments while acknowledging at most a connection with issues of landscape or urban and regional characteristics has been abandoned. To define the material remains of

productive processes as "cultural heritage" means to regard them as a testimony to events and values worthy of attention in terms of conservation, protection and where possible, of exploitation.

2. Industry in the Salento

In the last few years the notion that there is no archaeological industrial heritage in the Mezzogiorno of Italy worthy of conservation and promotion has been discredited. It is certainly true that there is a quantitative difference in industrial plant between North and South, confirmed by the massive emigration of workers towards the factories of the North, and the cultural orientation of the South is basically humanistic and literary in character, but now, in the light of recent studies, it ca be affirmed that an appreciation of the identity of this land must take into account its emerging industrial past.

Considering its distribution over the territory, industry in the Salento may be described as "fragmented industry", without big industrial concentrations, where a wealth of small productive situations, considered all together, have given rise to a single industry. A mapping of the Salento in terms of industrial archaeology brings this "fragmentation" into focus: the production of oil, for example, was the common thread that held many towns of the Terra d'Otranto (the historical denomination of today's provinces of Brindisi, Lecce and Taranto) together; the underground olive presses found all over the area are today the tangible proof of this. The same goes for the building stone quarries, the wineries, the distilleries and the tobacco processing warehouses which, although characterised by greater concentration, are present in many parts of the territory.

Figure 3. Plan of the city and location of the decommissioned factory

The work of the last decade has tended to follow two different but parallel approaches: the first aims essentially at the discovery, the "census" and the primary cataloguing of industrial heritage items present in Puglia and in particular in the Salento; the second aims at spreading awareness (of the rich industrial legacy, considering this to be a potential resource), and is directed in the first instance towards the Local Administrations.

3. The Pilot project

This task of spreading awareness obtained its first fruits three years ago with the approval of a **Pilot project,** promoted by the *Comune* (town council) of San Cesario of

Lecce, which signed an agreement with the CNR Institute for Archaeological and Monumental Heritage in Lecce, the Chair in Industrial Archaeology of the Faculty of Cultural Heritage of the University of Lecce and Manni Editori publishers. The Project was funded by the Province of Lecce as part of the Salento Inter-provincial University Consortium.

A pioneer in the drawing up of a wide-ranging integrated plan for of Industrial Archaeological studies, the City Council of San Cesario di Lecce has launched a meticulous operation for the discovery, cataloguing and exploitation of its industrial legacy and that of the Salento in general. The starting point for this was its five distilleries (De Giorgi, De Bonis, Carmelo and Riccardo Pistilli and Cappello) still in part intact and uncontaminated; one of these, perfectly "frozen" in time, will house the Alcohol Museum.

The Project has precise steps divided into nine phases. The second of these phases involves the survey ("census") and completion of inventory cards for fixed items, such as buildings, sites and major pieces of machinery, to be placed in a Database (*Cfr. "A project for the creation of a catalogue of archaeological-industrial resources in the province of lecce" in this same Symposium*) accessible *on-line*; the fourth phase concerns the discovery, census, cataloguing and potentially the collection of movable items (machines, utensils, company archives, etc.), and the last concerns the drawing up of a Regional Plan for the conservation and the exploitation of the archaeological-industrial heritage in the Comune (district) of San Cesario di Lecce, with particular reference to the setting up of the Alcohol Museum and the creation of a Centre for the cataloguing of industrial-archaeological heritage in Puglia.

Figure 4. San Cesario di Lecce and its distilleries

Some of the specific objectives of the Project are to increase awareness of industrial archaeology in the region, to promote the region while respecting its historic and economic identity, and to create a study model that can be applied to other regions. The "products" resulting from these objectives include a series of scientific and informative publications - including multimedia presentations, the organisation of seminars and conferences for increasing awareness, the training of specially qualified operators, and a feasibility study that aims also to provide a methodology that may usefully be extended to the whole of the region. The project is also availing itself of the scientific co-operation of national (AIPAI) and international (TICCIH) Associations, in line with the most recent European Union

policy. It is worth remembering in this regard that this Project responds to the broad objectives as set out in "*Agenda 2000*" and more precisely that of "*developing internal policies for promoting growth, employment and the quality of life*". Cultural wealth - which archaeological industrial heritage clearly belongs to – has been included in the fundamental elements of European planning, as a resource that contributes to the cultural identity of a people and that possesses a high "exploitability" potential in socio-economic terms. Thus the Pilot Project of San Cesario di Lecce, whose initial phases are already well under way thanks to provincial funding, will be presented under the aegis of European Union programmes (Regional Operational Programme – Puglia 2000-2006 – Chapter II, Cultural Resources, Measure 2.1 "Promotion and protection of public cultural heritage and improvement of the provision and the quality of cultural services", ERDF; Community Initiative Programme, Interreg III Italy-Greece; Local Leader Plus Action Group) and the stakeholders will endeavour where necessary to draw up the relevant contracts for the implementation of the entire project. All this within the more general objective of facilitating ongoing co-operation between the public sector (Boards, Administrations), the private sector (the owners of archaeological industrial heritage items) and Institutes and/or Associations for study and research (University, CNR, Cultural Associations), further to an optimisation of existing resources.

Figure 4. The iconographic section

4. A Virtual Museum for the discovery of the industrial legacy of the Salento

"A virtual museum is a collection of electronic artefacts and information resources - virtually anything which can be digitized. The collection may include paintings, drawings, photographs, diagrams, graphs, recordings, video segments, newspaper articles, transcripts of interviews, numerical databases and a host of other items which may be saved on the virtual museum's file server. It may also offer pointers to great resources around the world relevant to the museum's main focus." (Jamie McKenzie)

"The virtual is a transformation from one way of being to another. That is, it has nothing to with the false, the illusory, or the imaginary, but is one of the possible ways of being." (Pierre Lévy)

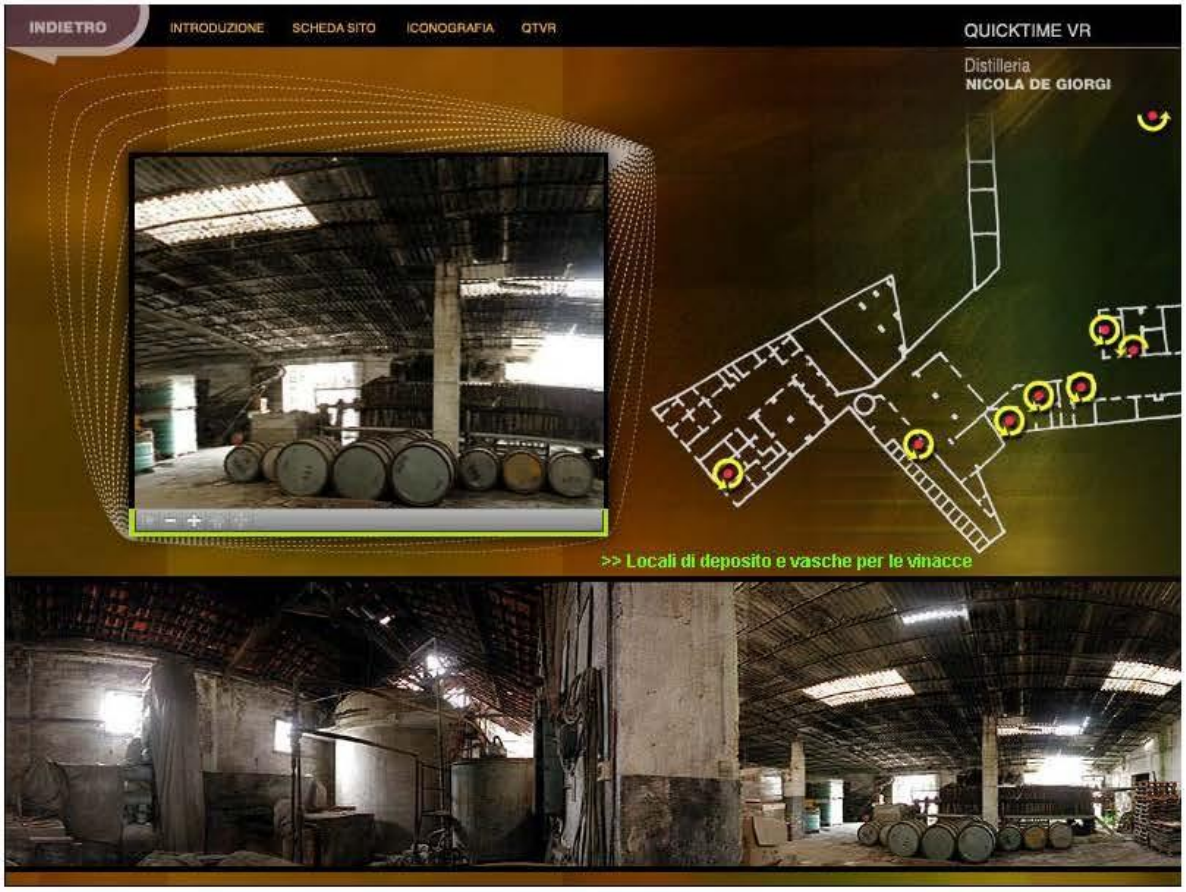

Figure 4. Virtual visit to the original working environments

The *virtual museum* can be interpreted, in a broad sense, as the possibility of enjoying an asset without actually visiting the site where it is kept or located. This particular approach to knowledge needs to be implemented with suitable instruments and techniques of communication, appropriate to the various possible levels of interest and understanding. But the "fruition in another location" can also be identified with the *museographical* operation of "highlighting the value" of the item, because to promote something means in the first instance being able to activate interest in a forgotten object, bringing it back into the 'sphere of attention', "as a living and present legacy". Thus, the more information it is able to transmit concerning the specific properties of a given item, in a coherent and overarching frame of reference, the more useful and more effective the collocation of that item in a museum will be.

However, while these considerations may be simple to apply in the promotion of movable objects, this cannot be said for the promotion of architectural creations, which by their nature are immobile. Indeed, at times, it is difficult to appreciate or contemplate these monuments, for two reasons: firstly the impossibility of comprehending *in toto* their formal, artistic and constructive values directly *in situ*, because of their size or particular difficulties of access (this is true of most archaeological sites); secondly the limitations of

the traditional systems of printed informative material. In this sense 'modern' technologies, inasmuch as they are able to facilitate a correct historical-critical reading of the item, constitute a powerful tool for fruition from a distance, as an alternative to a visit *in loco*.

Collocating items in a museum using digital technologies means organising new discovery processes within a multi-interactive space in which distances are cancelled out, and with them the limits imposed by the 'territory-as-museum'. The item displayed is thus removed from its physical location and re-inserted into a new space, the virtual space, where each item can be re-collocated in the original context, without limits of space or of time, in a new form of museum, that is to say a museum linked to an area in which the characteristic elements that unify the diverse expressions of a particular culture co-exist. It is precisely in this virtual territory and with this premise that the decision was made to gather together and organise the archaeological industrial heritage of the Salento (Lecce, Puglia, Italy), starting with a pilot experience in the Comune of S. Cesario di Lecce and its distilleries, now decommissioned and forgotten.

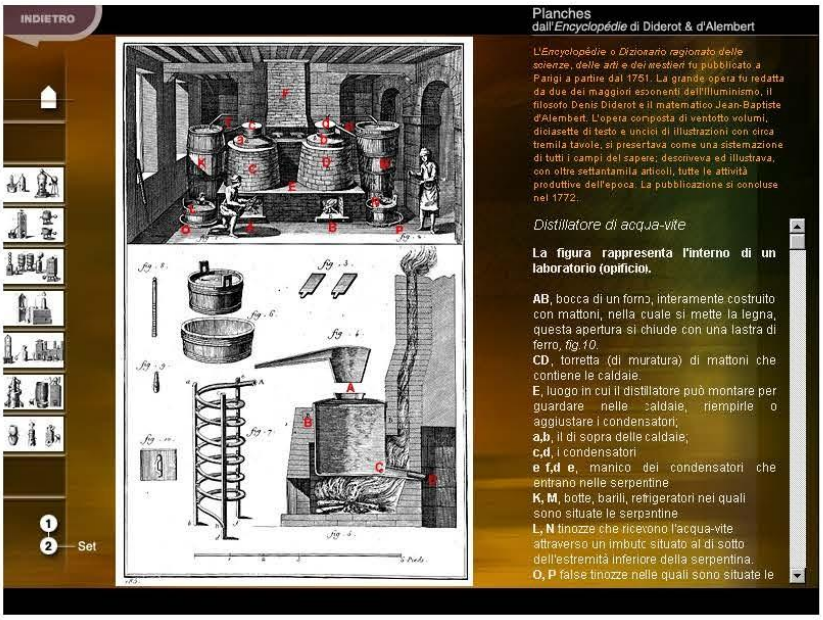

Figure 4. The plates contained in the *Encyclopédie* of Diderot & d'Alembert

The concept of a 'virtual museum of the archaeological industrial heritage of S. Cesario di Lecce' is developing from a base of digital information and is articulated in two separate phases:

Phase 1 - census and gathering of the information in a Database, conceived as a study and analysis tool, but above all as a *repository* of the knowledge of the archaeological industrial heritage of the Salento. The material thus gathered will shortly be published on the web so that it may be consulted by scholars and be enriched with external contributions.

Phase 2 - publication of the data on CD-ROM and in scientific publications. This phase involves the transfer of the gathered information, in a user-friendly form, to all possible levels of user.

These two separate phases constitute the methodological backdrop by which, using various technologies and acting autonomously, the museographical operation of 'highlighting the value'.

Phase 2 in particular, which is the subject of this paper, translates study methodologies that have hitherto been restricted to the confines of specific disciplines into 'products'. For this reasons it was decided to organise the documentary material on CD-ROMs, where the diverse forms of information (animation, QTVR videos, vocal comments, hypertexts, 3D

reconstructions, databases) will be accessible interactively in a virtual space, organised according to museographical criteria.
These contributions will therefore need to be:

- *Multimedial-interactive*
- *Multidisciplinary*
- *Multi-sensory*
- *Multidimensional* (the geometry of the museum and the information contained in it)
- *Dynamic* (the information evolves over time)

They will also need to have the following properties/features:

- *Multitemporality* (diachronic museographical evolution)
- *Connectivity* (multi-user and hypertextual linking)
- *Contextualization of the data* (with reference to other areas of interaction, URLs, etc.)
- *"De-territorialization"* (the museum information does not belong to any territory except the web and its context)
- *Polysemicity*
- *Accessibility of invisible data*
- *Guidance* (guided navigation via metaphors towards more complex information)
- *Cognitivity*. As a structure-system the virtual museum becomes a knowledge space, whose significance is a function of the sum of information and associations it embraces.
- *Exchangeability* (with other real or virtual environments)
- *Narrativity*, that is the possibility for the virtual museum to show and make legible not just works, exhibits or objects, but also dynamic events or episodes (Forte, Franzoni, 1998).

Collectively these requirements, efficiently organised within the authoring software, have made it possible to conduct a virtual visit to the original working environments and to activate a series of relations between objects, architectural spaces, products and processing methods. This level of fruition aimed at a diverse usership, from the child who enjoys interactive exploration on a computer, to the keen amateur or scholar who seeks to expand their knowledge of other more complex or specialist aspects by consulting the linked Database. The example visit, centred for the time being on the De Giorgi distillery, does not simply tell the story of the factory and its founders; it is rather the working environment, 'frozen' in its abandoned state and fortunately spared destruction, which is the real protagonist of this journey in time. The distillation tower and the chimney stack, the analysis laboratories, the boiler room, the storerooms and depositories still full of bottles tell the story of the recent past and come to life as panoramas that can be explored thanks to QuickTime VR technology. The user is free to move from one node to the other and to study the layout of the rooms. They can consult the iconographic section, containing about fifty images, or broaden their knowledge of the art of distilling or consult the plates contained in the *Encyclopédie* of Diderot & d'Alembert, the *Dictionary of the sciences, the arts and the professions*, published in Paris in 1751.

The virtual visit is extended with the same methodological approach to all the other distilleries present in the region, and to the old tobacco processing warehouses, bringing together all the archaeological industrial instances of the district in what may justifiably be called a "disseminated museum'.

It should be stressed however, that in this type of operation there is a danger of burdening the original work with an excess of information that may substantially hinder direct contact, or distort the original message with an emphatic and excessively generalised interpretation. As *Howard Burns* explains, the virtual visits cannot substitute direct knowledge of the buildings, their internal spaces, the sense of three dimensional works created with intelligence and toil in bricks and stone. They can however, enrich our perceptions and our objective knowledge when we visit monuments of the past, because they prepare us for the visit and enable us to better understand what those buildings were like, what their original context was. They help us to defend the sense of memory, to better understand their meaning as a testimony to a way of life, to become aware of our roots. They enable people from far away to approach our Cultural heritage in a completely new way, they are a valid vehicle of knowledge and a useful tool for conservation.
Conscious of this, the town council of San Cesario di Lecce, in agreement with the bodies involved in the formulation of the "*Archaeology and Industrial legacy*" agreement, has decided to set up the Alcohol Museum in its territory, probably by reconverting a decommissioned factory.

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REGIONAL CENTRE OF COMPETENCE FOR THE CONSERVATION, ENHANCEMENT AND ACCESSIBILITY OF CULTURAL AND ENVIRONMENTAL RESOURCES, DESIGNED AND FINANCED BY THE REGIONE AND UNIVERSITIES OF CAMPANIA (ITALIA)

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Abstract

The Regione Campania is responsible for conserving and safeguarding a heritage which is unique in terms of both quality and quantity. At the same time, it must set up processes of economic development based on the cultural, artistic and environmental competence present on the territory.
The sheer scope of such a wide-ranging and diversified heritage represents an ideal laboratory for evolving types and modalities of rehabilitation, diffusion, enhancement and circulation of knowledge and accessibility of the cultural and environmental resources.
The conservation of this abundance can contribute, on one hand, to reinforcing community roots and promoting cultural and relational values on the basis of historical, artistic and environmental assets and, on the other, to improving the quality of life and the ability to attract new activities.
A correct approach to promoting and managing the cultural and environmental resources present in Campania necessarily entails, not least in view of the complexity and scope of the heritage, providing incentivations for the adoption of technological and innovative solutions in all the sectors directly or indirectly linked with the conservation and enhancement of the cultural heritage.
If the innovatory process is to be fostered, there must be a system of research and development which does not merely meet the needs of innovation but anticipates and sustains them by means of constant attention to the environment in which they emerge.
The Centre of Competence, designed and financed by the Regione and the Universities of Campania, aims to devise and introduce new approaches, methodologies and tools for the conservation of the heritage in the context of strategies of sustainable development. In addition it will play a fundamental role as a point of reference for businesses by producing pre-competitive proactive research favouring technological transfer, in order to upgrade management systems.

The idea and the requisites

No one would deny that the cultural heritage possessed by the Regione Campania is of worldwide importance and represents an essential resource in the Region's compatible development. At present the state of conservation of this heritage is inadequate, for it is largely undocumented, poorly protected and under-exploited.
The adequate conservation of this heritage will contribute not only to increasing employment and improving the general perception of the quality of life (and hence attract new activities into the area) but also to reinforcing community roots, reviving people's sense of belonging and promoting cultural and relational values based on historical/artistic/ environmental resources: fostering, in short, a new equilibrium between innovation/ development and memory/roots, in the interests of a more sustainable globalization.

Cultural and environmental values must be integrated with economic and social values, creating a synergy in a Region in which "the man-made cultural and environmental capital" is perhaps the prime resource, providing a significant advantage in terms of economic competition.
Over the last ten years there has been considerable scientific interest in Conservation, Enhancement and Exploitation of Cultural and Environmental Resources. A wide range of research projects have been implemented, both theoretical and practical, involving numerous sectors of Engineering, Natural Sciences, Physics and Mathematics. This new cultural outlook has favoured an osmosis with scientific sectors involving historical disciplines in general and the history of architecture in particular, so as to achieve an interdisciplinary vision of the strategy that must underlie the Conservation of the Building Heritage.
At the same time, the scientific progress of these last ten years has illustrated the complexity and multiplicity of the sectors involved in the conservation, enhancement and exploitation of a vast heritage which presents the most variegated requisites, including know-how which pertains not only to the strategic pool identified by the Ministero per le Attività Culturali and implemented on the territory by the organisms responsible for safeguard, but also to the local authorities, and above all the Regions.
The objective of the Centro di Competenza is to elaborate new approaches, methodologies and instruments to promote the conservation of the cultural/environmental heritage in the context of the sustainable development strategies of the Regione Campania.
The constitution of a Centro di Competenza must be based on a cultural strategy defined and carried out by the promoting Organism. For the success of this strategy it is indispensable to identify Criteria and Guidelines able to embrace cultural, technical/scientific and social/economic requisites.
Thus there has to be a radical reformulation of the administrative and managerial culture, for this is all too rarely modelled on the strict needs of conservation and correct exploitation, but rather on an arbitrary modification of the asset and its misconceived exploitation. This change must also be pursued by means of a well- qualified training scheme which, starting from artisans and technical staff, will extend to all the professional skills involved.
In practice the mission of the Centre is to be a source of technological back-up and consultancy, thanks to its research activities, transfer of results, availability of its own infrastructures, both towards the institutions charged with safeguarding and management and towards firms interested in carrying out interventions of conservation, enhancement and exploitation.

Structure and organization

Managerial area
The Managerial Area is responsible for drawing up the strategic project of the CRdC, achieving the necessary consensus both internally and externally, and taking decisions related to the scientific-technological orientation and operative implementation. It will have to recognise the need for research and innovation expressed by the territory and elaborate scenarios of scientific application, where appropriate on an international scale.
The Managerial Area will operate through three fundamental organisms:
- *Steering committee*: clearly oriented to acquiring scenario information in the sector and achieving the greatest possible external consensus concerning the development strategy proposed by the CRdC.

- *Scientific committee*: the link between the Managerial Area and the Research Area; responsible for elaborating the operative guidelines for the overall action of the CRdC, ensuring the necessary internal consensus, coordinating the various research structures and proposing to the Executive committee the criteria and modalities for implementing the Project. It must also foster the activities contained in the Project and monitor progress in terms of the established scientific priorities.
- *Executive committee*: the link between Scientific Management (Steering committee and Scientific committee) and Operative Management (Project Manager).

Research areas

The research areas, which will involve some three hundred researchers employed by the institutions involved in the Centro di Competenza, are as follows:

- **Diagnostic Area**, preparatory for activities of restoration and conservation, oriented to the development and application of advanced methodologies and technologies for identifying remains and analysing and monitoring physical, chemical, mechanical, geophysical, geological and palaeontological characteristics for the conservation of the cultural heritage;
- **Conservation and Enhancement Area,** establishing methods for conserving and enhancing the historical and archaeological heritage and identifying planning instruments for the development of territorial systems concerning cultural and environmental resources;
- **Promotion and Exploitation Area,** developing ICT methodologies and technologies, from structuring information to establishing user-friendly interfaces and identifying instruments for corporate net surfing.

◆ The Managerial Area and Research Area depend on the operative support of the **Department of Management and Coordination,** which articulates and interprets the indications produced by the Executive committee.

The chief objective of this structure is to serve as interface between the Centro di Competenza and the world of industry, external organizations, clients in general and the public institutions for technological transfer and the provision of advanced services, including market surveys and demand analysis.

Pilot project

The research activities undertaken in the three areas will have to **demonstrate** their efficacy and validity in a **project** serving as an operative test of research and technological transfer.

The scenario chosen for this "PILOT PROJECT" is a set of interventions to be carried out on two territorial areas: **Campi Flegrei** and **Paestum** with the area of Cilento, areas rich not only in cultural assets (collections of objects and the relative contexts) but also in activities which characterise the identity of the local communities as they have developed over the centuries.

The extraordinary value of the designated territorial areas is borne out by the fact that they are supported by a strong political commitment, at both the regional and national level. In fact they are defined as *significant cultural poles of attraction,* featuring in the Programma Operativo Regionale, Progetti Integrati and Programma Quadro Regione - Ministero per i Beni e le Attività Culturali, with substantial financial investments.

Objectives of the pilot project

The extraordinarily diverse heritage of the **Campi Flegrei** and **Paestum** makes them an ideal laboratory for elaborating models of regeneration, diffusion, enhancement and diffusion of the knowledge and exploitation of cultural and environmental resources.
The conservation of this diversity can contribute on one hand to reproducing a community's roots and promoting cultural and relational values, based on historical-artistic-environmental assets, and on the other hand to improving the perceived quality of life and the capacity for attracting new activities.
Through the pilot project the Centro di Competenza intends to set up new approaches, methodologies and instruments for the conservation of local heritage in the context of sustainable development strategies, serving also as a fundamental point of reference for firms by producing pre-competitive, interlocutory research favouring technological transfer, enhancement of the demand and concentration of intellectual and instrumental resources and their intersection with the managerial system.
The project's typology will reveal the complexity of the intervention and the broad possibilities of integration, in interdisciplinary terms, of wide-ranging experiences and competences so as to launch with success the process of *cultural fraternisation* between Sciences and Arts.
The integrity of the monuments and of the urban fabric in question provide a completeness of information which is rare in the international panorama, **favouring a series of research activities** which can turn this into **an experiment unique in the Mediterranean basin** in view of its multiple archaeological, anthropological and naturalistic aspects.

Articulation of the pilot project

The choice of a complex scenario which is sophisticated but realistic leads us to articulate the project in various levels and phases, to ensure that the interventions are effective.
The overall criterion for aggregating the research activities will be the homogeneity of the intervention typologies with respect to the uniformity of the methodologies and/or technologies employed. Intervention typologies which differ from one another but have a certain methodological and/or technological uniformity will be identified, to formulate a small set of intervention typologies covering a wide range of methodologies and/or technologies, exploiting their synergy.
The three macro-areas outlined above are articulated in workpackages (WP) and activities (AT), highlighting the preliminary phase of development and fine-tuning of the investigative methodologies and intervention protocols to be used in the fieldwork.
The main interventions on the two sites will consist in:
(Diagnostic area)
- Characterisation of materials constituting the works of art and analysis of the artistic techniques;
- Study of causes and mechanisms of decay;
- Analysis and verification of materials and intervention techniques;
- Study of environmental characterisation;
- Development of prototype equipment and diagnostic models;
- Development of new products, formulae and technologies of restoration.

(Conservation and enhancement area)
- Examination of real estate and territorial systems;

- Development of methods and instruments for the study of the building environment and its natural context;
- Monitoring of the Regione's existing and potential resources, producing thematic maps and data-bases;
- Organization of restoration interventions, both on site and off;
- Elaboration of measures and programmes for the renewal and improvement of the assets which are in a state of decay, underused or liable to future alteration;
- Proposal of policies for use and training, involving and raising awareness in both the experts and public authorities responsible for heritage safeguarding.

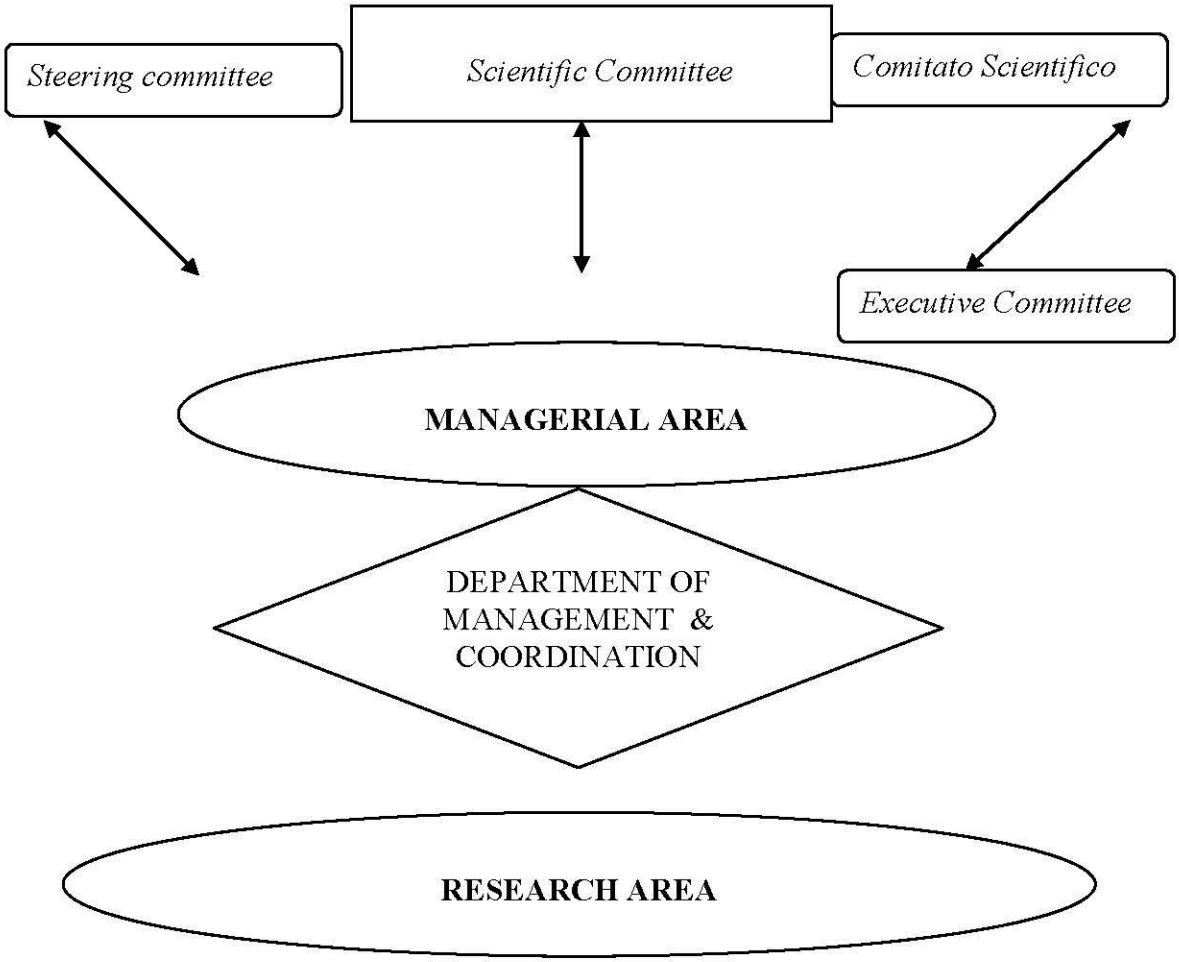
(Promotion and exploitation area)

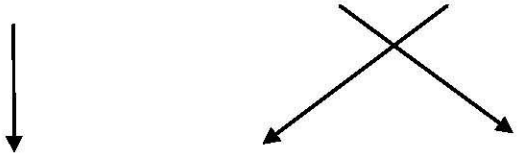
- Preservation of memory, focusing less on the material support of archives and more on access to information;
- Constitution of a global system of memory conservation;
- Making it possible for users not only to identify the objects involved but also to refer to the relative contexts of interpretation;
- Making it possible to access information with different tools from those used in its production;
- Making it possible to access information on the cultural and environmental asset wherever this is available.
- Fostering the integration of different methods of codification, developing methodologies and technologies tested both in the laboratory and in the field.

The potential difficulties of interdisciplinary coordination and competition will be overcome by taking a new approach, based on the broad objectives proposed and their importance for residents of Campania, rather than the needs of a single cultural area or the specific methodologies adopted by one particular sector.
The general objective of the WP (WorkPackages) and AT (Activities) is to develop instruments, methods and models to assist in decision making in sustainable enhancement, integration of the environmental and cultural heritage and creation of a business culture, calling on various professional competences whenever necessary.
Interventions on environmental and cultural resources have genuine practical spin-offs if the *scientist* and the *technician* work side by side with the restorer, art historian, archaeologist, urban planner and environmental operator, who will pose precise questions and problems and transmit their specific culture. Besides, it is important for the latter personnel to have a scientific culture which enables them to understand and appreciate the potential of the investigations proposed.
The innovative value deriving from the development of original investigative methodologies and adaptation of proven technologies to the peculiar needs of the sector of environmental and cultural resources, with particular reference to **non-invasive** techniques and **transportability**, constitutes on one hand an integral part of the interventions and on the other a source of important technological spin-offs for other sectors.

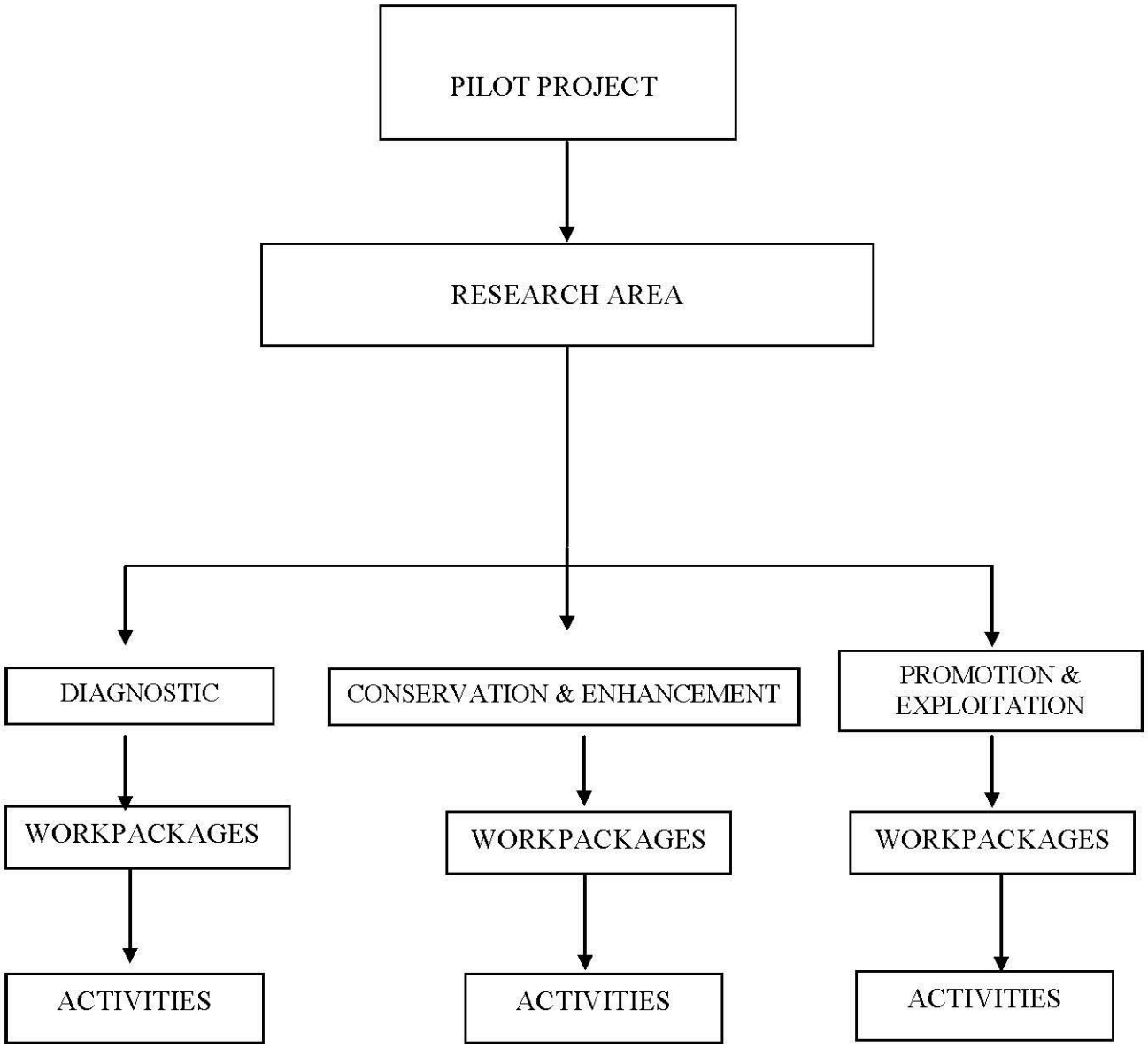
The human resources involved in the Centro di Competenza, running to about 300 people, are drawn from research groups based on the seven Universities in Campania and institutes of the CNR.
The cost of the Project of setting up the Centro Regionale di Competenza amounts to 25.823.240,09 euro. The regional funding, 18.073.256,09 euro, is used above all, 15.262.951,86 euro, for acquiring scientific instrumentation.

STRUCTURE AND ORGANIZATION OF THE CENTRO REGIONALE DI COMPETENZA





STRUCTURE AND ORGANIZATION OF THE PILOT PROJECT



INTERDISCIPLINARY COOPERATION BETWEEN CONSERVATION AUTHORITIES AND RESEARCH INSTITUTES IN THE INTERESTS OF AN ARCHAEOMETRY OF THE MAN-MADE ENVIRONMENT: MUD-BASED CONSTRUCTION SYSTEMS AND THEIR CONSERVATION

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Abstract
The study of constructions made from crude earth, erected using the most basic building techniques, gives us an insight into the sequence of discoveries which brought into being a whole range of historical buildings and important monuments. Complex structural problems were solved by means of geometry, and the load-bearing structures were overlaid with seamless waterproof cladding, ensuring constant protection and maintenance for the buildings. As a result humankind has known an architecture using crude earth which over the millennia produced structures ranging from rural villages to grandiose monuments.
The various configurations that emerge from the disintegration of the original modules (erected without the aid of any calculations of mass or equilibrium and often without supporting structures) suggest some hypotheses about crude earth structures which, when confronted with the brick-built counterparts we are more accustomed to dealing with, can provide useful indications as to conservation.

Continuity through history

From earliest times humans have made use of the materials provided by nature to build both communal and private living spaces. Such structures were based on models found in nature and came to characterise villages and cities: these agglomerations were then given prestige or indeed magnificence by means of the skills men had developed working with wood and stone. Wherever the more noble building materials were unavailable, the same impulse ensured that human intelligence created the structures needed for social co-existence out of mud and sand.
In Europe, Asia, Africa and America the ancient art of building made it possible to adapt the territory to the needs of aspiring settlers, bringing into being individual and collective structures intended for habitation, meditation, worship, the manufacture and conservation of products and goods, the storage and distribution of water, and defensive and social purposes.
Constructions in crude earth go back to earliest times, witness three very different palaces, that of the governor of the Mari in Mesopotamia dating from 1900 BC, that of Akhet-aton near Thebes, 1400 BC, and that of Cnossos, 200 BC. In Mesopotamia and in the Egypt of the Pharaohs, in the Mediterranean basin and in northern Europe, in the deserts of Africa and Central Asia and in the mountains of India and Afghanistan, the remains of rural villages and whole cities survive from antiquity in any number of archaeological sites in spite of centuries of neglect. Similar techniques were developed by North American Indians, the Toltechs and Aztechs in Mexico and the Mochicas in the Andes, illustrating the ability of precolonial societies to organize the territory and coexist with catastrophic natural events.
In regions where building techniques have changed little, the ancient constructions have been frequently renovated, and flanked by new similar structures, forming urban nuclei of outstanding historical interest. In contrast to ancient cities originating from crude earth and transformed by modern technology (Damascus, Teheran, Baghdad, Cairo), Sanaa in the

Yemen and Medinat az Zahra near Cordova have been declared worldwide heritage sites for the intrinsic quality of their construction.
On the American continent, the fate of ancient and prosperous cities built in crude earth was sealed by the Spanish occupation: capital cities like Chan-Chan in northern Perù were simply abandoned. Yet the building techniques survived to be used in the new colonial constructions, and continue to be used even today in the humble dwellings of the Indios[1]

Material

Of course there are all sorts of ways for compacting mud, but two techniques in particular were commonly used in building: "*pisé de terre*", recorded for the first time in 16th century Lyons, and "adobe", an Arab term adopted during the 16th century in America. With the former it was possible to build walls at least 50 cm. thick by pressing the mud between wooden shuttering, removed during the process, or using stone supports which were left in place. The latter involved bricks fashioned with straw or twigs, pressed into moulds and dried in the sun.
Forms of water-proofing varied according to the local climate. In Europe and other rainy regions walls had a stone foundation to prevent them being washed away, while the building was roofed with a thick layer of straw, peat or other vegetation, underpinned by wood slats. In dry climates the horizontal structures, barrel-shaped or using stone supports in the absence of robust vegetation, were built on a slight slope and drained by layers of leaves. Wherever clay or pitch was available this was used to waterproof flooring and roofs, reaching its apogee in the famous roof gardens of Mesopotamian cities. The walls of buildings were simply whitewashed or plastered each year in humbler constructions, or else clad in enamel or vitrified finishes and even with such noble materials as stone or ceramic.
All these surfaces could be decorated with elaborate designs. Plaster could be coloured with various clays, using images and graffiti, and ritual and symbolic patterns could be wrought in and hollowed out of the wall itself. Sculptures in stone or precious materials could be set up as artworks proclaiming the magnificence of power and authority.
The limitless availability of both building materials and - at least for rulers – manpower, in the form of slaves, meant that the sky was the limit as far as size was concerned. Men built for the glory of the gods or their king, raising the tower of Babel to a height of 90 metres or accumulating and compacting millions of metric cubes of crude earth to create the Great Wall to protect the Chinese capital, from the 3rd century BC onwards.
The shifting of enormous quantities of earth and its treatment in simple processes of proven resistance left its mark on the environment in deserts and mountains, erecting and fortifying cities and enabling human communities to survive the onslaught of nature (fig. 1).

Figure 1

Form

Most of the structures built in crude earth comprise sequences of elementary correlated modules which do not in fact differ greatly from similar structures built of traditional materials such as brick or stone. The salient qualities of the material are its plasticity, well suited to elaborate decoration in fretwork, renewability and adaptability, so that modules can be easily extended and modified, ease of maintenance, ensuring conservation over centuries, good insulation even with reduced thickness and mechanical resilience.

Aggregates of elementary modules whose walls intersect at right angles, with or without the support of wooden struts to protect and reinforce the angles or underpin the horizontal structures, often take on unexpected forms in the third dimension, with variously constructed domes and fanciful round towers rising to considerable heights from a four-square groundplan (fig. 2).

Figure 2

Such an aggregation can be extended horizontally so as to generate walls which are considerably thicker than the intervening spaces, creating hidden labyrinths inside pyramids or ziggurats as high as a hill, as in the fortified cities of Fèz, Rabat and Marrakesh.

The inspection of ancient buildings, the analysis of archaeological sites and a more detailed knowledge of the historical events which brought about their construction and destruction can lead, with a proper interdisciplinary approach, to an understanding of ancient building methods and the formulation of some essential considerations that contribute to our knowledge of the material history of the building heritage and benefit its conservation.

Examples

We shall examine in a technical perspective some examples of buildings in crude earth covering a range of typologies and historical and environmental contexts. Our objective is to identify, in common with the humanistic disciplines that focus on environmental and archaeological data, the parameters of an ancient and generalised building know-how based on "the rules of the art".

1 – Rectilinear masonry shells

The enclosure built in crude earth of the temple of Nadura at the oasis of Kharga, erected under Antoninus Pius between 117 and 138 AD, is our chosen example, but ur considerations will be valid for portions of rectilinear masonry not exceeding 1 ml. in thickness and 10 ml. in height, whatever the framework used. Whether they are sanctuaries, fortified cities, farmsteads or castles built at the edge of the desert, in the absence of towers and orthogonal the free-standing wall, reduced to a ruin, rises like an immense corbel stuck in the ground. This aspect is particularly evident when the wall stands up perpendicularly to the prevailing winds, which in the desert can reach great speeds. The fact that the wall can incline until its load falls outside the cone of inertia constitutes, especially in the presence of winds, a condition of great precariousness which can nonetheless be long-lasting (fig. 3).

Figure 3

This state of affairs, which in effect invalidates the safety coefficients produced by calculus, may be due to a number of factors introduced during the phases of the structure's construction and destruction. The desert sand may have been kneaded with substances having particularly marked cohesive properties; the original form of the wall, now no more than a fragment, may be revealed by an archaeological dig, which could also throw light on its present appearance.

The event that produced this fragment may have generated new assets in the original structure which ensure its equilibrium. These are just some hypotheses which highlight the importance of observing a ruin with care and from various angles in order to fathom its secrets.

2 – Towers, chimneys and columbaria

Circular structures with a hollow core served a variety of purposes. They varied widely in size and cross-section but shared a common construction process, with wooden poles inserted in the brickwork at intervals of a metre to permit repairs to be carried out on the exterior. In the case of tall slender structures, these poles may reach across the core to form an internal framework. The circular base, inscribed in a square measuring about 4x4 ml., can thus support a tower rising to a height of 18/20 ml. If wooden poles are not used, regularly spaced holes are made round the outside which allow the wind to pass through and provide holds for climbing (fig. 4). A whole range of expedients were used in laying the bricks to form the innumerable joints between rectilinear and curvilinear shells, the tapering towards the top and the domed roofing structures.

Figure 4

3 – Domes and vaults

Domed roofing is a very ancient construction technique, particularly common in desert regions. It is found on simple rooms, but above all on religious edifices, monuments of prestige and tombs (fig. 5).

Figure 5

In the necropolis of Bagawat, built at the oasis of Kharga in Egypt in the 5th century AD, the basic dome in crude bricks laid in parallel horizontal courses gives rise to a variety of volumes. From the cell with ante-cell to the longitudinal basilica and the Greek cross, with axial and diagonal recesses, we see how a single architectonic module, barely larger than a room, could generate the whole fabric of the ancient necropolis. The masonry shells have continued to exist even long after this city of the dead was abandoned, conserving and displaying the inventions of the ancient craftsmen which not only gave form to space but also kept at bay the onslaught of the desert. The surfaces are plastered both inside and out, and the extradoses are waterproofed with a paste made from crushed shards; what rainwater does fall is carefully channeled and stored in tanks.
Of course there are much larger domes, often with different curvatures on the inside and outside, whose construction required greater technical expertise. They made use of wooden supports, or bays and pendentives, or simply ribs of sand to open out the curvature. The same techniques were used to generate overarching spaces by joining together barrel vaults. As we see in the granaries of the Ramesseum built near Thebes in the 13th century BC, use was made of orthogonal frames to compensate for horizontal stresses and plastered inside and out. Built with one or more inclined brick layers extending over a vast area, the sequences of vaults were sealed on the exterior by filling in the spandrels.

4 – Compact constructions
This category includes all the massive buildings made of crude earth bricks, in all shapes and sizes, in which solidity prevails over internal space. These monumental edifices sometimes contained one or more internal burial chambers, but never very large. Much more often, however, as archaeological digs should be able to bear out, the immense artificial hills, visible from far and wide, were simply a venue for making sacrifices.
The archaeological sites in the desert plains of Peru feature Mochica temples built between 200 and 750 AD in the form of pyramids, covering some 100x100 ml. and rising to a height of 30 ml. Excavations at Huaca Cao north of Trujillo have revealed the various stratifications

of the monumental complex. The edifice, built in ascending steps, was repeatedly coated with plaster and decorated with bright colours and depictions of processions of warriors (Fig. 6, 7)

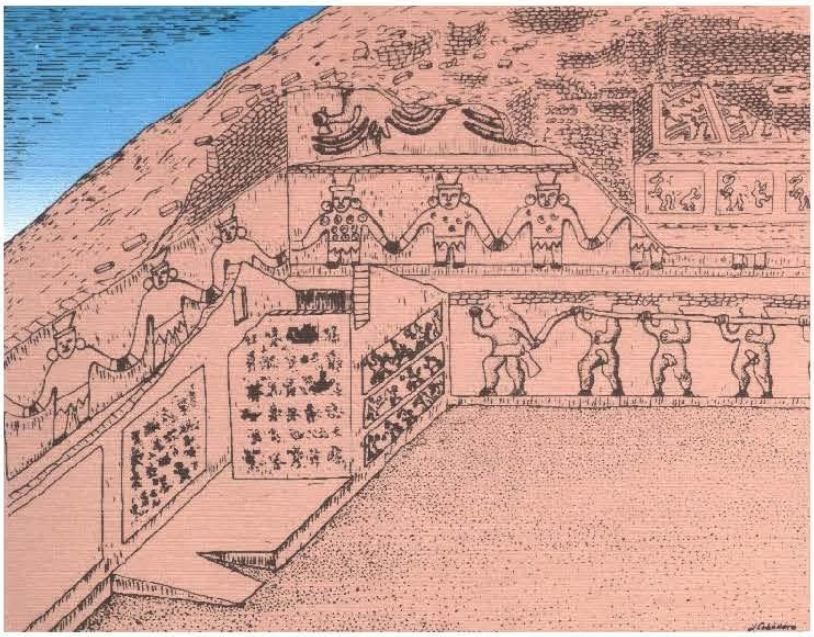

Figure 6

Figure 7

Some of these wall paintings may have belonged to open-air ritual chambers, but many were simply done on surfaces destined to be covered up by successive additions. The current ruined state of the site is open to two interpretations: either the decoration was systematically renewed with a new dedication on ritual occasions, or else reconstruction followed on natural disasters such as torrential rains or earthquakes. Many monuments have been conserved not merely thanks to elementary routine maintenance but through sheer determination not to let nature get the better of constructions which were crucial to cultural identity.

Conclusions and perspectives

It is up to historians and archaeologists to date events and account for habitation patterns in the light of these dates, but equally the technical experts involved in conservation are charged with identifying the processes which brought into being monuments, including seismic events, neglect and sudden disasters. A correct evaluation of the causes leading to situations of decay in fragile materials exposed to all kinds of damage can make it easier to adopt the most suitable measures for contrasting the natural processes which tend to reduce a ruin to inert material and to understand the fundamental processes of material history. This is now in the forefront of scientific research based on the interdisciplinary approach.

One of the first achievements has been the remarkable reconstructive restoration of the House of the Pithoi, dating from the 5th century BC, located on the plateau of Serra di Vaglio, 1054 m. above sea level, in Lucania, Southern Italy. The stone walling was rebuilt and covered with the original form of plaster. Ten years after its reconstruction the house is in an excellent state of conservation, in a location severely taxed by the elements[2]. The same research strategy has been applied to other test cases in Mediterranean architecture[3], [4]. It will be possible to extend our investigation of structures in crude earth, in both architectonic and structural terms, with particular reference to the mechanical, chemical and physical properties of this primeval building material.

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THE PROTECTION OF THE ARCHAEOLOGICAL PLACES AS A MEAN OF PLANNING AND MANAGEMENT OF THE URBAN DEVELOPMENT

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Abstract
The archaeological outcrops present in the territory of Andria, a town in the Province of Bari, have set up the opportunity to develop a dialogue, which was carried out in terms of the operating plan, between the Municipality and the institutions put in charge of protection, through technical and cientific advice of the University.
In this case, the above-mentioned cooperation will carry out a computerized thematic map, with the archaeological places of Andria's territory. This map, easily researched and updated, will be written with the purpose of providing the Municipality a cognitive device to look it up before the planning and the management of the urban development, as a guarantee of the protection of the current and registered archaeological places.

The case we are about to consider is an exemplar of the fruitful collaboration between institutions, each one with its own competence, but with the mutual intention to protect the archaeological heritage. The Municipality of Andria, a town of Apulia in the North of Bari, has taken steps towards the identification, according to the regulation in force of *Piano Regolatore Generale* – P.R.G. - (1), of the areas determined as *archaeological interest* present in the municipal territory. The places identified, according to the P.R.G., have been registered by a team of archaeologists and, appart from these, more have been added and identified after the scouring of the urban and, especially, extra-urban territory. There are some signs of preclassical settlements, classical and medieval necropolis, as well as the ancient traced route of *Via Appia*.
The P.R.G. considers those places, among the public properties, bound by the Law 431 of 1985, together with the rivers, the streams, the waterways on the surface or not, the swamps and the woods. The Technical Rules of Implementation, regarding the archaeological areas clearly identified, at least indicated even if they're not bound, forbid any changes without the previous opinion of the *Soprintendenza* (2), in order to be always a consistency between the archaeological heritage and the possible changes of the municipal territory.

(1) – Master Plan
(2) – The Institute for the protection of the Historical and Artistic Heritage.

The territory of Andria, besides the presence of these archaeological places, is characterized by swamps, that is, natural furrows in the calcareous stratum owing to the draining of inland rainwaters; cattle-tracks, which were the traced routes of dirt road where the sheeps passed through, coming from the Central Italy. Moreover, on the immediate outskirts of the inhabited centre, it is still evident the ancient traced

route of *Via Appia,* that from Rome reached the Adriatic Coast through the Port of Brindisi.
The specialized advice of the *Soprintendenza Archeologica* (3) for Apulia, in order to operate in such signed territorial fabric, has seen, in operative sequences, the activity of the Departments of the Civil Engineering and of the Architecture, of the Facoltà di Architettura of the Politecnico of Bari, come together in the final goal of providing the Municipality a thematic map, that is a computerized archaeological one. This means that the map will not be just a storage medium, through which should be characterized the archaeological emergencies, but it will also include several windows with cross-references, regarding the specific characteristics of the single places and the materials found.
The computerized thematic map constitutes an essential work-tool for the Municipality, that could make use of it in order to plan new activities for the territorial development, without running the risk of damaging an heritage of inestimable value, which is at the moment just identified.
This is the starting point of a systematic operations of excavations, always in close collaboration with the *Soprintendenza*, to whom these specialized works are referred, in order to become known the present archaeological emergencies by the general public.
Knowledge, spreading, improvement. The protection of the archaeological places involves the cultural participation of the whole citizenship and assures it a planning of the urban growth, which is drawn around these testimonies of history, art and local culture.
The phase of the knowledge of the archaeological emergencies, commanded by the *Soprintendenza Archeologica* for Apulia, is unquestionably preparatory of all the following phases of the work. This knowledge, in fact, will allow Politecnico to carry out a computerized file of informations, implemented in a Geographical Information System, briefly known as G.I.S., which contains all the archaeological informations about the municipal territory of Andria, and the territorial archaeologic map, resulted from it, will be accepted by the Administration in order to avoid damaging inside the territory of the archaeological heritage itself.
Therefore, the Geographical Information System in consideration constitutes an usefultool of synthesis, with the possibility of being updating in time, which sums up all the aspects starting from the knowledge until the consistency of the archaeological places pointed out.
At the moment, the works, complied with the agreements and the rules that regulate the treatment, and whose results could be known at the end, are still being done. Through this report, there is no intention to reveal the partial results, but to carry out a working method, which has specific competences regarding the institutions present and working in cooperation with themselves in the Italian territory.
This experience is not the only one. In fact, there are others in Italy, already developed or being carried out in some others regions like Emilia Romagna, Toscany and Sicily, which had the

(3) – The Institute for the protection of the Archaeological Heritage.

It is only a rational policy of management of the territory that gives no importance to the fact that each delay might be an herald of irreparable damages to the archaeological heritage on the surface, which has been handed over to us from the past.
The Local Entities, has it happened towards the city of Andria, feel the necessity to be provided by a computerized file with informations that contains, like in this specific case, all the archaeological ones, concerning the territorial jurisdiction. Therefore, there have been made some contacts with the Politecnico of Bari, which has already done some important experiences in this area, and can give its own advice prescribed by an agreement with the city of Andria.
The Politecnico will report some relevant informations given by archaeologists, which will appear in the municipal cartography. Obviously, the result will be the boundary of the identified areas and its submission to an archaeological binding force of the protection Law 1089 of 1939, while a further collaboration between the Municipality and the *Soprintendenza Archeologica* of Apulia can be planned in order to get true and real campaigns of archaeological excavations.
At the moment, the topographical recognition on the basis of the cartography in existence has been made by archaeologists experienced in identifying the ruins belonging to the pre-historical periods, classical and medieval ones. The photographic documents, the gathering of the findings with the informations of origin, the temporary displacement of the findings, after having been carefully cleaned, classified and repaired, are operations of the responsability of the *Soprintendenza*. In addition, the informations about the environment are also filed, in which those findings have been discovered in a way to protect the environment, with a positive spin-off for the archaeological emergencies.
Following the recognition in the field, there is the precise boundary, so the special emphasis of the areas helped by the most modern methods of archaeological survey, such as the satellite one.
The informations were reported and catalogued by the official set of forms of the *Istituto Centrale del Catalogo e della Documentazione del Ministero per i Beni e le Attività Culturali* (4), and all the work has been strictly bear out by archive and bibliographic researches.
Together with the establishment of the *Ministero per i Beni Culturali* in 1975, was born the *Istituto Centrale per il Catalogo e la Documentazione* of the *Ministero per i Beni Culturali e Ambientali* (5), better known as I.C.C.D. The Institute not only points out all the methods for the inventory, but alsocoordinates the activity of the several *Soprintendenze,* spread all over the Italian territory. Regarding the goals of this Institute, the survey is seen like the premisse and the basis of the environmentaland architectonic protection; after the survey of the properties follows the cataloguing of themselves and then on starts the measuring of the protection.
The informations collected are included in concise files, which on their turn come together in the computerized database of easy access. The authorities of protection, the schollars and the workers involved in the management of the territory can consult this electronic catalogue, with a standardized language.

(4) – Central Institute for the Cataloguing and Documentation of the Ministery of the Properties and Cultural Activities
(5) – Ministery of the Cultural and Environmental Properties.

Thus, the condition and the consistency of the cultural heritage stand constantly updated and sistematically controlled. At this point, is easy to establish also a correlation between the different properties, in order to pass from the particular to the general and vice versa.
In nowadays, the systematic cataloguing, done by each *Soprintendenza*, is the only tool that allows the objective and precise identification of the cultural properties.
The Departments of the Civil Engineering and of the Architecture of the Politecnico of Bari, by themselves, are in conditions to preparestudies and researches towards the drafting of a decriptive framework, for instance, the *archaeological vulnerability* of the municipal territory of Andria, based on the informations about the consistency of the current stratified archaeological heritage.
Therefore, the Municipality will be provided by an instrument that will allow it of adopting, by mutal agreement with the *Soprintendenza Archeologica* of Apulia, an operative procedure of preventive protection, regarding the carrying out of the public works, such as the *primary* and *secondary* works of urbanization (6), that need preliminary activities of excavation, running the risk of interfering with the archaeological subsoil. The same changes in the P.R.G., as well as the operative rule, like the *Piani Particolareggiati* (7), can not neglect the presence of those emergencies. At another level, the ordinary management of the programmes of maintenance, dependent on the technical entities of the Municipality, can not leave out of consideration those presences.
From this on, all the possible ways of spreading the knowledge of this historical and archaeological heritage can take place, which will be better definite, and at last those that make use of the multimedia systems. The archaeological properties of the municipal territory may come alongside and be integrated in properties of landscape, environmental and architectonic values.
This kind of management of the archaeological heritage, fro, the knowledge of its consistency to the project of the city, is an exemplar way of the attention towards the art and the preservation of itself.
It's surely a strategy of intervention, in which the preservation and the management of the territory are not in contrast. After being measured and catalogued, those materials become useful for further researches, that is an open laboratory of the knowledge of a cultural heritage that preserves the identity of this site.

(6) – according to the Italian laws
(7) – Detailled Plans

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THE GUIDE FOR THE REHABILITATION OF RURAL BUILDINGS IN THE NATIONAL PARK OF "CINQUE TERRE", AN INSTRUMENT FOR THE MANAGEMENT OF THE TRANSFORMATIONS OF THE BUILT ENVIRONMENT WITHIN A CULTURAL LANDSCAPE

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This contribution describes a current project directed to the drawing up of a guide for the rehabilitation of the rural built heritage of the National Park of *Cinque Terre*. The project has been funded by the Ministry of Cultural Property and Activities, which in 2001, for the first time, financed some projects for landscape enhancement.
The work, proposed by the local park authority and coordinated by the *Soprintendenza Regionale per i Beni e le Attività Culturali*, has been started by the *Soprintendenza per i Beni Architettonici e per il Paesaggio*, together with the D.S.A. department of the School of Architecture of Genoa and involving the Regional Department of Territory, Landscape and Environment Planning.
The Park Administration is pursuing a management policy of its territory aiming at the safeguard and the enhancement of the terraced landscape, characterised by fragile balances, compromised above all by man's abandonment, and this project enters the framework of operative and research activities promoted by the Park itself within the management plan of its territory. The cultivation of abandoned terraced lots is encouraged, in order to ensure a widespread stable human presence within the territory of the park, as well as some tools have been developed to increase forms of "cultural" tourism, as alternative to mass tourism. Furthemore the Park Administration promoted and is promoting many research activities, among which there are: a study on the dry stone walls, the most important elements of this delicate landscape system, recently concluded; this current research to draw up some guidelines for the rehabilitation and maintenance of rural buildings, in order to manage their transformations; a research to plan new mechanized system as lifts and new monorails.
The territory of Cinque Terre embraces a strip of landed situated in the end of the eastern ligurian coast, between Punta Mesco, which divides the gulf of Monterosso from the gulf of Levanto, and Punta Persico, beyond which startes the powerful cliffs of the Portovenere promontory.
The population is mainly gathered in the coastal villages of Monterosso, Vernazza, Corniglia, Manarola e Riomaggiore but it lives also in the minor settlements of Volastra, Groppo, S.Bernardino, Fossola, Monesteroli, Schiara and Persico. Several buildings groups and sparse settlements still survive, now nearly completely abandoned, even though some of them have been recently refurbished to get temporary tourist residences.
The geomorphological and environmental assets of Cinque Terre are varied. On the coast, steep cliffs alternate with narrow shores, fed by materials coming from the hillsides above, from historical landslides or those produced by human activities (such as the building of the railway). In the hill zones, the different slopes and exposures have influenced the environmental conditions and the agricultural exploitation of soils, prevalently intended for vine and olive tree cultivation. Occupation of these sites, supposed to have occured around 900 -1000 A. D., started from the watershed delimiting the coastal side and, within 300 –400 years, spread out to the coast, giving rise to many small hillside settlements, that are the most ancient testimonies of this process. The terraced system occupies only the lower zone of the hillsides as this is the most suited part for growing vines or olive trees.

The building of terraces and the creation of a proper soil for farming required a hard and long work, implying deforestation and the removal of the Mediterranean maquis, tillage of the soil, collection and selection of stones to build the dry stone walls, provided with drainage systems (consisting of layers of stones and stone fragments with different size disposed behind the walls) and finally the rearrengement of the surface layer of the soil. The connection among the villages, the settlements and the farms was ensured by mule-tracks and narrow paths, frequently passing on the dry stone wall edges and of steep stairs set between the walls. After the 1950s, many connecting roads have been built and now all the main villages can be reached by car, even though accessibility still remains one of the most severe problems.
In 1997 the World Heritage Committee "decided to inscribe this site on the basis of criteria (ii), (iv) and (v), considering that the eastern Ligurian Riviera between Cinque Terre and Portovenere is a cultural site of outstanding value, representing the harmonious interaction between people and nature to produce a landscape of exceptional scenic quality that illustrates a traditional way of life that has existed for a thousand years and continues to play an important socio-economic role in the life of the community."
Two years after the nomination of Cinque Terre in the World Heritage List, the National Park of Cinque Terre has been established by the Italian State in order to grant a co-ordinated and controlled management of the transformations of this territory.
Considering that the main goal of the Park Administration is the increase of stable human presence in the territory of the park, as a strategy for its protection, the need of some indications to properly intervene on the rural built heritage of the Park appears urgent and quite evident, looking at the great transformations that a large part of it has undergone over the last thirty years. In many cases interventions have been carried out in such a way that the buildings have completely lost their features and their identity. The same happened within the villages where transformations have been more massive and repeated and need proper and specific planning mechanisms and tools to reverse the trends and to improve the built environment.
(LDM)

The national and regional legal framework for the protection and the management of landscape

Before describing the main elements of this project, an outline of the organisation of Italian State and of its national and regional provisions of law will be given, to clarify how the different national institutions and local authorities involved in environmental and landscape protection relate one to each other and to show how the particular Ligurian institutional conditions have allowed a close co-operation between regional offices and the government office for Monuments and Landscape protection.
The Italian Constitution acknowledges local authorities and communities, regulating this matter in a specific chapter (ch. V, part II), recently reformed. These authorities are: Regions, Provinces and Municipalities, to which subsequently Mountain Communities and Urban Districts have been added. Over time, the State conferred on these many functions and tasks regarding the management of territory, urban planning and landscape protection.
Some functions, such as territorial management, have been transferred to Regions, thus allowing each region to make laws by itself. Other functions, such as the protection of landscape, have been only delegated which means that the State maintains the right to verify the results of regional activities in the field of landscape protection. Later, Regions have delegated and sub-delegated many functions to

Provinces and Municipalities on the basis of regional acts. The situation varies from one region to another.
In the field of territorial and urban planning, the State maintains a guidance function and gives the main lines for the development and planning within Italian territory. The Regional authorities have the task of carrying out the territorial planning and of controlling the planning activities of the other local bodies (Provinces and municipalities). There are also other bodies that have competencies in environmental protection, such as Basin Authorities, Harbour Boards and Park Administrations, which attend to the planning of specific parts of territory such as river basins, harbours and parks. This means that a number of thematic plans are to be added to the main kinds of territorial planning and, as a result, an overlapping of rules has to be observed.
In 1999 the provisions of law regarding the protection of cultural and environmental property have been collected into a consolidated act, *Testo unico delle disposizioni legislative in materia di beni culturali e ambientali*, *D. Lgs n. 490/1999*. From a historic point of view, the fundamental law for landscape protection has been the law L. 1497/1939, *Protezione delle Bellezze Naturali*. This law specified the kind of properties to be protected, because of their remarkable interest, and the procedures to be followed to formally declare this interest; it also charged the State with the protection of this property and provided that protected areas could be managed through landscape plans. Environmental property is subject to the provisions of law only when their particular public interest has been formally declared and notified to the owner.
The aesthetic focus of this law has been criticised for many years but recent theoretical and methodological achievements, mainly at the international level, in regard to the central role that landscape has in human life, give this law its meaning and importance. Unfortunately in Italy, also as a consequence of the low regard in which this law has been held, the study of assessment methods for landscape values and the development of operative tools to evaluate the impact of transformations on the landscape were not developed.
In 1977 landscape protection was delegated to Regional Governments together with several other tasks, in the observance of the Constitutional statements. In the years after this first reform, it was clear that the regions were not prepared to manage the new delegated functions and, in 1985, considering the high level of landscape degradation and to coincide with the amnesty for infringement of local regulations, the State decided to reaffirm its right to control the conduct of regions in the field of landscape protection. In that year, it was promulgated an important law, known as the *Legge Galasso*, which specified large categories of environmental property to be subjected to this law, with no further notification procedures. Furthermore, this law gave a central role to landscape plans, obliging the regions to draw them up, on penalty of total ineligibility for building development. This provision has never been applied, so for years the only landscape plan in Italy has been the Ligurian one (adopted in 1986 and approved in 1990).
This law regulated -and still does- also modalities to obtain landscape planning permission. Owners whose property is listed must submit to the regional offices (or to the offices of the local authorities which have been charged with this task by the region) schemes that can, in some way, alter the aspect of a protected site. Permission is to be granted or denied in a period of sixty days. These offices immediately inform the government offices for landscape protection (*Soprintendenze per i Beni Architettonici e per il Paesaggio*, *SBAP*) and send to them the related documents. Government offices can invalidate granted permissions within a maximum of sixty days, starting from the date of the document's arrival. This synthetic description of the path that planning permissions follow within the protected areas shows how complicated and long the

procedures can be and, above all, its low level of effectiveness, as the control occurs only at the end of the permission granting process, actually reducing the incisiveness and the efficacy of the control itself, provoking above all difficulties and conflicts with low results in terms of protection.
The current State reforms and the most up-to-date European and International trends in the field of landscape protection have recently influenced also the legislative framework for Italian landscape protection, giving some new interesting perspectives for an integrated action of the different bodies involved.
Actually, after the signing of the European Landscape Convention, the Ministry for Cultural Property and Activities (MBAC) has recently signed an agreement (*Accordo sull'esercizio dei poteri in materia di paesaggio*, 19.4.2001) with the regions and the autonomous provinces of Trento and Bolzano, regulating the exercise of duties about landscape protection.
It provides for:

- co-operation among MBAC, regions and municipalities for landscape planning,
- engagement of the Regional Governments to protect and enhance landscape values through the drawing up of territorial plans which take into account landscape values;
- the carrying out of actions directed to the protection, and the enhancement of different areas, according to their features and issues;
- the obligation for local authorities to make their urban plans conform to landscape plans in the way and in the times prescribed;
- the obligation for the region to adapt their landscape plans to the principles expressed by the agreement or to formally declare their compatibility to them;
- the separation between planning permission (granted by municipalities) and landscape permission (granted by regions), the latter becoming the more important between the two and is to be obtained before the planning permission;
- the obligation for projects to be enclosed with a study of the state of the area before the intervention and an evaluation of the work impact on landscape values, in case expecting some mitigation elements;
- some criteria for granting landscape permissions, up to now based only upon the principle of conformity to the plan provisions, and now including the "suitability" for the values protected by the law and the "coherence" with some goals for the quality of landscape.

These indications have a great significance for the enhancement of italian landscape protection, even if they will need some years to be fully implemented and to show some results.

<u>The ligurian planning system</u>
The 75 % of the Ligurian territory is protected by the national law, because of its morphology and the variety of its environments. Probably also for this reason, Liguria has been the first region in Italy, and the only one for many years, that provided itself with a landscape plan enacted in 1990 (*Piano Territoriale di Coordinamento Paesistico - PTCP*).
Another important thematic plan worth remembering is the Coastal Plan (*Piano della Costa*). It aims at managing the activities and the development processes and introduces the concept of "active protection" as an alternative to "passive protection" based only on constraints. The Coastal Plan identifies some critical areas within the coastal zone for which environmental enhancement schemes will be carried out.
Furthermore, a regional co-ordinating scheme has been recently adopted. This plan aims at bringing together the different levels of the regional planning system, and managing the transformations of the territory through thematic local schemes and

programmes, including the Coastal Plan, the Landscape Plan and all the co-ordinating plans having an impact on the regional territory at different levels.

The Ligurian Landscape Co-ordination Plan has been the first effort in Italy to manage the transformation of the territory through focussing on the protection of landscape values. This Plan covers the whole regional territory and not just the protected areas, as required by the law. In this sense, it can be said that Liguria put into action the indications and the philosophy of the European Landscape Convention, considering all its territory as a landscape, much before than this convention had been signed.
The goals pursued by this plan are:

- the quality of the landscape as perceived environment, a heritage that need to be preserved and can be integrated by new resources;
- the accessibility to various parts of the territory and the fruition of its resources for leisure;
- the preservation of those sites characterised by natural values of scientific or didactic interest;
- the search for increasing stability of ecosystems, to compensate for the environmental fragility provoked by urban and industrial development;
- the careful management of some fundamental resources, such as water springs and tables, sandy shores (subject to a strong erosion), rich soils, ore deposits.

The framework of this plan is quite similar to that of a masterplan and comprises a statement which describes the analysis methods and the choices made on the basis of the analysis; some zoning maps; some rules to put the plan into action. The plan is articulated in three levels:

1. a *Territorial level*, which divides the regional territory in 100 areas (recently reviewed) with homogeneous character, for which the plan provides general guidance to urban masterplans and sectorial regional policies.
2. a *"Small area" level* (*livello locale*), for which, within each area, different situations are assessed and regulated;
3. a *Local level* (*livello puntuale*) whose indications have to be developed in the further planning phases, according to two distinct addresses: the settlement of rules and guidance at a feasible scale of building interventions and the settlement of criteria and technical tools to control building design.

The description of the features of the ligurian landscapes has been carried out on the basis of an analysis which comprised three different categories of physical elements: *settlement* (relevant elements: settlements, road network, farming, infrastructures); *vegetation* (relevant elements: woods, prairies); *geomorphology* (relevant elements: sides, water network, plains, littorals).
The degree of transformation allowed for each category is based on the results of the analysis of the territory, considering the aspects described above.
In spite of its analytical and multifaceted approach and of its detailed framework, or perhaps for these very reasons, this plan has been not completely implemented, usually considering only the set of rules and neglecting the description of the main features, actually a sort of "statement of significance", provided for each area and each category. This happened also because the Regional administration has never activated the necessary training courses to help pratictioners and technical servants of the local administrations.
As the existing legal framework doesn't help the offices charged with the protection of landscape to achieve effective results, the Ligurian office for Monuments and Landscape Protection (SBAP) decided to promote a more close co-operation with the Regional and Provincial offices in order to anticipate the ministerial advice when

building programmes are submitted to the competent authorities, in a phase in which, if necessary, it would be still possible change the general scheme, a more effective action than that one on each single building scheme, as provided by the rules in force.
The Regional Government, considering the importance of co-operation with the SBAP, provided it to be involved in the Technical Urban Planning Committees (CTU), when building programmes have to be discussed and submitted to formal approval. The close collaboration between Government and Regional offices over the last ten years has led to the drawing up of a document in which some guidelines for a correct interpretation of the PTCP and for the enhancement of the insertion of new buildings and infrastructures have been provided.
Some years later, in 1999, an Agreement between the Ministry of Cultural Property and Activities and the Regional Government concerning landscape protection was signed. It somehow anticipated the agreement signed on 19.4.01 between the Italian State and the Regions, providing the development of guidance actions in order to improve the quality of the projects; the drawing up of documents for a correct interpretation, carrying out and management of the PTCP; the organisation of a training programme for professionals and technicians of local administrations in order to enhance their skills in designing; the promotion and the co-ordination researches on historic and composition features of ligurian landscape in order to improve the knowledge of cultural and environmental property and to up to date the PTCP; the carrying out of some environmental enhancement pilot projects.
(MS)

Purpose of the Guide and planned activities
This guide tries to face the described problems within Cinque Terre and to pick up the challenge of the management of change of the Park's built heritage, proposing appropriate technical solutions for the repair and adaptation of rural buildings to modern living needs, while retaining as much of their original character as possible. The guide also intends to play a cultural and educational role in arising awareness among local communities toward this fragile heritage, threatened and partly already damaged by the lack of sensitivity, the loss of traditional skills and, consequently, by rude interventions.
At the same time, this work has given the chance to the Government Offices in charge with landscape protection to reflect upon the criteria adopted for the acknowledgement of landscape values, according to the law in force, and on which the work experience of these offices is based, and to think over the ways in which these criteria usually are and can be applied. This process should help set up clear guidelines that favour a widespread enhancement of building interventions and a more effective safeguard of the protected values. To define and make explicit the evaluation criteria required a reflection on the daily management of landscape protection and on the quality of the judgements made when a building project is allowed or denied. In evaluating design quality and impact on landscape there is a subjective element that it is almost impossible to eliminate; nevertheless, it has been aknowledged that there is a need to contain this subjectivity, defining clear criteria to evaluate projects of refurbishment or for new buildings, to which the professionals can refer to in their work.
In accordance with these goals, the Department for the Sciences of Architecture of the University of Genoa (DSA) has been charged to carry out the following activities, according to an agreed research programme:

a) A survey on rural buildings within the territory of the park, taking into account their morphology, their building materials and techniques, their problems of decay or structural instability, their technological and functional deficiencies;

b) The drawing up of some guidelines for the rehabilitation of this fragile heritage, primarily threatened by uncontrollable transformations, due to the attempt to adapt rural buildings to different uses than those they were built for.

The Government Offices for Landscape Protection are carrying on the third activity of the programme which is the drawing up of a pilot project for the rehabilitation of two rural complexes, selected together with the administration of the Park, whose development completes the whole project.

Point a) has been developed by identifying the location of the highest number of buildings on the regional digital technical map (CTR, scale 1:10.000) to ensure the correct cartographic identification of each building. The field survey focussed on technological components of rural artefacts, on their building materials and techniques and on their decay or stability problems.Two survey cards have been developed for the recording activity. The first comprises information about the location of the property, a short description of the building features, their accessibility, their current use and of their decay problems, and at least one photo. The other, more analytical, includes three different levels of analysis (a territorial level, a building level and a detailed level) with drawings and photos. It provides concise descriptions and collects data on building lot accessibility, data on use and ground arrangements, information on building morphology, on construction elements and on decay problems of building components and on related technological deficiencies. These cards will be the base for the elaboration of a further card which professionals and owners will have to compile before the drawing of any intervention on an existing building, in order to help them identify problems and needs. The collected data will also be implemented in the database, thus enlarging the amount of available data to improve the management of transformation over time.
The survey has been carried out in all the different areas of the Park in order to collect some information on its whole built rural heritage and to correctly address the selection of buildings to be analytically treated. Almost 600 rural buildings has been examined and their related data recorded in a database.
The survey highlighted the range of rural building and artefacts surviving throughout the park. Their features depend on their use, on the morphology of terrain they were built on, and on building techniques employed. The most frequent kinds of edifices are: rural buildings used as tool shelters, with just one storey and a shed roof; two-storey rural buildings, used as shelters for animals at the ground-floor and as temporary dwellings at the first floor, with a shed roof; dwellings very similar to the rural buildings, with shed roof and sometimes, when the building stands on a flat site, with gable roofs; dwelling buildings with two (or more) storeys used for stable habitation, often with more complex building structures, deriving from the unification of simpler buildings.
Over time, traditional buildings have undergone many transformations, in order to adapt them to new uses and we can find that many of these whose traditional character has been completely lost.
The fieldwork has pointed out also that the most recurring interventions are the complete replacement of roofs, with low increase of the building height (this usually means the construction of a concrete stringcourse under the roof line); stone masonry repairs and repointing, which often alter the external aspect of buildings; the widening of doors and windows that frequently need new plaster to hide wall damage; the addition of shutters, with subsequent reconstruction of jambs; the insertion of external flues and chimeys; the insertion of bathrooms and plumbing, often made without any care for the existing; the reduction of the width of the wall section, which means the

demolition and reconstruction of buildings, usually made with materials different from the originals (air bricks, or concrete blocks), plastered or stone faced.
The second activity (point b above) of the programme has included:

- an inventory of technical solutions with respect to the different construction components and including structural reinforcements and consolidations, repair interventions on walls, roofs, windows, doors, on external stairs, terraces and balconies and on technical installations for electricity and water supply, and some defensive responses to raising damp. The inventory will provide guidelines to choose the most appropriate solution among traditional and innovative building and repair techniques.
- The setting up and the representation in explicit form of some evaluation methods for project and intervention review, based upon a selection of some projects and solutions considered appropriate or inappropriate by the working group, in relation to different aspects, such as the respect of panoramic views, design quality, the choice of materials and building techniques, structural solutions, and design connections;
- State-of-the-art overview in the field of renewable energy resources (from both a technical and a normative point of view) and study of the possible use of renewable energy systems in the territory of the Park.

While the survey has been going on, the government offices carried out an inventory of refurbishment projects designed between 1992 and 2001 and sent to these offices for final control. These documents are already filed in a database, created in 1992 to manage the control activity of the office. The examination of each plan and the collection of technical data enable the acquisition of some information about local building activity trends, the kind and the substance of proposed (and in many cases already carried out) interventions. This data base provides a quite reliable picture of adapting needs, expressed by owners of the rural buildings of the Park as well as of the transformation pressures they are subject to and the results of this desk survey have been compared with those of the field survey, building a good knowledge framework. The data acquisition has been carried on using a card in which were registered some general data, including the location of the commune and the park zone where the building is situated, PTCP (landscape plan) zone classification (from the point of view both of current situation and of allowed activities), cadastral data, a brief description of the planned intervention and some technical data regarding the building components involved, including roofs, carrying structures (walls, pilasters, vaults and floors), doors and windows, and the kind of transformations they would need to undergo. This work allows focussing on the most frequent problems and needs encountered in order to draw up inventories of technical solutions aimed at solving highlighted problems. Besides, the comparison with the fieldwork results has given the opportunity to verify the tangible outcomes of implemented interventions and to open a preliminary debate, before drawing up the guidelines.
The evident difference among project intentions, results expected by the offices responsible for landscape protection and the concrete outcomes of building interventions has been the point of departure for the formulation of these guidelines. While the setting up of an inventory of technical solutions was going on, some project and intervention examples has been discussed in order to highlight the different opinions and points of view of each member of the working group regarding the ways to ensure landscape character to be preserved, while giving the opportunity to the rural built heritage to start living again.
Further developments of this work will be the drawing up of some simple technical booklets addressed to owners more than to professionals, to help them in carrying out properly the most elementar repair works, for which is not requested any professional,

it is also expected the elaboration of a virtual version of the guide, which will be available on the web, to facilitate its access and use.
To assure the implementation of the guide over time, it will be necessary to provide some financial incentives and procedural mechanisms to fasten the approval process for owners in compliance. Also the organisation of some training and sensibilisation programmes for professionals, practitioners and owners will be helpful to spread the use of guide and to support its correct use.
At a research level, it is also expected to build a systematic inventory of panoramic views enjoyable from the main tourist routes and from the sea, in order to keep care of the panoramic values protected by the law and to put in evidence the landscape impact (good or bad) of buildings and facilities and to ensure over time the management of landscape transformation, while retaining the identified values.

The pilot project
This pilot project aims at putting into operation the guidelines, now in preparation, and testing them, since it is expected that they will converge in the provisions that will ultimately regulate the building activity in the Park. The building scheme for the buildings involved will refer to the technical solutions proposed in the guide, verifying their technical and economical feasibility in that particular context, generally characterised by a difficult accessibility and a lack of skilled workers.
The authority of the Park proposed two sites in which it intends to provide some facilities for the training activities promoted in the park. The two sites, called *Lemmen* and *Cacinagora*, have been chosen because their different geomorphologic, settling and use features provide the opportunity to develop different solutions, even though the same methodology will be applied.
Lemmen stands on a sunny and well-exposed hillside near a ridge, very close to a yet cultivated area, interposed with lots of neglected terraced land, abandoned probably because of their less fortunate exposure. Within these small areas, vegetation has quickly got the upper hand but the first surveys suggested that it would not be a great problem to cultivate again those lots of land, as cultivation is still active nearby and the human presence ensures the defence of this territory. The settlement comprises small isolated buildings, with plastered walls and gable roofs; some of them look abandoned and deeply decayed, whereas others show traces of recent repairs or are now subject to refurbishment.
The settlement of Cacinagora, probably one of the most ancient settlement of this area, possibly established in the earliest period of the colonisation of the Cinque Terre, is situated at an altitude of 350 m above sea level and is set in a wide woody area, where the terrace system is still clearly recognizable. Here desertion seems to have occurred in former times and much more extensively than in Lemmen. In this situation, it seems difficult to re-establish vine cultivation around the settlement, as this would alter the balances that this site seems to have reached. Besides, new cultivation will probably require only a little lot of land, which would remain surrounded by thick woods, not the best conditions for vineyards or other forms of cultivation. Therefore, it seems to be necessary to find some alternative uses for this land in order to ensure a stable human presence, itself the only effective condition for its maintenance.
The main part of this settlement comprises a single building framework composed of many aggregated cells, with a few isolated buildings all around. External walls show a good dressed stone face, made with sandstone blocks; the roofs have just one pitch, covered by tiles and many of them have completely collapsed. No traces of recent repairs are evident and all the building fabric is subject to a deep decay, including wall deformations, cracks, and weed infestation.

To set up the project some information are needed about: hydro-geological structure of the site; soil characterisation related to previous or still active instability mechanisms characterising the site and the buildings; the role of the previous agricultural practices on the environmental processes, in order to comprehend what is the balance (or imbalance) in place and in which way appropriate balance can be managed through agricultural exploitation practices (developed as an alternative to vine cultivation).
To confront these issues, it has been decided to involve in the pilot project consultants coming from the fields of geology and geotechnics, as well as that of environmental archaeology.
The first working hypotheses will be tested through specialised studies, through the examination of the planning previsions for these sites and through discussion within a scientific committee, on purpose constituted and involving representatives of the Park Administration and of the other bodies involved in the landscape protection of Cinque Terre.
(LDM)

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THE MASONRY-MAKING WITH REFERENCE TO THE BUILDING CODES BETWEEN SPACE AND TIME

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Abstract
Only a detailed knowledge can lead the study of systems and methods for the conservation of architectural patrimony, put into operation through the respect towards cultural and technological identity of monuments. In particular, the attention turned to stone buildings request a systematic study of masonries, analysed for their morphological, dimensional, material, chromatic, of masonry-making characters.
The conscious choice about the kind of intervention to adopt in the restoration of a masonry building, as like in prevision of a correct maintenance process, is possible only on the bases of an accurate documentation that resume the monuments identity, for its material, expressive and degradation components.
The employ of digital photogrammetrical techniques, carried out by non metric cameras, through rectified photographs taken along non fixed ranges and angles, allow to realize detailed digital images of masonries, facilitating the study and the achievement of a data catalogue, indispensable to the cognitive phase, upstream any conservative intervention.

Preliminary reflections

The moral subject of the transmission to the future of a monument resides in the conservation of those morphological, dimensional, material characters that define its identity. The construction of a building represents the synthesis of a project expressed by forms, dimensional relations, space's distributions, but also of building codes, strictly connected to the space and the time of the work realization.
The knowledge about buildings, about their masonry and wood structures, about their technologies, can hold the secrets of their construction, the intentions of their manufacturing. The decodification of the messages preserved in the historical architectures constitutes the patrimony of a culture connected to materials and buildings codes, elements that characterised the identity of an epoch.
The study about the building codes and about the materials employed in the realization of an architecture, refereed to the geographic and historical context, allows to outline the building yard characters, to declare a local particularism, expression of an economic, social and cultural closing, rather than an exchange of materials and building knowledge. The will to go deep into the masonry making knowledge has bring out the necessity to proceed to a systematic data collection with the realization of a successive ordinate catalogue.
The characters that define a masonry framework involve numerous different fields: beginning from the characters of the material employed, the cut, the manufacturing and the preparation of the elements, ending to the finishing and the treatment of the walls.
It deals with a large mass of information that univocally defines every masonry texture and that establish a succession of relations with the historic and cultural context of the work. At present, the research has the purpose to outline the relations between building codes and architectures erected into limited geographic areas, throughout the comparison of masonry textures taken as a sample.

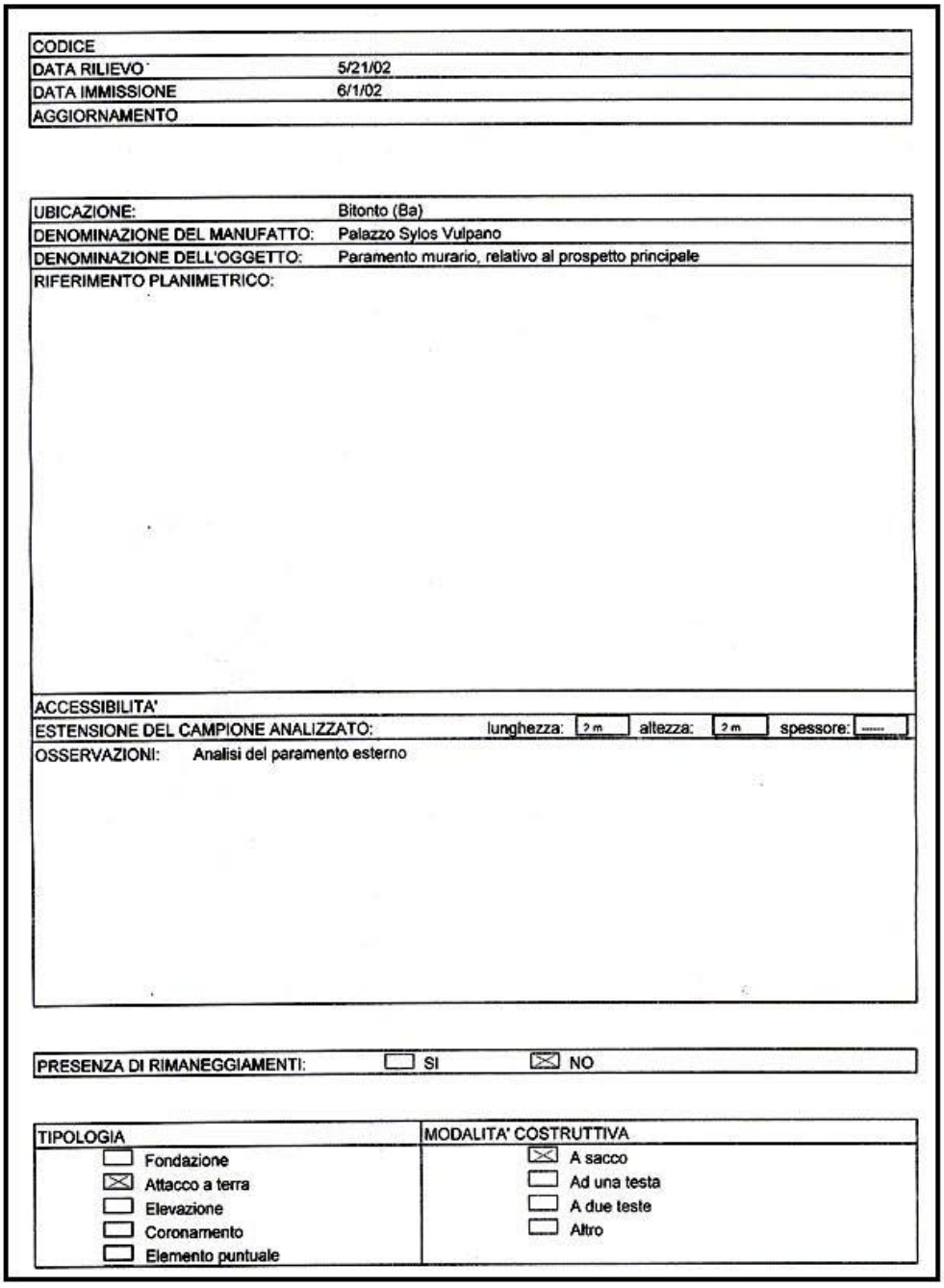
The knowledge of a monument, the only way to lead the expression of a conservative intervention, proceeds through the establishment of the building history, carried out with bibliographic, photographic and documentary researches, supported by detailed plans of the buildings, by the direct observation of the structures and by the comparisons with coeval realizations, sign of the cultural period in which the structures were realized.
The detailed study about masonry texture allows to outline the concreteness of the monument realization, from a thought form, the idea of an architecture, enclosed into the culture of a time and a place, realized throughout the employment of available materials and building knowledge.
The data collection leads out relations between buildings united by the same building codes, even if belonging to different architectural types; it allows to insert the monument into the culture of workmen that realized the structures. It follows that it is possible to recognise an historic and documentary value to masonry textures, especially in the case of buildings lacking in historic documents.

At the same way, without any doubt, it is possible to attribute an aesthetic value to a wall with particular working and finishing attributes, expression of a particular carefulness of execution, that unequivocally define the distinguishing characters of the monument identity.

The index card employed in the relief phase

The large mass of characters that marks a masonry texture has established the necessity to define a method to apply to the relief phase, by means of a systematic collection of information. The current research has drawn up an index card that contains a data list to approach a detailed study about masonry texture. This index card become such a framework through reading and comparing samples of wall, pooled by material components or by the cut an the making of the dressed stones.

The index card is made up of four parts. The first is dedicated to some identification data of the building: denomination of the monument, location, landmark,…; then are listed some information about the dimension an the location of the sample of wall object of study.



CODICE	
DATA RILIEVO	5/21/02
DATA IMMISSIONE	6/1/02
AGGIORNAMENTO	

UBICAZIONE:	Bitonto (Ba)
DENOMINAZIONE DEL MANUFATTO:	Palazzo Sylos Vulpano
DENOMINAZIONE DELL'OGGETTO:	Paramento murario, relativo al prospetto principale
RIFERIMENTO PLANIMETRICO:	

ACCESSIBILITA'

ESTENSIONE DEL CAMPIONE ANALIZZATO: lunghezza: 2 m altezza: 2 m spessore: ----

OSSERVAZIONI: Analisi del paramento esterno

PRESENZA DI RIMANEGGIAMENTI: ☐ SI ☒ NO

TIPOLOGIA	MODALITA' COSTRUTTIVA
☐ Fondazione	☒ A sacco
☒ Attacco a terra	☐ Ad una testa
☐ Elevazione	☐ A due teste
☐ Coronamento	☐ Altro
☐ Elemento puntuale	

1. The first part of the index card

The piece of masonry is studied in its volumetric substance, watching the characters that define the two external surfaces together with the observation of the inside core. The second and the third part, composed by the same fields to fill in, are related to the two surfaces of the masonry sample. The observation begins from the identification of the geometric shape and the texture of the surface, to come to list material data, with references to their possible origin.

PARAMENTO A

CONFORMAZIONE SUPERFICIALE

- [x] Verticale
- [ ] A scarpa
- [ ] Con risega

APPARECCHIO MURARIO

- [ ] Isodomo
- [x] Pseudoisodomo
- [ ] Opus incertum
- [ ] Listata
- [ ] Reticulatum

MATERIALI

PIETRA

TIPOLOGIA
- [x] Calcare compatto
- [ ] Calcarenite (tufo)

PROBABILE PROVENIENZA
- [x] Cava locale
- [ ] Cava esterna
- [ ] Reimpiego
- [ ] Altro

COLORE: brunito

LATERIZIO

TIPOLOGIA
- [ ] Pieno
- [ ] Forato
- [ ] Altro

IMPASTO
- [ ] Omogeneo
- [ ] Disomogeneo

COTTURA
- [ ] Crudo
- [ ] Cotto

CONCI

DIMENSIONI lunghezza: min: 43 cm. max: 140 cm. altezza: min: 31 cm. max 45 cm. spessore: min: ---- max ----

CONFORMAZIONE

- [x] Parallelepipedo
  - [x] Squadrato
  - [ ] Non squadrato
  - [ ] A coda
  - [ ] Altro
- [ ] Ciottolo
  - [ ] Spaccato
  - [ ] Spaccato e parzialmente spianato
  - [ ] Altro

LAVORAZIONE
- [ ] Sbozzato
- [ ] Rustico
- [ ] Segato
- [x] Squadrato
- [ ] Spianato
- [x] Bugnato nella parte centrale del concio

ATTREZZI
- [ ] Accetta
- [x] Sega
- [ ] Mazza
- [ ] Martellina
- [ ] Bocciarda
- [x] Scalpello
- [ ] Subbia
- [ ] Gradina
- [ ] Rabot

RIFINITURA SUPERFICIALE
- [x] Assente
- [ ] Lucidatura
- [ ] Ceratura
- [ ] Arrotatura
- [ ] Pomiciatura

SPIGOLI
- [ ] Non lavorati
- [x] Vivi
- [ ] Smussati
- [ ] A cartabuono

GIACITURA DEI FILARI
- [x] Regolare
- [ ] Irregolare
- [ ] Mista

ALTEZZA DEI CORSI
- [ ] Costante
- [ ] Variabile

min 31 cm. max 45 cm.

GIUNTI

CONFORMAZIONE
- [x] Sfalsati
- [ ] A sorella
- [ ] Irregolari
- [ ] Misti

FINITURA
- [ ] Stilata
- [ ] Sporgente
- [x] Lisciata
- [ ] Altro

DIMENSIONE
- [x] Costante 2 mm.
- Variabile
  - min:
  - max:

MALTA

GRANULOMETRIA
- [x] Fine
- [ ] Media
- [ ] Grossolana

PROBABILE COMPOSIZIONE
- [ ] Cocciopesto
- [ ] Pozzolana
- [x] Calce
- [ ] Cemento
- [ ] Altro

2. Second and third part of the index card

Then the study is lead on the single dressed stone: dimensional, formal and making aspects are analysed. The identification of the tools employed in the cut and in the surface working of stones, including the treatment of the edges. The information about dressed stones are completed by the examination of the height, the position and the regularity of the rows.

Specific observation are besides dedicated to the joints, regarding their distribution in the contest of the wall surface, their dimension and workmanship; it is moreover watched the material composition of mortar, with a specific attention to the nature and the dimension of the particles.

The fourth part of the index card is devoted, as far as possible, to the inside core of the wall sample, source of many information about the manufacture quality of the masonry. About the inside core the index card lists some fields dedicated to describe

the material, the texture, the cut an the dimension of stones, besides identification aspects of the mortar employed.

NUCLEO

- ☐ NON ISPEZIONABILE
- ☐ ISPEZIONABILE

MODALITA' DI COSTRUZIONE

- ☐ Non apparecchiato
- ☐ Apparecchiato con conci (muratura intrecciata)
- ☐ Apparecchiato con scapoli

Piani di giacitura:

- ☐ orizzontali
- ☐ ad inclinazione variabile

MATERIALE INERTE

- ☐ Calcare
- ☐ Tufo
- ☐ Laterizio
- ☐ Scaglie
- ☐ Frammenti
- ☐ Misto

MALTA

- ☐ Analoga al paramento esterno
- ☐ Analoga al paramento interno
- ☐ Diversa dai paramenti

GRANULOMETRIA

- ☐ Fine
- ☐ Media
- ☐ Grossolana

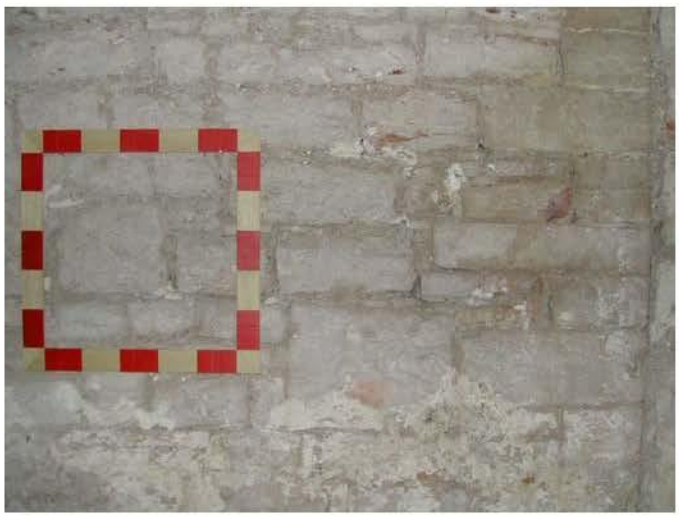
CONSISTENZA

- ☐ Tenace
- ☐ Media
- ☐ Pastosa
- ☐ Polverosa

COLORE: ☐

3. The fourth part of the index card

This index card is assisted by the employ of digital photographs that shoot the sample of masonry, including some details of great interest. It's a matter of photographs, carried out by non metric cameras, taken along non fixed ranges and angles, shoot affixing on the wall a square frame, as unit of measurement.



This allow to rectify photographs, using specific digital programs, leading the image to a scale of measurement, facilitating the study and the achievement of a data catalogue, indispensable to the cognitive phase.

Conclusions

The synthesis of the digital image and the index card represents the mass of information to work out in the phase successive to the relief moment. The systematic data collection, made up with the employ of the described index cards, leads indeed to the creation of a catalogue of the masonry samples. Through their tidy organization into a catalogue, by means of data-base programs, it is possible to realize a large inventory useful to the study and the comparison of building codes that define the masonry-making.
It is so possible, each time there is a particular element to observe inside a masonry, to lead out the research of analogous wall textures, drawing clear relations between architectures combined by the employ of the same building codes, in relation with well-defined geographical, historical and cultural context.

REHABILITATION ACTIVITIES AT THE CASTLE OF CANOSA DI PUGLIA

F. Dentamaro, Università degli Studi di Bari; M. Ieva, Politecnico di Bari; I. Spadavecchia, Università degli Studi di Bari

Abstract

The medieval Castle of Canosa di Puglia, one of the most representative monuments in the town, was ruined by an earthquake in 1856 and then, as time passed by, it was completely hidden underground except for its turreted walls. In the year 2000 the Canosa Town Council, owner of the building, has fostered some restoration activities in order to develop this area, setting up a new archaeological park. Therefore, some rooms near the Castle have been restored and transformed into a little museum to show all the finds from the Castle itself.

Besides, archaeological excavations have been made on the north side of the building, where an amazing system of ancient structures has been discovered, placed inside another circle of walls, probably Angevin. All these structures, among which an underground vaulted cistern, can be referred to previous building phases of the Castle; indeed, according to historical sources, it was built up before the Longobardic Age and used, during centuries, by Normans and Swabians.

Apart from the usual documentary operations, digital pictures of both the circles of walls have been taken, in order to draw a detailed model of the Castle and to create a virtual reconstruction of its building phases.

Figure 1. Canosa di Puglia, the Santi Quaranta's Hill

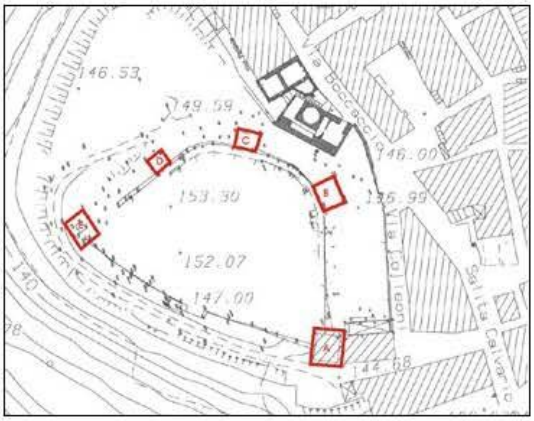


Figure 2. Canosa di Puglia, plan of the castle before excavations

A brief history of the monument

The historical sources bear witness to the presence of a castle in Canosa built on the Santi Quaranta's Hill, since the age of the Lombard King Autari (584-590 A.D.). The castle withstood two Saracen sieges, but it was destroyed during a third one, ended with the sack of the whole town in the second half of the 9th century. It seems that the castle was later re-built by the Byzantines, and indeed the building is mentioned in a document that may be dated to the year 1000; then the castle was used by the Normans, who conquered Canosa almost a century later.

The Swabians followed the Normans, and with Frederick II the Castle of Canosa was under the direct authority of the Imperial Administration. Therefore at that time the *provisor castrorum* was responsible for its ordinary and extraordinary maintenance. In the Angiovins age the castle was still considered a royal fortress, though it appeared, according to some official Angiovin documents, seriously damaged, and between 1271 and 1277 it was restored by Pierre d'Angicourt, one of the most famous *magistri* at the court of Charles I of Anjou.

In the year 1294 Mary, Beomond IV's daughter, came into possession of the castle, passing later from hand to hand up to the Capece Minutolo family, and finally donated to Canosa Town Council. In 1856 an earthquake destroyed the building, and only the external circle of walls with its five towers is still visible nowadays.

(F.D.)

The recovery works of the Castle of Canosa

The castle of Canosa di Puglia rises on the plateau of the Santi Quaranta Martiri, already ancient site of the acropolis of the Daunian and Roman town. According to the documentary sources, the presence of a fortification could date back to the 6th century, during the well-known Lombard siege to *Arx Sancti Angeli* (see above). Notwithstanding the authoritative evidence, there are not elements which can demonstrate the existence of a real fortress; we could as a consequence accept a later date, very likely coinciding with the Lombard dominion and the Saracen's threat to the town. It would therefore be allowed to admit the concomitance of the transformations to the plateau area with the age in which the progressive improvement of the defensive systems in the whole Apulia takes place. Only a few elements of the original construction rise, since no investigations have been carried out in the area inside the towered circle walls of the castle. Anyway, if we interpret them through the formative genesis of the castle as a typology, and in a comparative analysis with some main examples, we'll be able to reach to a former reconstruction of the Canosa structure. In order to make a hypothesis about the first building phases of the fortress, we'd better recall the relationship with the types that gave origin to the castle specialization.

As for this it is useful to remind that the word *castle* comes from the Latin *castellum*, nickname for *castrum*, and is in comparison with the latter, in Roman times, a smaller fortress. Within a process of transformation of the types from late ancient to Dark Middle Ages, the castle is the synthesis between a fortified settlement (which has by now reached a certain complexity with respect to its origins), and the type palace, site of the power. Indeed, the two words, *castellum* and *castrum*, were not used used *scricto sensu* in the past, but sometimes ignoring their dimension, they were used regardless the extension and the quality of fortification. The wide casuistry of fortifications already known in ancient times, in an age of transition from Roman military constructions to Byzantine buildings, demonstrates that the *castellum* does not initially presents typical forms to be ascribed to the *castrum* regular matrix of Polybian type. There are, indeed, many cases whose geometrical shape is polymorphous: trapezoid at Altrip on the Rhine, almost circular at Junkerath, octagonal or mixed polygonal elsewhere.

This evidence, linked to the geometry and the nature of the site, would be the reason of the irregularity often noticed in more ancient fortifications among which the Canosa one, whose foundations, built in an area already inhabited by human beings, could have adapted its structure to a pre-existing substratum. A hypothesis could be done about the original architectural group, with a simple form of protection from the outside (like a fence made of a *agger* with a vallum and usually a simple palisade), together with a fortified residential construction with towers: the donjon. All these are recurring elements in the fortresses of the time, recovered and re-interpreted by the Normans. The existing sources still tell about the fortified construction which in this phase undergoes large repairing works and becomes a meeting point between Beomond of Altavilla and his step-brother Ruggero Borsa. Later the castle was raised and enlarged, a very common process the Swabians started at that time, the process of petrification, realized through integrations and enlargements of the already existing patrimony. In conclusion, this is what we know about the fortified building before the recovery works started in 2000.

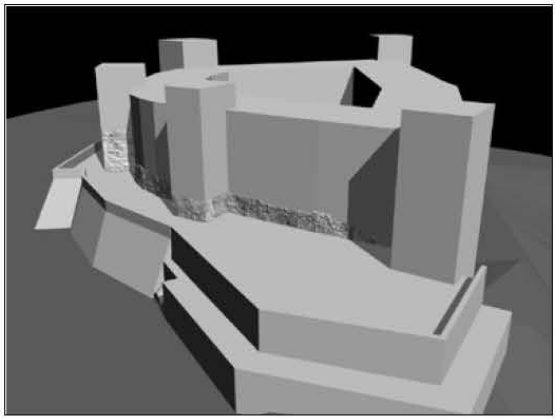


Figure 3. Virtual reconstruction of the defensive system of the castle

Figure 4. Rooms near the castle after the recovery

These recent archeological excavations allowed to reveal a series of progressive variations of the Norman-Swabian castle, built very probably in the second half of the 13th century during the Angiovins government. This important discovery has revealed fundamental to reconstruct the different transformations of the castle and, more, it allowed to catch the essence of the walls brought to light which enlarge the castle with a fortified circle almost all around it with a system called *a falsa braga.* This interesting device allowed to conjugate the building statical needs of the former fortress with the new defensive ones, updating the protective system according to the progress of the techniques used. As for this, the investigation about the type of terrace construction, excavated in the north-west sector, was particularly fruitful, demonstrating the relationship of full organic unit coming from the unitary conception of the building, which is not only the result of a structural and defensive view. Indeed, the continous plateau, enclosed by a wall oriented east-west overlooking the wide valley of the Ofanto river, was realized raising the level, and was wisely used inserting two cisterns for gathering waters of different origins. The larger cistern the Angiovin sources identify as the *terraciam*, when discovered (see *infra*), presented a partial filling made of wall demolition material, pieces of stone balustrade, animal

bones, fragments of majolica tiles, most of which presented a snout inside a horseshoe on the glazed side, elements commonly present on the Affaitati family coat of arms (17th century). Their presence, even in the excavation area outside the cistern, would make you think of important restoration works under the Capece-Minutolo (18th century), thus demonstrating the long process of transformation of the fortified construction into a Palace, started in the 16th century.

The Angiovin sources allow to locate another building recovered with the present project, the *furnus*, next to a scarp wall of the *falsa braga*, which could originally be annexed to the castle and used to cook pottery. During the excavation campaign some works of restoration have been done to preserve some rooms next to the monument. Coherently with the typical features of the old medieval villages, the internal and external superimposed strata of more recent ages, have been taken away. Later on, some repair works have been carried out using the materials of the local building tradition (traditional plaster, whitewash on walls and vaults, floors in Canosa fired bricks, slaked lime paintings, wood frames, etc.). The study of the static system of the breast wall (calcarenite blocks and vault cover) has suggested the suitable structural interventions to do. The *utilitas* of the original project (the rooms should have been of public use) was respected applying only slight changes to the internal arrangement.

Beyond the living units recovered, the restoration interventions were extended even to the group of houses opposite the monumental area. This choice has come from the need for considering the castle not only like "the Monument" which, out of its surrounding context, rises alone and without any implication. On the contrary, its essence of "outstanding figure" is real, even at a historical level, if there is a *continuum* of buildings around it establishing a relationship of close i*nter-existence* with it. The use of traditional materials and techniques was slighly changed when the ancient oven was recovered. When the works started, the internal part seemed to be completely transformed in comparison with what could be caught of the original structure. It had been improperly used as a storage, and this hindered the complete analysis, however it did not fade its mystery away.

Although it was necessary to set it up as an *Antiquarium*, according to the project, the operations have focused on the recovery of the main features, and particularly to the cleansing of the stone surface of the walls. Another typically Middle Ages/Renaissance feature of the village presented with this work is the paving of some tracks with pebbles from the Ofanto river. Some fragments found in the area of intervention, but largely widespread in the whole medieval town, have suggested the use of this technique very popular in many Apulian cities.

(M.I.)

The archeological excavation

Placed on the highest hill of the ancient urban centre of *Canusium*, the castle has been sistematically excavated in the year 2000, as part of a wide restoration action in order to make the monument more valuable and enjoyable to the public. The group of buildings is made of a circle wall in a polygonal shape, adapted in its irregularity to the hill morphology, having a straight profile overhanging on the south side, and a more indeted one on the northern side. Five quadrangular towers are placed at the corners all around the circle.

Although the archives and historical sources report the use of the castle from early Middle Ages to 1800, it has never been previously investigated; therefore due to its state of neglect, it was neither possible to recover the settlement value of the *Canusium* acropolis, nor to analyze the archeological documentation of the urban centre during the Middle Ages and the Modern Age. Thanks to recent investigations, a quite unusual organization of the whole area of the castle has come to light, compared to the other well-known Norman-Swabian castles in Terra di Bari. That is why the castle of Canosa is nowadays a document of outstanding interest for the analysis of the following topics:

1. the structure of the castle in early Middle Ages, with an unusual planimetry, which makes it an isolated example in the context of the Apulian Norman-Swabian castles net, already having a wide bibliography;
2. the findings coming from scientifically investigated archeological contexts, which allow to enrich our knowledge about the materials used in Terra di Bari during the Middle Ages that, unlike the classical Age, have never been topic of interest or systematically studied;
3. the settlement adopted in post-classical age during the battlements of the region, with refence to the transformation of Canosa urban shape from ancient times to modern age. As for this subject, we'd better remind at the moment there aren't many terms of comparison due to the few interventions of urban archeology in the whole region.

Figure 5. Canosa di Puglia, view of the castle before excavations

Figure 6. Canosa di Puglia, excavations of the castle: detail of the higher terrace

Leaving out the internal part of the circle walls, where the sources set the modern age Baronial Palace, the archeological investigations focused on the external boundary, on the northern side between Towers C and E: the wide plane in front of it, sloping regularly down to the valley and ending near the ancient inter-regional *Traiana* road, suggested indeed the presence of underground constructions. At the same time in the modern rooms next to the castle area, a group of rooms to be set as *Antiquarium* of the archeological area were put on. Making the whole slope enjoyable to the public was indeed the basis of the whole project to recover the castle.

The circle walls, with an internal space and a stone surface, are made of a wall base of local calcareous ashlars from *Gravina di Puglia*, and a wall of local calcarenite blocks, the so-called calcareous tufa, melted with mortar. The lower construction hasn't given back dateable elements, and the ashlars wall built in ordered lines cannot be compared to other fortified buildings or any other kind of building in Canosa and in the Bari province. The higher wall, though divided into modular sets, presents evidence of re-used materials, coming from different deprived buildings, as it can be implied by the variable presence of some technical details such as the cut of blocks and the manufacture of the surfaces, the typology of the ashlar-work, where present, and rare crossed stone engravings.

Phase I. The organization of the area north of the castle with a series of added terraces started. Indeed, a breast wall of a terrace, in the middle between Towers D and E was built, with a higher level connected with the inside of the castle through an entrance at the corner of Tower E. The wall with a surface made of accurate lines of parallelepiped calcareous tufa blocks, rests directly on an ochre layer suitably cut in a traditional building technique from Canosa. The original dimensions of the terrace are not known, since this building phase needs further investigation.

The wall belongs to the same phase as a hypogean cistern located in the middle of the same terrace. The internal space, longitudinally developed and parallel to the castle screen, presents waterproof walls and ogival vault, with a median rib on flat echines shelves with no supports underneath. At around the same level as the bottom of the cistern, north the breast wall of the terrace, two walls defined another external room at a lower paving level, which no more elements are available about. As for the chronology of the group made up by the breast wall and the cistern, the typology of its ogival vault allows to date it back only as far as the 13th century. It is certainly to be identified as the *cisterna terracia* that under Charles I of Anjou needed some suitable maintenance interventions (RA, Vol.XI, n.208, a.1273-74). Other elements missing, it cannot though be excluded that they are Swabian constructions, as under the dominion of Frederick II of Swabia the *Statutum de Reparatione Castrorum* reports building interventions at the castle of Canosa.

Phase II. The rooms located north of the breast wall are hidden by a homogeneous earthy filling with no shapeless stone material. On the top of the filling and the partition walls, suitably cut, an earthy paving level has been built tangent the breast wall, with an ascending slope to the east and equipped with two tracks beaten along the edges. At the same time the breast wall is covered by two twin walls at its edges, built using the same building materials, but in a less refined work technique; the former rests on Tower D, the latter is linked to a wall which in its turn is connected to Tower D by a further breast wall. On the north-western border of the multi-layer wall, a postern with an ogival vault cover is now open.

The higher floor of the terrace, paved with calcareous ashlars arranged on edge and flat alternatively, and melted with firm mortar, is divided into two parts by a partition wall near Tower D. To the west of the wall a system of water supply is located, and includes the already existing *cisterna terracia*: a pipe with rectangular section is connected to it, going EW along the screen of the castle, under the calcareous ashlars floor; near Tower E a second pipe very similar in structure, ends in a double basin with a bottom equipped with big river pebbles to cleanse the downflow waters;

finally, north of the basin, a bell-cistern can be found, come to us without its higher part, presumably connected to it. Both the pipes under the calcareous ashlars paving were fed by a gutter in the wall screen at the corner of Tower E. Finally, a couple of clarification chambers were located at a higher level with respect to the terrace and connected with the main cistern. The eastern sector of the higher terrace is covered by constructions of uncertain function at the same level as the partition wall; paved with simple trodden earth, in different levels maybe due to building interventions in rapid succession, it presents an operation surface with traces of ashes, with many holes of different forms and dimensions, whose fillings have not given back useful elements.

Figure 7. Detail of the breast wall of the higher terrace

Figure 8. Internal of the hypogean vaulted cistern

Phase III. A further earthy filling hides the EW ramp north of the breast wall of the higher terrace and the access to the latter is now allowed through a trodden earth ramp, with an ascending slope to the south, which is located near the eastern sector of the terrace. Near the western side of Tower D there is a pipe with a bottom made of roofing tiles, circumscribed on the other side by a parapet made of medium size parallelepiped tufa blocks; the pipe fed by a gutter located in the wall screen, extended above all the earthy filling hiding the previous phase, and went on the lower terrace (see *infra*). Further interventions are made in the western sector of the terrace, on the water supply group of buildings. A second paving of calcareous ashlars is added to the previous one, creating a new higher floor; the main cistern and all the water supply systems seem to be adapted to it, with the superimposition of the walls of the feeding hydrants. Inside the cistern the top part of the vault is restored with a different material, yellow calcar parallelepiped blocks melted with a firm and strong greyish mortar lied in thick layers.

In phase III, which develops soon after phase II, the same building materials are used; we know that under Charles I of Anjou many maintenance interventions to the *cisterna terracia* were made, therefore these interventions were likely to be extended to the paved floor of the terrace. There aren't certain chronological elements about the desertion of the group of buildings: the paved floor of the higher terrace was indeed hidden by a huge heterogeneous and shapeless filling, even polluted by modern rubbish, and more, some clandestine interventions on the terrace have left evidence on the constructions. The relationship between the latter and the Baronial Palace inside

the castle is not known, though we are sure that even after the desertion of the castle by the Capece-Minutolo family, poor houses were built next to the wall screen near Towers D and A, using the level of the filling north of them as use level.

(I.S.)

The constructions North of the Castle

North of the higher terrace, after the removal of a thick layer of earth accumulated on its side, some other constructions, absolutely unknown before the excavation, have been discovered. Laying out in a line with the north-eastern corner of Tower D the whole drain has come out, made of re-used calcareous slabs, whose initial part had already come into light very close to the tower. The drain was more than 6 metres long, winding across the land steeply sloping to the north, where it finished against a wall parallel to the breast wall of the terrace, which was almost 5 metres far from it, and at an inferior level with direction east-west. This construction went on westbound, beyond the bounds of the excavation, therefore it was quite likely to be a second circle of walls of the castle, external to the towered circle, surrounding the western slopes of the hill completely. It must have been originally imposing, but nowadays it is seriously damaged and only the first line of hewn stones above the foundation lines is left.

On the north side of this wall, another construction 1.5 metres thick, probably a buttress, rests on the same breast wall of the higher terrace, carefully built in horizontal lines of yellow tufa hewn stones. At the moment this wall is a bit more than 1 metre high, and at least two superimposed layers of stones and mortar, creating a sort of cobbled, have been added on the top of it. The foundations of this construction rest directly on the same level and on the same bank of ochre clay which the breast wall of the terrace rests on. On the setback level, just in the north west corner of the bounds of the excavations, some traces of cobbled have been found, maybe to be ascribed to the presence of a disappeared paving.

In the second phase of the excavation campaign, the activities focused in the area roughly included between Towers C and D of the castle. Here a disordered accumulation of stones mixed to mortar came to light, in a line with the north view of Tower D, and about 1 metre below the ground floor. It was connected to the calcareous drain almost in the middle of its run, and it has been identified as the internal side of a huge wall. The external surface of the construction had disappeared in the above level, but in a lower level it was kept almost intact, and it has been recovered down to the foundations level. Indeed the wall, built against the ground with a sharp scarp profile, presented its front, northbound, made of tufa hewn stones, medium sized, tidily placed in horizontal lines. To the west the construction connects to the border of the external circle wall of the whole group, cutting it and going south to form a corner which is the west side of a large quadrangular very deep well, where the drain ends.

From the edge of the external circle the scarp wall, well kept and in some parts up to almost 7 metres high, went on south-east proceeding more or less parallel to the towered walls of the castle, keeping a distance from them of about 10 metres. However, a little bit more east than the initial corner, the wall was broken, throughout its remaining height, by an irregular mass of crushed stones, at the bottom of which

two big spherical stone projectiles have been found. Because of the clearly defensive purpose of the wall, it has been assumed that the breach had been made during a military attack to the castle, but it is not possible at this stage of the research, to provide any hypothesis on the chronology of this event.

The large breach on the wall has been restored and closed with blocks of stones and earth. Above them, some re-used stone slabs had been stuck in the wall and used as steps of a rough staircase which, from half the height of the wall left, got to the top. The stairs which obviously were meant to climb over the wall were of course built in an age when the defensive function of the wall was over. By the accumulation of earth layers, a new plane of use was established at the level of the lower impost of the staircase. The existence of this plane has been confirmed by the analysis of the archeological stratification, as well as by the discovery on the same level, a bit more to the east, of the foundations (made of re-used elements) of a long wall, built above thick accumulations of ground, resting on the scarp construction and going straight to the north, beyond the bounds of the excavation.

Figure 9. The buttress on the north side of the castle hill

Figure 10. Detail of the scarp wall, the breach and the staircase

Consequently, the activities of the excavation focused on the area included between the wall of the castle, east of Tower D, and the scarp construction, in order to investigate the archeological layers which that construction had been built against. The excavation got 4 metres below the ground floor. It has been possible to ascertain that the scarp wall rests on layers made of yellow tufa and brown-ochre slimy earth laid one on the other, alternated with very thin layers of carbon ashes. This stratification, too regular not to be of human origin, has been found only in a narrow strip neighbouring the scarp wall which, as above said, rests on it, and also between it and Tower D. Towards the towered circle of walls of the castle, regularly superimposed layers have been found, but they have a definitely earthy matrix, and they are rich in highly heterogeneous materials. It is clearly an accumulation of filling earth, probably used to raise the level of the frequentation area. These layers, similar to one another for their matrix, origin and quantity of the materials included, were however clearly recognizable thanks to the presence of interfaces made of very thin ash and carbon surfaces spread on the whole area of excavation.

The removal of these earth accumulations brought to light what it seems to be the original foundation of the castle walls; the whole Tower D made of huge parallelepiped blocks of calcarenite appears therefore as an added body with respect to it. It is a construction made of hard calcareous ashlars, built with abundant use of mortar and wedge slabs. In some points of the wall, a larger presence of mortar implies that the construction has been restored and repaired throughout the centuries. The ashlars wall is made of three rectilinear segments, set out to draw the conjunction curve between Towers C and D. On the spots where the wall changes direction to strengthen the construction, the excavation has located, but not completely brought to light, two saw-toothed buttresses, made of hard calcareous ashlars again. Comparing the underground level reached here with the level reached with the wall on the south-east side of the castle, previously excavated, it must be supposed that the wall construction develops underground for at least 4 m. more.

The archeological activity has demonstrated that in this area the bank of clay already located to the west had been cut to create the necessary area to build the tower; the hole was filled again by a clay layer which was later covered with tufa in pieces. In order to bring to light the foundations of Tower D, this filling of clay has been removed as well. It has been therefore noticed that under the level of the calcarenite blocks even elements of hard calcareous ashlars seem to have been used in the tower building. Unfortunately, for static reasons it was not possible to investigate deeply this original building phase of the tower, whose stratigraphical relationship with the wall circle is still not clear. The excavation has been interrupted when it has been discovered, under the accumulation earth layers above described, a thin carbon surface, spread on the whole excavated area, presenting a steep slope from west to east and certainly identifiable with the carbon layer found in the east section of the excavation, immediately under the eastern edge of the breast wall of the higher terrace.

(F.D.)

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La participation des citoyens dans la gestion et la mise en valeur de l'arrondissement historique du Vieux-Québec

Texte présenté par Francine Bégin, Ville de Québec, et Jean Desautels, Parcs Canada, District de Québec, dans le cadre du 7e Colloques International de l'OVPM à Rhodes.

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INTRODUCTION

Les arrondissements historiques de villes patrimoniales sont constitués de monuments d'importance qui en sont souvent les symboles. Mais ils sont aussi composés d'une multitude de bâtiments plus modestes, à l'architecture relativement homogène, abritant une grande mixité de fonctions et qui font de ces arrondissements des lieux d'habitat exceptionnels.

La préservation et la mise en valeur des grands ensembles monumentaux sont souvent prises en charge par l'État qui, à cause de leur valeur symbolique importante pour la nation, n'hésite pas à affecter les ressources nécessaires à leur conservation et à leur mise en valeur. Leur occupation aussi, à des fins publiques ou muséologiques, se présente d'emblée. Par ailleurs, pour assurer la conservation adéquate et la mise en valeur de la multitude de petits bâtiments de l'architecture populaire des quartiers historiques, pour maintenir la vitalité et l'authenticité de ces quartiers, les difficultés sont plus nombreuses. Cela requiert l'adhésion de l'ensemble des nombreux propriétaires et des résidents à des valeurs et à des objectifs communs. Souvent cette tâche est reléguée à l'administration municipale qui se doit de manifester du leadership à cet égard.

Il en est ainsi à Québec, comme dans toutes les villes patrimoniales. D'une part, nous avons le réseau des fortifications qui ceinture la ville historique et constitue à lui seul un lieu historique national. C'est un monument exceptionnel puisqu'il s'agit du seul réseau de fortifications complet en Amérique du nord et sa préservation constitue l'un des motifs de reconnaissance de la Ville de Québec sur la liste des sites du patrimoine mondial de l'UNESCO. L'ensemble de ce lieu, qui occupe en superficie, avec toutes ses composantes, près du tiers de l'arrondissement historique, est propriété du gouvernement du Canada qui en a confié la gestion et la mise en valeur à Parcs Canada. Cette agence a la charge, non seulement de conserver l'intégrité de ce monument unique en Amérique du nord, mais aussi de l'intégrer dans un quartier historique en évolution constante et de lui affecter une vocation compatible avec son caractère et avec les besoins de sa population.

D'autre part, il y a l'ensemble du quartier historique que ce monument enserre et protégeait jadis et qui est constitué de bâtiments appartenant à une multitude de propriétaires privés et dont l'architecture traditionnelle mérite d'être conservée puisqu'elle témoigne de l'adaptation aux rudes conditions climatiques du pays. Ces bâtiments sont occupés par une grande diversité de fonctions caractéristiques d'un centre urbain animé : l'habitation, le commerce, les institutions d'enseignement, l'hôpital, les institutions administratives, les lieux de culte. La tâche d'assurer la conservation et la mise en valeur de cette architecture domestique intéressante et de toute cette vie de quartier revient à l'administration municipale de la Ville de Québec.

Pour appuyer leur mandat de mise en valeur et de conservation de ces deux composantes de l'arrondissement historique de Québec dont ils ont respectivement la charge, ces deux intervenants ont choisi d'impliquer la population. Pour ces deux intervenants, la Ville et Parcs Canada, cette implication va au-delà de l'information et de la sensibilisation. Elle s'appuie sur une consultation systématique de la population et des organismes du milieu. Le but de l'exposé

aujourd'hui est de mettre en parallèle les démarches entreprises respectivement en ce sens par ces deux intervenants qui travaillent depuis plus de 30 ans, en étroite collaboration, à la sauvegarde, à la protection et à la mise en valeur des ressources culturelles et patrimoniales de l'arrondissement historique de Québec.

FB/ février 2003

1. La démarche de Parcs Canada : L'importance accordée aux consultations publiques dans les politiques de gestion des aires patrimoniales de l'Agence Parcs Canada

Parcs Canada est une agence fédérale rattachée au ministère du Patrimoine canadien qui a pour mission d'assumer le mandat national et international du Canada en matière de reconnaissance et de conservation du patrimoine. Parcs Canada s'acquitte de ce rôle en protégeant et en mettant en valeur, directement et indirectement, divers aspects représentatifs du patrimoine naturel et culturel du Canada et en en favorisant l'accessibilité au public. Le résultat le plus tangible de l'action de Parcs Canada s'exprime dans le réseau des parcs nationaux et des lieux historiques nationaux, auquel se rattache le lieu historique national des Fortifications-de-Québec.

Au cours des années, Parcs Canada a développé, en autres, une expertise technique et professionnelle importante dans le domaine de la restauration et de la mise en valeur du patrimoine bâti. Les travaux de stabilisation et de réfection des Fortifications-de-Québec ont contribué à cet essor. Ce fut une école où les archéologues se sont fait la main. Les actuels responsables de l'archéologie à Québec, à Montréal, à l'Université Laval et au ministère de la Culture et des Communications du Québec ont tous débuté à Parcs Canada.

Au niveau des métiers traditionnels, Parcs Canada a développé une expertise dans des domaines de la maçonnerie, de la menuiserie et de l'ébénisterie. Les investissements majeurs faits dans la ville de Québec au cours des 30 dernières années (plus 70 millions de dollars canadiens) ont permis de consolider cette expertise. Nos équipes sont régulièrement consultées pour des avis techniques. Notre expertise s'étend aussi dans les domaines de la muséologie et de la diffusion des messages d'intégrité commémorative.

Face à la population, Parcs Canada assume trois responsabilités spécifiques:

1) **veiller sur les parcs nationaux, les lieux historiques nationaux et les aires marines nationales de conservation ;**
2) **accueillir des visiteurs du monde entier en leur ouvrant les portes de lieux de découverte et d'apprentissage, de réflexion et de loisir ;**
3) **miser sur les riches traditions des peuples autochtones, la vigueur de la mosaïque culturelle canadienne et les obligations du pays envers la communauté internationale.**

Afin de remplir son mandat, Parcs Canada élabore un plan directeur pour chacune de ses aires patrimoniales protégées. Ces plans directeurs exposent les orientations stratégiques à moyen et long terme qui ont été retenues pour préserver, mettre en valeur et utiliser les aires patrimoniales. Ces plans qui sont basés sur la consultation du public sont soumis au Parlement et traduisent ainsi les engagements du ministre responsable de Parcs Canada envers la population canadienne.

La consultation du public est donc obligatoire pour tous les programmes de planification et de gestion de Parcs Canada. C'est pourquoi ce processus joue un rôle si important au sein des politiques de gestion de l'agence. Un programme de consultations publiques comporte trois phases:

1. **la phase d'information qui consiste à annoncer le programme de consultation publique et à informer les personnes et organismes intéressés par la problématique de planification ;**
2. **la phase de réception des commentaires qui permet au public d'exprimer ses préoccupations et ses opinions sur la vision, les objectifs et les mesures de gestion proposés dans le plan directeur préliminaire ;**
3. **la phase de rétroaction qui permet à Parcs Canada d'informer le public des résultats de l'exercice de consultation.**

Il n'existe pas de démarche-type qui convienne à tous les programmes de consultation du public et ainsi, chaque démarche doit être adaptée aux problématiques particulières de l'aire protégée visée. Ces programmes doivent être ouverts, transparents et équitables.

Les mécanismes et les outils retenus pour susciter l'intérêt chez les groupes, organismes et individus ciblés doivent être créatifs puisqu'il faut rejoindre le public le plus large possible et non pas viser un niveau de participation minimal. Il n'est possible d'atteindre cet objectif qu'en ciblant, au préalable, les organismes, groupes, ministères, individus qui peuvent contribuer au succès de la planification et qu'en utilisant des outils de consultation susceptibles de rejoindre la population régionale ainsi que les personnes et les groupes qui n'ont pas pour habitude de participer aux programmes de consultations. À cet égard, les nouvelles technologies de communication peuvent contribuer grandement à faciliter la participation du public. Le réseau Internet, par exemple, est l'un des outils envisagés pour faciliter la participation d'un grand nombre de Canadiens et de Canadiennes aux programmes de consultation. La consultation du public doit aussi être intégrée à une vaste stratégie de communication et de relation avec la communauté locale et être accompagnée, au cours de la période de mise en œuvre qui suit, d'un programme de suivi et de rétroaction.

La démarche reliée au lieu historique national des Fortifications-de-Québec

Le plan directeur du lieu historique national des Fortifications-de-Québec a été publié pour la première fois en 1988. Le document est aujourd'hui dépassé à maints égards et une mise à jour s'impose. De fait, depuis la publication du plan, grâce aux efforts soutenus de la ville de Québec et de ses partenaires fédéraux et provinciaux impliqués dans la mise en valeur de la ville et de son arrondissement historique, le paysage urbain de la ville intra-muros et des quartiers qui ceinturent les fortifications a été considérablement modifié et rehaussé. Ce processus de mise en valeur n'est pas terminé puisqu'à la veille des fêtes qui commémoreront, en 2008, le 400e anniversaire de la fondation de Québec, les projets déposés sur la table laissent présager que le paysage du quartier historique continuera de se transformer au cours des prochaines années.

À ce contexte, s'ajoute le fait que la philosophie d'intervention de Parcs Canada a elle-même beaucoup évoluée et que l'agence se voit confrontée à de nouveaux enjeux de gestion. Le partenariat, le tourisme culturel, la génération de nouveaux revenus, la notion d'intégrité commémorative, sont autant de nouveaux concepts qui traduisent les défis auxquels doit maintenant s'attaquer l'Agence. Il est temps de renouveler la vision du devenir des fortifications dans la ville et de reconsidérer sous l'éclairage, de ces nouvelles réalités, les orientations

antérieures. L'exercice de révision du plan s'amorcera au printemps 2004 et sera accompagnée d'un programme de consultation.

Les objectifs du programme de consultation pour le lieu historique national des Fortifications-de-Québec

Le programme de consultation projeté pour le lieu historique national des Fortifications-de-Québec a pour objectifs :

- de diffuser des informations sur les buts poursuivis par Parcs Canada dans le développement d'un réseau de parcs historiques nationaux et, plus particulièrement, dans la mise en valeur des Fortifications-de-Québec;

- de rendre accessible au public les informations pertinentes sur la valeur patrimoniale des fortifications et sur leur potentiel historique, interprétatif et récréatif;

- de favoriser une prise de conscience et de discuter de la problématique de mise en valeur d'un monument intégré en milieu urbain;

- de donner la possibilité à la population de se prononcer sur les différentes hypothèses de mise en valeur proposées dans le plan directeur provisoire, sur l'approche globale du projet aussi bien que sur des interventions spécifiques;

- de permettre aux planificateurs de Parcs Canada d'ajuster les propositions de mise en valeur proposées, afin de répondre aux besoins et aux attentes des utilisateurs et de la population locale;

- de favoriser l'intégration du projet de mise en valeur des fortifications dans le quartier adjacent du Vieux Québec, en tenant compte de la perception qu'a la population de cet ensemble historique.

L'organisation du programme de consultation

Le programme de consultation visera deux clientèles cibles :

- le public en général et plus particulièrement la population touchée par le projet, soit les résidents et les usagers du Vieux Québec;

- divers groupes et organismes représentatifs du milieu ou dont les préoccupations touchent certains aspects du projet.

Le véhicule privilégié par Parcs Canada pour informer et susciter la participation du public est le montage d'une exposition qui comprendra trois éléments :

- la présentation de l'évolution du système défensif de Québec et de ses composantes;

- la présentation des hypothèses d'aménagement contenues dans le projet de mise en valeur des fortifications;

- la projection d'un document audio-visuel reprenant l'information des deux premiers éléments de l'exposition.

Afin de solliciter la participation du public, des avis annonçant l'exposition seront publiés dans les journaux locaux et une invitation personnelle sera adressée, par courrier, à tous les résidents du Vieux-Québec sous forme d'une carte postale.

L'exposition sera ouverte au public sept jours par semaine et des guides seront à la disposition des visiteurs afin d'expliquer l'histoire des fortifications, les enjeux du projet de mise en valeur, d'animer des discussions et de recueillir les commentaires. De plus, un dépliant résumant les propositions de mise en valeur sera distribué aux visiteurs de l'exposition. Afin d'obtenir un feedback systématique sur les principales hypothèses proposées et de faciliter la réponse du public, un questionnaire sera remis aux visiteurs. Enfin, le site Internet de Parcs Canada et celui du lieu historique national des Fortifications-de-Québec présentera tous les éléments d'information et permettra à l'ensemble des Canadiens d'acheminer leurs commentaires.

Pour ce qui est des groupes cibles, plus de cinquante organismes, tels comités de citoyens, associations professionnelles, sociétés savantes, seront invités à se prononcer sur les propositions de mise en valeur. Il est prévu que 70 % des groupes ciblés répondent à l'appel en présentant des mémoires ou en se présentant aux soirées d'information et d'audiences organisées à cet effet par Parcs Canada. Tous les groupes contactés auront reçu au préalable une brochure et un CD-ROM synthétisant le concept de mise en valeur des Fortifications-de-Québec. Les soirées d'audiences permettront de fournir un complément d'information et d'échanger sur le contenu des mémoires.

L'objectif du programme de consultation est de présenter le projet de mise en valeur des fortifications et d'exposer schématiquement les diverses hypothèses d'aménagement. Il ne s'agira pas, pour le public, d'effectuer un choix entre plusieurs options déjà définies. Le programme vise plutôt à susciter des réactions et à proposer des correctifs ou des améliorations aux interventions proposées. Il est évident que les opinions les plus élaborées seront véhiculées surtout dans les mémoires présentés par les groupes et dans les réponses aux questionnaires.

L'évaluation du programme

Le programme de consultation fera l'objet d'un bilan qui sera élaboré à partir des sources suivantes :

- les rapports quotidiens des guides;

- le contenu du livre de commentaires mis à la disposition des visiteurs;

- les questionnaires complétés reçus par Parcs Canada;

- les mémoires et commentaires écrits déposés par les groupes et organismes;

- la synthèse de l'écoute des enregistrements sur bande magnétique effectués lors des audiences;

Le rapport de consultation comprendra :

- une première partie regroupant les idées émises et les recommandations reçues, sur les objectifs généraux du projet et sur l'approche de mise en valeur présentée par Parcs Canada pour les fortifications ;

- une deuxième partie présentant la synthèse des positions du public et des groupes face à chacune des hypothèses de mise en valeur proposées ;

- une troisième partie traçant, en guise de conclusion, un bilan sommaire du programme de consultation et dégageant les principaux éléments qui serviront à réévaluer le projet de mise en valeur et permettant la production d'un plan directeur qui tienne compte des attentes du public.

Conclusion

En somme, un programme de consultations publiques bien monté ont toujours des retombées positives et facilitent grandement la gestion d'une aire patrimoniale. Dans des milieux urbains comme à Québec, ils permettent à la population résidante d'adhérer et de se l'approprier. Pour ces raisons, les consultations publiques sont devenues un outil d'accompagnement essentiel de la démarche de gestion de Parcs Canada.

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25 février 2003

2. La démarche de la Ville de Québec : L'implication de la population dans la préservation de la qualité du milieu de vie à l'intérieur des limites de l'arrondissement historique.

Le premier objectif de la Ville de Québec dans la mise en valeur de son arrondissement historique est d'en **faire un quartier habité et vivant** et non une ville-musée ou un lieu de consommation artificielle dédié uniquement à la fonction touristique. Ainsi, dès la fin des années '70, alors que la Ville, avec le ministère de la Culture et des Communications de la province du Québec, convenaient d'investir massivement dans la mise en valeur de l'arrondissement historique, la Ville de Québec a entrepris de le faire en collaboration avec ses résidents. Il fallait que cette mise en valeur permette de maintenir la population en place, d'y attirer des nouveaux résidents, de leur garantir un milieu de vie de qualité et des services adéquats. La partie ne s'annonçait pas facile parce que déjà les commerces à caractère ludique et touristique, hôtels, bars, restaurants, se développaient considérablement dans ce secteur de la ville, au détriment de l'habitation et des commerces desservant le quartier. Il s'agit là d'un problème qui menace un grand nombre d'arrondissements historiques.

La première tâche que devait réaliser la Ville à cette époque était de doter l'arrondissement historique d'une réglementation d'urbanisme adéquate, contrôlant les fonctions urbaines. La Ville souhaitait que l'ensemble des intervenants concernés, les résidents, la communauté des gens d'affaires et les experts en matière de patrimoine, soient non seulement solidaire de la démarche mais y participent et alimentent le contenu de la réglementation. C'est ainsi qu'en 1977 fut créé **le comité consultatif du Vieux-Québec**.

Cette année-là, la Ville déposa son projet de règlement d'urbanisme, le présenta à l'ensemble de la population, recueillit en assemblée publique les commentaires des groupes et individus concernés et en entreprit, par la suite, l'étude, article par article, avec les membres du comité consultatif nouvellement formé. Durant des mois, le comité consultatif se réunit chaque semaine avec les élus du quartier, les urbanistes et les conseillers juridiques de la Ville, spécialisés en réglementation, pour élaborer une réglementation de zonage qui fasse consensus. Effectivement, un consensus très fort ressortit de cette consultation, ralliant les résidents, la communauté des affaires, qu'il s'agisse des propriétaires de bars, des restaurateurs, des hôteliers ou des marchands, et les spécialistes de la protection du patrimoine : **la vocation résidentielle de l'arrondissement historique devait être préservée.** Pour cela, le nombre de commerces à vocation ludique et touristique alors existant dans l'arrondissement historique était jugé suffisant et ne devait pas augmenter, mais, par contre, devait être maintenu et stabilisé. Les séances de travail permirent de mettre au point une technique réglementaire nouvelle basée sur la gestion des droits acquis qui visait à atteindre cet objectif. Bien que cette réglementation ait été plusieurs fois amendée, ses principes de base, particulièrement innovateurs, sont encore en vigueur dans le quartier historique et ont été adoptés, par la suite, dans plusieurs autres quartiers sensibles de la Ville. Le Comité consultatif, constitué à l'origine pour cet exercice de réglementation, fut institutionnalisé et devint le véhicule officiel de consultation pour le quartier historique et subsiste encore 25 plus tard.

Bien que tout n'ait pas été gagné, il y a eu beaucoup d'implantations de commerces de souvenirs et de T-shirts au détriment du commerce de quartier, la vigilance du comité consultatif a donné

de bons résultats. Ainsi, depuis 1977, le nombre de restaurants, de bars et d'hôtels autorisés dans l'arrondissement historique du Vieux-Québec est, à toute fin pratique, stabilisé. Tout projet d'implantation d'un nouvel établissement de ces catégories dans l'arrondissement historique implique une demande de modification à la réglementation d'urbanisme qui doit être soumise au Comité consultatif du Vieux-Québec pour avis. L'expansion des commerces à caractère ludique et touristique a été considérablement freinée dans l'arrondissement historique malgré la croissance phénoménale de l'industrie touristique laquelle est passée du stade embryonnaire à la fin des années '70 pour accueillir maintenant plus de 4 000 000 de visiteurs par année. Parallèlement, de nombreux logements ont été créés dans l'arrondissement historique et, de 1981 à 2001, la population du Vieux-Québec est passée de quelques 4 000 habitants à plus de 5 086, soit une hausse de 27% en 20 ans. Il s'agit d'une augmentation passablement substantielle pour Québec puisque, durant cette période, plusieurs des autres quartiers centraux de Québec ont subi une baisse de population.

Le comité consultatif du Vieux-Québec

Composition

Le comité consultatif du Vieux-Québec est une création de la Ville de Québec, les membres y sont nommés pour deux ans par le Conseil de la Ville, sous recommandation du Comité exécutif de la Ville, et le nombre ciblé pour ses membres est de onze. Afin d'assurer la meilleure représentativité possible de la population du quartier, le Conseil de Ville en choisit les membres à partir d'une liste de représentants proposés par chacun des organismes du milieu, associations de commerçants, comités de résidents (comités de citoyens ou regroupements des aînés), conseils d'établissements d'enseignement, de culte ou santé, caisses populaires, etc. La Ville ajoute à cette liste des noms de citoyens susceptibles de siéger à ce comité à titre individuel. Les individus inscrits sur cette liste doivent cependant avoir reçu l'appui de la communauté et posséder une expertise dans le domaine du patrimoine. Le conseil a recours au choix de ces individus lorsqu'il faut équilibrer certaines lacunes dans la représentativité du comité (sous-secteur non représenté, manque de représentativité féminine, etc.) ou lorsque que la liste fournie par les organismes du milieu est insuffisante pour y recruter le nombre ciblé de membres pour le comité.

Mandat

Le mandat du comité est de donner des avis au Conseil de Ville sur toute demande de modification à la réglementation d'urbanisme, à la réglementation de circulation ainsi qu'à la réglementation de stationnement dans le quartier du Vieux-Québec, qui correspond à peu de choses près, aux limites de l'arrondissement historique reconnues par l'UNESCO. Le rôle consultatif du comité relativement aux projets de modification à la réglementation d'urbanisme découle directement du mandat originel du comité lors de sa fondation en 1977, soit d'étudier le projet de règlement alors déposé par la Ville et de faire des recommandations au conseil avant son adoption. Par la suite, logiquement, il a été convenu que toute demande de modification à ce règlement lui soit soumise. Cette étape est devenue incontournable lors de l'étude d'une demande de modification au zonage et les avis du comité sont toujours pris en compte par les autorités municipales. La plupart des modifications demandées vise l'implantation de nouveaux restaurants ou hôtels, l'implantation de nouveaux commerces dans des zones résidentielles, l'agrandissement de restaurants ou d'hôtels existants ainsi que, dans une certaine mesure,

l'augmentation de la hauteur des bâtiments. Le comité consultatif se trouve donc ainsi le gardien de la mixité des fonctions dans l'arrondissement de même que le protecteur du maintien des percées visuelles depuis la haute-ville vers le fleuve et depuis le fleuve et la basse-ville vers les fortifications.

Un autre aspect important pour le maintien de la qualité de vie dans le Vieux-Québec est le contrôle de la circulation de transit et du stationnement, notamment sur les rues résidentielles. Pour cette raison, tout projet de modification au pattern de circulation et aux conditions de stationnement dans le quartier est aussi soumis, pour avis, au comité consultatif.

Mode de fonctionnement

Le comité consultatif du Vieux-Québec est une instance créée par l'administration de la Ville de Québec. Ce comité n'a pas de pouvoir d'initiative, il est convoqué au besoin, à la demande de la Ville, et celle-ci dresse l'agenda des réunions et rédige les procès-verbaux. Un professionnel du Bureau des consultations publiques de la Ville en assure l'animation et le secrétariat. Les séances du comité sont publiques et la population y est conviée, selon la portée et l'importance des sujets discutés, par avis public dans les journaux ou par un avis de convocation spécifiquement distribué par la poste à chacun des résidents. Bien que d'envergure plus locale, comme pour les processus de Parcs Canada, les consultations se déroulent en trois phases :

1. Information : Le professionnel de la Ville responsable du dossier effectue généralement la présentation de la demande, des non-conformités qu'elle présente et des scénarios possibles de solutions. L'élu du quartier présente ensuite les enjeux de la demande. S'il le désire le requérant peut, à son tour, présenté son projet et en faire la promotion.

2. Questions et commentaires : Les membres de l'auditoire sont ensuite conviés à poser des questions aux intervenants, professionnels de la Ville, élus ou requérant et à formuler leurs commentaires et avis sur la question.

3. Bilan et rétroaction : Le comité délibère par la suite en public de la question. Ces délibérations débouchent sur des propositions sur lesquelles votent les membres, s'il y a lieu. Les recommandations approuvées à la majorité sont consignées et argumentées dans un rapport de consultation qui est acheminé aux autorités de la Ville qui les prennent en considération dans leur prise de décision.

Comme pour Parcs Canada, l'objectif de la consultation est de présenter la problématique de la demande et ses enjeux et d'exposer schématiquement les diverses hypothèses de solution. Il ne s'agit pas d'effectuer un choix entre plusieurs options déjà définies mais de susciter des réactions et proposer des correctifs ou des améliorations qui rendraient le projet ou la demande acceptable.

Autres formes de consultation

Le comité consultatif du Vieux-Québec est le véhicule principal de la Ville de Québec pour consulter la population de ce quartier et la plupart des problèmes d'aménagement les plus courants relève de leur compétence. Cependant, comme le quartier historique du Vieux-Québec a un rayonnement national et international, des intérêts qui dépassent ceux de la population locale

y sont aussi en jeu. Dans le cas où les problématiques soulèvent des enjeux qui vont au-delà de l'intérêt des résidents du quartier, la Ville a recours à d'autres formes de consultation publique et étend sa consultation à un bassin plus étendu d'intervenants. La Ville forme alors des comités de travail et de suivi ad hoc dont le mandat est directement relié à une problématique bien précise, comme se fut le cas pour la problématique des autocars touristiques ou a recours à des audiences publiques, comme se fut le cas, récemment, pour l'implantation d'un terminal de croisières sur les quais longeant la façade fluviale de l'arrondissement historique. Ces consultations de plus grande envergure sont souvent réalisées en partenariat avec d'autres niveaux de gouvernement mais, dans tous les cas, les résidents et la communauté des affaires du quartier historique, par le biais du comité consultatif, y sont toujours représentés et écoutés en tant qu intervenants privilégiés.

Conclusion

La participation directe de la population à la mise en valeur de l'arrondissement historique est à l'origine d'un des fondements de la vie démocratique municipale à Québec. La pratique de la consultation publique, initiée à la fin des années '70 par la création du comité consultatif du Vieux-Québec, a pris rapidement de l'expansion suite aux résultats de cette première expérience qui a suscité de l'intérêt autant auprès de la population qu'auprès des élus de la Ville. L'expérience du Vieux-Québec a servi de modèle à l'ensemble des quartiers de la Ville qui se sont, un à un, doté d'un comité consultatif au fur et à mesure que la Ville y déposait un nouveau projet de réglementation d'urbanisme. Cette notion de comité consultatif a même évoluée. Bien que le quartier historique ait choisi de conserver son institution initiale, dans plusieurs quartiers, les comités consultatifs ont évolué vers une autre forme plus sophistiquée, les conseils de quartier. Ces conseils qui ont des pouvoirs d'initiative, détiennent les mêmes mandats de consultation sur les questions d'urbanisme, de circulation et de stationnement mais leurs membres sont élus par la population locale, sont constitués en OSBL et disposent d'une enveloppe budgétaire qu'ils ont la discrétion d'affecter, dans le cadre de leur juridiction, à la réalisation de certains aménagements ou études jugés prioritaires pour leur quartier.

La loi du gouvernement du Québec qui a créé la Ville de Québec et lui confère ses pouvoirs lui impose certaines obligations de consultation auprès de la population en matière d'urbanisme mais la Ville a choisi d'aller beaucoup plus loin en cette matière et fait de la consultation de sa population l'une de ses priorités. Elle se fait un devoir et un point d'honneur de tenir compte de l'opinion de sa population pour toutes ses décisions en matière d'urbanisme et d'aménagement. Et, malgré le fait qu'ainsi, les procédures de mise en œuvre de certains projets soient plus longues, les résultats obtenus dans l'amélioration de la qualité de vie dans ses quartiers et le taux de satisfaction de sa population envers son administration municipale témoignent en faveur de la justesse de ce choix.

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RHODES SYMPOSIUM 2003 - OCPM

APORTACIÓN ENVIADA POR EL REAL SITIO Y VILLA DE ARANJUEZ

PAISAJE CULTURAL PATRIMONIO DE LA HUMANIDAD

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PONENCIA – CUERPO GENERAL

TITULO

LA BELLEZA NECESARIA

Introducción:

En el mes de octubre de 2002, y en el marco legislativo vigente fue presentado ante el órgano regional competente un Estudio para la Rehabilitación Integral de los inmuebles que constituyen el tejido urbano del Conjunto Histórico del Real Sitio y Villa de Aranjuez, es decir, los inmuebles de propiedad privada con uso primordialmente residencial.

Al margen de otras operaciones constructivas de gran importancia presupuestaria llevadas a cabo en la Ciudad relacionadas con la restauración o rehabilitación, las intervenciones promovidas por el citado estudio se circunscriben específicamente al ámbito de la conservación, cifrándose su coste económico en 34.200.000 Euros.

La ponencia que se presenta parte de la premisa básica de la insuficiencia de dicha dotación económica.

Dicha dotación resulta insuficiente no por la cuantía monetaria asignada, sino porque en sí misma no supone atención alguna a cuestiones de orden cualitativo, imprescindibles para la conservación efectiva del patrimonio heredado.

A) Asumida esta necesidad, se plantea el siguiente **objetivo**:

Despertar la atención hacia la comprensión de los valores estéticos que conforman espacialmente el Conjunto Histórico de Aranjuez como proceso de adquisición mental sin el cual no es posible proteger dicho fenómeno artístico.

Para abordar la cuestión, en primer lugar han de aceptarse las características esenciales que definen los problemas de la situación actual en el ámbito que nos ocupa:

A1.- La situación actual está completamente inmersa en un discurrir del paso del tiempo poco o nada proclive al arraigo y desarrollo de la serenidad.

Esta serenidad es imprescindible como estado anímico capaz de permitir la adecuada percepción del entorno y la realización de determinadas capacidades humanas. (Es imposible acariciar con prisa)

A2.- Es necesario diferenciar con absoluta claridad la percepción de quienes visitan la ciudad de modo expreso para su disfrute (turistas), de la percepción de quienes la habitan y con su actividad la modifican lenta e indefinidamente otorgándole su carácter.

A3.- La situación actual transmite valores confusos hacia la distinción entre los conceptos valor y precio.

A4.- Es necesario admitir abiertamente que la belleza sirve, que sirve para la salud anímica y que su carácter es esencialmente cualitativo.

B) Contenido:

Se propone la elaboración de un Plan para acercar a todas las personas hacia una comprensión calmada y crítica de del espacio en el que desarrollan su cotidianeidad a través de sus propias capacidades, con la finalidad de que a través de la consciencia de su disfrute, protejan los valores de su entorno.

Es posible analizar la percepción global mediante su descomposición sensorial:

B.1.- Sensorialmente ha de enseñarse a distinguir entre los estímulos procedentes a través de los sentidos como elementos sinérgicos encauzados hacia la elaboración de un sentimiento.

Estos estímulos no sólo han sido estudiados por la psicología, sino que han sido y son legalmente regulados en la mayoría de los países mediante normativas de obligado cumplimiento de distinto ámbito con establecimiento de escalas de valores cuantitativos al respecto como garantías hacia el control del entorno para el bienestar humano.

Dicha regulación de los parámetros relacionados con los estímulos sensitivos ha de ser transmitida con ejemplos prácticos a los ciudadanos a fin de que conozcan su incidencia y valoren su entorno.

B.2.- Tras el análisis específico de las capacidades sensoriales ha de analizarse la memoria en sus diversos aspectos como elemento independiente formador del sentimiento.

La toma de conciencia de los ingredientes esenciales que forman la composición estética del paisaje de la ciudad puede ser entendida como el conocimiento de la Historia de la Ciudad, más que como conjunto de tríos fecha - nombre - acontecimiento, como esclarecimiento de la razón de ser de cada presencia física de los elementos que la configuran.

B.3.- Simultáneamente a lo anterior, todo ha de dirigirse hacia la regeneración renovada del sentimiento estético como fin último al que aspirar dentro del plan propuesto, la percepción de la belleza como ingrediente cotidiano exclusivamente humano, alcanzable al margen de cuestiones monetarias porque, tal y como ha sido planteado, sirve.

Para ello ha de potenciarse la capacidad de sentir como acto unido a la actividad cerebral de pensar.

C) Método:

Para llevar a cabo el objetivo marcado, el Plan diseñado se basa en la sensibilización de la población residente mediante las siguientes acciones:

C1a.- Explicación de la afección de los sentidos por el entorno.
C1b.- Puesta en valor de sensaciones cotidianas confortables.
C1c.- Capacidad individual de disfrute y destrucción de sensaciones.

C2.- Transmisión de la Historia de la Ciudad como organismo fruto de la intervención continuada.

C3.- Toma de conciencia de la importancia de cada intervención mediante visitas a obras de conservación, rehabilitación, restauración o renovación.

C4.- Visitas de disfrute consciente por la Ciudad.

D) Atmósfera:

D1.- Todas las acciones se dirigen a la población residente, particularmente a quienes se encuentren en edad escolar y a los propietarios de inmuebles objeto de intervención rehabilitadora.

D2.- Todas las acciones deben realizarse necesariamente de forma lenta.

D3.- Todas las acciones deben estar presididas por la idea básica a transmitir consistente en que importa más la cualidad, el cómo, que la cantidad, el qué, en lo que a la belleza del entorno se refiere, como se deduce de la no existencia de Bienes de Interés Cultural debido a su precio, sino al contrario, su valor lo es en función de su cualidad.

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THE ASSESSMENT OF IMMATERIAL VALUES OF URBAN HISTORIC CENTERS: THE EUROPEAN "SUIT" PROJECT

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Abstract

The European SUIT (Note[1]) research project aims at establishing a flexible and consistent assessment methodology to assist with the active conservation of urban historical areas. This methodology is designed to help municipalities and local authorities in assessing the suitability of new urban developments that would promote the sustainable exploitation of urban and architectural cultural heritage. The rationale supporting the research project is based on the assumption that existing European directives would be applicable to the conservation of cultural heritage.
The identified directives are from three particular ~~origin~~origins. They are addressing the Right of Information, the Environmental Impact Assessments and Strategic Environmental Assessments.

Interestingly the cultural heritage, as defined by these three legal instruments, covers both material assets and immaterial heritage. It has been reflected in the SUIT research project by a consideration for immaterial urban heritage values. Hence cultural artefacts, like public places, common buildings or even distinctive urban patterns, should be part of the assessments, especially when local people, know-how and affects consider them as significant. The conservation of their integrity hence appears in the SUIT project as a priority for the protection and enhancement of a necessary cultural diversity in urban areas including modern developments.

Introduction

While it was once considered as a major impediment to a continued urban development, the conservation of the built heritage presently appears as one of the cornerstones of the *urban renaissance* advocated for by most European authorities, at every level of decision-making, from the European Union itself to the municipal authorities. Actually, it is increasingly considered that the sprawl, the d~~e~~esurbanisation and the increased competition between cities witnessed during the last decades not only hamper environmental and economical resources, but also cultural ones. Despite large differences in spatial and administrative organisations, European cities indeed belong to what is usually termed a European model of society, as they are characterized by a relatively low speed of transformation (especially when compared to their American counterparts), and ~~-~~a continuous reuse of past structures and fabrics, may they be material or immaterial. This specific European model deserves due attention if it is to be kept alive and transmitted to future generations.

Obviously the questions raised by the conservation of this heritage are not entirely new. They have led, since the beginning of the century, to the development of two complimentary approaches.

A first approach mainly concentrated on the preservation and renovation of listed monuments and individual buildings of great cultural value. This "emergency approach" has been rapidly criticised for its limited efficiency. The most significant remarks concerned its incapacity to protect heritage buildings from damages caused by inappropriate developments located in their close surrounding. Another marked point is the difficulty to implant new functions within urban areas that would be compatible with the strong requirements implied by the protection of the heritage integrity. And finally, heritage buildings cost a lot to maintain and, as the community cannot always find compatible uses to valorise it, ~~they are usually not considered as profitable investment by individual actors~~individual actors do usually not consider them as profitable investment. The listed-heritage buildings maintenance costs would then fall completely under the scarce public-money dependency, either through indirect economical incentives (tax abatement, primes etc.) or even direct investments.

The second approach to built heritage conservation is an extension of the first one. It consists in associating to each listed individual monument a sort of buffer zone aimed at providing the individual monument with a "packing-case" at its scale and dependency. This approach progressively led to consider entire urban areas as heritage objects, and to apply them specific regulations in the view of their protection. The risk here is a progressive 'commodification' (Note[2]) of large urban areas, and the subsequent loss of cultural diversity, if their sole or too exclusive function consists of the ~~touristic~~tourist exploitation of their historical character. Another subsequent risk is the population drain to more living parts and then the reduction of the district people diversity.

These two approaches constitute the structuring (indeed almost hidden) structure of the present paper. It is hereby considered that they failed to address some important characteristics of the urban heritage, amongst which the immaterial urban artefacts or the public accountability of the conservation management.

Towards an active conservation of urban heritage.

Broadening progressively the scope of the heritage concept in order to include a larger variety of objects has had a deep impact on the way to manage them. In a first time, it has been considered that processes and criteria developed in the context of isolated monuments (castles and churches) could be readily transposed to urban conservation. Practically, such a straight transposition has led to stress the notions of authenticity and scarcity, which were largely dominant in this approach. But, very rapidly, it appears that the excessive importance given to these classical criteria was irrelevant. In fact, when considering larger architectural ensemble, it is not so much the individual quality of buildings than the homogeneity and legibility of the ensemble that have to be considered. Therefore the economic question, which may not be the crucial one in monument conservation, becomes truly central. Moreover it also enlarges the number and the diversity of actors involved and subsequently the various values attached to heritage assets. And it is well known that divergence of values uses to trigger conflicting claims and behaviours…

As mentioned here above, when considering a whole urban fragment at a time, the criteria for cultural heritage identification, conservation and integration in urban setting cannot be simply those used by experts in monuments conservation (i.e. authenticity, rarity, aesthetic or symbolic value, etc.). Even the simple set of morphological constraints imposed to the "urban context" aimed at protecting an individual monument becomes rapidly unacceptable in such a complex situation. It definitely needs a better argumentation than just an authoritative expert decision.

These limitations have led us to propose developing a new approach called *active conservation* of the built heritage. It has indeed already been considered above that there is a real danger to see the present historical city centres becoming open-air museums if the contained built heritage, urban assets and networks cannot find new socio-economic uses. When the townscape, the street patterns and the plan of the plots are treated as heritage (when applicable), it always has implication for the functioning of the city as a whole. "Current and future land-uses, traffic circulation and not least, the demographic and social composition, in such areas become involved in conservation issues" (Ashworth et all.[2]). The aim of active conservation strategies would precisely be to achieve a better integration of urban heritage within the rest of the town so as to generate the investment, local developments and citizens' involvement needed to conserve it in a sustainable perspective.

Integration of active conservation policies within the existing Environmental Assessment instruments (EIA & SEA).

The preservation of cultural heritage falls under the scope of numerous European Union policies (Teller et all.[4]). First and foremost Article 151 of the Treaty (ex. Article 128) states that *"The Community shall contribute to the flowering of the cultures of the Member States, while respecting their national and regional diversity and at the same time bringing common cultural heritage to the fore"*. Yet the recent acceleration of European integration (common monetary unit, enlargement process etc.) combined with the growing speed of globalisation raised real anxieties among citizens of the Union that what they perceive as their culture, in the broader meaning, may be harmed by foreign or centralised regulations.

Considering these concerns, Article 151 of the Treaty adopts a very cautious approach with respect to the subsidiarity principle. Point 5 of this Article explicitly requires that the Council activities are limited to incentive measures, *excluding any harmonisation of the laws and regulations of the Member States*. It also states that the Council shall act unanimously in cultural matters, which appears a serious restriction to a coordinated European cultural policy. It has still to be acknowledged that culture is likely to be affected by a number of other EC policies. It is important to remember in this respect that point 5 of Article 151 of the Treaty does not affect the bases on which a number of harmonisation measures with a cultural dimension have already been, and continue to be, taken in other EC competency areas. Amongst these are the social and human resources policy, the cohesion and regional development policy and the competition policy.

But it is mostly European environmental policies that will retain our attention in this regard. Interestingly, since their initial implementation in 1972, it can indeed be observed that environmental policies have progressively involved more of a cultural heritage dimension, be it through incentive measures (LIFE program for instance) or through the scope of their directives and guidance. As soon as the environment is considered as being modified by the

interaction between people and nature, it is clear that nearly all our present landscapes are characterised by a strong cultural stance. This has led to a progressive extension of the definition of environment, which now includes a human and cultural dimension besides the traditional ones.

The right of information.

The 'Marais' -experiment in Paris highlighted how much conservation could become a way to foster gentrification: "the sequence of restoration, higher rents and social change has been well-established with 20,000 residents moving out and a rather smaller number moving in since the project began. Whether higher land-values are a result or a cause of the replacement of working-class housing and small workshops by high-rent apartments is not clear, but the change in the function of the area is" (Burtenshaw[5]). ~~The question on H~~how to conserve the urban built heritage while avoiding dramatic changes to the existing social network is a question still open at the moment. Considering this, it seems crucial to increase the citizens and public control over the operations in order to improve the accountability of the decision-making. The Aarhus Convention and the European directive on the public access to environmental information appear as an appropriate legislative context for this action.

Initially designed to build upon the experience gained through the application of the Directive 90/313/EEC, on freedom of access to information on the environment, the Aarhus Convention (Aarhus[6]) has notably contributed to this extension. Yet, besides "elements" and "factors/activities", the two traditional dimensions of the environment, it added a third bullet considering human and cultural aspects *"inasmuch as they are or may be affected by the state of elements of the environment or, through these elements, by the factors, activities or measures"*. Therefore, cultural sites, even though immaterial like the urban form, should now explicitly acknowledged as genuine environmental concerns. It has also been stressed that the phrasing of the objectives of the Convention shifted from ensuring a "freedom of access", as required by the Directive 90/313, to guaranteeing effective "rights of access to information" and public participation in environmental matters.

Given these new developments and the number of amendments required, the Commission proposed to replace the existing Directive 90/313/EEC rather than to amend it. A first Directive proposal has been issued by the Commission in June 2000 which has now to follow the traditional adoption procedure (CEC[7]).

The proposed Directive adopts the broader definition of the environment used by the Aarhus Convention. *"The 'environmental information' shall mean any information in written, visual, aural, electronic or any accessible form on: (...) (f) the state of human health and safety, conditions of human life, cultural sites and built structures in as much they are or may be affected by the state of the elements of the environment referred to in (a) or, through those elements, by any of the matters referred to in (b) to (d)."*

The existing Environmental European Directives: EIA & SEA.

The right of access to information truly appears as a valuable contribution to a greater environmental awareness, transparency and debate. It can still be argued that environmental information would not really foster a pro-active decision-making since it mostly covers existing effects, factors or discharges. Hence this model of information would keep assuming an *ex post* decision-making, through recourses, protest or any form of reaction against

existing environmental nuisances. Environmental Impact Assessment may be an answer to this issue as it basically tends to reverse the "burden of the proof" —as has already been the case for quite a long time in other industrial sectors such as the pharmaceutical industry for instance. In this approach, it is up to the developer to demonstrate *ex ante* that its scheme is not excessively harmful for the environment in its broader meaning.

The European Directive 85/337/EEC established, in 1985, a first European-wide framework for environmental impact assessment. One of its major aims was to reduce the existing disparities between Member States with regard to environmental protection. It was, in the early eighties, considered that such disparities might constitute a bias towards competition and thereby *"affect the functioning of the common market"*. This Directive did require the consideration of effects of projects on "*architectural and archaeological heritage*" from July 1988. The Directive 85/337/EEC has since been transposed in national law by the different Member States. Some twelve years later it had to be amended by Directive 97/11/EC. This new Directive gives provision to identify, describe and assess in an appropriate manner the direct and indirect effects of a private or public particular project on factors including *"landscape, material assets and cultural heritage"* Which recognises the restricted nature of the definition used in the 1985 Directive, and extends its scope to immaterial heritage.

Interestingly the Annex III of the Directive 97/11/EC gave more precise criteria to determine whether an EIA is needed (environmental screening). Among the project location's criteria, we now find "*... (e) areas classified or protected under Member States' legislation*", referring to Member States' designated areas like some urban historical areas, but also "*... (g) densely populated areas, and (h) landscapes of historical, cultural or archaeological significance*". Among the characteristics of the impact, we now find the issue of reversibility. It may prove to be a crucial factor when heritage is involved.

These new dispositions should imply a greater consideration for urban heritage issues in future EIA. Still it has to be acknowledged that the methodological background to support this trend is not yet ready, as clearly reflected by the limited number of publications dealing with cultural heritage impact assessment as compared with other specialised fields of assessment —social impact or health impact for instance. There still exist very few specific guidelines about how to consider cultural heritage issues in an Environmental Assessment. Existing documents too often consider cultural heritage as one of many environmental topics and under-estimate the distinctive features of heritage conservation compared to ecological or natural protection (water, air, soils, etc.). The few documents that specifically addressing cultural heritage issues either tend to provide broad and general advice (see i.e. the guidelines of the World Bank (World.Bank[8])) or stay at the survey stage of the assessment (see i.e. InterSAVE[9]).

In these conditions, it is no surprise that research confirms that EIA practice does not consistently consider cultural heritage at least in the UK (King[10]), and there is evidence that the lack of consideration of cultural heritage in EIA is not just a European problem as it has been shown to be the case in the European Union as a whole (Bond et all.[11]). The screening and scoping stage of the procedure are too heavily focused on listed monuments, and the assessment of the likely impacts of contemporary projects upon existing heritage is usually sketchy if not inexistent. Also, the consideration of alternatives is too often limited to the

location of the project. This is probably not so relevant when heritage values are at stake. The long tradition of heritage charters and documents, briefly summarized here above, actually paves the way towards ways of deriving alternatives, usually much subtler than simply playing on the location. ~~So~~ However, this will need~~the point of~~ developing methods that could foster a~~n~~ ~~accountable~~ responsible consideration of urban heritage, and especially immaterial heritage, at the different steps of the EIA procedure.

The Strategic~~al~~ Environmental Assessment.

The public authorities role in the urban conservation context has dramatically changed in its scope. It is no longer restricted to the production of rules nor limited to direct financial support as it was in the past. These two aspects obviously remain present, especially when dealing with major and trusted heritage, but the regulating role of public authorities has been extended to more dynamic aspects. The public authorities have often to act as a *facilitator* (between convergent yet fragmented stakeholders' interests i.e.), as a *mediator* (between private actors and higher political levels i.e.) or even as an *effector* (between general rules and their local transposition i.e.). Municipalities that have a better knowledge of the local situation and closer relations with the stakeholders, best hold these new roles, but they obviously need a strong institutional and methodological framework to do so. Especially in those small and medium size cities where skills and means are often scarce.

Accordingly it has now been acknowledged by the European Commission that the EIA procedures have to be completed by Strategic~~al~~ Environmental Assessment (SEA) if they are to address the likely impacts and introduce involved actors much sooner in the decision process (COM-92[12]). SEA has been defined as: *"...the formalised, systematic and comprehensive process of evaluating the environmental impacts of a policy, plan or programme and its alternatives, the preparation of a written report on the findings, and the use of the findings in publicly accountable decision-making* (Therivel et all.[13]).

The recently adopted European Directive (EU.Parmement and Council [14]) suggests that SEA would typically deal with plans and programmes that condition the future development consent (COM (99)73[15]). Local authorities, sometimes in partnership with private actors, often prepare urban development projects using adapted local plans or conservation schemes. The assessment of these legal documents is a way to extend the democratic control over the whole decision-making cycle. Consequently, the Forthcoming SEA framework appears as an ideal support for the development of an active conservation strategies, respectful of sustainable development and cultural identity issues.

Annex I of the Directive requires, *inter alia*, that the likely significant effects on the environment should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects (as in the EIA Directive). Additionally, these should be "*identified, described and evaluated in the environmental report*", instead of simply described as stipulated in the EIA Directive. The environmental aspects to be dealt with in the environmental report should include "*cultural heritage including architectural and archaeological heritage*". It has to be stressed the word "impact" has been dropped and changed into "effect". This should allow the consideration of both negative AND positive effects, in order to compare the alternatives more objectively. This is important when promoting the active conservation of urban heritage, as the outcome of

conservation should not be to freeze development or to transform cities into open-air museums. Instead, a sustainable maintenance of the urban heritage implies a sustained transformation. When considering this continuous process, it is of prime importance to consider both positive and negative effects of development, in order to balance the risk of the "No-Action" alternative (obsolescence and decay) with the one of overshoot (destruction and loss of identity).

The SEA Directive has thus the potential to increase the level of accountability of area-based conservation strategies throughout Europe. Besides addressing plans and programmes, it forces the consideration of positive and negative outcomes and the consideration of alternatives. It also tends to involve non-governmental organisations, whose role has often been essential in the domain of heritage conservation. Nevertheless, until now, SEA has mainly been applied to land-use plans, because the formulation of these plans is already iterative, publicly open and geo-politically well defined (Curran[16]), which is not the case for active conservation policies. Once again it will require an appropriate methodological framework to become fully effective in practice, especially if it is to consider the conservation of immaterial urban heritage.

The SUIT research project.

Considering the general context described here above, the SUIT project (Sustainable development of Urban historical areas through an active Integration within Towns) has been successfully proposed as an answer to the EC 5th Framework Programme, spring 2000 call for proposal. It has been hosted in the Theme "European and Sustainable Development", Key action 4: The City of Tomorrow and Cultural Heritage, Action 4.2.3: Foster integration of cultural heritage in the urban setting. The SUIT research project started on 2000 December 01, for a period of three years.

The SUIT project aims at establishing a flexible and consistent Environmental Assessment methodology to assist with the active conservation of historical areas also called urban fragments. This methodology is presently designed to help municipalities and local authorities in assessing the suitability of urban projects, which will promote a sustainable exploitation of *urban and architectural cultural heritage*. The methodology will also help *to match existing historical areas with current socio-economic requirements*, through an *active integration* of this heritage within new urban revitalisation projects.

Development of an Environmental Assessment methodology devoted to the active conservation of urban heritage.

The SUIT research project main objective is to define a *generic, integrated EA methodology*, specifically devoted to the active conservation of urban heritage. When transposed to State or Regional legal context, the adapted methodology will be used by municipalities and local authorities wishing to review the effect of *local plans or programmes (SEA)* as well as the impact of certain public or private *development projects (EIA)* on historical urban fragments.

The methodology is based on existing European Environmental Assessment procedures: Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA), briefly described here above. It has been designed for use by municipalities in those cases where they have to regulate important urban development present-day projects taking place within the limits or inside historical urban areas.

The integrated EA methodology will be described and documented through a guideline summarising the experience gathered during the research project development. This guideline will provide precise recommendations to municipalities about how to organise the overall Environmental Assessment process, from the preliminary meetings (intended to define heritage values and valuable project intentions) to the practical evaluation of conservation measures adopted in the development project.

The EA methodology addresses local conservation plans (SEA) as well as specific projects (EIA) or any combination of them. It proposes adapted screening and scoping procedures, innovative assessment methods for alternatives comparison, visual formalisms to make "visible the invisible", specific rules and protocols for an improved public participation in urban heritage appraisal.

Development of tools and methods devoted to urban historical-fragments quality analysis, capable to support an objective and reliable Environmental Assessment procedure.

Considering this overall objective, the project will develop a multi-dimensional decision-matrix gathering the existing cultural heritage analysis methods (at large) organised along the various Environmental Assessment process stages. According to the specified situation, the matrix helps municipalities to identify the major risks and eventually select an appropriate method to handle them. The matrix is progressively completed by selected tool development so as to consider the specificity of historical areas more reliably. These tools will be designed to increase the intelligibility of the information communicated by local authorities and municipalities to concerned stakeholders. They address, besides the usual conservation measures, the four following methods that are more oriented to the integration aspects of the active conservation procedures and more innovative in the SUIT context.

- *Morphological analyses:* integration methods for immaterial but visible aspects of the active conservation. They concern both the urban built form and the urban open space form. They are significant approaches to the built environment regulation. It is due to their capability to manage, at the same time and in the same representation, the specific features of the build heritage and the new project shapes, to assess their mutual impact and their joint effect on the urban form seen as an immaterial cultural heritage.

- *Life-cycle analysis and sustainability indicators:* integration methods for immaterial and invisible aspects of the active conservation. The concept of sustainability and sustainable development is very broad and conceptually integrates numerous qualitative and quantitative aspects. Of course, no attempt will be made at reinventing again a new and exhaustive list of indicators. Most of the research efforts will be concentrated on to main aspects. First, a list of specific indicators will be prepared for cultural heritage asset conservation at the urban fragment scale. Life-cycle analysis will be the fair means to integrate the time duration aspects of urban objects (historical, existing and new planned buildings) located in the concerned urban fragment. Second, a central concern of this task is to render the complex information claimed by EA methods intelligible to actors from different educational and social backgrounds. All attempts to global aggregation of a large number of qualitative and quantitative criteria leads to indexes, simple to handle, but with little practical significance. The optimal solution is considered to result from social and political consensus and not from "scientific" results. They are absolutely inappropriate in a dynamic — open social and political — discussion context, which is aimed at obtaining a

consensus, based on a common vision of the future. Therefore, the key aspect here will be to develop appropriate techniques to aggregate a set of different indicators into scenarios

- *Visual perception:* protocols for the application of visualisation techniques to participatory morphological analysis. Evaluating the quality of existing historical areas is fundamentally different from evaluating the perceived qualities of a historical area through models (may they be computer based or not). In this task we intend to examine different methods of presenting new developments to different groups of users. This is intended to help them assessing the quality of these proposals. The task involves testing the sensitivity of the different groups to a variety of presentation tools: from Virtual Reality models to spherical projection of urban spaces. The research will focus mainly on currently available tools and methods rather than introduce new tools; the overall intention being to develop protocols for the effective application of these tools to the participatory Environmental appraisal of plans and projects.
- *Participative methods:* this last set of tools enlightens the necessity, in such a negotiation context, to reach an acceptable level of mutual confidence among the people involved in Environmental Assessment procedures. The best understanding of the partners requires the availability, as well as the progressive constitution of a common urban culture that is usually missing among lay people and experts as well as among experts from different backgrounds. It means to develop negotiation and approval procedures (mitigation and compensation methods), which are at the essence of the EA process. One of the aims of the project is to increase the accountability of these activities through an improved transparency, and participation of stakeholders.

Conclusions

Municipalities, town councils and, more generally speaking, local authorities are the public bodies politically responsible for the active conservation of historical areas. Nevertheless they cannot claim to control nor decide on all the transformations that contribute to the urban development. They are caught between legal responsibilities enshrined in European and national legislation and responsibilities towards their constituents. Furthermore, given their acknowledged lack of financial means and political leadership, they are required to embrace an increasing diversity of participants—heritage protection bodies, private developers, global corporations, special interest groups and citizens—in the decision making processes that mould future urban landscapes. The management of this emerging political situation requires the availability of open ad hoc procedures to bring social adherence to the decisions.

In such a chaotic context, new kind of heritage experts (more pro-active and less reactive) can play an important role in producing very efficient argumentation's, better strategic plans and more convincing analysis aimed at reinforcing the local authority capabilities to urge the involved participants taking the built heritage integration into consideration. Efficiently intervening in such a complex situation (knowing that technical mistakes, unresolved conflicts and misunderstandings among partners could produce severe penalties on the built heritage itself) requires a high level of competence and a clear definition of new behaviours and better adapted roles for the expert to play, for instance: sensor, facilitator, effector, etc. Decision-makers generally lack the conceptual framework to do so, whether in terms of methodological experience, efficient tools to describe and simulate the

outcome of complex situations or examples of best practice gained through successful as well as unsuccessful actual applications.

The active conservation of historical areas should fall under the present EA methodologies: Strategic Environmental Assessment (SEA) for local plans and programmes and Environment Impact Assessment (EIA) for development and revitalisation projects. These instruments constitute a reference framework for the SUIT research project since both directives mostly focus on the decision-making process rather than to the final "product". By this way, they allow for enough flexibility to be transposable from one Member State to another. These procedures formalise the decision-making process through a precise scoping (which projects are to be considered and which are not), and screening (which environmental issues to take into account), as well as precise requirements about citizens' participation and alternative assessment. Yet they still present some lacunas when dealing with cultural heritage that proves to be rather difficult to quantify, measure or simply compare.

This, certainly justify the SUIT research effort.

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A PROPOSAL FOR EARTHQUAKE RETROFIT OF RESIDENTIAL APARTMENT BUILDINGS IN ISTANBUL

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1. Background and General Considerations

Turkey ranks high among countries, which have suffered losses of life and property due to earthquakes over many centuries. So far in this century there have been earthquakes that caused loss of life in Turkey with total of over 110,000 deaths, about 250,000 hospitalised injuries and close to 600,000 destroyed housing units.
Following the losses suffered during the two major earthquakes that struck Turkey in 1999, there has been a broad recognition among Turkey's governmental, non-governmental and academic organizations of the need for extensive response planning based on detailed risk analyses of likely seismic hazards in Turkey general and, Istanbul, in particular.
In recent decades earthquake disaster risks in urban centers of Turkey have increased mainly due to very high rate of urbanization, faulty land-use planning and construction, inadequate infrastructure and services, and environmental degradation. Several studies conducted (Erdik and Aydinoglu, 2002) has shown that the vulnerabilities of Turkish building stock are at least an order of magnitude higher than their counterparts in California, which shares comparable level of earthquake hazard. The reasons for this high vulnerability can be traced back to several reasons. Essentially the building development system was conducive to poor construction due to high (chronic) rate of inflation (consequently very limited mortgage and insurance, impediment to large scale development and industrialization of the construction sector), high rate of urbanization (which created the demand for inexpensive housing), ineffective control/supervision of design/construction, regulations with limited enforcement, no accountability and government acting as a free insurer of earthquake risk.
The other important source of the increased risk in Istanbul is the unprecedented increase of the probability of occurrence of a large earthquake (which stands at about 65% during the coming 30 years).
The inevitability of the occurrence of such a large earthquake in Istanbul makes it imperative that certain preparedness and emergency procedures be contrived in the event of and prior to an earthquake disaster, which in turn requires the quantification of effects of the earthquake on physical and social environment and subsequently, the development of urban earthquake risk mitigation master plans that develops and elaborates on short and long term strategies.
This study first summarizes the study conducted by the Department of Earthquake Engineering with support from American Red Cross (BU-EQE, 2002) on the assessment of building losses in Istanbul as a result of a major earthquake. The second part of the paper elaborates on a building retrofit strategy that can be adopted for cost-effective mitigation of life losses. The metropolitan municipality of Istanbul has recently (October, 2002) signed a memorandum of agreement with the Bogazici, Istanbul Technical, Middle East Technical and Yildiz Technical Universities to develop a comprehensive earthquake risk mitigation master plan that encompasses technical, legislative, administrative, social and economical issues and strategies of large scale retrofit, renewal and relocation campaigns.

2. Estimated Residential Building Losses and Casualties in Istanbul

Earthquake Hazard

For Istanbul, a worst-case scenario earthquake of Magnitude 7.5 is assumed to take place on the Main Marmara Fault. Figure 1 provides a map of earthquake intensities that would result from the scenario earthquake. Using the damage definitions of 1998 European Macroseismic Scale (EMS), a general understanding of damage under exposure to these intensity levels can be gained. For the vulnerability class where the general reinforced concrete multi-story building stock in Istanbul is located, EMS-1998 provides the following damage definitions.

Intensity VII: A few buildings sustain moderate damage
Intensity VIII: Many buildings suffer moderate damage; a few substantial to heavy damage
Intensity IX: Many buildings suffer substantial to heavy damage; a few very heavy damage

Where "Few" describes less than 20% and "Many" describes between 20% and 60%.

Inventory of Elements at Risk

In urban areas, buildings, population, lifeline systems and socio-economic activities constitute the "elements at risk". Buildings and lifeline systems are generally termed "Built Environment". Building inventory data is compiled from Istanbul Metropolitan Municipality and State Statistical Institute complemented by Turk Telekom analog maps, imagery from helicopter flights and aerial and satellite imagery. Classification of buildings in Istanbul is essential to ensure a uniform interpretation of data and results. The building inventory is classified using three basic categories on Structural Systems, Number of Stories and Year of Construction. Each category is further subdivided into groups to yield 24 different building classes. Istanbul Metropolitan Area was divided into grids as 0.005° x 0.005° (approximately 400 m x 600 m) cells for aggregation of hazard and physical inventory data. The day and night time population of 28 districts were determined, and then assigned to the geo-cells in order to calculate the human losses in Istanbul due to a major earthquake. The population and building data for Istanbul have been obtained from the State Statistics Institute. For the determination of day population, Istanbul Transportation Master Plan, which is prepared by Municipality of Istanbul Metropolitan in 1997, is been utilized.

Vulnerabilities

There are two main approaches for generating vulnerability relationships. The first approach is based on damage data obtained from field observations after an earthquake or from experiments. The second approach is based on numerical analysis of the structure, either through detailed time-history analysis or through simplified methods.

In the earthquake loss scenario developed for Istanbul have used building vulnerability relationships that express the percentage damage for each typified building group and in certain damage classes against the EMS-1998 (European Macroseismic Scale) intensity ranges and Spectral Displacements. The intensity–based vulnerability relationships are empirical in nature and are based on damage data from local earthquakes. The spectral displacement-based building vulnerabilities (also called as "fragility curves") relate the probability of being in, or exceeding, a building damage state to for a given spectral displacement demand parameter using the methodology developed in HAZUS (http://www.fema.gov/hazus/).

The most vulnerable building group is found to be medium-rise (4-7 storey) reinforced concrete frame buildings built prior to 1975. These are cast-in-situ reinforced concrete frame buildings with unreinforced masonry infill walls designed on the basis of outdated codes and generally suffering from reinforcement corrosion problems. In majority, the ground floors are often left open for shops and irregular plan shapes are common due to irregular land lots and urban congestion.

Death tolls in earthquakes arise mostly from structural collapses and to a lesser degree from collateral hazards. In this study casualties per damaged building for a given class of buildings is obtained on the basis of data obtained from local earthquakes.

Risk Assessment Methodology

Several methodologies and attendant software (such as, HAZUS, EPEDAT and NHEMATIS) exist for computation of urban earthquake risk using hazard, inventory and vulnerability inputs through a GIS engine for the manipulation data and display of results. The KOERILoss software developed by the Earthquake Engineering Department of Bogazici University, Kandilli Observatory and Earthquake Research Institute (KOERI), applies a loss estimation methodology (Probabilistic vs Deterministic) developed by KOERI to perform analyses for estimating potential losses from earthquakes. In order to perform building damage and loss analysis, the building inventory stock database should be provided for each geo-cell. The seismic hazard information in terms of: Intensities for intensity based-analysis and Spectral accelerations for spectral displacement-based analysis should also be aggregated at the center of geo-cell. To compute the damage probability ratios intensity based vulnerabilities and/or spectral displacement based fragility curves for each building class type vulnerabilities should be specified. Economic losses associated with the general building stock is estimated using the building damage losses and costs for different structural damages of each building group. In order to estimate the number and the severity of the casualties, the day and night time population for each building type in geo-cells should be provided together with the casualty rates for each building class and damage grade. The software provides the building damage loss, economic loss and the number of casualties in terms of Geo-cells, which can then be integrated into sub-districts (Mahalle) and districts (İlçe), as MapInfo Output tables.

Building Losses and Casualties

The study culminates with maps depicting the distribution of building losses, lifeline facilities overlaid on intensity maps, distribution of casualties, temporary shelter needs and expected financial losses due to building damage. The resolution of these maps is the geo-cell (400m by 600m) scale. All the digital data, some subject to security classification, will be made available to professional users that can build any information they need at any scale and with any overlay desired using the GIS software of their choice. The expected building damages, calculated by the intensity based deterministic approach, is provided in Figure 2. Results indicate that, on the basis of two independent approaches (intensity based and spectral displacement based approaches), a total of about 35,000 to 40,000 buildings (about 5% of the total building stock) were estimated to be damaged beyond repair (complete damage). Most of casualties are expected in this damage group, especially in a subset of this group where the collapse will be of the worst "pancake" form. In pancaked buildings the floors pile up on top of each other rendering very difficult conditions for search and rescue. Our estimate for pancaked buildings will be in the vicinity of 5,000 to 6,000.

Furthermore about 70,000 buildings will receive extensive damage and about 200,000 buildings will be moderately damaged. Both of these damage groups are repairable. The total monetary losses due to building damages caused by the scenario earthquake are estimated to be in the range of about USD 11 Billion (Figure 3). Building damages are mostly concentrated in the densely populated districts located in the southwestern part of the city, such as Eminönü, Fatih, Zeytinburnu, Bakırköy, Bahçelievler, sourhern part of Küçükçekmece and Avcılar, and to a lesser degree, in districts such as Kadıköy, Maltepe and Kartal located on the southestern part of Istanbul. Although situated in relatively farther locations from the causative fault, due to the building density and vulnerability conditions, districts of Beyoğlu, Eyüp and Bayrampasa are also expected to undergo high levels of damage. As the result of the analysis conducted for various structure types, the mid-rise reinforced concrete structures constructed before 1980 are found to constitute the most vulnerable building class. The expected casualties were calculated using both the intensity based and the spectral displacement based approaches. The results for both the nighttime and daytime population are obtained for the four levels of casualty severities from the spectral displacement based approach. Thus, on the basis of these two independent approaches it is estimated that the death would vary between 30000 and 40000. How many of the casualties in serious injury class would be lost is difficult to estimate since it would depend on the post earthquake emergency services. If we assumed that about 1/3 would be lost, that would bring the total estimate of deaths to about 40,000-50,000 level. Death distribution based on intensity approach is presented in Figure 4. As the result of the intensity based analysis a total of about 600,000 households and from the spectral based analysis a total of about 430,000 households were assessed to be in need of shelters following the scenario earthquake. This amount constitutes an upper bound limit for the expected shelter needs, since the conversion of this number to total number of households is subject to some discussion and the vacancy of some dwelling units should also be considered. It should again be noted that these values are the estimates for a Mw=7.5 earthquake at closest position to Istanbul, that one can provide in the absence of detailed building inventory and geotechnical data. Especially the death figures entail large uncertainties arising from the time and date of the earthquake.

3. Retrofit of Residential Apartment Buildings for Earthquake Risk Mitigation

General Risk Mitigation Options

The basic tenets of mitigation are: Do not increase the existing risk (i.e. build proper); Decrease the existing risk (i.e. retrofit) and; Transfer the risk (i.e. insurance). Reduction of the structural vulnerability, siting and land-use regulations, design and construction regulations, relocation of communities, and public education/awareness programs are viable measures for the mitigation of earthquake risk. Urban settlements can be improved by changing the functional characteristics of the settlements through land-use planning and increasing the redundancy of the infrastructure, such as building an additional bridge at a strategic crossing.

The new buildings in Istanbul are in general being built much better than the existing building stock. The reasons for this improvement are: Application of new (1998) earthquake resistant design code; Increased public awareness and demand for earthquake safety; Various training and education programs for engineers; Better zoning regulations and enforcement by municipalities and; Control by private construction supervision firms. New legislation (Revision of Law on Engineering and Architecture, Building Design and Construction Control and, Standard Development

Regulations for Municipalities) enacted after the 1999 earthquakes provided help in this regard. For Istanbul the most important and complex issue in mitigating earthquake casualties is the retrofit of existing buildings.

Retrofit of the Existing Building Stock

It is clear that the greatest impact to the reduction of human casualties can be affected through retrofit of the existing building stock. Although several assessment and retrofit applications are in place for public and commercial buildings, serious initiatives have yet to be taken for the strengthening of residential building stock. A comprehensive retrofit campaign will be a formidable task that would involve the earthquake performance screening of about 800,000 buildings, prioritisation based on the exhibited risk, analysis of options and market study, development of retrofit alternatives; development engineering capacity for retrofit and finally creation of public / private incentives.

The full retrofit (i.e. in compliance with latest code requirements) of a residential building costs about 40% of replacement value and the building has to be vacated for several months. In addition to this high cost and the inconvenience of moving out, for residential buildings there are strong impediments for retrofitting. The retrofit decision is difficult to reach since these buildings are multi-family owned/rented apartments with tenants having different expectations, budgets, and constraints. Due to the high residential mobility (desire for better housing in better neighbourhoods) there does not seem to be any sense in spending money for something that is expected to be changed. Furthermore, there is evidence that retrofitting will not increase the sales value or rental fee of the property as such it is being viewed as an investment with no financial return. Under these conditions, no conceivable reduction in insurance premium (or property tax) would be sufficient to create an incentive for retrofitting.

Even neglecting the social and legal constraints of retrofit actions to be taken in apartment complexes and the highly distressed real estate market in Istanbul, on the average the structural retrofit is not cost effective. For a mid-rise R/C MRF building in Istanbul the average loss (mean damage ratio - MDR) in intensity IX region will be 62%. For a mid-rise reinforced concrete frame building in Istanbul the average loss (MDR) in intensity VIII region will be 40% (CAR and BU, 2000). If these buildings are retrofitted to meet the current earthquake resistant design code to its full extent the MDR's will be respectively 16% and 11% in intensity IX and VIII regions. Thus retrofit actions will save 46% and 29% of the cost of construction of the building. The average cost of full retrofit is about 40% of the cost of construction of the new building. For probabilistic earthquake occurrences (even with average return periods as low as 50year, as is the case for Istanbul) it is almost impossible to be cost effective in full-scale (meeting code criteria) retrofit applications. Only for short-horizon deterministic cases (say, in 5 years) we can barely be at the break-even point of cost effectiveness in intensity IX regions. In intensity XIII (or less) regions retrofit can never be cost effective. Thus, if life loss and the other social costs associated with an earthquake are taken out of account, the expected future losses are small by comparison with the immediate cost of retrofit, which translates to no economic feasibility.

Possible incentives for retrofit are being discussed all over the world. These include: Earthquake retrofit grants by government or compulsory insurance agencies; Below-market interest rates on loans for earthquake retrofit;

Insurance premium discounts to policyholders upon completion of the retrofit and; financial incentives to property owners of properties, such as: waiving of building permit fees, city property tax and easing of siting and geometric regulations.

It should be noted that the direct use of Turkish Catastrophe Insurance Pool (TCIP) in earthquake risk mitigation, such as funding of retrofit applications, does not seem to be realistic. The premiums are far short of the actual risks (about 0.2% per annum, 2% deductible for a flat in Istanbul). These rates should be compared with 0.5% premium rate and 10-15% deductible in San Francisco. In Istanbul, with a cap of about USD 17,500, the premium is about USD 35. For comparison, in San Francisco average premium is between 600-800 USD. In Istanbul, with such low rates, no risk-based adjustment of this premium, can serve as an incentive to structurally upgrade one's property. The market forces require that for retrofit actions and campaigns to be successful the insurance premiums should be high (or realistic), such that property owners can see that it would be profitable to retrofit their premises instead of waiting for damage and reimbursement for damages. Currently (October, 2002) the penetration of compulsory earthquake insurance in Istanbul is about 30% and the pool has a capacity of about 1 Billion USD (including the 0.85 Billion USD re-insurance) for settlement of the claims in case of an earthquake (Information from Milli-Re). There is stagnation in the market since the number of new policies is almost equal to the non-renewals of existing policies. In case of a large earthquake the TCIP today can be barely enough to cover claims (about 1 Billion USD capacity versus about 3 Billion USD estimated insured losses and 1.5 Billion USD claims, using a cap of USD 17,500 per housing units, in Istanbul earthquake). Thus it is not reasonable to use the pool for funding retrofit at its current financial level.

Although building owners will find the future property losses small by comparison with the cost of full retrofit and cannot visualize the benefit, at the macro scale, the society in general will greatly benefit from a retrofit campaign through the reduction of physical, social and consequential societal losses, that will eventually be covered by the public. The load imposed on the public finance by 1999 Kocaeli earthquake was about 6.2 Billion USD (Erdik, 2001). About 3.5 Billion USD of this amount was utilized for post-earthquake housing construction. The special earthquake taxes and paid military service scheme introduced by the government have generated about 3 Billion USD in one year after the earthquakes. Foreign finances (World Bank, European Union and others) contributed another 2.5 Billion USD. Although steps are taken, such as TCIP, the public funds will continued to be used for rehabilitation after earthquake disasters in Turkey. As such, the use of public funds can be justified for retrofit purposes under a strategy that is designed to maximize benefits with well prioritized and fairly distributed minimum expenditures. Such a strategy can lead us to the concept of minimum retrofit.

Prioritization in Retrofit of Residential Buildings

Under the circumstances and issued discussed above, what seems to be rational is to provide rehabilitation (strengthening or retrofit) to the most vulnerable building stock in Istanbul. The objective of the retrofit will be to avoid total collapse where most of the deaths are associated (fatality ratio is about 10%). The earthquake performance criteria will be the prevention of total collapse and saving lives at minimum cost. The avoidance of total and especially pancake-type collapses is also important for facilitating search and rescue operations and reducing the road closures. However, it should be noted that the boundary between upgrades to the "collapse prevention" and "life safety" performance criteria is fuzzy and more research is needed to assess the amount of retrofit consistent with the objective of saving lives at minimum cost.

The first priority in the use of public funds will be the upgrading of the seismic performance levels of the most vulnerable buildings to collapse prevention performance level. These are the buildings that are expected to collapse in "Pancake" manner. Somewhat crude, screening criteria for the identification of these most vulnerable residential buildings in Istanbul can be set as follows:

Buildings with and greater than 5 stories, built before 1970 (pre-1975 code, poor concrete quality and corrosion issues), located in zones with PGA >=0.25g or SA (0.2) >= 0.60g or EMS-I >= VIII.

Similar buildings with added floors (with no engineering services) and buildings that have received structural damage in 1999 Kocaeli Earthquake but not retrofitted properly can also be considered.

Initial assessments indicate that about 5,000 buildings fall in this first priority group. The cost of minimum retrofit is estimated to be on the average USD 40,000 per building with a total cost of about USD 200 million. Upon proper implementation of this retrofit scheme it is expected that about 20,000 lives can be saved. On the technical side intelligent retrofit scheme(s) that are suitable for general campaign-type applications needs to be developed.

A possible mode of operation for this minimum retrofit campaign can be as follows:

After the identification process the Municipality will declare the buildings as "Hazardous" and legally enforce that unless "Minimum Retrofitting" is done within a prescribed time the occupancy permit (if any) will be cancelled, the tenants evicted and building will be sold on behalf of the owners. For financing each household will need to have access to a credit of about USD 5,000. Such a credit scheme has precedent in Turkey. After the Kocaeli Earthquake Turkish government had extended about USD 5,000 low interest credit with long payment terms to eligible owners of medium damaged housing units.

The second priority can be the retrofit of about 40,000 buildings that were assessed to be damaged beyond repair (greater D3 damage level). These are mid-rise R/C frame buildings located in zones with EPGA>=0.2g or SA(0.2) >= 0.50g or in zones with EMS-I >= VIII. The retrofit performance criteria will be life safety. The approximate cost of this retrofit will be 1.6 Billion USD

Acknowledgement

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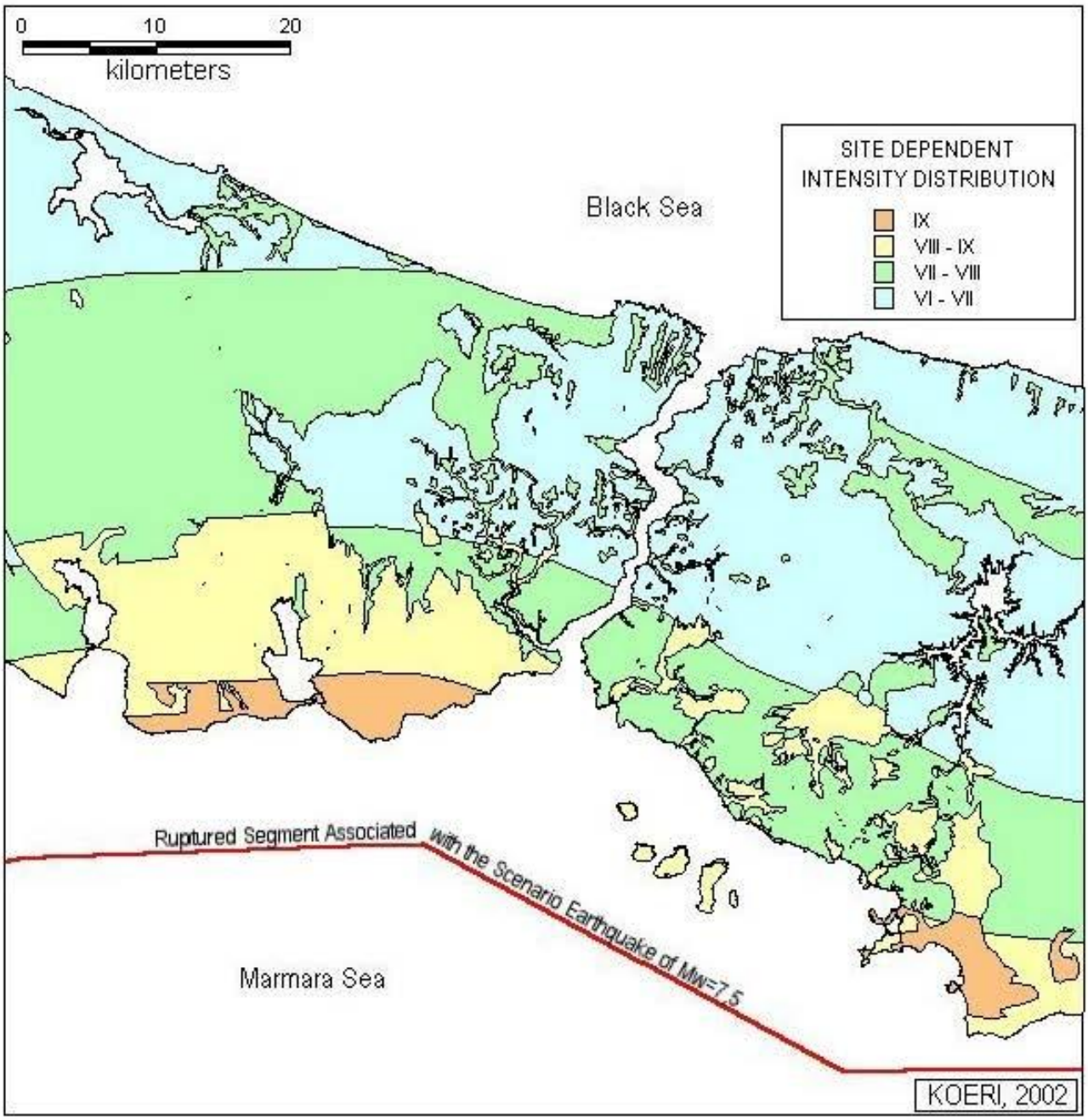

Figure 1. Site dependent deterministic intensity distribution.

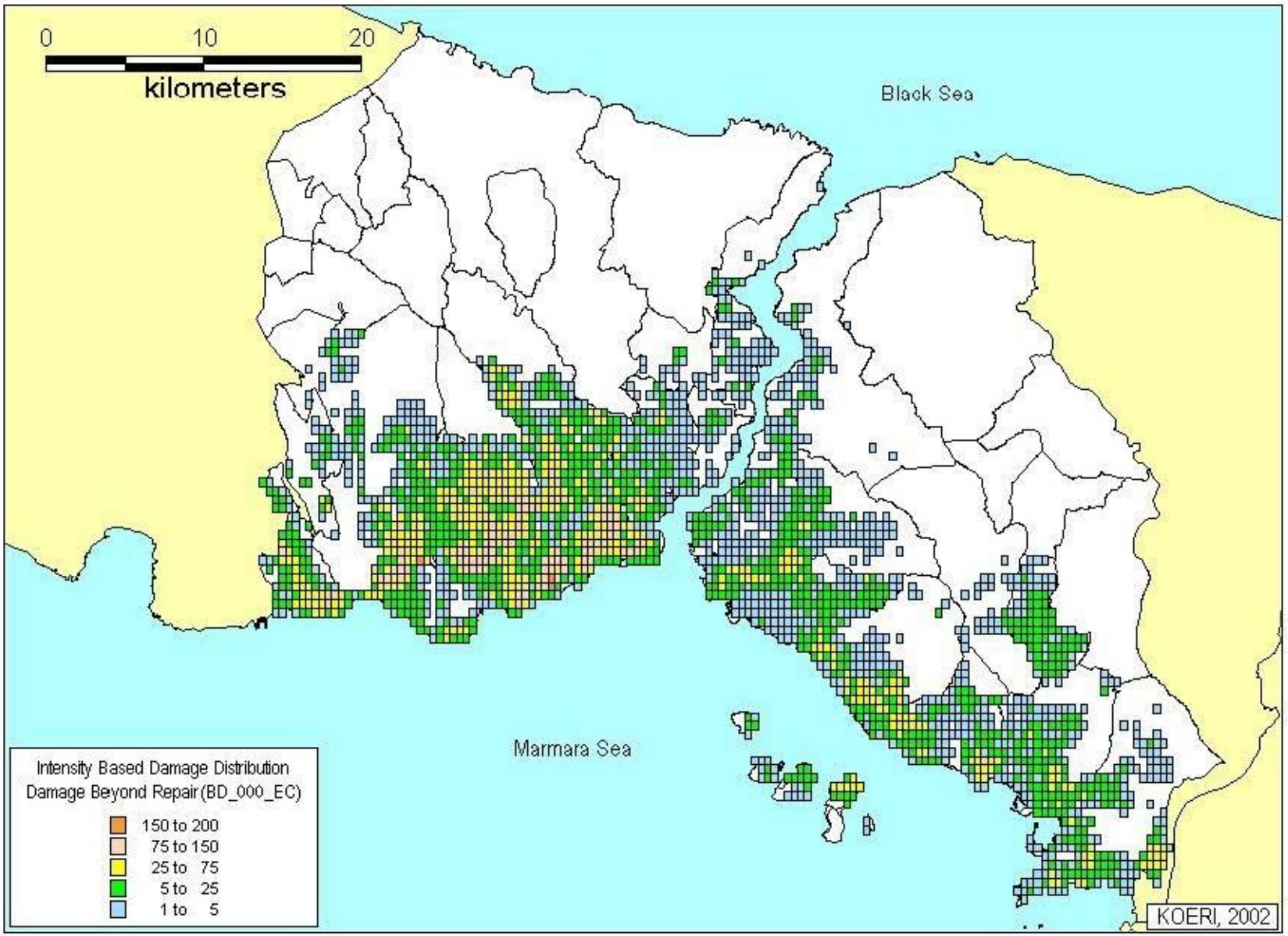

Figure 2. Intensity based distribution of all buildings damaged beyond repair (complete damage).

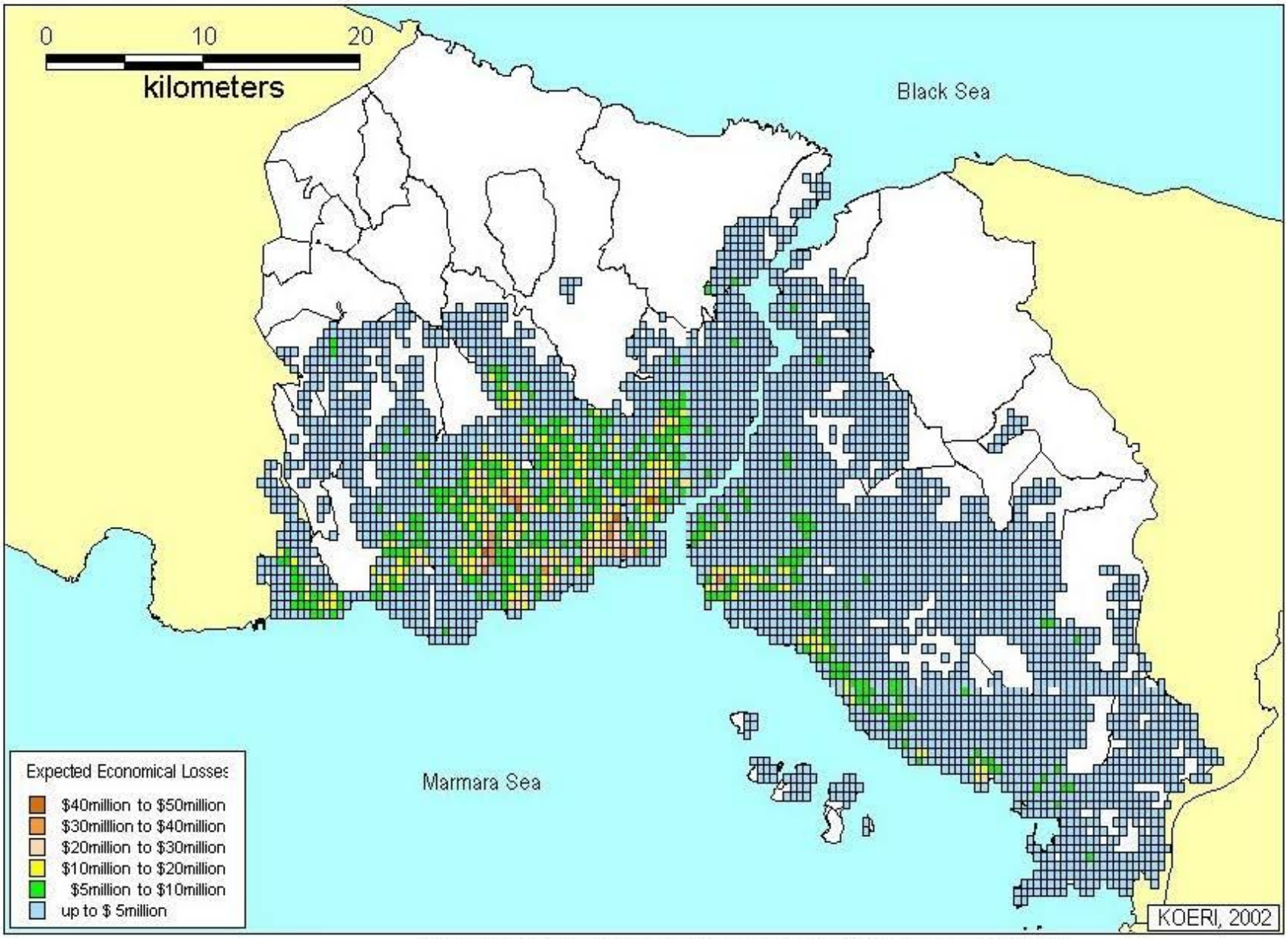

Figure 3. Distribution of Direct Financial Losses due to Building Damage

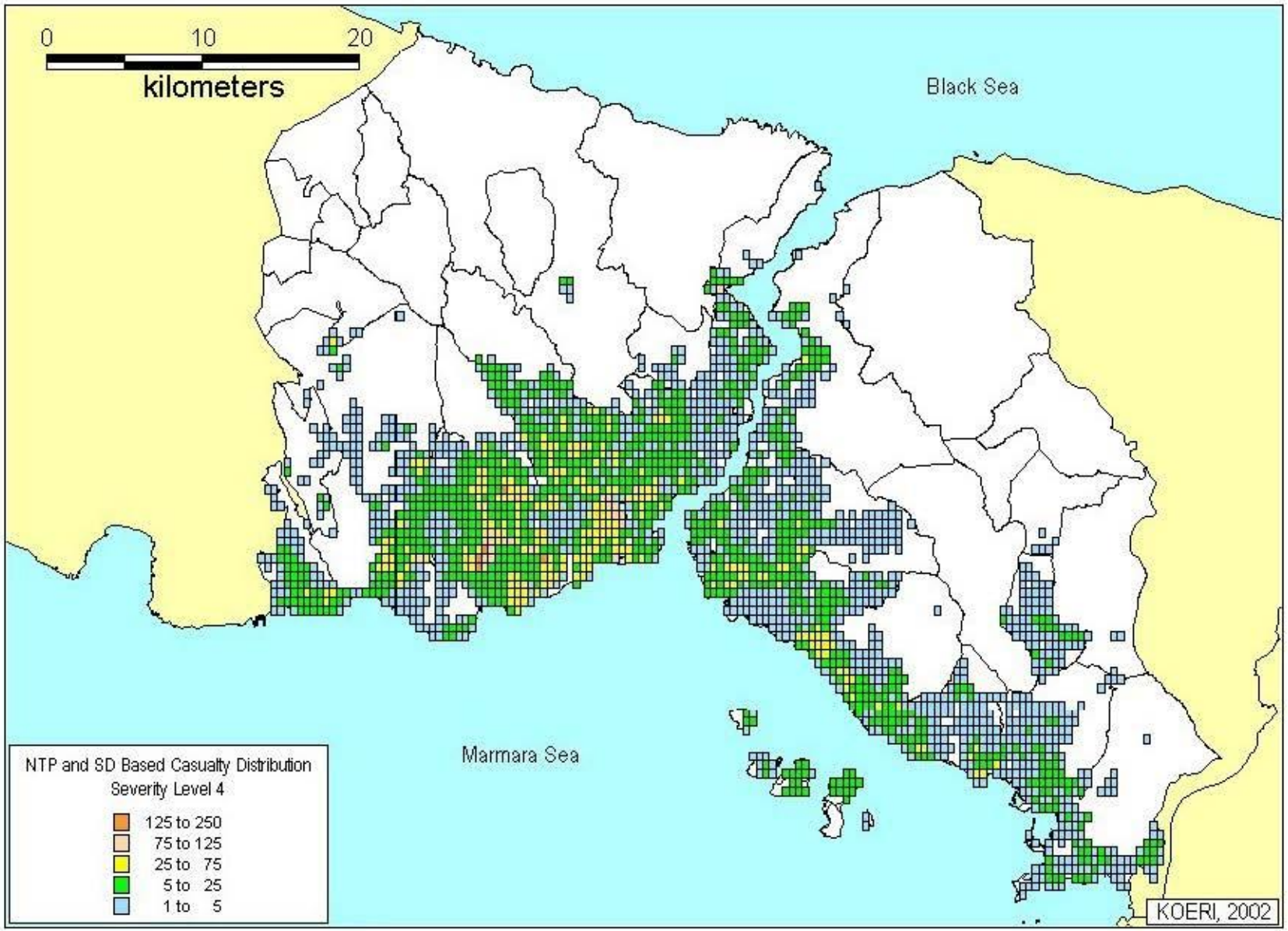

Figure 4. Distribution of Deaths for a Night-Time Scenario Earthquake.

ETUDE DE VULNERABILITE
ET
D'EVALUATION DU RISQUE SISMIQUE
DE LA VILLE D'ALGER

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RESUME

Alger, capitale de l'Algérie, du fait de plus grandes concentrations d'infrastructures économiques et de population, requière une attention particulière pour la protéger, à un niveau acceptable, contre le phénomène sismique qui la menace au plus haut degré, et qui peut frapper à n'importe quel moment.
Les autorités de la ville, conscientes de ce risque et pour disposer de tous les éléments qui leur permettent de connaître et d'estimer les pertes à l'avance, avec une marge d'erreur acceptable, et de prendre les mesures nécessaires, ont initié une étude de vulnérabilité et d'évaluation de risque sismique de la ville. Le but principal étant de mettre en évidence les zones ou circonscriptions les plus sujettes au risque, et ainsi pouvoir localiser les lieux d'intervention et les moyens idoines avant l'événement pour réduire son impact aussi bien sur la population que sur les tissus industriel et économique.

Les résultats de l'étude obtenus avec la méthode RADIUS et l'Echelle Macrosismique Européenne (EMS 92), en supposant un séisme de magnitude 6.5 engendré par la faille de Bouzaréah à 10H00 du matin, sont synthétisés sous forme de tableaux et cartes où figurent les pertes et dommages (dans les bâtiments et en vies humaines) à l'échelle de la ville limitée à 26 communes. Celles-ci permettront aux autorités concernées de prendre des dispositions pour mettre en place les outils nécessaires (plan de secours, politique de prévention, etc.) pour réduire ces pertes et dommages.

1. Introduction

Le risque sismique a significativement augmenté ces dernières décennies du fait que les grandes villes, dans les régions sujettes aux tremblements de terre, et notamment dans les pays du tiers-monde, se sont développées rapidement (accroissement des populations et forte urbanisation), et que la demande en logement a souvent été telle que la construction s'est faite au détriment de la qualité.

Evaluer ce risque et le connaître est nécessaire pour toute politique de planification urbaine rationnelle.

En Algérie, les derniers tremblements de terre de Chlef (1980), Constantine (1985), Oued Djer (1988), Tipaza (1989), Mascara (1994), Ain-Benian (1996), Ain Témouchent (1999), et tout récemment Beni Ourtilane (2000), montrent que l'activité sismique est importante. Cette activité touche essentiellement le Nord du pays où se situent les plus grandes villes (Alger, Oran, Constantine, Annaba, etc.) pour lesquelles le risque sismique va grandissant avec le développement du tissu économique et la croissance de la population.

La ville d'Alger, du fait de plus grandes concentrations d'infrastructures économiques et de population, requière une attention particulière pour la protéger, à un niveau acceptable, contre ce phénomène naturel qui la menace au plus haut degré, et qui peut frapper à n'importe quel moment. L'évaluation du risque qui menace cette ville devient une nécessité et une priorité du fait qu'elle est la Capitale politique, administrative, économique et sociale du pays.

Dans le cadre de la politique de réduction du risque sismique dans la Wilaya (département) et plus particulièrement de la ville d'Alger, l'un des moyens privilégiés consiste à mettre en place des outils d'analyse et à mener des études et des actions pour une prévention efficace des effets de ce phénomène naturel que sont les tremblements de terre. Parmi elles il y a **l'étude de vulnérabilité et d'évaluation de risque sismique.**

La présente étude se limitera à l'évaluation des pertes ou dommages aux bâtiments dans les 26 communes centrales (figure n°1), et il faudra par la suite l'affiner en réunissant des données plus riches et des conditions plus appropriées.

Figure n°1 : Wilaya d'Alger -limites de la zone d'étude
(zone de couleur verte)

2. Méthodologies utilisées

Deux méthodologies ont été utilisées pour estimer les pertes et dommages:

a) RADIUS (Risk Assessment Tools for Diagnosis of Urban Areas Against Seismic Disaster) qui a été mis au point dans le cadre de la decennie Internatyionale des Nations Unies pour la prévention des Catastrophes Naturelles (IDNDR 1990-1999) et qui utilise les fonctions de vulnérabilité représentées sur la figure n°2.

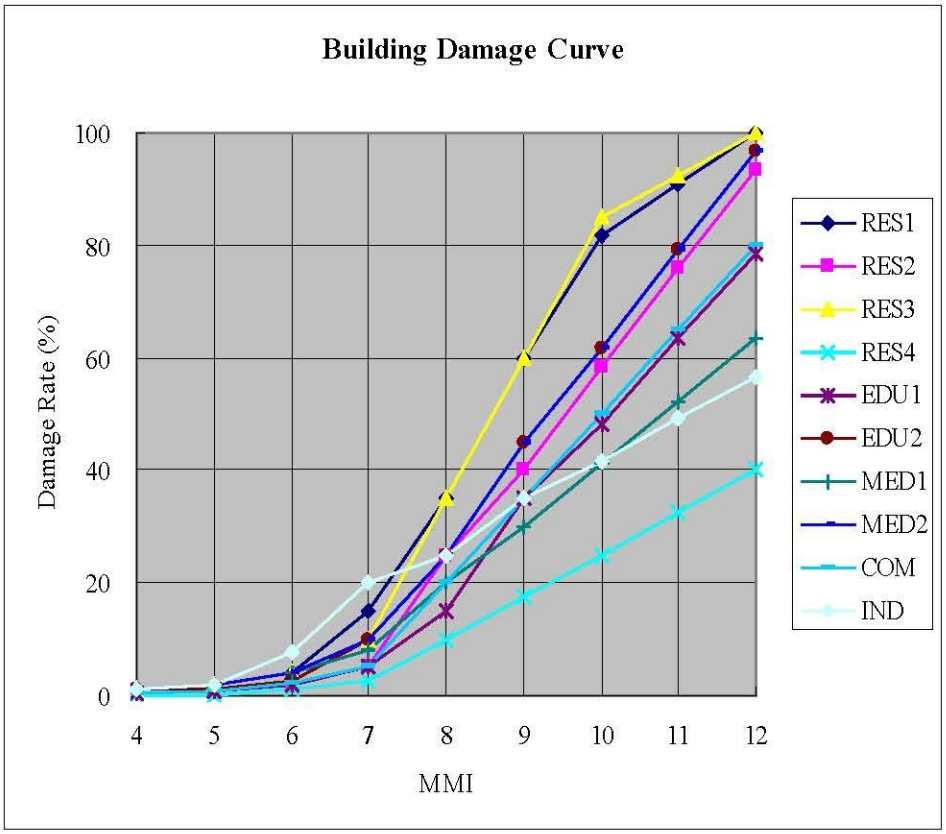


Figure n°2 : Courbes de vulnérabilité de RADIUS

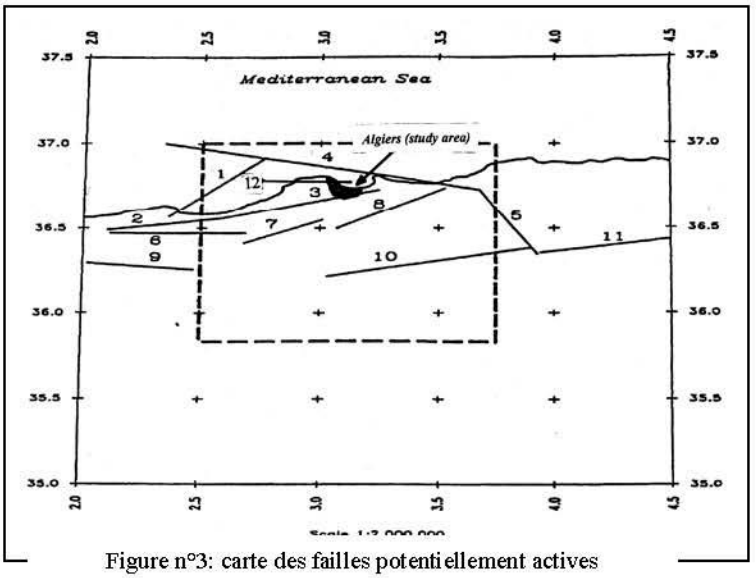
RES1:Constructions Précaires.
RES2:Constructions en maçonnerie et béton armé datant d'avant 1980 et dont le nombre d'étages est inférieur ou égal à 3.
RES3:Constructions en maçonnerie et béton armé construites avant 1980 et dont le nombre d'étages est supérieure ou égal à quatre.
RES4:Constructions en béton armé construites après 1980.
EDU1:Bâtiments à usage scolaire et administratif, jusqu'à 2 étages.
EDU2:Bâtiments à usage scolaire et administratif , de plus de 2 étages.
MED1:Bâtiments à usage hospitalier, jusqu'à 3 étages.
MED2:Bâtiments à usage hospitalier, de plus de 3 étages
COM: Centres commerciaux;
IND: Installations industrielles

b) La deuxième méthodologie utilisée est une méthode directe qui est l'Echelle Macrosismique Européenne (EMS 92) qui définit 6 catégories différentes de bâtiments (6 classes de vulnérabilité) de A à F:

Les constructions recensées lors du RGPH-98 ont été analysées et classées suivant l'échelle EMS 92 en 5 classes (classe A à classe E).

3. Aléa sismique au niveau du site d'Alger

La région algéroise a connu dans le passé récent et lointain plusieurs secousses sismiques modérées et parfois violentes. Le catalogue de la sismicité historique (CRAAG, 1994) mentionne particulièrement les événements sismiques majeurs du 03 février 1365 et du 2 janvier 1716 (20 000 morts). Ce dernier est associé à des vagues importantes qui ont affecté les parties basses de la ville. Récemment, le séisme de Aïn Bénian du 04 septembre 1996 (M_S = 5.6) a causé des dégâts assez sérieux à certaines localités telles que Cheraga et Aïn Bénian. En outre, même les séismes lointains, comme celui du Chenoua du 29-10-1989 peuvent causer certains dégâts à Alger en raison de la vétusté du parc immobilier. Par conséquent, l'évaluation du degré des secousses sismiques qui pourraient affecter la ville d'Alger dans le futur a toujours constitué une préoccupation majeure aussi bien pour les scientifiques que pour les décideurs.
Les études récentes menées dans la région algéroise (Meghraoui, 1988; C.G.S.,1993; Boudiaf, 1996; SWAN, 1995) ont permis d'identifier un certain nombre de failles potentiellement sismiques (Figure 3).



1-Chenoua –Tipaza
2-Menaceur
3-Sahel
4-Thenia
5-Isser- bouira
6-Sud Mitidja
7-Blida
8-Khemis El Khechna
9-Miliana
10-El omaria-Bouira
11-Bouira-Bedjaia
12- Bouzaréah

Figure n°3: carte des failles potentiellement actives

4. Description du bâti existant (Tebbal, 1985)

En se développant progressivement depuis les 17e et 18e siècles, Alger a connu une extension semi-circulaire autour du vieux quartier central de la Casbah. Les vieux logements enchevêtrés de la Casbah sont construits en maçonnerie médiocre légèrement chaînée, horizontalement, par des poutres en bois.

Autour de ce noyau existent de vieilles constructions coloniales (photo n°1) datant du siècle dernier et du début de ce siècle. Ce sont des bâtiments de plusieurs étages (jusqu'à 12) généralement non chaînés verticalement (Bab El Oued; Hamma, Sidi M'hamed).

Une troisième ceinture de constructions individuelles ou de bâtiments moins élevés (trois étages) est située sur les collines entourant le centre de la ville. Ce sont généralement des structures en béton armé ou en maçonnerie chaînée, non calculées au séisme.

Les constructions les plus récentes sont des bâtiments de cinq à neuf étages de conception parasismique. Ce sont soit des ossatures en béton armé soit des constructions avec murs de refends. La qualité de la construction n'est toutefois ni toujours satisfaisante, ni uniforme. 22 000 de ces logements, formant de grands ensembles (photo n°2.), ont été construits dans la banlieue de la ville (Kouba, Bab Ezzouar, Bir Mourad Rais....)

Il est important de rappeler que la plupart des bâtiments administratifs sont de vieux bâtiments datant de l'ère coloniale. Ces constructions, dont certaines ont jusqu'à huit étages, ne sont pas calculées au séisme, et sont des structures en béton armé ou en maçonnerie lourde. Très souvent des étages inférieurs souples ont été réalisés pour permettre de grandes entrées ce qui compromet la capacité de ces bâtiments à supporter des secousses telluriques importantes.

La plupart des hôpitaux (Mustapha, Maillot, Pamet....) sont anciens et de toute évidence non résistants aux séismes.

Photo n°1 : bâtiment à Bab el Oued

Photo n°2: Ensemble à Bab-Ezzouar

5. Recensement Général de la Population et de l'Habitat de 1998 (RGPH 98)

L'analyse des données sur la population et l'habitat faite pour les besoins de l'étude, est basée sur les résultats du Recensement Général de la Population et de l'Habitat (RGPH-98) fait par l'Office National des Statistiques (ONS) en 1998.

Il ressort de ce recensement que pour les 26 principales communes étudiées:

- la population est estimée à 1 498 043 habitants
- la superficie est de 12 301,204 ha
- le parc habitation est de 260 684 logements.

L'analyse des données a permis d'isoler les paramètres qui intéressent l'étude en question, à savoir:

- La population et sa répartition géographique
- Les différents types de constructions et leurs périodes de réalisation

Tableau 1 . Densité de logements et de population

COMMUNE	LOGTS / ha	HAB/ ha	COMMUNE	LOGTS / ha	HAB/ ha
ALGER CENTRE	105	485	OUED SMAR	4	27
SIDI M'HAMED	181	449	BOUROUBA	30	213
EL MADANIA	36	226	HUSSEIN DEY	16	102
HAMMA ANASSER	64	370	KOUBA	19	108
BAB EL OUED	120	747	BADJARAH	35	220
BOLOGHINE	35	215	BAB EZZOUAR	26	115
CASBAH	92	478	BEN AKNOUN	18	96
OUED KORICH	31	184	RAIS HAMIDOU	7	43
BIR MOURAD RAIS	36	187	DJASR KASENTINA	20	111
EL BIAR	25	139	EL MOURADIA	28	159
BOUZAREAH	6	35	HYDRA	13	67
BIRKHADEM	12	69	MOHAMMADIA	12	63
EL HARRACH	12	74	EL MAGHARIA	62	388

Afin de connaître le pourcentage de chaque type constructif dans une même commune (donnée nécessaire pour la méthode RADIUS) et faire un classement (10 classes) compatible avec les courbes de vulnérabilité de la figure n°2, un inventaire par échantillonnage des constructions a été fait dans les vingt six communes concernées par l'étude.

6. Evaluation des pertes

6.1. Méthode RADIUS

L'analyse est faite sur la base d'un scénario qui considère donc que le séisme de magnitude 6.5 est généré par la faille de Bouzaréah à une profondeur de 12 Km, et se produit à 10 H 00 du matin un jour de semaine. La distance épicentrale est prise égale à 5 Km et les lois d'atténuation sont celles de Joyner et Boore
Ceci suppose que la plupart des habitants sont dans les lieux de travail, les enfants sont à l'école, les hôpitaux fonctionnent normalement, etc. L'analyse qui combine ces données sismiques, la nature du sol, le type constructif et la densité de population a abouti aux résultats qui sont consignés sur la figure 4:
En ce qui concerne les pertes en vies humaines, la méthodologie RADIUS utilise l'algorithme de Coburn (Coburn et al., 1992), pour l'estimation du nombre de morts et de blessés. Ces résultats sont consignés dans le tableau 2

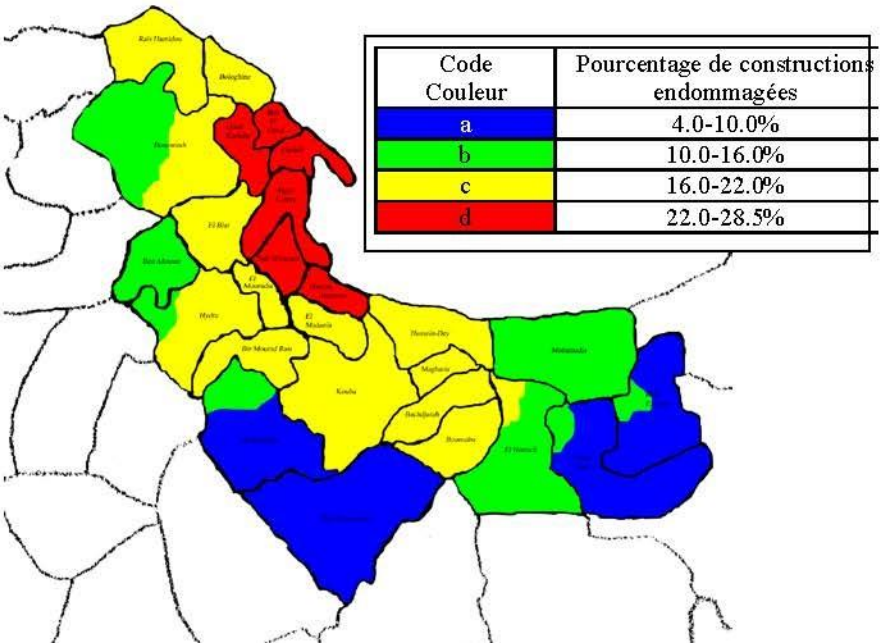


Figure 4: répartition des dommages selon l'analyse RADIUS

Tableau 2: Nombre de blessés et de morts par commune

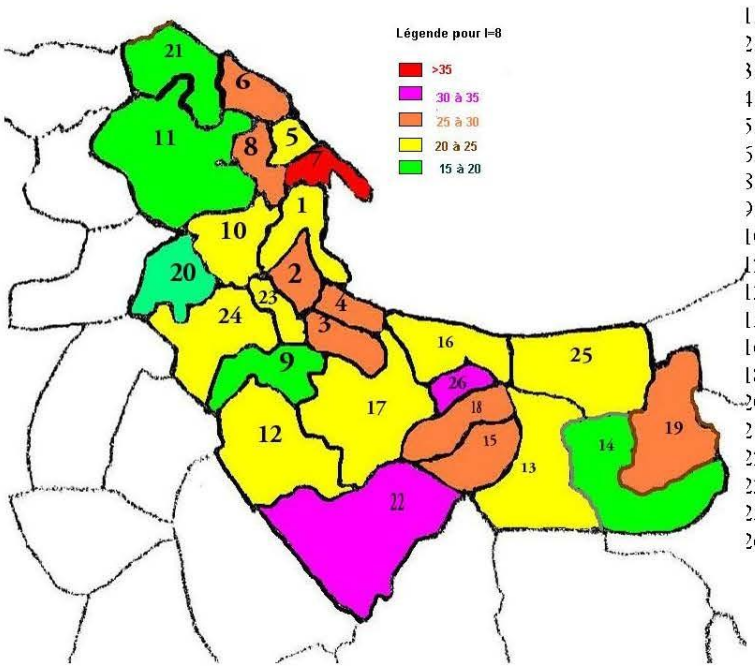
N°	Nom de la commune	Mort	Blessé	N°	Nom de la commune	Mort	Blessé
1	RAIS HAMIDOU	45	534	14	BACHDJARAH	133	1807
2	BOLOGHINE IBNOU ZIRI	87	964	15	EL-MAGHARIA	59	682
3	BAB EL-OUED	81	1048	16	KOUBA	181	2332
4	CASBAH	102	1316	17	EL-MADANIA	64	733
5	ALGER CENTRE	202	2820	18	EL-MOURADIA	51	554
6	SIDI M'HAMED	200	2449	19	EL-BIAR	130	1496
7	HAMMA ANNASSERS	100	1250	20	OUED KORICHE	91	933
8	HUSSEIN DEY	109	1267	21	BOUZAREAH	211	2715
9	MOHAMMADIA	110	1556	22	BEN AKNOUN	119	1414
10	BAB EZZOUAR	95	1889	23	HYDRA	103	1364
11	OUED SMAR	55	835	24	BIR MOURAD RAIS	126	1644
12	EL-HARRACH	135	1898	25	BIRKHADEM	206	3028
13	BOUROUBA	151	1962	26	DJASR KASENTINA	133	2428
TOTAL						**3081**	**40917**

Le scénario fait en suivant la méthodologie RADIUS donne un dommage moyen d'environ 20% pour toute la zone étudiée. Ceci équivaut à des pertes d'environ 62 515 équivalents logements. En terme de surface, les pertes seraient de plus de 3 750 000 m2 de planchers, ce qui représente une **perte financière** de plus de **56 000 000 000 DA** soit **700 000 000 €**. En ce qui concerne les pertes humaines, elles seraient de plus de **3000 morts et plus de 40 000 blessés.**

6.2. Méthode EMS-92

Deux simulations sont faites en appliquant les fonctions de vulnérabilité de l'échelle européenne EMS92 avec deux séismes d'intensités sismiques VIII et IX.
Une valeur moyenne de dommage a été déterminée pour l'ensemble des communes étudiées.
La figure 5 montre la répartition spatiale des dommages (en %) pour une intensité VIII sur l'ensemble des 26 communes.

Figure n°5: Pourcentage des dommages pour une intensité VIII (EMS 92)



6.3. Synthèse des résultats

A l'issue de cette première étude d'évaluation du risque sismique pour Alger, il ressort les résultats suivants :
Par application de la méthode RADIUS:

- Pertes financières : 56 milliards de DA (700 000 000 €)
- Pertes humaines : 3081 Décès et 40917 blessés sur 1 498 063 habitants

Par application de la méthode EMS:

- Pertes financières : 66,1 milliards DA (826,3 millions €) pour EMS VIII
- 124,6 milliards DA (1,558 milliards €) pour EMS IX
- Pertes humaines : non calculées

7. Conclusion

L'étude, avec toutes les limites qui lui ont été fixées au départ (seulement 26 communes étudiées, limite de l'étude aux bâtiments avec exclusion des gros équipements et des réseaux, simulation avec une seule source sismique pour la méthode RADIUS) n'en renseigne pas moins sur l'étendue des dégâts et pertes humaines avec un séisme important de degré VIII sur l'échelle EMS 92. Avec un séisme majeur (degré IX), les dégâts et pertes sont plus que doublés.

Dans ce contexte, il nous paraît plus qu'urgent que des mesures soient prises au niveau des autorités et services concernés pour faire en sorte que ces pertes prévisibles soient réduites au mieux lors d'un prochain séisme qui frapperait Alger.

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CITY OF MEMORY, CITY OF CULTURE – THE CHALLENGE OF MANAGEMENT

Joaquim António de Moura Flores - URBE

Abstract

Ancient houses are like old TV sets

When I was a child whenever a television or any other device went broke my parents send it to fix. It was the usual procedure. Today, fixing something usually costs around 2/3 of a new one. That is the commercial strategy to oblige us to buy a new device, spending always more money. We are naturally lead to think: «for such a price I would rather buy a new one». By this way a policy of consumption is promoted in detraction of a recycling one.

In the world of building industry and real estate a similar process is implanted. The idea that the rehabilitation of an ancient building is so expensive that the only rational alternative is to buy a new flat in the surroundings of the city is promoted, leading to the decay of the urban centres. Once again we are lead to think: «for such a price I would rather buy a new one».

We are always leaded to consume a new product rather than recycle the old one. That is the truth for TV sets or mobile phones, as it is to ancient houses.

City of memory, city of culture

The culture of conservation that we are progressively loosing is throwing us in a world where references are lost. The sustainable balance, the tradition and the memory that the historic city represents, should be motivations to the city management policies or to the guidelines of urban design.

The traditional building techniques, the organic balance of the urban morphology, the simple but effective traditional urban design and the maintenance of the human scale, are elements that we should incorporate in our contemporary urban culture.

Above all, we should learn the lessons from the past. The culture of conservation represented by the historic city, in detriment of the culture of consumption, should teach us the principles of the urban sustainability and urbanity.

The challenge that today our historic cities are dealing with is the challenge of management. Not the traditional urban management, but one where the culture of sustained partnerships and consensual actions are the base for a strategic and sustainable development. This should be done in balance with the preservation of the authenticity of historic cities, their most added-value in a globalised world, where everything is tending to look alike.

Authenticity

The World Heritage Cities, like any other historical cities, are important for their own irreplaceable characteristics. These are cities of memory, each one with it's own ADN printed in their built heritage, creating a distinctive urban image impregnated with local history and sedimented with memories. This image is like an icon that immediately identifies the city. But this image needs to be understood in a larger scale than just iconography. It must be understood in the sense that Kevin Lynch gave to the sentence «image of the city» in the 60's.
Today we live a major paradox: we are in direct contact with all the world through the media, but at the same time we are alone with our mobile phone or in front of a computer monitor, virtually linked to the global village.
Due to globalisation everything and every one looks alike following fashion wave tendencies. The same happens within the cities, where their contemporary expansions are homogenising its image. As a reaction, the image of the built heritage gains another sense – to its intrinsic values of memory, aesthetics, and economy is added a new one - distinctiveness. This new value makes of historic cities distinctive references in this globalised world.
A prove of this situation is the way corporations, public or private, are taking for logo the image of their built heritage icons.

PORTO
Câmara Municipal

Figure 1 - Porto City Council Logo

Figure 2 – Tower of Clérigos - Porto *ex-libris*

These distinctive images, understood in the broad sense of representation of the stratified memory of the cities, are a major value in the definition of a strategic vision for the urban development in this competitive world. These images are an added-value in the marketing of places, an indispensable tool of today's urban management.
The challenge is to keep the authenticity of these images in a world where nothing is what it looks like. An example are the known brands of clothes that sell the images of the «American dream» or the «French glamour» and are made in China.
The historic cities in general and the World Heritage Cities in particular, must absolutely keep their authenticity or they will lose the great value they possess in a world where everything looks the same. It's a question of survival.

Decline of Urban Centres

In the beginning of the 70's the North American downtown started to show signs of decay. It was the visible signs of a process that spread rapidly to the industrialized world, in a first stage, and globally in a second one.

The downtown was the centre of city life, where everybody met and where the main shopping was done. Shops were mainly rented and the same happened with the majority of the flats above. Being the most wanted place for trade and living the price of property raised, leading to a process of urban sprawl of the peripheries, in conjunction with an increasing motorization tax of the population and new highways developments.

The new suburban development led to the raise of the first mass shopping places, known as Malls in the 50's. The first acclimatized Mall, Southdale Shopping Center (Minneapolis) designed by the architect Victor Gruen, opened its doors in 1954, beginning a process that speeded the commercial decline of urban centres. The indoor commercial space copies the image of the urban centre and its public space, giving ideal conditions to the commercial activities.

As a consequence of this overall situation, the delicate balance encountered in the Downtown was broke. The decline of the urban core was inevitable, visible in the progressive desertion of stores and flats. The image of the city centre reflected this situation, visible in the deterioration of buildings and public spaces. A vicious circle began: the level of attraction diminished, the human desertification progressed, the property income lowed, the level of insecurity raised as the economic degradation and physical decay.

Town Centre Management

As a reaction and a response to such situation it is developed in the North American Downtown the first experiences of its management, fighting back the malls concurrence by increasing the level of attraction of the urban centre and, consequently, raising the value of the property. In such way, the reaction was primarily economic, leaded by the property owners. However, to promote the revitalization of the urban centre a global management activity has to be established, leading in such way to the appearance of the Town Centre Management discipline.

Business Improvement District - BID

From this community informal movements of the late 70's it was born a formal management scheme, in the middle of the 80's, known first as «Special Assessment Districts», and spread today all over the United States of America as «Business Improvement Districts» (BID) - there are currently over 1,200 BIDs in the US, which together generate more than $1billion per annum on the provision of capital projects and services.

Mainly a BID its a partnership between a local authority and the local business community that develops and takes forward a project which will benefit the trading environment and the public realm, in a bottom-up approach to the problem (private sector leadership).

A non-profit private organization is created to develop various services of common interest to the owners and shoppers of a delimitated zone. Their funding is provided by a tax that the property owners of such zones are obliged to pay. Those owners benefit on the valorisation of their properties in a long term.

The services provided by the BID organization are commonly the following: maintenance; security; marketing and promotion; capital improvements; business and fund raising.

Maintenance Various services are provided as a complement to city hall obligations. These services are vital to obtain a quality image of the urban centre. The cleaning of the streets and sidewalks, graffiti's removal and green elements maintenance (grass and trees).

Security In addition to police work a service of private security is provided, as well as CCTV in the streets for surveillance.

Marketing and Promotion A Vision of the urban centre is created and developed in a strategic plan, where the strengths of the district became opportunities. The promotion of all the necessary actions to accomplish this vision are also attribution of the BID management. Those activities can be translated into all kind of merchandising products that promote the image of the urban centre, publicity campaigns and festivals and several public events.

Capital improvements Although the main initiative on the creation of the BID's is from the private sector, the partnership with the public sector (city hall) is unavoidable. Only the city administration can make the necessary investments in the public space requalification needed to obtain a viable and attractive district.

Business and fund raising The execution of a business plan is also an attribution of the BID management team. In such plan, supported by market research, the economical promotion of the District is the main objective, balancing between the offer of financial benefits and raising of new investments and funds.

Town Centre Management Schemes

Suffering from the same problems of city centre decadence, a similar reaction was produced in the United Kingdom in the 80's, leading to the creation of the «Town Centre Management Schemes». The first manager was nominated in 1987 for the Centre of Ilford. In 1991 it was created the Association of Town Centre Management (ATCM), with the purpose of promoting the exchange of management experiences and training of managers. By the end of the 90's, 240 management schemes were already implemented in Great Britain.

"The primary aim of town centre management is to create active partnerships and broad networks to develop a healthy and sustainable environment that involves and benefits all its stakeholders. It works for all levels of society, valuing and encouraging contributions from those who are normally least able to influence events, from the bottom up as well as from the top down, so to speak." (ATCM [1])

On these experiences the partnership between the private and public sectors is more balanced than in the North American experiences. The contribution of the local authority is almost equal to the retail sector, usually the leading partner of those management schemes.

Figure 3 - Town Centre Management benefits (ATCM)

Figure 4 - Town Centre Management basic scheme (ATCM)

Without a sustained funding, as in the American experience, the British schemes revealed themselves with some fragilities. Their support was, in the beginning, made by some of the major retailing companies that normally can be found in the majority of the English town centres, like Marks & Spencer or Boots the Chemist. With the progressive economic recession those partners reduced their contribution. That fact, in

conjunction with the voluntary scheme of contributions, reduced the vitality of the management structures in progress.

Based on the success of the American model and taking into account the fragilities of the British one, the authorities of this country approved in 2002 a pilot project to introduce the BID model in 22 British cities. In case of success it can be generalized to all the town centres of the country.

Several other countries have town centre management experiences, however those mentioned above are the most developed. The Austrian scheme deserves to be mentioned because it confirms the viability of the BID model in Europe. In several cities of Austria a regional tax for tourism is now being used by some entrepreneurial cities, with the agreement of regional and local authorities, to support some management experiences.

Urban management versus Town centre management

The type of management that we have been speaking about differs from the usual urban management made by the city authorities. The main difference results from the necessity of Town centre management schemes to develop partnerships that are their base of sustained work. The advantage of this kind of management is that the actions taken and developed in the city centre are the result of a previous agreement between all the urban actors. That way of action contributes to successful management.

Town Centre Management in Historic Towns

The management experiences previously mentioned can and should be applied in historic towns. The decadence of the city centre results, among other factors, from the concurrence of the shopping centres. Those shopping structures apply the model of current commercial street, with ideal climate conditions and a rigorous management. As an example we can mention the «Via Catarina Shopping", which is located in the major commercial street of the World Heritage City of Porto. Inside this shopping a copy of several facades of traditional architecture gives form to the «food square».

The struggle that town centres are dealing with the peripheral shopping centres is not a lost one. There are still several advantages that our city centres can reclaim. They are **multifunctional** - residential, administrative, commercial and cultural are some of the usual functions that can be found there. That's also the reason why we can say that those centres are places of **convenience**.

The specificity of the historic towns reaffirms its advantages over the shopping centres and also over other city centres. Such affirmation is sustained by the importance of their built heritage, understand in its 3 values as defined by Françoise Choay – economic, aesthetic and memorial – that combine to produce the most relevant advantage of all: **identity,** that specifically characterizes and individualizes one place from another. This factor increases the power of **attraction** of the city centre over any other territory in the regional context.

Figure 5 and 6 – Via Catarina Shopping – interior

In such way, the preservation of the built heritage is not only a question of culture, fashion, balance, authenticity, sustainability, etc., but also an essential aspect on the power of attraction of the city, working as a vital element in its competitiveness in the territorial context. In that sense, it's also a fundamental issue to be included in the strategic planning and management of the city.

Conclusion

The culture of conservation that we are progressively loosing is throwing us in a world where references are lost. The sustainable balance, the tradition and the memory that the historic city represents, should be motivations to the city management policies or to the guidelines of urban design.

The traditional building techniques, the organic balance of the urban morphology, the simple but effective traditional urban design and the maintenance of the human scale, are elements that we should incorporate in our contemporary urban culture.

The management of historic cities must have in it's strategic objectives the preservation of the city's authenticity. Above all, we should learn the lessons from the past. The culture of conservation represented by the historic city, in detriment of the culture of consumption, should teach us the principles of the urban sustainability and urbanity.

The challenge that today our historic cities are dealing with, is the challenge of management. Not the traditional urban management, but one closest to the Town centre management above-mentioned, where the culture of sustained partnerships and consensual actions are the base for a strategic and sustainable development.

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1 - ATCM, *What is Town Centre Management*, London, ATCM, 2000, p. 3

2 - *Ibidem*, p. 4

Images Index

Figure 1 – http://www.cm-porto.pt

Figure 2 – http://www.cm-porto.pt

Figure 3 - ATCM, *What is Town Centre Management*, London, ATCM, 2000, p. 3

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THE REDISCOVERY AND THE REVIVAL OF THE TRADITIONAL PREVENTIVES MEASURES USED IN THE MEDINAS AND CASBAH OF THE MAGHREB DURING THE XIIX CENTURY
THE CASIS OF THE CASBAH OF ALGIERS

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Abstract:

This paper presents the first traditional seismic measures discovered and adopted in the "Casbah of Algiers" in the XVIII century, by the Dey of the region after the 1716 earthquake.

Old historic centers in Europ, principally San Lorezello in Italy, devasted by various earthquakes in 1688, 1805 and recently in 1980 has been the scene of abundant testing of fundamental notions, such as the vulnerability of old centers, "the seismic culture" wich developed in areas hit by natural disasters, the construction "anomalies" accounted for by their antiseismic function.

It intends to rediscover "the local seismic culture" developed by the previous communities as a technical response to a repeating disaster event in the Casbah of Algiers after the 1716 earthquake and in the medinas of Fès and Tunis after the respective earthquake 1755 and 1758. These techniques will be compare and develop in order to preserve historic cities. Protection of cultural heritage through the revival of local or regional "seismic cultures" is made possible.

Key words:

Seismic culture, preventives measures, construction's anomalies.

1. Introduction:

The human kind history is partially represented in the historical monuments and sites around the globe and thus for sure need preservation. The vulnerability of the cultural heritage is growing every day, due to age, deterioration of materials by geophysical and environmental conditions as well as by human interaction. Cultural heritage is found in most of the countries and thus constitutes a growing concern among the governments and the population alike. Great interest has been shown to preserve the world cultural heritage as many programs were initiated by local governments as well as by International Organisations as UNESCO and others.

As awareness about the human values is growing every day, the world cultural heritage is considered as a universal site to preserve and to transmit to future generations in all the diversity of their authenticity. For this purpose which is an international understanding, it is thus imperative to establish fundamental principles which will lead preservation, conservation and restoration of historical buildings and to make them known to the world level.

The restoration and conservation concern mainly the artistic patrimony, but are also applied to the protection and preservation of archaeological monuments, architectural buildings, sites and historical sites.

Most of the world cultural heritage is located in seismic active zones which accelerate the vulnerability of these constructions. These constructions should preserved over time and mainly against earthquakes which nowadays constitute the most devastating phenomenon. Earthquakes are a complex societal problem, because they have a low annual probability of occurrence, but high probability of causing significant damage to structures. The recent damaging earthquakes in Turkey, California, Japan, Taiwan and India have one more time proved the urgency need to take practical steps to reduce earthquake risk.

The Medinas are a particular type of medieval Islamic city, present in every country in the Maghreb and the Mashrek. They are important not only for their physical structures, their built but also for their preventives techniques used in their constructions and that today could be replicated and could be preserved.

The largest cities in the Maghreb countries built between the XVIII and XIX centuries, Algiers (Algeria) and Tunis (Tunisia) seem to constitute a homogeneous block which is due to their belonging to the Ottoman era. However, other large cities in north Africa, none Ottoman, but Idrisside as Fes (Morocco) present similar structural, functional and constructive characteristics as Arabic cities in North Africa, which may help to study the various problems

related to these factors (A.Raymond [1]). These historical cities are located in the highest seismic active zones in north Africa which extends from Agadir (Morocco) through the north of Algeria to the Golf of Gabes (Tunisia) (D.Benouar [2]).

If these historical cities do still exist today despite the numerous seismic events that hit their sites; this implies that in the past there was a certain awareness of the seismic risk and thus the development of an ancient constructive preventive technology during the reconstruction of structures after the disasters. This has probably engendered a local seismic culture characterized by local preventive measures (F.Ferrigni [3]). Concerning the Casbah (old nuclei of Algiers built in the thirteen century) which was seriously damaged during the 1716 earthquake (Ambraseys [4]), it is said that the Dey (Governor) in that time decided while reconstructing the city to impose preventive techniques that he decreed and which some of them are being studied today (Foufa [5]).

In Morocco, the medina of Fes under the dynasty of the Allaouites also suffered very much from the devastating earthquake of Lisbon 1755 (A.Ramdani [6]). It is of interest to know if the city was rebuilt by taking into account preventive measures at that time and also how much was the awareness level of seismic risk reduction?

In Tunisia, the medina of Tunis had been seriously damaged by the 1758 earthquake. It is also of great interest to know if its reconstruction had followed the same techniques imposed by the Dey in the reconstruction of the Casbah. Tunis, as an Ottoman city, could be built using same techniques as in other Ottoman cities. A complete analysis of these old cities in north Africa will enhance our knowledge about the eventual seismic risk reduction preventive measures taken in the reconstruction of the old cities and for sure will allow us to better propose preservation techniques.

The limitation in space and time constitutes a homogeneous sample which may represent quite well the medieval Islamic cities in North Africa. It is also to establish a coherent corpus which we limit to three large old cities Algiers, Fes and Tunis after the respective damaging seismic events of 1716, 1755 and 1758 (Foufa [7]).

The notion of Local Seismic Culture started in 1987 following the Open partial agreement approved under the authority of the European Council against natural and technological disasters. Local seismic culture is defined as the set of knowledge of the seismic history of the region considered, the response of the soil, the buildings as well as the behaviour of the population (A.Lavorgna [8])

The protection and the preservation of the cultural heritage from natural and environmental disasters make compulsory research work on the methodologies ancient communities

concerned have built their constructions during centuries to resist earthquake loads. The analysis of their constructions by a detailed archaeological reading may bring the first lessons of which the omission may increase the seismic disaster impact. In order to reduce seismic risk, it is important to develop a methodology for applying preventive measures through a better knowledge on the impact of destructive earthquake not only on buildings but also on the behaviour of people. The methodology consists of confronting historical, scientific and technical knowledge of the ancient structures in order to establish a realistic approach together with fundamental instruments to reinforce the historical building according to the local environment. The main objective of the revival of an eventual local seismic culture is to preserve old building traditions and to update them and eventually using them in the preservation of historical monuments and sites. The preservation of the local seismic culture is not only in terms of technique matter, it implies also the compatibility between the needs of the community and the preservation of testimony of its culture. It is only with this condition that recovered building techniques may be applied to the community concerned.

The assumptions on which the research is based on how to recover the local seismic culture are:

The efficiency to replace the control regulations by standard local procedures in order to have from each context the technique response which will be used to adapt interventions to specific needs of the structural system.

Apart from the reduction of the vulnerability of the system, the recovery of the local seismic culture allows to highlight professions, techniques and local resources together with the increase and preservation of the local culture.

That what makes important in one hand the development of recovery techniques and the seismic protection adapted to local specificities of the structure and in the other hand to promote their diffusion and use. The revalorization of the knowledge of the old buildings construction techniques will give a new impetus to reinforcement techniques, repair and transformation and present a better protection to cultural patrimony.

2. Investigation of the local seismic culture:

In order to preserve and protect historical buildings, antiquities, monuments, and other national treasures from the potential impacts of natural and environmental disasters, the first phase is to understand how ancient communities have built their cities.

Our strategy is based on the study and analysis of the old core of the casbah of Algiers which was built during the XVI century and have resisted numerous disastrous seismic events. This has lead us to deduce that, even at ancient times, disastrous events gradually generated seismic risk awareness with the development of protective measures. It is assumed that the protective arrangements developed gradually over time, in empirical manner, by the ancient inhabitants in high seismic active zones, as technical response to a recurrent disastrous seismic event. Therefore, these protective arrangements may well explain that historical buildings, far of being weak and dangerous, and far from presenting a high vulnerability with respect to nowadays constructions, could be considered as having survived with success numerous damaging earthquakes during several centuries.

However, the rediscovery of these protective arrangements or local seismic culture requires for the site under investigation (Ferrigni [9]):

(1) The re-evaluation of the historical seismicity which should be as complete, homogeneous and precise as possible and also as back in time as possible according to the availability of data.

(2) A detail evolution analysis (topology and morphology) of the construction procedure separately and in the context of the whole urban site and its interaction with other buildings, in respect with the frequency and intensity of seismic events that occurred during the period of time of interest.

(3) An inventory of all "anomalies" met in buildings or in the whole urban site.

(4) A confrontation between these "anomalies" met in various parts of the buildings (Walls, floors, windows, etc.) and the modern today's techniques.

(5) Those traditional techniques found in old buildings and which are proved to play a role in resisting earthquake loads could be proposed to be used nowadays to preserve the world cultural heritage from earthquakes.

3. Preventives measures discovered in the Algiers's Casbah:

The casbah of Algiers also developed a unique style of housing in response to local topographic panel and local traditions. A special attention is paid to the constructions details especially to the arch system, the walls, the floors and the corbelling wich were used by the past as a protective measures.

In Algiers's Casbah we have discovered seven traditional techniques which were used by population in order to protect themselves and their constructions.

- The arch- column system

There is two arch system in the casbah of Algiers

The flowerbed arch

The horseshoe pointed arch wich was used after the 1716 earthquake probably further to a wooden break.

The flowerbed arch. The Dey Palace Algiers

The horseshoe pointed arch. The Dey Palace Algiers

- Arch-column departure system,

The logs of wood are disposed between the masonry at the level of the departure of arch. They are used as an element of horizontal effort owed to the seismic load.

The arch column departure details. The Dey Palace, Algiers

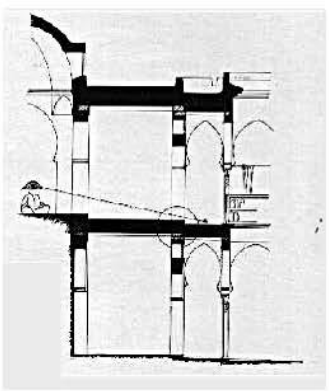
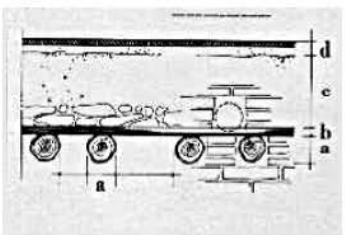
- Bracing by arcades,
- walls structures,

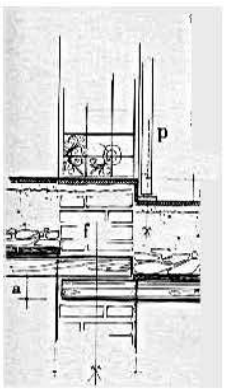
the walls are constituted by a layers of bricks and logs of wood. The regular superposition of the different materials, a rigid and a flexible, allowed a movement by rolling since the earthquake.

Walls structure. The Dey Palace Algiers

- floors structures,

The floors of the houses are constituted by a superposition of the logs of thuya wich are insert in all the width of the wall (f), creating a level difference (a). Between the two logs a battening of boards (b) wich allowed a movement by rolling since the earthquake.



Floors details. The Dey Palace (A.Ravereau [10]).

- corbelling,

Corbellings in the Casbah of Algiers

- chaining of the walls,
- bracing in the urban composition,

Arch made of bricks wich insure the bracing

These some arrangements of which we have cite as preventive measures have been put in evidence following investigations on the site at the Casbah of Algiers, the Dey Palace, Dar Aziza and at the Bastion 23. These constructive techniques, have certainly played an important role in the resistance to earthquake loads and thus allowed the Casbah to resist the disastrous Algiers 1716 earthquake and those which had followed during the XIX century, have been imposed to the inhabitants of the Casbah by the Dey of Algiers during the reconstruction phase in 1716.

4. Conclusion:

The strategy proposed has been designed with the purpose to take advantage of the currently available knowledge in science and technology in order to reduce the vulnerability of cultural heritage for future disastrous seismic events in north African countries.

Research in traditional seismic preventive technology "local seismic culture" constitutes a study which will generate considerable consequences in medium and long term to the profit of

the rehabilitation of cultural heritage. In fact, the practice of a adequate reinforcement intervention will be assured by:

1- Developing a sound culture of preservation by diffusing local seismic culture through universities and official authorities.

2- Developing an intervention methodology for the preservation of historical monuments and sites based on science.

3- Producing an exhaustive traditional preventive techniques catalogue including their role and their use as a practical tool.

4- Diffusing knowledge acquired by the training of qualified workers in the field of preservation.

5- Concentrating on cost effective and social impacts of the preservation actions.

6- Encourage national and international funding for preservation of cultural heritage.

7- Promotion of awareness and need to keep cultural heritage living at a national and international levels.

8- Promote international cooperation and program for the reduction of seismic risk in cultural heritage.

9- Promote tourism for cultural heritage at national and international levels.

10- Preservation of the cultural heritage through the revival of the local seismic culture.

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ITALIAN EXPERIENCE OF MANAGEMENT PLAN FOR THE HISTORICAL TOWNS OF THE WORLD HERITAGE LIST: SAN GIMIGNANO (TUSCANY)

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Abstract
The aim of this paper is to show the Management Plan of San Gimignano (Tuscany), highlighting the reasons that have led to this plan.
It comes from the will of the Town's Council during the redaction of the Structural-Town Plan, because it is considered highly useful for an appropriate grow of the town in agreement with the Unesco's suggestions, and also in order to be ready for the next Unesco checking.

Meaning and role of a Management Plan and of UNESCO Monitoring activity

~~Roba in inglese da Donatella~~Towns and cities are organized in similar fashion throughout the world to respond to the needs of their citizens. All functions with the support of civic administrations entrusted with the day-to-day management of affairs affecting most spheres of live such as transport, transit, parking, housing, culture, water and sewage, energy supply, development, etc. Through the course of this century city governments have become more interventionists, pushed in this direction by the general desire for achieve higher levels of service and support.
All towns and urban centres strives to provide their citizens with basic needs and a decent quality of life. Historic urban centres offer ambience with a special capacity to enrich the lives of their residents.
Several decades of experience in historic towns have demonstrated that heritage goals are best achieved by integrating these with other community goals.
The town on the World Heritage List sit on all continents, and reflect the accomplishments of a significant cross-section of the globe-cultures. The special qualities of World Heritage Towns may invite means of providing care which reduce their vitality and their value as living embodiments of evolving cultural expression. We have to consider that yet a museum, no matter what its scale, is still a museum. So, if we consider the historic city such only a museum, we stop the evolutionary processes and froze its developmental elements.
The key to sustaining the special qualities of historic towns without measures which may in time erode their qualities is to adopt a conservation approach. In the light of Ruskin' and Morris' teaching, we ascribe value to the contributions and changes introduced by all users of cities, rejecting the idea of sacrifice some contributions in favour of others. Important consequences are concentrate in the speech of Bernard Fielden "The object of conservation is to prolong the life of cultural property and, if possible, to clarify the historic and artistic message therein without loss of authenticity".
From the Venice Charter and from the creation of the ICOMOS Council important steps have been done in terms of conservation of historic towns. In the General Conference of UNESCO in 1976 the members adopted a "Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas". For the first time, this document emphasized the use of a planning process, accompanied by all relevant

supporting legal, economic, financial and social measures, to ensure development decisions respect the particular character of urban areas.

Up to this, many other documented has been redacted in order to preserve historic towns such as the "Charter for the Conservation of Historic Towns and Urban Areas" approved by the 1987 ICOMOS General Assembly in Washington, quickly considered the most important guiding instrument in urban conservation. It describes the salient characteristics of appropriate approaches (participation, prudence and planning) and outlines a set of specific management directives concerning traffic, disasters, training, etc.

It is now clear that compatibility between conservation and urban development can be possible only by means of management strategies. The key attributes of workable management strategies for historic cities are the following:

1) Respect for dynamic nature of cities
2) Respect for the value of public participations
3) Integration with complementary goals
4) Positive approach to conflict management
5) Cultural adaptability

Mise en forme : Puces et numéros

The planning process is simple and rational: its success requires the application of five sequential steps:

1) ŧThe analysis of the existing situation
2) Tthe analysis of the desired situation that includes conservation goals
3) TThe definition of desired results
4) The choice of appropriate means to achieve desired results
~~1)~~5) Monitoring: reviewing ad adjusting the strategy.

Mise en forme : Puces et numéros

Results statement focused on heritage qualities will elaborate on factors identified when the site was placed on the WHL.

Step one should permit identification of global strengths and weaknesses in the city: state of infrastructure, employment opportunities, cultural development, quality of environment. Step two reacts to the "as found" situation and builds around a coherent vision of that "should be" the desired state in each area looked at in step one. Step three gives specific targets for programmes and activity to rich, identifying the gap between "is" and "desired". Step four permits analysis of available mean to lead to the results desired and step five allows targets to be fine-tuned and programmes adjusted on the bases of experience.

Management is often defined as administrative direction or as the control of the course of affairs by one's own action. Heritage site management is the control of the elements that make up the physical and social environment of a site, its physical condition, land use, human visitors, interpretation, etc. Management may be aimed at preservation or, if necessary, at minimizing damage or destruction or at presentation of the site to the public.

A Management Plan is then necessary for different reasons. In fact planning before intervention leads to better decisions and provides a structure for the analysis of a complex process; ensures that preservation, enhancement, presentation and maintenance of a place is deliberately and thoughtfully designed to protect the place values; provides and establishes guiding principles or coordinated actions for activities on site, including conservation, maintenance, monitoring, interpretation, enhancements and evaluation; provide a framework to make informed decisions that will be taken in the future; helps

to defining the resource we manage and take stock of existing situation; helps in the rationalisation of resources at our disposal (available funds, manpower, etc).
For this reasons, each site candidate to the WHL is called to present a Management Plan and, if already enrolled, to adequate his political instruments to the philosophy of Management Plan.
The planning process consists on:

- Documentation on the site and its environment
- Determining values
- Definition of the state of conservation and use and at the same time of resources and management
- Definition of guiding principles
- Setting objectives and designing strategies
- Action pan and its implementation
- Evaluation

For sites already inscribed in the WHL such as San Gimignano's historic centre, the most important instrument is the action of monitoring.
Monitoring is an activity which involves both measuring and evaluating charge. I the heritage field, and indeed in all the fields to which it is applied, monitoring is undertaken in order to gain information which allows for "course correction", for definition of remedial actions or strategies to improve performance of plan or improvement of ambient conditions. With respect to individual properties of heritage value, monitoring can involve efforts to measure change in three areas:

- Evaluating forces and pressures external to sites
- Evaluating "state of conservation" (existing condition) of sites
- Evaluating effectiveness of management and/or conservation actions taken on site

The defined purpose of the monitoring activity will ~~guige~~guide the ~~choise~~choice of subject to be monitored. It is equally important that the particular choice of appropriate monitoring "tools and indicators" also follow from a "careful delineation of the purpose" of the monitoring activity. Indicators can never de developed on a stand-alone basis. Effective indicators must always be defined within a management context.
For this reasons it is not easy to carry on a monitoring in a management plan context. It is necessary a specific training and adequate professional skills.
Also in Italy, since 1995, a standing committee has operated at the Ministry for Culture and the Environment, whose job it is to address national petitions for enrolment and technical assistance, and to give scientific support in monitoring the state of conservation and protection of the approved sites.
The activity of the Group has given important impulse to the Italian contribution to the World Heritage List, and has guaranteed the co-ordination of national initiatives as well as surveillance on the timeliness and effectiveness of the proposals and on the sequels of enrolment.
All over the world a group of experts appointed by UNESCO is carrying out monitoring activity to check whether the peculiar characteristics for which certain sites have been included on the list are preserved or whether they need corrective action before they can be inspected. To this purpose also the municipal administration of San Gimignano will be supported by a work-group for the monitoring of the centre in view of the expert inspections that will start in Italy and Europe in 2004, after the current monitoring and recognition in Arab Countries has been completed.

Mise en forme : Puces et numéros

Mise en forme : Puces et numéros

WORLD HERITAGE LIST: ITALIAN SITES							
Agreement's date of World Heritage List (Italy): 1978							
SITE	**Historic Centre of San Gimignano**						
Location	Siena, Tuscany						
State Party	Italy						
Date of enrolment	1990						
Criteria	C **(i) (iii) (iv)** (i) represent a masterpiece of human creative genius (iii) bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared (iv) be an outstanding example of a type of building or architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.						
Category of property		**Monument**		**Groups of building**	X	**Site**	
History							
Middle Age							
Brief description							
"San Gimignano delle belle Torri" is situated in Tuscany, 56 km south of Florence. It served as an important relay point for pilgrims on the Via Francigena to and from Rome. The patrician families, who controlled the city, built some 72 tower-houses (up to 50m high) as symbols of their wealth and power. Only 14 have survived but San Gimignano has retained its feudal atmosphere and appearance. The city also contains masterpieces of 14th and 15th-century Italian art.							
Legal Status							
The site is protected by the following national laws: D.lgs 490/1999 ex L. 1089/39 and L. 1497/39							
Management							
Housing and Planning Municipal Office (local institution) Soprintendenza ai Beni Artistici, Architettonici e del Paesaggio (local institution of a National Ministry) Soprintendenza ai Beni Archeologici (local institution of a National Ministry)							
Some notes on preservation							
In this moment the redaction of the~~È in corso la redazione del~~ Structural Town Plan is in progress~~o~~. This documents will join together and systematize ~~dove saranno contenute tutte le~~all urban and conservation laws in agreement with UNESCO ~~norme di tutela e salvaguardia, in accordo con le~~ suggestion ~~Unesco~~.							

The reasons of the Management Plan of San Gimignano, site already enrolled in the Wworld Hheritage List

Very often to the enrolment of a site in the World Heritage List is recognized the value of a "seal of guarantee", without the contemporaneous consciousness of responsibilities that this reward involves especially in terms of protection and conservation of the heritage with strong consequences on the environmental and urban system and on the ways of management about each site.

~~Molto spesso si riconosce all'iscrizione il valore di un "sigillo di garanzia", senza la contemporanea consapevolezza delle responsabilità che la permanenza nella Lista comporta specie in termini di tutela e conservazione con forti ripercussioni sul sistema e le modalità di gestione di ciascun sito.~~

The role of the Management Plan for the historic centre of San Gimignano is to be in agreement with the Unesco's suggestion even if the town is already a site of World Heritage List since 1990. ~~During~~ By the redaction of the Structural-Town Plan it~~e~~ is necessary to keep the urban development under appropriate strict control and to consider an ~~(appropriate develop or)~~ appropriate strategy of conservation for the town and its environment, in order to be ready for the next UNESCO checking. Lets examine the ~~direction~~course ~~lines~~ of the San Gimignano's development and of its environment.

Here, it~~'s~~ doesn't matter to find a solution for a possible urban development because~~,~~ ~~in~~ San Gimignano and ~~also in~~ its country too, ~~there is~~had - and ~~there~~ has also nowadays ~~was~~ a good ~~politic~~ policy of development, yet. The aim is ~~going~~ to go on and to continu~~ing~~ in the future in the ~~with the~~ name of quality, as property ~~propriety~~ not as an attribute~~property~~.

During the urban planning t~~T~~here is the necessity to have a sole point of view about the environment and its activities: ~~during the urban planning~~

- ~~reutilising~~ re-using the historic centre / economic planning / urban decoration
- housing development / use of historic centre / housing politic
- industry and craftsmanship development / hamlets / environment decisions
- field of accommodation for tourist / agricultural tourism/ farm holiday-/ farming

The preservation of the historic structure of town and landscape has to be a impassable limit for each planning activities. It means not only checking the new housing activity, but also preventing acoustic, electromagnetic –and brightness pollution; avoiding a useless use of the territory.

~~At~~ On the ~~opposite~~ opposite, it has to creat~~e~~ing or preserv~~e~~ing extensive structures as parks or public gardens, or punctual structures as museum or as historic building restorations, that cause a growth of the management co~~a~~st for the municipality and then for the citizens. First of all: the evaluation of the connection ~~behind~~ between economic resources and development, and the ~~to~~ preference to projects on synergy with the private resources.

On this point of view the Structural Plan~~e~~ and the Urban Regulations -will confirm the ~~actual~~ existing buffer zone around historic centre, and also will identify part of the territory as landscape-value, through ~~thought~~ a total preservation law as a restrictive clause (around and near historic centre, in the agricultural lands, in the ridge zone, rural hamlets).

~~In the field of~~As regards accommodation for tourists ~~it is produced~~ two different aspects derives from it: one is strictly about the hotel trade, the other is about the new ~~agricultural tourism~~farm holiday trade. Concerning the first one, it already exists a good

urban planning regulation, really useful during the time. Concerning the new ~~agricultural tourism~~farm holiday trade, the general reason is the use of territory. Then the agricultural use of the land and the rural buildings have to be tightly as an aim to the cultivation – transforming process – trade, not to the tourist attraction, that is only a plus value of the environment.

The "buffer zone" and the ~~frontiere~~ boundary line of cultural landscape

In the 1990 there was the enrolment of San Gimignano in the WHL as a site with these criteria: C (i), (iii), (iv).
The town represents a masterpiece of human creative genius; it bears a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared; it is an outstanding example of a type of building or architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.
(i) In fact the historic centre of San Gimignano has a lot of great masterpieces of XIV and XV century by the Italian art, collocated in their origin place or site: the "Giudizio Universale", the "Inferno e Paradiso" by Taddeo di Bartolo (1393), the "Martirio of San Sebastiano" by Benozzo G~~B~~ozzoli (1465) the frescos paintings by Domenico Ghirlandaio, the history of Santa Fina (1457), in the cathedral; and many other.
(iii) ~~Also~~ T~~t~~he town is also an exceptional evidence of the medieval culture, because it joins in a small area, within the walls, together all the typical structure of a medieval urban life: squares, roads, buildings, towers, wells, fountains. The argument of the frescos painting in the historic municipality-house (Memmo di Filippuccio, 1303) are often reproduced in order to show the domestic life in Italy during the XIV century.
(iv) San Gimignano is a peculiar landscape in Tuscany, and also in Italy, for keeping 14 towers with different height (the firsts since the 998), not reduced by the time or by the political events.
Then it means an urban importance, not only monumental, and we have to look for:

- authenticity and intangibility of the walls and of the towers' skyline
- authenticity and intangibility of the curvilinear ways

After almost thirteen years since the enrolment in the WHL, it is necessary to revise the urban dynamism and check if the UNESCO's remarks are and has been really used during architectonic and urban actions.

Table 1. San Gimignano and its cultural landscape

Three remarks regarding the future management of the cultural property:

1. The implementation of the 1983 town plan must not lead to the creation of reinforced protection zones within the walls, the full preservation of the whole constructed part of San Gimignano architectural heritage is an absolute necessity which cannot accommodate any kind of selectivity.
2. The heavy tourist influx noted at San Gimignano every summer must not be taken to imply a need for additional infrastructures (nearby parking lots, hotels and restaurants, public restrooms) that may alter the beauty of the site.
3. Protection must be extended to include the Contado, which, even though isolated in the farmlands of the Val d'Elsa, is an integral part of the fortified town's visual and historic aspects.

Exactly the site enrolment by UNESCO is the whole historic town within the walls, and the "buffer zone" recognized is composed by a narrow strip around the ancient town without considering the relations between town, landscape and visual perspectives.

In terms of conservation of authenticity of sites and, at the same time, of intangible aspects of the medieval urban system, it is necessary a new-reading of the building and of its ~~********* AIUTO DONA!!!!!! Qual'è la buffer zone????~~

~~*********~~

~~*********~~

~~In termini di conservazione dell'autenticità dei luoghi e contemporaneamente degli aspetti intangibili del complesso medievale è necessaria una rilettura dell'edificato e del suo~~ environment through its materical and managerial aspects

About this last point in particular it is important to verify:

- urban law and relating planning tools

~~attraverso i suoi aspetti materici e gestionali. Riguardo a quest'ultimo punto particolarmente la verifica de:~~

~~- legislazione urbanistica e relativi strumenti di pianificazione~~

- protection law and connected cataloguing and stocktaking systems of cultural assets, especially referring to the aspect of the damage state evaluation of the catalogued assets;

~~leggi di tutela, con le specifiche relative al sistema di catalogazione e inventariazione dei beni e con particolare riferimento alla parte relativa alla valutazione dello stato di conservazione dei beni schedati.~~

- characteristics of obligations
- laws on security and accessibility on public sites
- tourist flow and relation between man and environment.

Throughout these categories we can verify the presence of phenomenon-problems of degenerative kind:

- of materials and building areas;
- of destination use
- of relation between man and environment (for example the one regarding the strong tourist fluctuation.

Mise en forme : Puces et numéros

~~caratteristiche dei vincoli~~
~~*- norme in materia di sicurezza e accessibilità dei luoghi pubblici;*~~
~~*- flusso turistico e rapporto uomo-ambiente.*~~
~~*Attraverso queste categorie si può verificare la presenza di fenomeni problema di tipo degenerativo:*~~
~~*- dei materiali o delle aree edificate;*~~
~~*- delle destinazioni d'uso;*~~
~~*- del rapporto uomo-ambiente quale quello della forte oscillazione turistica.*~~

~~Specially~~Above all in this case of Tuscan town, we have to consider that a town, as a whole site, is tightly linked on its environment and landscape. It means that an historical town goes on with its preservation living in connection with the social and economic activities in its environment. It is also a cultural environment, as cultural landscape site ~~of~~ for cultural activities.

The ~~politic~~ policy of preservation starts with the recognition in the environment of this kind of plus value, suggested also in a Management Plan that goes on out of the walls.

For example: the intention by the Municipality to start a list of the territorial state of the roads, included the historic ones, even if these are not in use. The list will include the municipal-public roads and the private ones, plus up to date of the use conditions.

The management has also the aim to plan the level of use of the territorial roads, for example reserved use for free-time or trekking, reserved use ~~-~~for woods and lands (public use of private roads). For example: to identify the historic productive activities in this environment and linked by those roads, as management object.

Now travelling and discovering the landscape or following a route of navigation means synonymous with virtual travelling by using modern multimedia vehicles or synonymous with buying a not expensive holiday in a small town in the countryside.

Then the creation and the knowledge of a cultural landscape means going on: the human landscape as a material evidence of the cultural changes (~~meaning~~ intending "cultural" also as a production activity, economic activity, social activity). For these reasons a Management Plan~~e~~ to a Historic Town of UNESCO exceeds the buffer zone as a site or as a point, and throws the town towards its cultural landscape (social, economic and productive).

According to the evaluation criteria of UNESCO, a "cultural site" must meet the criterion of authenticity as far as regards its conception, materials, execution, or natural environment, and in the case of a cultural landscape, as far as regards its character or its distinctive components. While a natural site must meet the conditions of integrity, that is it must include the elements needed to define such a site.

Recent national experience shows that the physical conservation of scenery, exclusively obtained through a plan of protected areas is not enough to ensure vitality of the historic urban organism and natural and historic landscape as the core of a developing town, of a developing environment.

~~Individuazione~~ Identification of risk factors~~dei fattori di rischio~~:

- identification of elements which characterize the rural-productive-cultural landscape
- safeguard and vitality (intangibility and tangibility): carrying on vitality of a country in an eventual controlled and guided transformation

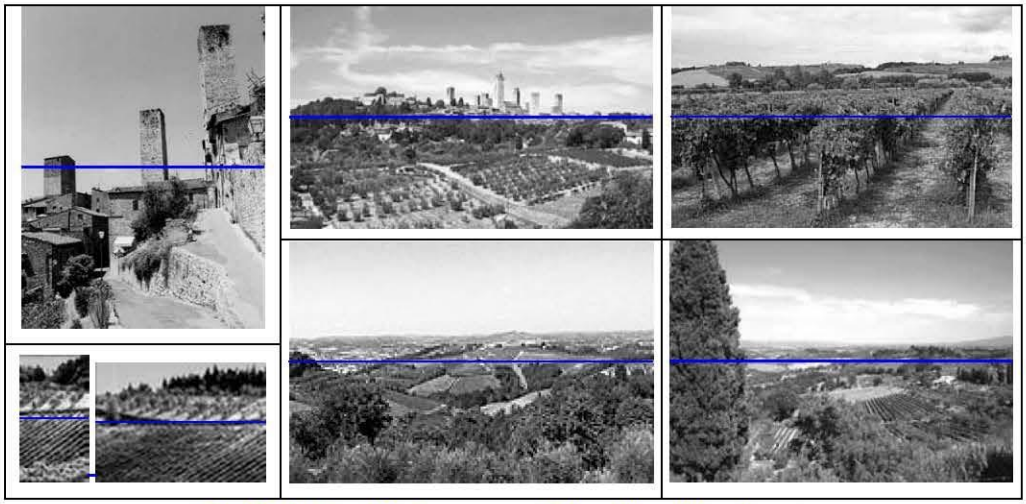
~~- individuazione degli elementi caratterizzanti il paesaggio rurale produttivo culturale~~

Mise en forme : Puces et numéros

Mise en forme : Puces et numéros

Mise en forme : Puces et numéros

~~- salvaguardia e vitalità (intangibilità e tangibility): continuazione della vitalità di un territorio in una eventuale trasformazione controllata e guidata~~



~~**Table 1. San Gimignano and its cultural landscape**~~

An example of cultural landscape in San Gimignano territory: the Francigena Way

The aim is to link a landscape rich of material and cultural peculiarity to a Site already inscribed in the WHL. The management plan has also to discover the joints existent between a preserved Site and its cultural landscape. This joints are historical, structural, social and economic ones. Then the management plan runs on synergic way these questions, recognizing the argument of comparison.

The Francigena Way From the High Middle Ages to the first Jubilee celebrations, the Francigena Way was the privileged road to Rome. However it was not only a religious-way as it was used by merchants and armies, and by emperors and popes, findings itself to progress along with the men and ideas that travelled on it. In this way the road contributed in a rather important way to the construction of the substantial unity of the medieval European culture. As all other medieval roads, the Francigena Way was not a single path, but rather a group of trails that often alternated among themselves but converges at certain strategic hubs. One of this strategic and economic points was the town of San Gimignano in Tuscany.

The Francigena Way (or the "street originating in France") connects North Europe to Rome, after having passed across the Padana plains. In then reaches the Lunigiana Area and then in Tuscany, across the Cisa Pass. It then followed the extreme southern border of Liguria (around La Spezia), after having touched the towns of Pontremoli and Aulla and the populated areas of Santo Stefano, Sarzana and Luni, before entering the heart of Tuscia. This great artery crossed the lower Magra valley, witch became and important meeting point for the medieval roads. From the Francigena road several secondary roads

started which led to the Vara valley and the inland from the coast to Genova. Towards continuing on Rome one would encounter the first real city of the Tuscan Francigena Way: the town of Lucca. Crossing the Arno river and the swampy areas around Altopascio under the careful guidance of the Knights of Tau, who were the hosts who also maintained a ferry for crossing the river, one would continue on to the Valdelsa Area. After that to San Gimignano, after to Siena, and finally to the monastery of San Antimo in the Orcia Valley and San Salvatore on the slopes of Mount Amiata. One could otherwise follow the road to Contignano to arrive at the fortification in Radicofani quicker. Crossing the border to the Lazio region, the Francigena Way went towards the three large tufa rock vulcanos in the region (Volsino, Comino and Sabatino). These are very different from Mount Amiata in their more gentle shape to the slopes as well as for the presence of ample craters occupied by the lakes of Bracciano, Vico, and Bolsena. At this point the last great point of the road was Rome.

This road did not exclusively lead pilgrims to the Holy City but it was the most important medieval link of communication. Along this artery many of the travellers included writers, artists, miniature painters, and master artisan from North Europe to the Middle East, who left important traces of their trip. San Gimignano's then wealth is thanks to its positions on the Francigena Way and for this reason to its privileged rapport with Pisa and its commercial power of the time.

Architectonic traces of the influence from the travellers can be found often along the route followed by the road, also and specially along this part of Tuscany near San Gimignano. From the Romanesque to the successive Gothic style, the cultural footprint left by the transit occurring during those centuries can be easily seen.

To be in the WHL, as "San Gimignano delle belle torri", means not only managing tourist flows and keeping the heritage in order to reason of the exterior and material peculiarities, but it also means managing economic flows and linking these reasons with the cultural one. Cultural landscape is also culture of the production. In particular San Gimignano on the Francigena Way is rich of cultural traditions, applied in the production system of the country, that are among the most thriving economic activities for the area. This tradition is for example the cultivation of grapevine, that has characterized the human landscape in Tuscany; plus the oil and the less famous cultivation of the saffron, since the medieval age.

These are just some example about "cultivation as culture", specially in a historic environment as Tuscany, travelling through the Francigena Way.

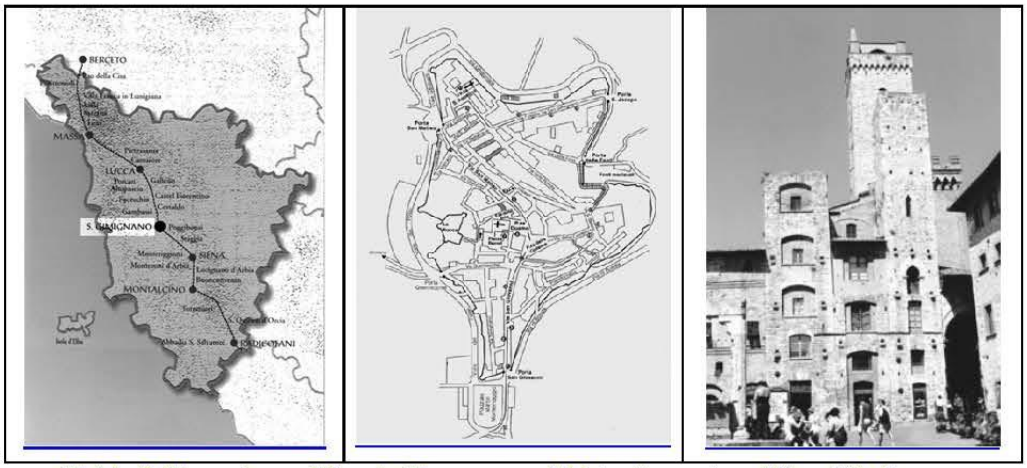


Table 2. Francigena Way in Tuscany and historic centre of San Gimignano

During 1994 the Francigena Way was declared a Cultural Route by the European Council, second to the Walk to Santiago. This was thanks to the desire shown by the Regions that it travels through, the studies done by the International Scientific Committee, and to the patronage of the Promoting Committee made up of the World Tourism Organization, the European Council, UNESCO, and the Vatican City.
The Routes of Santiago de Campostela in France is also inscribed in the WHL as a Route since 1998 (for played a key role in religious and cultural exchange and development during the later Middle Ages), and for this reason it is joint with the town of Santiago de Campostela (Old Town), inscribed in the WHL as Site since 1985.
To this point of view it matters reading again the San Gimignano dossier of enrolment to WHL in the 1990, being on the brief description: "it served as an important relay point for pilgrims on the Via Francigena to and from Rome". This is the recognition of the San Gimignano's site vocation to take part in a widespread management.
Also UNESCO has already inscribed on WHL the Cultural Landscape of Aranjuez in Spain (2001). It means Cultural Landscape as historic agricultural: "represents the coming together of diverse cultural influences to create a cultural landscape that had a formative influence on further developments in this field" and also "the complex designed cultural landscape of Aranjuez, derived from a variety of sources, marks a seminal stage in the development of landscape design".
San Gimignano as a Route and as a Cultural Landscape, not only as a site, has to be the aim of the management planning.

Conclusions and comparisons with other Italian cases

Among the last management plans in Italy should be considered the "Val di Noto" management plan (2002 prof. T. K. Kirova, prof. P. A. Valentino), developed for the enrolment of the eight Sicilian baroque-town to the WHL (Site: Late Baroque Towns of the Val di Noto). The plan manages, on territorial basis, urban reality differentiated by dimension and development, but linked together by a unique theme: the urban reconstruction during XVIII century after the earthquake, as the most important building yard of the Sicilian history. Today the region is a mine of environmental,

architectonic, artistic and cultural resources. Furthermore the rural areas and agricultural landscape of this wide region keep still now value of authenticity.
While the San Gimignano town has an intense and structured flow of tourism below an acceptable limit, the eight towns of Noto valley have 1) a poor integration between tourist attraction and council management and 2) a not enough developed economic structure based purely on agricultural and building field. The management plan has highlighted three environmental elements of danger for the keeping heritage alive: 1) structural danger due to natural causes (earthquake, etc.), 2) pollution danger for stone masonry, 3) danger that comes from on going or planned political and territorial dynamics. The plan schedules: 1) focusing of areas and actions for turning to account cultural resources, 2) incentive the presence of privates defining modalities and procedures of their evolvement , 3) define tools in order to manage the turning to account programs and monitoring activities, 4) focus the needed changing to the actual planning with respect to cultural heritage.
Hence we can compare the evaluation for the plan of San Gimignano (prof. T. K. Kirova), that aims to have territorial value beyond the area limited idea of "site", to the "Val di Noto" management plan, for the value of authenticity and integrity of rural and urban landscape that links the cultural activities of a site to his historic and agri*cultural* territory.

~~**Un esempio di individuazione di paesaggio culturale per San Gimignano: the Francigena Way**~~

~~Ciò allo scopo di unire un territorio pieno di peculiarità materiali e culturali con sito già facente parte della lista. Il piano di gestione deve anche, oltre alle altre cose, individuare i legami tra il sito tutelato ed il territorio culturale, legami che sono storici, strutturali, sociali ed economici. Scopo del piano è quello di gestire e concertare questi aspetti, una volta individuate le tematiche di confronto.~~
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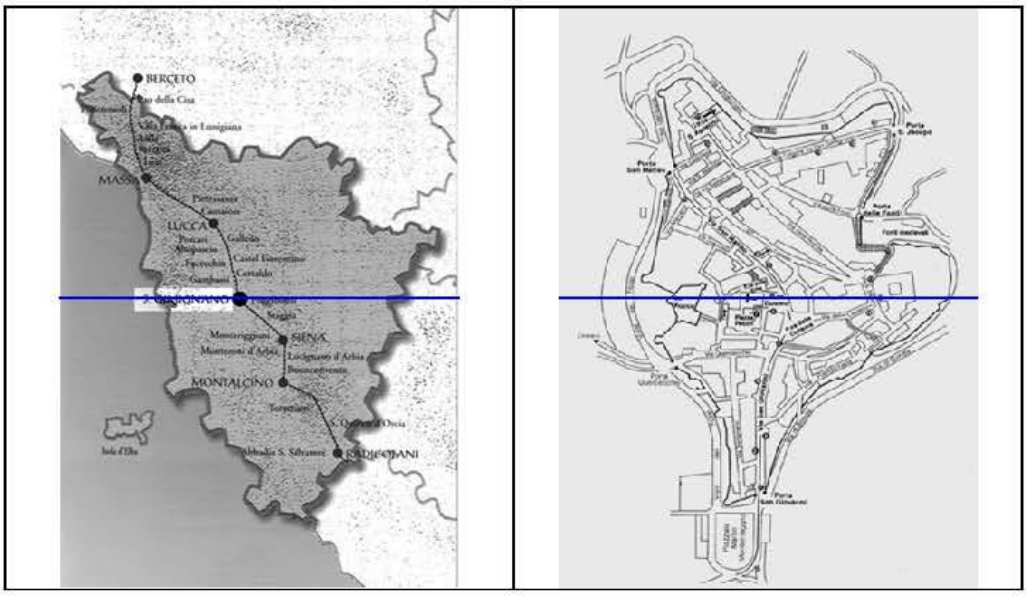

Table 2. Francigena Way in Tuscany and historic centre of San Gimignano

CONSERVER OU TRANSFORMER?

Bernhard Furrer
Conservateur de la Ville de Berne (Suisse)

Résumé

A toutes les époques les villes historiques ont été soumises à des transformations pour répondre aux besoins de la société. Notre temps leur impose d'une part des interventions souvent destructrices et anéantissant la substance d'origine. D'autre part, les responsables de la conservation – dans un reflex de défense – ont tendance a rejeter a priori tout changement. A long terme, les deux tendances mettent en danger le patrimoine vivant. Tout en maintenant la substance historique reconnue de valeur, dans nombre de cas des ajouts seraient possibles. De tels changements dans un sens additif pourraient contribuer à maintenir au monument sa place dans la société et dans la vie. L'exposé plaide pour une ouverture des villes du patrimoine mondial pour des contributions architecturales contemporaines de haute qualité à condition que le patrimoine soit sauvegardé dans le respect de règles précises.

Le monument et sa signification dans notre vie

Un bâtiment ancien n'obtient sa signification et sa valeur de monument historique qu'en fonction du regard que les humains portent sur lui à travers leur considération et leur appréciation. Ce sont eux qui reconnaissent sa valeur spécifique de témoignage historique et qui, par la suite, sont prêts à le sauvegarder. Comparé à d'autres témoignages historiques tel le document aux archives ou le tableau au musée, le monument a un intérêt supplémentaire, celui de faire partie de notre expérience humaine pendant une vie entière, d'être présent dans nos activités de tous les jours. Il est une source qui inspire nos réponses individuelles aux questions sur le passé, le présent et l'avenir. Il est un lieu de mémoire. Cette appréciation du monument et – dans un sens égal – de la ville ancienne en tant que composante vivante d'une société dépend largement de l'authenticité des œuvres d'architecture et d'urbanisme d'une part, du dialogue créatif et de l'adaptation aux besoins légitimes de la société en mutation permanente d'autre part.

Vivre signifie changer. La biologie nous apprend que ce qui a perdu la capacité de changer, de s'adapter à de nouvelles conditions et circonstances, est condamné à mourir. Mais elle nous apprend aussi que malgré toutes mutations, une part considérable et déterminante des données biologiques subsistent sans se modifier dans le cours d'une longue vie. Vivre signifie changer et inversement, ne pas changer signifie disparaître. Sommes-nous conscients que ces règles sont également applicables à la vie humaine dans les villes anciennes? Savons-nous qu'elles sont valables, dans un sens figuré, également pour les noyaux historiques eux-mêmes?

Bien qu'il soit évident qu'il y a des différences entre la vie humaine et le sort d'une ville historique, nous pouvons transposer nos observations dans le domaine de la biologie aux villes dont l'avenir nous préoccupe. Cela veut dire qu'elles ne survivront que dans la mesure que leur développement saura s'adapter aux exigences nouvelles . Mais cela signifie aussi que les caractéristiques fondamentales du monument doivent être préservées. Développement continu dans la permanence. D'où la question posée par le titre de cet exposé «Conserver ou transformer?».

Conserver les villes historiques

De prime abord, la notion de transformation et d'intervention répugne profondément au conservateur des monuments. En effet, sa vocation est de conserver un bâtiment, de le préserver. Faisant ceci il est bien conscient que tout monument est soumis à des modifications cons-

tantes. Elles sont dues et aux conditions atmosphériques et à toutes les mesures de «pure» conservation luttant contre les effets de dégradation naturelle, mesures, qui représentent elles aussi des interventions importantes et irréversibles. En plus, tout ce que il fait au cours d'une opération de restauration entraîne souvent des interventions massives sur le monument, sur sa substance historique. Globalement, il faut considérer que la nature soumet le monument à une action continue, l'homme par contre le soumet à des actions ponctuelles, le plus souvent irréversibles, sur la base de considérations évaluées selon les circonstances du moment.

Dans ce contexte, il reste évident que la conservation matérielle de nos villes du patrimoine mondial est au centre de nos préoccupations et nous devons veiller en premier à garder le bien culturel indemne. Il y a bien assez de pressions insistantes qui veulent s'en prendre au monument, l'exposer à de nouvelles exigences, l'exploiter grâce à des transformations tous azimuts. La première tâche et le premier devoir des responsables de la conservation sont et restent la protection du monument dans sa matérialité et la défense de son authenticité.
Son message ne peut durablement passer qu'à travers sa réalité matérielle, nous apporter – à nous et à ceux qui viendront après nous – le témoignage des époques de sa construction et de celles de ses modifications.

Transiger sur le principe de l'authenticité matérielle conduit à mettre en danger l'ensemble des monuments et de la ville. Il est inacceptable de s'en remettre à l'arbitraire de valeurs subjectives comme «d'esprit authentique», de réduire le monument au seul critère d'une beauté préconsue, de limiter le monument à sa valeur symbolique voire son aspect extérieur ou de reconstruire des monuments perdus depuis des décennies. Nous ne devons pas tomber dans de tels pièges: la tâche essentielle restera la défense du témoignage matériel dans sa substance vive, afin de le tenir ouvert au questionnement présent et futur.

Transformer les villes historiques

Attribuer un rôle actif aux monuments, leur conserver la signification dans la vie d'aujourd'hui en les intégrant à un environnement humain demandera cependant des transformations. Des changements seront nécessaires s'ils doivent rester à la fois des parties constitutives de notre cadre de vie et des témoins matériels de formes anciennes d'existence, témoins, qui ne cessent pas de nous fournir des enseignements. Pour ce faire, la simple conservation, notre tâche prioritaire, aussi indispensable qu'elle soit, ne suffit pas. Selon les cas, des transformations du bâtiment ou de la ville et leur environnement orientées vers l'avenir sont nécessaires. On évitera ainsi d'aboutir à de la matière morte, des épaves dans le paysage urbain. La ville historique échappera au sort d'une pièce de musée.

Ce n'est rien de nouveau: les historiens connaissent les innombrables transformations, agrandissements, adaptations, mesures compensatoires dont les bâtiments importants ont fait l'objet; selon les principes de la Charte de Venise, nous protégeons de telles interventions des générations précédentes – dans la mesure où nous y voyons une expression majeure de leur époque – comme nous protégeons la substance originelle. On ne voit pas pourquoi un tel processus s'arrêterait complètement, pourquoi des modifications apportées aux bâtiments ne devraient tenir compte des besoins d'aujourd'hui. Certes, nous somme à juste raison devenus prudents, nous avons tiré la leçon des dommages considérables subis dans le passé. Cela ne doit pas nous amener à adopter une attitude négative ou défensive face à tout changement, pour – une fois qu'il est devenu inévitable – laisser le champ libre aux «autres», aux promoteurs, aux politiciens et aux investisseurs. Nous nous opposerons aux nombreuses propositions qui s'attaquent sournoisement aux monuments; nous accompagnerons par contre les initiatives visant à assurer l'avenir du site, en contribuant à les développer sans nuisances pour le monument et à les soutenir activement. Le blocage que l'on constate aujourd'hui devrait faire place à une attitude ouverte (ce qui ne veut pas dire «laxiste»).

La proposition de réorienter notre travail pour les villes du patrimoine mondial maintient la conservation et la restauration au centre de nos préoccupations. Mais elle vise plus loin: toujours à condition qu'elles suivent des règles précises, nous devrons à l'avenir autoriser des modifications qui prennent en compte le futur, être conscients qu'elles ne sont pas seulement possibles, mais nécessaires. Nous, les responsables de la conservation, ne devrons plus réagir a priori avec hostilité à tout changement, mais plutôt l'encourager là où c'est nécessaire et justifié, pour autant qu'il satisfasse à certaines règles précises. Des freineurs qu'ils étaient, les conservateurs deviendraient des partenaires agissants.

L'incitation à soutenir activement les changements plutôt qu'à les autoriser de mauvais gré ne doit donc pas être comprise comme une invitation au n'importe quoi. Pas question de carte blanche à des propriétaires avides de construire, ni de champ d'exercices pour architectes en mal de notoriété ou promoteurs touristiques condamnés au succès.
Il s'agit au contraire, et dans tous les cas, de considérer la pérennité matérielle de la construction comme base inébranlable.

Les conditions pour toute transformation

Comme il a été dit, des circonstances doivent être réunies et des règles précises doivent être respectées quand il s'agira, suite à de nouvelles exigences, de procéder à des modifications sur les bâtiments ou aux alentours. Ces conditions doivent être respectées de manière cumulative.

Elaborer les bases et les rendre accessibles et publiques
La condition première et sine qua non de tout changement est une connaissance approfondie du monument. Les résultats de son analyse et une documentation étendue doivent être rendus public. On ne peut juger des changements que lorsqu'un ensemble conséquent de documents relatifs à la construction et à l'état actuel du monument a été constitué, relevé et travaillé.
Après des travaux pionniers comme les inventaires et plans d'ensembles des caves et des toitures, la ville de Berne a commencé un *relevé systématique des façades, des arcades et des plans* en vielle ville selon un procédé de haute précision. Après achèvement d'un quart des relevés, l'équipe a dû être dissous parce que les fonds nécessaires n'étaient plus accordés. Une base de recherche importante ne sera donc pas à disposition et les connaissances restent insuffisantes.

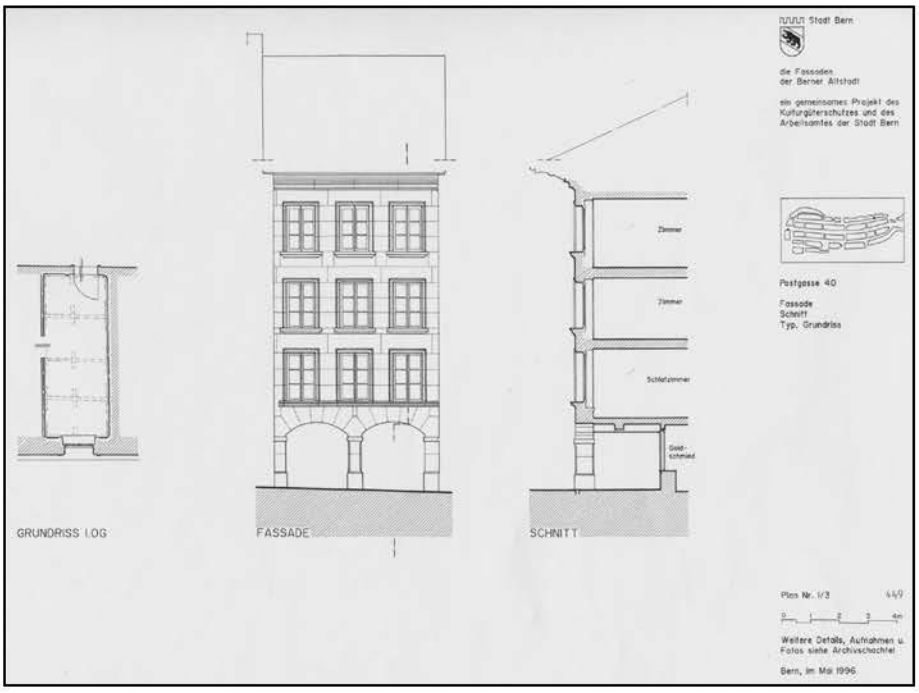

Illustration 1:
Relevé des façades en vieille ville de Berne.

Tenir compte des lieux
Il faut exiger de toute modification dans le contexte d'un bien culturel appartenant au patrimoine de l'humanité qu'elle tienne compte de façon approfondie des données du site construit et de son évolution historique. Cela n'a rien à voir avec la reprise de quelques caractéristiques de réalisation, ou le fait de construire des arc brisés ou en plein cintre. Il s'agit plutôt de connaître les règles internes, qui ne se dévoilent que par analyse approfondie.

La zone d'accueil de *l'Alhambra de Grenade* a été réaménagée en 1996 par les architectes viennois Erich Hubmann et Andreas Vass. Leur projet prit pour point de départ la signification culturelle et historique de l'eau et des systèmes de canalisation du palais.
Sur cette base, ils conçurent une architecture résolument contemporaine, qui s'adaptait de façon naturelle à la topographie particulière du lieu tout en prenant en compte de manière optimale les besoins des visiteurs.

Illustration 2:
Photo des installations d'entrée et de parking à l'Alhambra de Grenade.

La relation au monument
Il est de rigueur que la cause de la modification soit en rapport direct avec le monument. Celui-ci ne doit pas être ravalé au rang de simple support d'ambiance servant de cadre à une utilisation hétéroclite qui pourrait tout aussi bien se tenir ailleurs. Dans ce contexte, il est possible de procéder par une correction d'interventions passées.

Le *Mont St. Michel* a été relié à la terre ferme, à la fin du XIX siècle, par une longue digue qui a provoquée l'ensablement de la mer qui devenait de moins en moins profonde et risquait de se transformer en zone d'alluvionnement. Le projet de Feichtinger architectes prévoit la démolition de l'accès routier et la construction d'une passerelle en légère courbe pour piétons ainsi que pour la mise en service d'une navette à faible vitesse. La dernière partie de l'accès sera inondée à certaines saisons. La passerelle en construction élégante et minimaliste est une intervention importante pour l'avenir du site.

Illustration 3:
Le projet de passerelle reliant Mont St. Michel à la terre ferme: vue aérienne (à gauche) et vue du projet (à droite).

Qu'est ce qui est digne d'être protégé?
Quand il faut intervenir sur la substance du monument, il est nécessaire de distinguer attentivement la valeur architecturale des parties sur lesquelles l'intervention portera – à part les parties sacro-saintes il en existeront qui sont de valeur secondaire. Cet examen ne sera pas laissé à l'appréciation du maître d'œuvre; il est du ressort des Services des Monuments historiques, à la rigueur confié à un groupe d'experts.

L'architecte Franz Stempkowski a construit la *préfecture* (Amthaus) de Berne de 1896 à 1890; il s'agissait d'un bâtiment administratif, relié à un quartier carcéral par des cours intérieures. Après le déménagement de la prison, on se trouva devant le problème de l'élargissement considérable de la surface utile pour l'administration. Lors des transformations de 1979 à 1981, les architectes de l'Atelier 5 conservèrent le bâtiment principal qui donnait sur la rue et le restaurèrent soigneusement. Par contre le quartier carcéral fut démoli et sa profondeur est occupée par une nouvelle aile à vocation administrative.

Illustration 4:
L'intérieur de la préfecture à Berne avec parties d'origine (à gauche) et l'extension contemporaine (à droite).

L'utilisation d'origine
Le fait qu'un monument soit exploité conformément à son utilisation d'origine représente pour celui-ci une grande valeur. Il est possible que cette utilisation ne puisse se maintenir qu'en procédant à certaines interventions dans la substance. Le conservateur des monuments doit activement collaborer à la réflexion, donner des idées, peser le pour et le contre, cependant *il ne doit pas* proposer des projets d'architecture.

La *Bibliothèque nationale suisse* a été construite en 1928; elle servait alors de référence pour les bibliothèques modernes de toute l'Europe. Depuis, la solution choisie alors pour la conservation des livres dans un entrepôt en hauteur est devenue indéfendable pour des raisons climatiques; de plus, les magasins étaient pleins à craquer. Plutôt que d'opter pour la solution, discutée, de transférer la bibliothèque entière dans une nouvelle construction, son ancien emplacement a été conservé, et pour le stockage des livres des nouveaux magasins souterrains ont été construits. L'ancien entrepôt est devenu partiellement ouvert au public, ce qui impliquait un nouvel accès depuis l'entrée principale et un nouvel escalier. La transformation menée par l'association d'architectes BNS a rendu nécessaire la démolition de la précieuse zone des guichets des prêts, le prix à payer pour la conservation de l'exploitation d'origine.

Illustration 5:
L'intervention contemporaine dans la bibliothèque nationale suisse à Berne à l'arrière plan.

Lieu et importance de l'intervention
Un autre principe veut que les interventions ne soient opérées que dans des lieux ne présentant pas des témoignages d'intérêt historique essentiel, ou qu'elles soient effectuées de façon additive afin que les générations futures puissent revenir sur ces interventions.

Le *Castelgrande* de Bellinzone fait depuis peu partie du patrimoine mondial. La transformation du château par Aurelio Galfetti entre 1982 et 1992 montre combien, dans une situation délicate, un nouvel élément – en l'occurrence l'installation de l'ascenseur reliant la ville à la place du château – peut être inséré sans mettre en péril l'aménagement historique dans son ensemble et en apportant une amélioration notable du point de vue de l'exploitation publique – une réalisation exemplaire. La transformation montre toutefois à quel point le résultat devient douteux lorsque la substance historique est réduite à un simple accessoire décoratif pour des intérieurs à la mode. En effet, les bâtiments historiques ont été dénoyautés et leurs façades complètement remodelées. En plus, une partie des interventions est conçue de façon à être confondue avec les éléments médiévaux existants.

Illustration 6:
L'ascenseur reliant le Castelgrande de Bellinzone à la ville.

Qualité des éléments nouveaux

Après ce qui vient d'être dit, il apparaît clairement que seule une qualité architecturale largement supérieure à la moyenne est appropriée lorsqu'on s'apprête à apporter des transformations à des monuments de grande valeur, à des villes ou à leur environnement. Lorsqu'elles sont soigneusement conçues et correctement menées, des concours d'architecture permettent en général de trouver des solutions adéquates aux situations délicates visant des monuments historiques ou leurs abords immédiats. Les résultats de ces concours doivent être réalisés avec les architectes concernés; si cela s'avère impossible, il faut initier un nouveau concours.

Pour la *Place du Marché à Lübeck* on cherche depuis des années un projet de architecture sur la parcelle de l'ancienne poste et d'un bâtiment administratif de la ville. Un concours d'idées d'urbanisme a été lancé en 1996 par la ville Hanséatique; le projet vainqueur des hambourgeois Böge et Lindner-Böge n'a pourtant pas été exécuté. Quelques années plus tard, le propriétaire a mandaté d'autres architectes pour concevoir un projet. Même si quelques unes des idées du projet vainqueur ont été reprises et de nombreuses «corrections» ont été requises, le nouveau projet ne peut nullement suffire au niveau d'exigence élevé qui prévaut pour une nouvelle construction sur cet espace central du patrimoine culturel mondial.

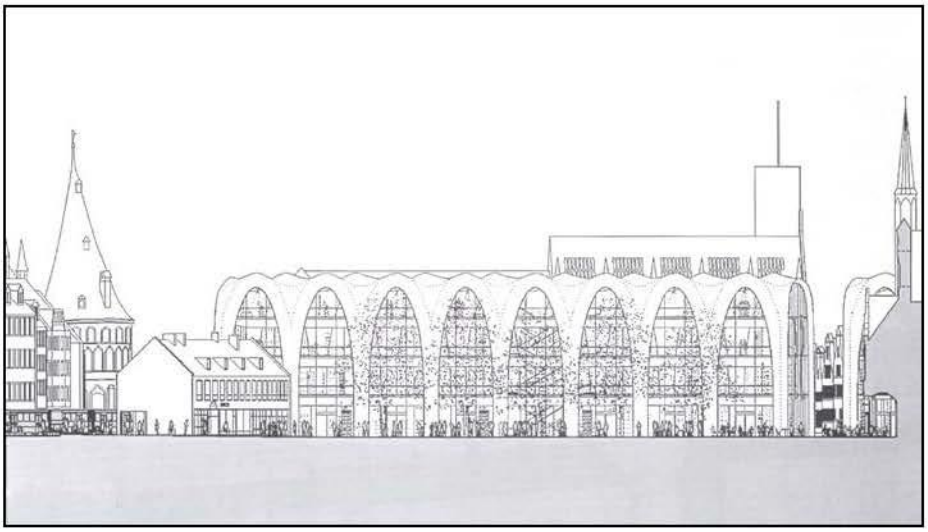

Illustration 7:
Lübeck; plan de la façade principale du nouveau bâtiment, côté marché.

Conclusion

La vie est changement. Les monuments ont de tous temps été transformés, même ceux qui étaient considérés de grande importance. Notre génération semble cependant paralysée par les monuments au point de ne pas oser entreprendre quoi que ce soit. C'est une attitude qui ne tient pas compte de l'expérience historique, fige les monuments, et les refuse en quelque sorte à la vie actuelle.

C'est une fait avéré: nous avons pour tâche première de protéger et de prendre soin des villes et de leurs monuments historiques, et nous devons le faire sur une base scientifique, avec conviction et ténacité. Cependant, même lorsqu'il s'agit de monuments appartenant au patrimoine mondial, nous devons également nous ouvrir et ne pas simplement considérer avec répugnance toute initiative de changement. Il nous faut au contraire nous impliquer activement, prendre part aux développements de ces changements et les cautionner pour autant que certaines données des base soient réunies et que des exigences claires soient formulées et imposées.

Cette ouverture est indispensable si nous ne voulons pas installer une sorte de société à deux vitesses dans le domaine des œuvres architecturales, qui classerait d'un côté les nouveaux bâtiments comme étant utiles et servant nos besoins quotidiens, et de l'autre les monuments comme des objets de contemplation sans utilité pour notre réalité quotidienne.

Protégeons nos villes historiques, mais laissons-les ouvertes au changement, à condition que celui-ci n'affecte pas leur substance reconnue et inaliénable.

Berne, février 2003

Mots clés

Conservation
Transformation
Adaptation à la vie actuelle
Architecture contemporaine

Regeneration of Vilnius Old Town, its methods and results

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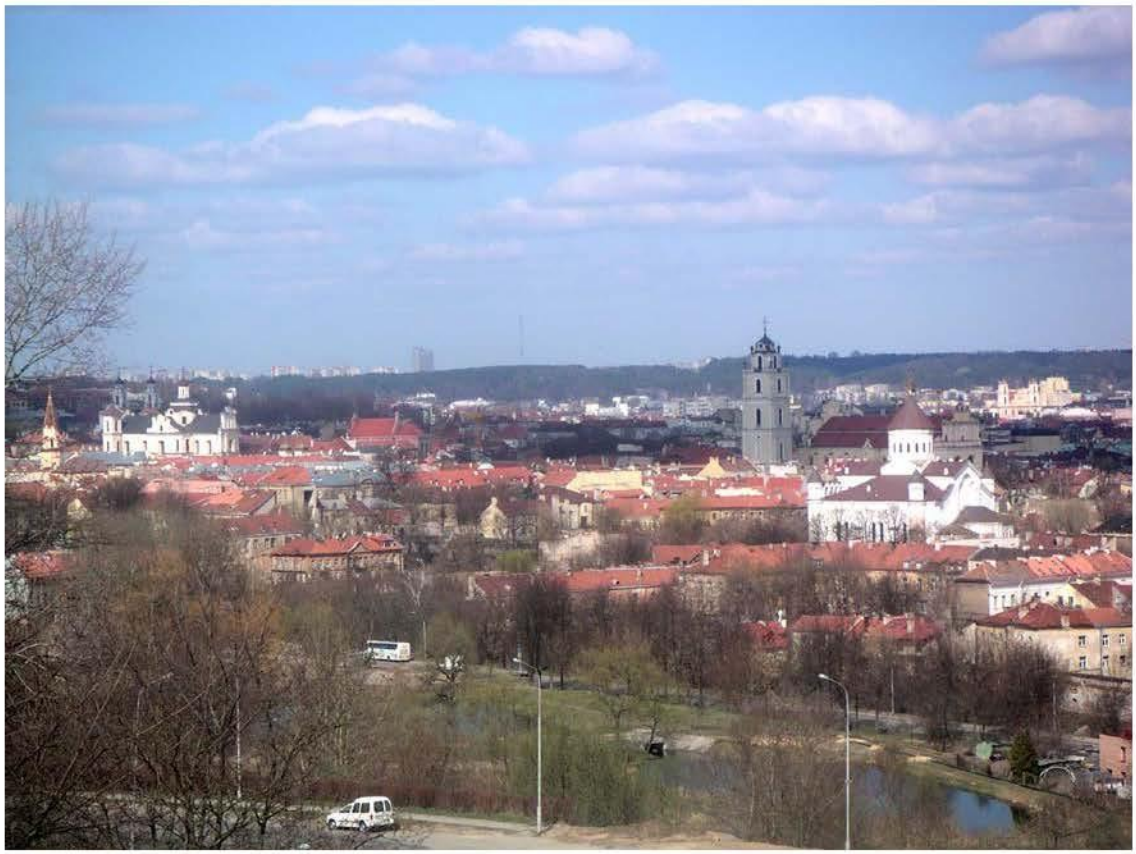
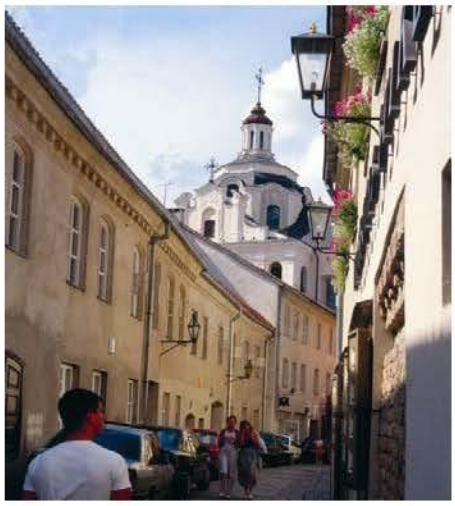
The regeneration of Old Town is protection and revitalization. The first program for protection of Vilnius Old Town was Old Town Reconstruction project prepared in 1956-1958. It was the first work of such type in the former Soviet Union. In 1970-1974 there was worked out the second Old Town Regeneration project. The third project was prepared in 1988-1992. The project is based on historic data of Vilnius architecture and was confirmed by Vilnius City Municipality. The strategy on the revitalization of the Vilnius Old Town was created in 1996 and it was made ready for implementation of regeneration. In Vilnius City Official Plan (up to 2015), which was approved by Vilnius City Municipality, a very important part is devoted to cultural heritage–protection and revitalization of Vilnius Old Town. The latter plans and programs have been widely discussed by society.



Regeneration is understood as protection on cultural values in historic centre-Old Town and its revival works with possible harmonic development (with limited new building). Czechoslovakian research methods applied for historic towns and their experience in this field were made use of while preparing projects for regeneration of Old Towns in Lithuania in 1956. But existing Lithuanian conditions were taken into account as well.

The first Old Town Reconstruction Project has foreseen: what makes up properties and its historic environment, what to protect, where it is possible to build or demolish the structures.

The second Project appreciated more in detail buildings with respect to their historic and architectural quality and suggested sites for new buildings and solutions for transport.



The third project, now in action, recreated historic boundaries of lots and foresaw a type of works in those lots (conservation, restoration, recreation or possibility for a new building). Trends of protection, revival and management works are related to the aims of integrated monument protection. Vilnius Old Town and its historic suburbs are differentiated in accordance with their zones of value. Recreation of separate objects is foreseen only in the main body of Old Town, limited by the walls of the medieval town.
Lately, general physical state of buildings has considerably improved due to more advanced technologies of restoration works.

At present recreation of Renaissance Royal Palace takes place in the complex of the Vilnius castles. Project on recreation the fragments of medieval Jewish Ghetto in Vilnius Old Town is going on as well. It is a partial compensation for properties lost through various disasters in the history of Vilnius Town.

Revealing the defensive system of medieval town walls, towers-gates, restoration of monasteries and their adaptation for the present needs are of the utmost importance for protection of Vilnius Old Town.

Researches of Vilnius Old Town covered many fields. The Old Town itself became a certain laboratory for researchers of archaeology, history, architecture, polychromy and town-planning.

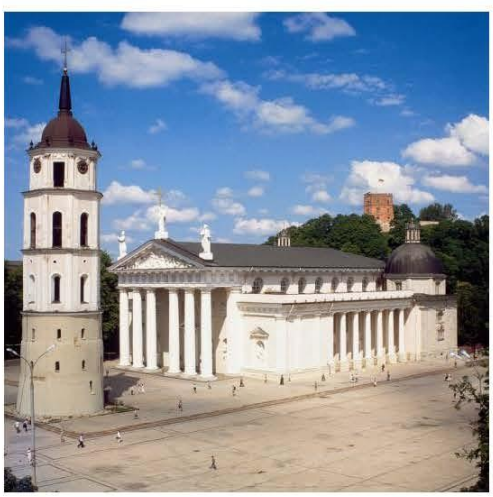
Polish scientists and restorers began historic-architectural researches of Vilnius Old Town before the Second World War. Only in 1950, after establishing a special institution of monument restoration-conservation in Lithuania which later developed into the Institute of Monument Restoration, successive researches were began. In 1958 the first

project for Vilnius Old Town reconstruction (as regeneration) was prepared. But it took time to form such important research methods for polychromy and town-planning.

Due to historic-architectural researches datum about historic development of buildings have changed greatly. Until the Second World War it was known that about ten buildings of Gothic period have survived in Vilnius. Thanks to researches carried out during 30 years we know there are up to 200 Gothic buildings or their fragments in Vilnius. Historians and restorers of architectural heritage defined concrete objects of architectural heritage which show the Gothic period objects' connection with Riga Town objects in Latvia and architecture of Eastern Prussia, former Order of the Knights of the Cross or North-Eastern Germany. There are connections of Renaissance and Baroque architecture objects with Italy which had been built according to the projects of Italian artists.

The part of Vilnius historic centre – the complex of three castles: the Lower and Upper castles and a former third wooden castle which has been burnt by crusaders in the XIVth century-is of particular importance.

In the Lower Castle there were and are being carried out very extensive archaeological researches. The remains of the former Royal Palace, the basement, were excavated. Russian tsarist authorities destroyed the palace about 1800. The remains of the excavated palace were named "Vilnius Pompeii". These archaeological excavations are going on far 14 years and attract a great attention of community. Students, schoolchildren take an active part in excavations. Four books on results of excavations have been published. The State Law on recreation of the Royal Palace as the symbol of medieval historic state of Lithuania was adopted by Seimas (parliament) of Lithuanian Republic. This object received a lot of attention and discussions. The community has established the public Royal Palace Restoration Foundation, which organizes various events and excursions to the site of



excavations (last year about 120,000 people visited it, and the Foundation collected a half of million litas - about 1,6 million dollars). Means collected by the Foundation are used for propagation of this object, researches and restoration of separate findings-exponents.
Since the XIVth c. defensive walls surrounded the complex of Vilnius castles. In the XVIth c. the Vilnius Old Town was surrounded by the defensive wall with ten gates which was three kilometers length. Due to disasters in the XIXth c. the Royal Place and most of defensive walls and gates were destroyed. Only one authentic gate with a chapel has survived. Researches of town's defensive walls were begun forty years ago. Some fragments of town's defensive wall have been uncovered and restored. Now the nearest task is to continue research of the survived part of the town's wall, to bring to light it and restore its fragment. The parts of wall and gates that have not survived will be marked as well.
Historic and survey researches are continued to define historic boundaries of land possessions. The datum are very actual for the process of Old Town regeneration and revitalization.
Since 1980 the institutions of monument protection have introduced the requirements to carry out not only architectural researches but also polychromic researches as well. It allowed to collect a lot of information about the XVIIIth-XIXth centuries interior décor in Vilnius. The abundance of received scientific information demands to summarize these results.

Youth's interest in the works of cultural heritage protection shows the increase of importance for cultural heritage. From 1976 the Vilnius Art Academy began to train architects-restorers. From 1997 students of seven different specialties take part in training on cultural heritage and conservation program: painting, mural painting, sculpture, architecture, history of art, textile, design (elements of historic interior).
The students of chemistry at Vilnius University (founded in 1579) major in technologies of heritage conservation. The students of history specialize in research of cultural heritage and protection.

Vilnius Old Town Renewal Agency works a lot to increase the activity of community. It organizes lectures, seminars, excursions for owners of heritage objects and various other events for youth. The Agency prepares an annual and perspective programs of Old Town revival to municipality.

The Lithuanian Restorers' Union contributes to this common aim organizing the competition of the best conservation-restoration results. Its aim is to award the best restoration works and its authors.

Thus, the preservation, harmonious use as well as revitalization of Vilnius Old Town depend on not only the attention of the state, municipality, but also efforts of community members, their understanding and respect of cultural heritage, the proper use and maintenance of heritage objects.

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by dr., architect Jonas Glemza (Lithuania)

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LA ILUMINACIÓN DE CENTROS HISTÓRICOS COMO UNA FORMA DE INTERVENCIÓN

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Resumen

Tanto las técnicas actuales como la propia filosofía de la iluminación, sugieren un tratamiento de los monumentos que, en algunos aspectos, resulta discordante con la consideración que a estos le dedica la doctrina en materia de restauración y conservación.

Por tanto, resulta imprescindible un análisis de la evolución de las tendencias en materia de intervención en el patrimonio y en la ciudad histórica, que debe adentrarse en los aspectos filosóficos de esta, con hincapié en las consideraciones culturales sobre la forma en que hoy pensamos el tratamiento que se debe dar a los monumentos y centros históricos.

Las conclusiones mostrarán la conveniencia de reorientar algunos aspectos conceptuales de la iluminación, hacia criterios más acordes con el modo en que, actualmente, se plantea la intervención en la ciudad histórica.

1. Evolución del concepto de Restauración

A lo largo de la historia, han sido numerosos los criterios que se han adoptado para la conservación de los monumentos y las obras de arte; de todos ellos se han solidificado dos posturas: conservadores y restauradores, que sólo con dificultad y en casos muy aislados han podido converger hacia conceptos integradores como los que, en líneas generales, se aceptan hoy.

Los distintos nombres que la restauración ha ido recibiendo, a medida que aumentó su contenido científico, intentaban definir las variadas formas de actuación sobre el patrimonio; en la actualidad, todos ellos se engloban en un sólo término: intervención, que tiene un contenido más amplio aunque no especifique el procedimiento a emplear.

Aunque el interés por la conservación de la obra de arte viene de la antigüedad, la preocupación por los monumentos arquitectónicos, concretamente por mantener su esencia, no surge hasta principios del siglo XIX. Desde el inicio se radicalizan dos posturas: conservadoras y restauradoras, lideradas por Rusquin y Violec-le-Duc.

Desde entonces, la legislación de cada país ha intentado unificar las posiciones y limitar la anarquía. Sin embargo, en esta materia, la doctrina ha sido más rica que la norma y, la materia de intervención en el patrimonio arquitectónico viene representada por las cartas y recomendaciones internacionales, ya que en estos documentos es donde se encuentran las formulaciones teóricas que, a lo largo del siglo XX, han ido proporcionando y desarrollando toda la metodología de la intervención en el patrimonio.

2. Algunos aspectos de las Recomendaciones Internacionales

Se podría afirmar hoy que la cultura de la conservación está empezando a integrarse en las estrategias de desarrollo, de forma similar a la ordenación del territorio y la protección ambiental. Documentos como Declaración de Amsterdam (1975) y la Convención de Granada (1985) o la Carta de las Villas Históricas (1987) reconocen, sin ninguna duda, que la conservación del patrimonio arquitectónico es uno de los objetivos principales de la política económica y de la planificación urbanística.

La Carta de Venecia (1964) amplió la noción de monumento, ensanchándolo hacia la concepción de sitio. Ese conjunto, referido a todo tipo de construcciones que en razón de su arquitectura, de su unidad o de su integración en el paisaje se ven investidas de un valor específico, ha ido adquiriendo una mayor dimensión y complejidad conceptual, hasta fundirse con la noción de ciudad histórica, aunque ambas tengan alguna característica distinta.

El campo del patrimonio nacido de la idea de conservar las arquitecturas representativas de una Historia, integra las obras de la arquitectura industrial, contemporánea, vernacular y, por supuesto, las obras de los grandes maestros del movimiento moderno.

El Coloquio de Quito (1977), define que los centros históricos, por sí solos y por el acervo monumental que contienen, representan no sólo un valor cultural sino, también, un importante valor económico y social.

En al Carta del Restauro (1972) se muestra un marcado interés por los centros históricos y ello como consecuencia del incontrolado desarrollo urbanístico de las ciudades, en la década de los 60, por influencia del movimiento moderno, que puso en peligro, y en muchos casos hizo desaparecer, estos conjuntos urbanos.

La Carta Europea del Patrimonio Arquitectónico (1975) refleja el interés del Comité de Ministros por promover una política común, para Europa, y una acción concertada de protección del patrimonio, basada en la restauración integrada. La necesidad de proteger el patrimonio la llega a fundamentar en razones de tipo histórico, estético y, también, de equilibrio síquico del hombre. A la estructura de los conjuntos históricos favorece el equilibrio armónico de la sociedad; tiene un valor educativo determinante para la formación del hombre.

Esta teoría de la restauración integrada se verá reforzada en el Año Internacional del Renacimiento de la Ciudad, así como en la Carta Internacional para la Conservación de las Ciudades Históricas, redactada en la reunión del ICOMOS, Toledo (1987).

Por último, la Carta del Restauro (1987) dedica un apartado a Instrucciones para la tutela de los centros históricos, donde se define el centro histórico como: conjunto habitable cuyo significado es insustituible en la historia de un área cultural de la humanidad. Es especialmente interesante el análisis detallado que hace de la intervención en esas áreas, hasta el punto de insistir en el continuo control y mantenimiento del microclima en el que se sitúa la obra, pues será la única garantía de su futura conservación.

Para ello resulta necesaria la utilización de todos los medios técnicos y científicos que en la actualidad se nos presentan, enormemente enriquecidos y con unos grados de sofisticación antes impensables.

Hace una apología del trabajo interdisciplinar y desmenuza el análisis hasta detalles como el que, sobre la decoración urbana, reproducimos por su interés: Ala revisión de la decoración urbana concierne a las calles, a las plazas y a todos los espacios libres existentes (patios, espacios interiores, jardines, etc.), con la finalidad de establecer una conexión homogénea entre los edificios y los espacios exteriores. Tal visión considerará aspectos cromáticos de la edificación de los centros históricos.

En definitiva y según estas consideraciones, el monumento ya no pervive sólo, como pervive un cuadro o un objeto, por su propia fuerza estética o histórica. También lo hace por su misma existencia material, como inmueble, y su inevitable fijación a la estructura física del lugar en que se erige y al que con su presencia configura.

Lo monumental no está formado, en estos casos, sólo por los mejores inmuebles, sino, sobre todo, por la estructura urbana misma que configuran y el modo de ocuparla (Capitel, 1983).

3. Iluminación y Técnicas de Intervención en los monumentos y Centros Históricos.

Resulta difícil definir, a priori, cómo ha de resolverse la iluminación de un monumento o un conjunto histórico; sin embargo, sí parece claro que es algo muy distinto a la simple resolución de un proyecto meramente técnico, entre otras cosas por razones tan evidentes como que el objetivo primordial es facilitar la observación, o la vivencia, de un objeto, o de un conjunto, artístico; lo que sugiere que el condicionante estético va a determinar, de forma fundamental, el resultado.

Por otra parte, resulta estéril un enfoque puramente técnico puesto que existen factores humanos, espaciales y sicológicos, con la misma importancia que los de naturaleza funcional.

No podemos olvidar que cuando se ilumina un edificio es, generalmente, lo más notable de su arquitectura lo que se está ennobleciendo, sus fachadas; y esto, de alguna manera, forma parte de la creación arquitectónica.

Parece evidente que la iluminación, vista así, es un forma de intervención en el patrimonio, con más fuerza, si cabe, que los posibles efectos de una actuación sobre sus aspectos materiales, ya que se destacan no sólo aspectos puntuales sino todo el conjunto, y con una profundidad que afecta a la misma esencia de la arquitectura de esos monumentos, por cuanto puede suponer una recreación formal.

En realidad, podríamos decir que la luz es una de las principales herramientas para modificar el espacio: la luz ha estado presente en todos los movimientos arquitectónicos y su funcionalidad puede realizarse desde distintos aspectos: como necesidad, como señalización del espacio, como modificadora del espacio y como herramienta para crear efectos y sensaciones. Se trata pues de potenciar el valor de la iluminación como un tipo de arte que expresa sensaciones, cambia características y ayuda a configurar un espacio artístico total (Camps, 1994).

Naturalmente, estamos hablando de recreación, es decir de una auténtica tarea artística para la que, obviamente, puede resultar indispensable una

mínima dosis de creatividad artística, cuestión que no tiene por que estar reñida con la funcionalidad del edificio; para integrar los deseos de los artistas teniendo en cuanta las reglas fundamentales de la fisiología de la vista, sin oponer la creatividad a la funcionalidad (Jousse, 1994).

Desde estos puntos de vista, parece lógico repensar algunos de los criterios que condicionaban los modos de intervención, tanto desde la práctica como desde la norma, por cuanto debieran servir de pauta en los modos de llevar a cabo la iluminación del conjunto.

La Carta de Venecia, uno de los documentos que más incidencia ha tenido sobre la doctrina, en materia de intervención, concretamente en el patrimonio arquitectónico, nos advierte de que es la nueva visión, por la que la sociedad desea servirse del patrimonio, en la vida ordinaria, la que ha abierto el camino a un reinterpretación del monumento, de carácter más dinámico. De tal forma que, evaluar el grado en que las alteraciones de esa nueva función afectan al edificio y los valores permanentes que deben ser transmitidos a las generaciones futuras, es el problema fundamental de la conservación actual.

En este sentido, las propias legislaciones, posteriores a estos criterios, se han mostrado sensibles a estos nuevos conceptos y propician la dimensión social que se da al patrimonio; en este sentido se enmarca el acercamiento a los ciudadanos. Se trata de proporcionar y aceptar que estos entiendan que este patrimonio es algo que les pertenece, en cierta medida, por lo que ya no resulta excesivo reclamar su conservación y hasta reivindicar su disfrute y su correcto mantenimiento y exposición.

Ahora se entiende, con más claridad, que el patrimonio si sitúa en un contexto de revalorización y elevación a categoría universal, que reclama, ante todo y sobre todo: conservación, respeto, mantenimiento y autenticidad.

Precisamente, debido a estos criterios, el término iluminación empieza a resultar restrictivo y es, progresivamente abandonado por los especialistas in iluminación, en provecho de la Apuesta en luz del monumento (Narboni, 1995).

4. La Iluminación como respuesta a las necesidades del Patrimonio y la Ciudad Histórica.

Cuando el concepto de iluminación se lleva al espacio urbano; a la ciudad histórica, a la ciudad; surgen nuevos enfoques. El espacio urbano está más

necesitado de una visión de conjunto, exigida, como hemos visto, por la propia filosofía con que hoy se contempla el patrimonio.

Aunque tampoco se puede olvidar, en este contexto, que las ciudades tienen su propia personalidad, debida fundamentalmente a: sus monumentos, su historia, su clima o ambiente y, porqué no, su alumbrado (Mateos, 1994).

Por ello, esta misma idea de iluminación o el conjunto de procesos necesarios para la puesta en luz, si están concebidos de forma exclusiva, es decir fuera del contexto urbano, pueden llevar a la destructuración del espacio urbano.

Y es que, históricamente, los monumentos pertenecen y conforman la estructura urbana aunque, progresivamente, el patrimonio se ha ido sacralizando, ha adquirido con el tiempo un prestigio cultural, por llevar consigo el testimonio de una civilización particular, de una evolución significativa o de una acontecimiento histórico, como recuerda la Carta de Venecia en su primer artículo.

Estas consideraciones hacia el monumento son las que han llevado a la creación de los distintos tipos de iluminaciones, asociadas más al carácter del propio monumento y a su estilo artístico que al entorno urbano que lo mediatizaba.

En efecto, hoy es considerable la cantidad de monumentos iluminados en nuestras ciudades, como es considerable el grado de crítica que están soportando; sobre todo por la dificultad para conseguir un equilibrio mínimo entre la puesta en luz del monumento y el alumbrado nocturno de los espacios públicos.

Especialmente importante resulta la integración, nocturna, del monumento en la estructura de la ciudad contemporánea. Se trata, y esto es cada vez más importante, de evitar la aparición de los monumentos como seres fantasmagóricos en un ambiente urbano indefinido y oscuro.

Hay casos verdaderamente insólitos: La Alhambra está iluminada sin que lo esté todo el entorno, los accesos, el paso al Generalife; en París, Notre Dame está iluminada sin que lo esté Lille; en Madrid está iluminado el Palacio Real pero no lo están los Jardines del Príncipe, etc.

La idea de patrimonio ha evolucionado hacia la consideración de los conjuntos monumentales insertados en su paisaje ambiental. La política y el concepto de las puestas en luz de los monumentos deben también

evolucionar, para no contribuir a romper o desfigurar el tejido nocturno de las ciudades.

Esta puesta en luz medioambiental, a que nos estamos refiriendo, comienza a percibirse en algunas realizaciones nocturnas del patrimonio, resultado de la aplicación de esquemas directores de ordenación luminosa se trata simultánea y complementaria- mente, de iluminar el monu- mento y el tejido urbano circundante. De esta manera la imagen nocturna del monumento se puede percibir con todo su ambiente exterior: accesos, espacio geográfico, magnitud y entorno.

Estos criterios llevarán a Apuestas en escena nocturnas sobre sitios de grandes dimensiones, concebidos de manera global y tratados por círculos de lecturas sucesivos, desde la escala de la estructura urbana hasta los mínimos detalles ornamentales. La iluminación del monumento no es estudiada sólo con el fin de destacarlo de su tela de fondo, por los diferentes planos que componen las visiones, el paisaje y las arquitecturas circundantes. La imagen es trabajada de manera pictural, por toques sucesivos, por añadidos o sustracciones de elementos urbanos iluminados, orquestando los valores de intensidad y las tonalidades de luz sobre el conjunto del sitio (Narboni, 1995).

Naturalmente, esto supone concebir el proyecto de manera totalmente distinta a la concepción clásica; allí existía un punto de observación, aquí existirá un espacio de vivencia con infinidad de puntos de observación; allí los proyectores eran colocados en función del punto de observación, ahora los proyectores se han de colocar en función de esta concepción espacial y de tal forma que queden destacados las distintas visuales que ofrecen el monumento y los espacios circundantes; antes había que cuidar una escala muy limitada de luminancias, ahora se deben utilizar todas las luminancias que ayuden a una mejor percepción del espacio.

En definitiva, desde el punto de vista luminotécnico, el proyecto ahora es más libre por cuanto su concepción permite más tonalidades de luz, muchos más puntos de observación, e indefinidas direcciones de iluminación para conseguir un verdadero juego de intensidades, sombras y claro-oscuros, lo que conjuntamente permitirá esa verdadera vivencia espacial del conjunto, una vivencia global que debe alcanzar a la iluminación de los espacios urbanos y las calles de su entorno.

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Título:

"PROPUESTA DE USO DE LA EDUCACIÓN NO FORMAL PARA FOMENTAR EN LA POBLACIÓN DEL CASCO HISTÓRICO LA PROTECCIÓN Y PROMOCIÓN DE LAS CIUDADES MONUMENTALES E HISTÓRICAS. MEDIOS DE COMUNICACIÓN SOCIAL. CASO DE LA TELEVISIÓN."

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El Alcance de los Medios de Comunicación Social dentro de los diversos estratos de la población los constituyen en una potencial herramienta de gran valor para la difusión de programas educativos o de procesos informativos de educación, con características muy distintas a las que se pueden presentar en el aula de clase.

Lógicamente, el uso de los medios, en este sentido, entraría dentro del campo de lo que se conoce como Educación No Formal. Cada medio como tal tiene alcances y características distintas. Esto se debe, fundamentalmente, a la naturaleza del medio y en otro término a las características del público que tiene acceso a los mismos.

A la par del surgimiento del fenómeno de la globalización (o mundialización) también han resurgido los medios de comunicación de corto alcance en las comunidades, es así como radios, televisoras y periódicos comunitarios han salido al aire y cumplen con ciertos objetivos dentro del área que abarca su señal, o su distribución en el caso de los impresos.

El medio radial es el de menor costo y el de mayor alcance, debido a que la señal de radio llega a cualquier lugar de la tierra. Quienes usan este medio no necesitan saber leer, y pueden hacer uso de él mientras ejecutan o desempeñan otras labores. Esto le da a la radio una ventaja adicional sobre otros medios que necesitan que el individuo utilice más de un sentido para captar el mensaje que se le está ofertando. El medio impreso (los periódicos y revistas) requieren que la persona detenga su atención sobre el objeto de su lectura, y en este sentido establece un vínculo intelectual con la información, pero apartándose de cualquier otra labor que se encuentre realizando para dedicarse a leer.

Las mismas características del medio pueden definir el tipo de público que lo aborda y la manera como puede y debe ser tratado el mensaje para poder satisfacer la necesidad informativa demandada por los públicos. Lo fundamental es tener claro para qué y por qué deben usarse ciertos medios en particular para la trasmisión de un mensaje determinado, o establecer el fin de una campaña específica.

La Televisión como opción para un Programa Educativo

Al abordar un plan de trabajo formativo dentro de los medios de comunicación, debe definirse muy bien la acción educativa, puesto que educar en este sentido no es sólo transferir conocimientos, sino que es además inducir, persuadir y estimular a la población. Lógicamente a la hora de definir cuál de los medios puede conjugar una serie de elementos

efectivos en el proceso del aprendizaje y el refuerzo, sin duda alguna que ese medio es la televisión.

En la televisión se maneja el uso de la imagen en movimiento, que además puede ser repetida y reforzada con la palabra tanto escrita como hablada y el uso del recurso auditivo, más la musicalización que contribuye a la creación del clima emocional en la producción. Habría que considerar también los adelantos tecnológicos, sobre todo cuando en la actualidad el aparato de televisión es ya un portal para la tecnología digital, manejándose ahora el concepto de televisión online, televisión interactiva, o televisión a la carta. Aquí es importante destacar que las grandes empresas de televisión han definido -con base en intensos estudios de mercado- que el público ha evolucionado, siendo ahora más específico y más exigente

Al reflexionar sobre el uso que se le ha dado a la televisión como instrumento educativo, nos damos cuenta que el valor didáctico de este medio (cuyo primer objetivo es entretener) ha sido subempleado, y utilizada –en algunos casos- con fines distintos a la promoción de los valores humanos. Sería oportuno revisar si los dueños de los medios han tenido interés en definir una política de información y de programación orientada no sólo hacia la promoción de las ciudades patrimoniales, sino hacia la cultura en general.

Hoy día, con la popularización de la Internet, el cable y el satélite, la televisión tiende a parecerse en muchos lugares y países, vemos así como formatos de programas se repiten y tienen similar éxito en lugares muy disímiles del planeta. Aunque hay casos como el de la televisión nipona y la francesa que guardan en si mismas características muy particulares, que pueden reflejar de manera directa o indirecta el perfil de su sociedad, y las tendencias socio-culturales de las mismas. De allí la importancia para la identidad cultural del trabajo que realizan las estaciones de televisión regionales.

La psicólogo Karen Tiemann de la Universidad Rafael Urdaneta de la ciudad de Maracaibo, en Venezuela, señaló al respecto en una entrevista periodística hecha para un Anteproyecto de Grado en el año 1990 de la Escuela de Comunicación Social de la Universidad Cecilio Acosta de la misma localidad, que "la televisión es un medio de comunicación colectiva, con gran influencia sugestiva... pudiéndose emplear como controlador social. Este medio permite hipnotizar al receptor por medio del sonido, imagen y color, permitiendo, de esta manera, arrastrar gran cantidad de público. Para ello es muy importante relacionar el mensaje connotado con el mensaje lingüístico y la imagen denotada, para que sea más efectivo el objetivo deseado", más adelante Tiemann agrega que "si nos basamos en la Teoría del investigador Bandura, quien afirma que se puede aprender por observación y no necesariamente por condicionamiento (siendo representantes de esta teoría Skinner y Povlov), la televisión, básicamente su mensaje, podrá servir como modelo a ser imitado por los televidentes. Algunos teóricos sostienen que los procesos cognoscitivos juegan un papel fundamental en la adquisición de nuevas pautas conductuales, a través de la observación, generando cambios de actitud, que es lo que en definitiva se pretende al emplear la televisión como medio de concienciar la sociedad en que vivimos", fin de la cita.

Todas estas consideraciones podrían llevarnos a deducir que de emplearse su potencialidad pedagógica, la televisión –y los medios en general- podría ser considerada un excelente recurso a ser usado en el fomento de una conducta positiva y proactiva en la población para la protección y promoción de las Ciudades Monumentales e Históricas, sobre todo en aquellas cuya fragilidad arquitectónica requieren de planes y atenciones especiales, incluso teniendo para ellas como el caso de La Habana, en Cuba, un espacio

televisivo propio. (La referencia se hace por el programa producido y conducido por Eusebio Leal y trasmitido por la televisión cubana llamado "Andar La Habana").

Cuando una imagen nos permite contar la historia

Es importante el que estas ciudades aparezcan en películas y telenovelas, y que sus imágenes adornen grandes espacios publicitarios en ciudades modernas, pero lo es aún más que la gente conozca de manera más detallada su valor, y cómo puede contribuir el ciudadano que la habita o el turista que la visita con su protección y mantenimiento, esto -por supuesto- con una política de información y de acción orientada sobre las fortalezas y debilidades de esa misma ciudad. A la luz de los avances tecnológicos actuales en la televisión digital, la explicación de la arquitectura de las ciudades patrimoniales puede convertirse en algo interesante y hasta apasionante, aún para los neófitos en el tema.

Doménech Font, en su libro "El poder de la imagen", señala que "el poder persuasivo que tiene para muchas personas la pequeña pantalla, en general en relación inversa al grado de instrucción del teleespectador, puede ser utilizado, sin merma de la libertad individual, en un sentido informador y formador sobre convivencia, con arreglo a los usos sociales, respeto hacia los demás y hacia la naturaleza".

Hay que estar claros en que la televisión ha terminado por conformar el mosaico de medios de comunicación que han llevado al hombre a convertirse en un puente entre dos realidades tangibles: su entorno real y los medios de comunicación de masas. Esta, como medio de divulgación de información, y sin entrar a discutir el carácter formal o informal que pueda tener en el proceso educacional, tiene a su favor un elemento decisivo: la utilización de la imagen, que es una realidad viva en el entorno humano.

No se trata de inundar la programación con estas imágenes, pero sí vincularlas con la vida del hombre, su entorno ecológico y su cultura. Es oportuno citar a la Profesora Heloisa Goncalvez (para ese entonces Prefecto de la ciudad de Salvador de Bahía en Brasil), quien durante su intervención en el "Encuentro de Alcaldes de ciudades Patrimoniales y algunas ciudades Históricas de América", realizado en Québec, Canadá, en abril de 2001, dijo -a propósito del tema educativo- que "las ciudades nos hablan y nos cuentan su historia, cuando se niega la identidad de una ciudad, esta se esconde para mostrar algo que no es", explicando luego que "la primera función de una ciudad es reflejar su realidad en todas sus dimensiones" (sic).

En materia de ambiente y protección ambiental, el uso de la televisión ha probado su efectividad, algunos canales de televisión a nivel mundial se dedican exclusivamente a la promoción para la protección y conocimiento de la fauna, de la flora y de las relaciones del hombre con su entorno natural y urbano, para los cuales este trabajo ha resultado enormemente rentable desde el punto de vista económico. Algunos como "People+arts", "History Chanell" y "Discovery", entre otros, abordan el tema patrimonial pero en un sentido más antropológico.

Es bueno destacar y reflexionar sobre el compromiso que tienen todos aquellos que viven o trabajan en las ciudades patrimoniales y dan la cara ante los medios de comunicación, pues directa o indirectamente son formadores o informadores de conductas, principios y valores, nos referimos a periodistas, animadores, locutores, actores, narradores, etc., un compromiso que algunas veces no es asumido con la seriedad que amerita, entendiendo que una conducta inadecuada, el mal uso del idioma , o la emisión de un

mensaje destructivo puede traer consecuencias nefastas al entorno en que vivimos, pues estos profesionales son tomados como referencia por muchos consumidores de los medios.

¿Bajo qué directrices puede estructurarse este trabajo?

Lo importante para elaborar y desarrollar la producción de un programa orientado hacia la promoción y protección de estas ciudades es tomar en cuenta aspectos como:

.La vinculación histórica
.Su valor y características arquitectónicas
.Definir una estrategia hacia segmentos determinados de la población (la que habita en el casco histórico, los que trabajan en el, los turistas nacionales y extranjeros, etc)
.Utilizar el video como arma estratégica y en lugares estratégicos
.Incitar a la investigación y a la discusión nutritiva de la información mostrada
.Fomentar el orgullo de vivir o de haber nacido en una ciudad patrimonial.

La propuesta principal consiste en la creación de un equipo multidisciplinario, integrado por un sociólogo, historiador, arquitecto, antropólogo, pedagogo, artesano, psicólogo, ingeniero, entre otros, unidos a representantes de la comunidad, siendo estos últimos muy importantes pues basan su conocimiento en fuentes vivenciales, todos en conjunto para asesorar al profesional de la comunicación social, en la elaboración de guiones estratégicos, para la producción de programas y microprogramas, cuyo objetivo sea el logro de modificaciones de conducta en cuanto a la visión que tienen los pobladores de los espacios patrimoniales, su valor y su importancia para el desarrollo de la economía general de la ciudad, así como la protección y cuidado de las mismas una vez orientados acerca de su utilidad y significado.

Quedando claro, de esta manera, que el asunto patrimonial, no es un tema exclusivo de una sola disciplina académica, ni de un sector específico de la población, sino que, por el contrario, es un tema que necesita de la pluralidad y de la heterogeneidad de interpretaciones para consolidar un macro-criterio que permita entender el patrimonio cultural, su protección y cuidado de manera global.

La universidad puede convertirse en un laboratorio de programación y entrenamiento, sobre todo si la casa de estudios busca una vinculación más estrecha con la comunidad, sirviendo además como catalizador de procesos educativos indirectos para la población de su entorno, más aún cuando esta misma casa de estudios tenga su sede principal en el casco histórico de la ciudad.

Un punto básico es la búsqueda de fuentes de financiamiento para estos programas. Sería importante el que la publicidad que acompañe a los programas fundamente sus contenidos centrales o periféricos en torno al tema patrimonial, consolidando un equipo de especialistas en publicidad y mercadeo, que –bajo la asesoría del equipo multidisciplinario- pueda 'vender' la rentabilidad de los espacios, sus beneficios y sus bondades a los inversores potenciales y a las grandes corporaciones.

La otra opción es que la misma planta televisora, o la productora que maneje el programa dé facilidades a empresas que quieran promocionarse para que estas puedan contratar paquetes publicitarios a corto, mediano y largo plazo. El que la empresa inversora conozca la condición del público al cual llega su mensaje es importante. No precisamente nos referimos al tema del *'target' o 'segmento'*, sino al del público cautivo, al público

estudiantil, al turista nacional, al turista extranjero y al público especializado que gusta de apreciar el arte en el mensaje publicitario y que conoce del tema del patrimonio, y que puede vincular los productos promocionados con el tema del patrimonio.

Siguiendo esta línea, si es la municipalidad la que maneja directamente el casco histórico de una ciudad, lo importante sería que el personal adscrito al área de Medios de Comunicación, Relaciones Públicas o Relaciones Interinstitucionales, sea capacitado y orientado para que ellos mismos puedan producir su propio material audiovisual, adecuado a las premisas mencionadas con anterioridad, manteniendo en este proceso un vínculo estrecho con su máxima casa de estudios y sin perder el sentido del entretenimiento, así como tampoco olvidar que el teleespectador es quien decide finalmente ver o no ver un programa.

Bajo la figura de convenios o acuerdos, la municipalidad o el mismo estado, pueden llegar a acuerdos con las estaciones de televisión locales o con algunas a nivel nacional o internacional, para producir espacios televisivos dedicados a la promoción y protección de los espacios históricos y patrimoniales. Recordando que deben establecerse estrategias distintas para las personas que viven en construcciones patrimoniales, para quienes habitan en ciudades declaradas patrimoniales, para el público que trabaja u ocupa una buena parte del día interactuando en estas construcciones, para el público que los visita de manera eventual y para el turista que se dedica a conocer estas ciudades. Establecer estrategias de acción permite ahorrar tiempo y dinero y obtener mejores resultados en las campañas.

Finalmente debe revisarse en común acuerdo las ganancias obtenidas por la aplicación de un proyecto como este que permita, primero cubrir los costos del programa (pagar los honorarios del equipo de producción), que arroje un margen de ganancia para la estación que exhibe el programa (de acuerdo a la figura que esta maneje) y que –básicamente- pueda nutrir un fondo para la ciudad que pueda ser empleado en el mantenimiento de la misma o en nuevos programas de protección y participación ciudadana para fomentar el conocimiento y la protección y promoción de las ciudades patrimoniales e históricas.
Fin.

CONCLUSIONES:

Nota: La Ponencia como tal es una propuesta, por lo tanto las conclusiones son presentadas no como algo necesario dentro del contenido de la misma, sin embargo, se presenta un cuerpo de conclusiones que permiten reforzar la tésis defendida.

1-Los medios de comunicación son considerados una herramienta importante para la promoción y difusión de información que fomenten la protección y defensa del Patrimonio.

2-La Televisión, por mostrar la imagen en movimiento, es un recurso de gran valor para favorecer el aprendizaje de conductas positivas hacia la protección y conservación de las ciudades patrimoniales.

3-La Televisión, específicamente el uso del video, permite difundir contenidos que pueden dar a conocer las estrategias y propuestas por parte de las municipalidades para el apoyo de las políticas de mantenimiento, conocimiento y promoción de las ciudades patrimoniales y lo que estas poseen.

4-La difusión de la imagen en video permite dar a conocer al detalle y de manera masiva, apoyada con imágenes, los detalles, estructuras y visiones de contexto de la arquitectura, elementos que la integran y materiales que conforman las edificaciones consideradas Patrimonio de la Humanidad.

5-Hacer este tipo de trabajo en video, permite la integración de equipos comunitarios que finalmente permiten formar en la comunidad equipos permanentes de acción y trabajo en pro del desarrollo y proyección de las ciudades patrimoniales.

EJEMPLOS DE APLICACIÓN REAL

En la actualidad estoy desarrollando el proyecto para ponerlo en práctica en la comunidad donde hago mi vida laboral, Santa Ana de Coro. Estamos trabajando con un programa de televisión que se ha titulado "Trópicos...apuntes de viaje", que promueve los valores patrimoniales, su conocimiento y las posibles estrategias para su protección y ayuda a que se conozcan los mismos.

Sin embargo, hay que destacar el trabajo que viene realizando la televisión mexicana con el uso de locaciones de sus ciudades patrimoniales para la realización de sus producciones, lo que ayuda a su promoción y a que la comunidad se identifique con ellas como parte de su cultura, las promueva y las proteja.

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Medios de Comunicación

TRADITIONAL CULTURE, ARCHITECTURE AND HANDICRAFTS IN A FUNCTION OF DEVELOPING STRATEGIES BASED ON THE HERITAGE

Grchev Kokan

Abstract

Note: The study was realized through field researching in the region of Maleshevija and Pijanec, in the eastern part of Macedonia, under authority of the Ministry of Culture and the World Bank, Project name: "Developing communities through culture".

The observation of the profile of the cultural identity of the regions is an extremely important category. This also refers to the urgent necessity to understand the real dimensions and to determine the adequate cultural values within all aspects of the material and spiritual existence of the regions in the course of their turbulent historic development. Thus, the situation in the specific regions can be seen as exceptionally interesting phenomena which contribute to the active persistence of their cultural identity.

At the other side, potentials of the cultural heritage points that the European architectural and cultural heritage does not consist only of the most important monuments, but also contains our old towns and traditional villages as wholes, together with their natural and built environment. Reflected in the cultural heritage, the past represents an unavoidable surroundings for the equilibrium and development of people and their community. At the same time, the cultural heritage is a spiritual, economic and social treasure with irreplaceable values.

Basic components of the evaluation and methodology description

Aiming at a creation of a systematized "database", the activities connected with the evaluation of the cultural heritage, natural heritage and the handicrafts define two purposes:

- Helping the population to get acquainted with the specificities of the historic development of the region, with the cultural and the natural heritage and their authentic values, which will render it possible to bring "informed" decisions by the population about the project;
- The creation of this database should raise the populations interest, which should be directed towards the preservation, cherishing and popularization of the cultural identity of the regions.

The main aspects of the approach towards an organized and complete evaluation of the qualities of the cultural heritage are based to several basic determination:

- The chronological and cultural development of the region;
- A review of the types and quantity of the cultural heritage;
- Archeological excavation sites: antique settlement, groups of buildings, necropolis, remaining of mediaeval fortresses, churches etc.;
- Architectural heritage reflecting the local cultural specificities: monasteries, churches, traditional rural architecture and economy-oriented buildings (mills, rolling mills etc.), urban architecture, urban and rural landscapes etc.;

- Industrial and rural economy heritage related to the local traditions: drying and smoking places, fish ponds, sawmills, distilleries, rural manufacturers etc.
- The actual situation of the local traditions: customs, popular literature, traditional foods, music, songs, dances etc.

The main project purpose of this kind of evaluation is to point out the characteristics and the capacities of the existing resources in the field of the cultural heritage, as well as of handicraft (concerning cultural tourism). The better understanding of these potentials represents a true basis of an entire strategy in function of strengthening and initiation of the regional development which is to contribute to raise the awareness of usage of the local cultural and natural values as a resource.

Concrete purposes of the activities

The appropriate methodological procedures in this evaluation were applied with previously projected expectations, resulting with increased interest of the local community for its own cultural heritage, in the same time opening the existing problems and needs for training and appropriate education about managing their own culture values, and the values of the heritage. In that point of view, we are pointing to these activities:

- Clear identification and analysis of the needs and interests of the local population,
- Activation of the local community in favor of the common needs and values, of sharing the responsibility and of the community's solidarity, achieved through mobilization of the local community and its direction towards the usage of the cultural and natural resources of the region;
- Exchange of opinions among the participants (local authorities, students, craftsmen and others) aiming at the establishment of project mechanisms on a local level;
- Analysis of the feedback information obtained from the local population about the potentials of the natural and the cultural heritage and their respective functioning as an inheritance in the development of the local community;
- Campaign to animate the public, which informed the community about the project;
- Using the cultural and natural goods, as a factor in opening new business possibilities for the local contractors;
- Education of the local community in order to assure better understanding and to develop a higher level of respect towards the values connected with the cultural and natural heritage, with handicraft and tourism;
- Evaluation of the perception of the local population about the potentials of usage of the cultural goods;
- Training of the local population in how to use the inheritance as a resource and as business factor, as well as in how to start economic activities;

Basic activities for the evaluation

The basic purposes of the necessary researching is to systematically evaluate the quantity and the quality of the cultural and natural heritage, as well as all aspect related to culture (recent and traditional) of living in this region: traditions, folklore, applied popular art (handicrafts), beliefs, traditions, customs, contemporary situation etc. All that means:

- Systematization and processing of relevant studies, projects and printed materials referring to the immediate realization of the project, which are pertinent in the evaluation of the actual situation in some branches (tourism, handicrafts, cultural monuments etc.);
- Field research in the municipalities;

The subjects of observation and inventorying through the above mentioned field research are: archaeological excavation sites, cultural monuments (sacral, profane: urban and rural nuclei etc.), traditional handicrafts, skills, handiwork and customs, traditional industries and economies, natural wealth, tourist capacities. Changing the passive attitude of the citizens towards the heritage, in view of their activation, is about to be made through:

- improvement and initiating adequate respect and knowledge of the local community about the values of their own heritage, which create the profile of the cultural identity of the region;
- direction of the activities towards the development of people's consciousness in the sense of: changing of their passive attitude, due to the conclusion that the "active" cultural and natural heritage will bring back the values of a recognizable and authentic identity of the region, whereby the latter becomes a "product" with its own market value;
- a thorough and planned introduction with the economic and industrial capacities which lay within the active cultural heritage, which opens possibilities for new employments, additional income, concentration of means and reduction of poverty by the locally concentrated economic growth;
- Detailed and transparent information in view of creating the prerequisites for bringing valid and consistent decisions by the population of the local community towards the project;
- an intentionally elaborated systematization about the cultural and natural heritage: to present the information and the documents (of different character) in a write review as a basis to a database for the future organizers, local institutions, tourist guides, mediators, agencies etc.

The cultural heritage – integrated field-research results

Archaeological heritage

The immense number of the archaeological excavation sites in the regions reflect the continuous persistence of the population, starting from the most remote periods of the evolution of mankind. There is almost no inhabited place without different archaeological findings of any kind, which show the permanent development of the settlements and emphasize certain specific qualities or aspects of their historic development.

Some of the conclusions points to the fact that the treatment of the archaeological heritage should be observed in the context of integrated activities which bring together different interventions in function of the collective exploitation of the natural resources: of the cultural heritage, the tourist offer, and of exploitation of the existing capacities. This can meet certain principles of openness of this type of heritage, adjusted to the actual trends of functioning of certain income creating structures.

On the other hand, it is important to research the possibilities of interactive inclusion of this type of heritage in adequate "networks" of connection and exchange, which can lead beyond the local framework and affirm the authentic values within a wider system of exchange and education, which can permanently develop the interest in archaeological riches, in the context of wider and more complex demands.

Figure 1-4: Results of organized archeological excavations, prepared for public promotion, and for further purposes and activities based on this kind of heritage

The observation of the accomplishments and results obtained so far, as well as the insight in the numerous passive and active archaeological sites with different qualities, lead to certain conclusions which are to be accepted as instructions:

- The research of the archaeological riches of the region has to become a regional activity of an exceptional interest, which will result in an equal treatment of the sites, depending on their importance, quality and characteristics, and not depending on their geographic location;
- The exceptional quality of the findings resulting from the archaeological excavations oblige to a permanent education on a larger scale, which would refer to their importance, to the quality of certain cultural strata from the past times, as well as to the necessity of a continuous search for new forms of presentation of those results to the public;
- The archaeological riches should be treated as one of the more important segments of the cultural identity of the regions, so that it could find its place in the planning of certain projects in coordination with the basic methodology of the project of development of municipalities through culture.

Architectural heritage: sacral buildings

Sacral monuments from different periods and a different level of architectural and artistic values exist in the municipalities which are subject of the observation. They are partly processed, but for some of them there is no systematized material which would determine their architectural importance for the regions in general.

There is a general conclusion that there are churches built in the 19th century, with local specificities that lead to the conclusion that they were built by guilds of constructors gravitating towards almost all settlement in the region. In almost all buildings of this type, there is a specific manner in the treatment of the architecture, colors in their interior, as well as a characteristic manner in the treatment of the woodcarvings. A great number of churches are located in the villages and were mainly built in the 19th century. These buildings are in a good condition, and their architectural and style characteristics are a special attraction to research, which, in the context of our understanding, are not relevant in details. But, we have to mention that some uncoordinated activities without expert consultation, and interventions carried out by laymen have made it impossible even to recognize the type of building and the period

when it was built. The same can be seen about their interior, which is often adequately maintained and in excellent condition and are ready to immediately receive visitors. This brings about an urgent necessity of programmed activities in this direction, for the benefit of the further development of the municipalities and can also be treated as a complementary activity which can, integrative, lead to a more organized presentation of this part of the cultural heritage.

Figure 5-7: Some specific examples of the 19th century church architecture

A challenge to further activities is to adequately present these buildings to the public, and to put them in function of organized visits and intentional research with an educational purpose. The great number of age-old manuscripts in these sacral buildings, the riches of the paintings and iconostasis which are performed by the local craftsmen guilds as well as the carvings, represent small local treasuries which have to be turned into sites for organized visits. This will include these buildings in the continuous presentation of the authentic values of the culture and identity of the regions as well as in the improvement of the attitudes of the local population towards them, which also functions in the preservation of the consciousness about the identity and belonging to the local communities which is cherished and exists as a feeling in the majority of the population in the three municipalities.

The exceptional architectural riches, the riches of the interior, the wood carvings, the old manuscripts, the historic events connected with them and their existence in the memory of the inhabitants, constitutes a complex picture as a configuration of different activities which can further develop within the context of an absolute affirmation of this part of the cultural heritage.

Figure 8-11: Details from the interior of the churches, with specific woodcarving techniques, recognizable icon-painting and plastic wall decoration

Architectural heritage: urban nuclei, environment and buildings

As a result of the field research, the development of the settlements is marked by specific historic continuities. Urban and rural nuclei and environment, based on the

field situation, have the tendency to point out certain specificities preserved in their present condition, which are in direct relation with the continuous development of the settlements. In this sense, the relations with the cultural traditions also represent an interesting and important factor through which it is possible to coordinate different activities in the context of the integrated development of the municipalities through culture.

There are many buildings registered which where erected in different periods of time. Before all, we should mention the residential buildings, accompanied by economy-oriented buildings in their yards. These buildings still bear the authenticity of the local architectural tradition with recognizable architectural elements and details. They are organized on specific locations as buildings that frontally define the directions of the streets, whereas their yards are behind, or function as residential buildings in relation with the location of the yard surface.

Figure 12-14: Traditional houses, existing in a present urban structures of the cities

Another type of old buildings define the main direction of movement. This direction includes a residential building protected by law, with its original architectural and environmental values, but is unfortunately neglected and with no contents which would assure its subsistence as an exceptionally important building for the cultural milieu of the town. This refers to several other buildings in the same direction, which constitute a continuous traditional urban image.

There are traditional self-sustained residential buildings, where the owners managed, with their own financial means, to preserve the local architectural specificities. This buildings had preserved all the specificities of the traditional and the interventions for their renovation have not disturbed the original image of the building. In their interior, efforts are being made to collect, restore and preserve the entire old household equipment, and to replace the worn-out details characteristics for this kind of architecture.

Figure 15-17: Self-initiative conservation, and individual measures for protecting the authentic values of the traditional houses, able to take different purposes in the future. These examples confirmes the interest of the community for its own identity.

Besides this type of residential architecture with characteristics from the period of the end of the 19th century, we notice the presence of a continuous construction activities at the beginning of the 20th+ century, as well as in the period between the two world wars. The facades of the buildings demonstrates interesting details and characteristics thanks to which the building deserves further treatment. The fact that this type of buildings (which are in a very low number) originate from the beginning of the 20th century, when the traditional architectural models acquired some of the "European" image, contributes to their treatment as an organic part of a complex architectural continuity. By bearing in their architectural expression elements of the rudimental or simplified Western styles, these buildings represent the period of the creation of the "urban" character of the settlements. The authenticity of these buildings is even more interesting because of the fact that their solid constructional structure allows small-scale interventions in relation to their physical consolidation, but, on the other hand, offer a wide range of supposed actions which originate from an integrated activity aiming at a presentation of the cultural identity of the town. Moreover, there are even buildings whose architectural structure originates from the traditional architectural models, upgraded to the standards of the contemporary times, with applications and elements which improved their value and which now represent attractive points for further interpretations and activities.

Figure 18-20: "Western-styled" buildings form the period between the two World Wars

Architectural heritage: rural nuclei, environments and buildings

Depending on the basic profile of the rural settlement, the settlements are organized in various forms. The architecture type is also different and depends on the period in which certain local architectural specificities were created, by which we can make certain classifications. The vicinity to the towns attributed in certain cases some urban characteristics to the rural settlement, and the rural characteristics gradually disappeared. In these regions the number of buildings which represent the local architectural tradition is not only lowered, but is still decreasing due to different reasons, allowing the growth of the newly erected buildings. The old and authentic buildings, left to the tooth of time gradually disappear.

Figure 21-23: Different types of rural settlements and remarkable local architecture

What is characteristic in the example of some villages is the very structure of the village which does not allow its expansion, but enabled an extreme concentration of the buildings. This represents an original and interesting environmental image of a concentrated rural structure. The network of streets which, along the isohypses connects all the parts of the settlement is defined by residential buildings which constitute the frontal aspects of the streets. The buildings with different architectural specificities have not been equally treated. We can emphasize the positive aspect of certain interventions for preservation and protection of the buildings with special architectural values taken from their owners. This shows the real attitude towards such riches differently from other such buildings which are left to decay and have not been subject to any renovation although they deserved it.

In some cases, the residential buildings are in an exceptionally good condition and have excellent environmental values. Because of the fact that the village is permanently populated and the houses are exploited to the maximum, these buildings have preserved their original architectural beauty, and the adequate standards of the interior allows for its free exploitation. This is surely related with the mentality of the population, which creates conditions to predict activities in view of a directed and adequate exploitation of the residential capacity of the traditional buildings. This gives a special quality to this rural settlement which, identically as in the previous examples, contains architecture created during different periods.

Figure 24-26: Excellent environmental values, good condition and original architectural beauty, opening possibilities in the context of the qualities of the rural environment.

The different field configuration as well as the other factors influencing the development of the settlements also contributed to their different organization, of the rural economy locations as well as to the whole ambiance created by the unity of the rural buildings and the natural environment. Having in mind this fact, we treat the rural settlements as separate groups with their own individual and recognizable specificities, differing in structure and thus demanding an adequate treatment. According to that, there is a possibility to understand the possible aspects and activities which can potentially be taken as initiatives in view of the affirmation or presentation of some of the previously demonstrated qualities of the rural environment.

Local traditions: handicrafts, skills and handiworks

The evaluation of the handicrafts as an important segment of the cultural heritage of the regions, contributes to the establishment of their place in the whole picture of the cultural identity. The traditional handicrafts, skills and handiworks were in connection with the traditional ways of living, in the form of extensive farming and cattle raising. This way of living demanded complete production of all the necessary elements: house buildings, food production, production of clothes, objects for everyday use and

different tools for the economic activities. In this proceed of production the self-taught people were forced to make everything which was necessary for the households. By acquiring skills in different handiworks, they also differentiated handicrafts and the grouping of craftsmen into guilds. At the other side, the modern skills represent a certain continuation of traditions, with only little modifications in the type of production, and in the change of the material and of the raw materials which are partially different from the traditional ones: weaving (carpets and other), spinning, embroidering, making musical instruments, wood carving,
Icon painting etc.

The extinction of these traditions is not a new process, because the same one occurs with other types of artistic handicrafts, as a result of the historic events which had a destructive impact on their development. But, the attempts towards their revival are also noticeable and exceptionally important, because they perform a certain correction of the historic processes by a reaffirmation of artistic phenomena which permit an adequate classification of the regional cultural heritage. The interest in studying these artistic handicrafts increases because of the confirmed positive financial effects and due to the open possibility to be competitive on the market with products of exceptional cultural and artistic importance.

Figure 27-30: Some contemporary products of traditional handicrafts, skills and handiworks, representing opportunity for developing small businesses based on culture

The constitution of supporting centers and of adequate premises for a permanent presentation of the achievements in the domain of these handiworks would certainly be an additional motivation and opening of a free circulation of ideas which would lead to their evaluation and categorization. This is make a distinction between the purely commercial and the artistic handiworks, which will additionally influence their respective prices.

Local traditions and customs

The facts concerning the existence of the different local traditions and customs as well as the adequate promotion of the large number of forms which represent the actual situation of the folklore in the regions are of extreme importance for the definition of the cultural identity. This reflects an immense cultural heritage, whose contents represent the quality of life, as well as persistence throughout the different historic periods of their development. The cherishing of the local traditions is of extreme importance in view of the education of the young population, who possesses a

developed awareness of the necessity of such memories, practice and transfer of the experiences and traditions as a unique mark sign of their local identification.

Figure 31-34: Present condition of local traditions-remarkable efforts pointing to the developed interest for preserving and keeping the values of the tradition, local culture and folklore.

Conclusion

The main reasons for the present situation of the heritage originate in the fundamental changes of the lifestyle, the changed activities of the inhabitants under the influence of the wider civilization processes and of the transitional processes in the country which concentrates the finance priorities on other areas. In its evaluation, this study equally treats the rural and the urban traditions in all aspects of the material and spiritual culture. This leads to a real and objective information basis, which will equally consider the values of heritage and permit an identical access as well as their further treatment by the population of all communities. Considering the previous conclusions, this has a function of popularization of those values of the heritage, which were identified by the previous researches as exceptionally important for the further realization of the projects of this kind, and of this comlexity.

This modern paradox – which is not specific only for our country, with the already known limitations to the development processes, imposes the need of intentional interventions. The project for the development of municipalities through culture should represent a continuous interpretation of the existing capacities aiming at an organized realization of such intervention which has great perspectives if well planned and properly managed.

All of the mentioned activities have to be certainly treated as a part of an unbreakable material and spiritual integrity, because only in that way they do reflect the real dimension of life in these regions. All project activities connected with the initiation development, continuation and preservation of certain aspects of the material or spiritual subsistence of the cultural identity of these regions, has to be treated as a positive action directed to the strengthening of the communities' heritage. This attitude leads to many directions towards an integration of heterogeneous activities, which will ultimately deal with the complete affirmation of the local cultural values in the context of a generally defined development projects.

LA GRAND-PLACE DE BRUXELLES.
GESTION DU PATRIMOINE ET SENSIBILISATION DU PUBLIC.

Vincent Heymans
Ville de Bruxelles – Cellule Patrimoine historique

Le 2 décembre 1999, l'UNESCO inscrivait la Grand-Place de Bruxelles sur la prestigieuse liste du Patrimoine mondial.
Cette reconnaissance internationale constituait le couronnement des efforts fournis tant par le Service des Monuments et des Sites de la Région de Bruxelles-Capitale que par l'Administration communale de Bruxelles-Ville. Elle représentait également le point de départ d'une série d'initiatives menées tantôt de manière individuelle, tantôt en collaboration entre les deux niveaux de pouvoir impliqués dans la gestion du patrimoine architectural en région bruxelloise.
Reconnaissance et encouragement, ces deux termes résument le sens dans lequel le message de l'UNESCO est interprété à Bruxelles.

Contexte historique

Depuis le moyen âge, la Grand-Place constitue le cœur économique et politique de Bruxelles. D'abord limitée à une esplanade destinée à l'organisation de marchés, ce vaste espace est progressivement bordé de maisons, de commerces et de bâtiments publics : une halle au pain, au drap et à la viande, plusieurs fois rebâtie et finalement supplantée au XVe siècle par un édifice destiné aux bureaux et tribunaux du pouvoir ducal et un imposant hôtel communal, construit en plusieurs phases dans la première moitié du XVe siècle. Directement impliquées dans l'exercice du pouvoir, de nombreuses représentations professionnelles - les corporations - font bâtir des maisons sur la place ou dans les rues avoisinantes. Edifiée de manière progressive, la Grand-Place témoigne cependant d'une grande unité stylistique.
Cet ensemble est détruit en août 1695, lors du bombardement de la ville par les troupes du roi Louis XIV placées sous le commandement du Maréchal de Villeroi. Seules ont résisté les façades de la Maison du Roi et de l'Hôtel de Ville. La reconstruction sera rapide mais sévèrement contrôlée par les autorités. Chaque propriétaire rebâtit sa maison, dans un style baroque hybride, particulièrement inventif.
A la fin du XVIIIe siècle, les révolutionnaires français confisquent les biens des corporations après avoir envahi nos régions. Toutes les maisons deviennent de simples immeubles de rapport, avec commerce au rez-de-chaussée et logements aux étages. Plusieurs façades sont transformées - les fenêtres sont agrandies, les décors sculptés et les pignons sont démontés - et l'entretien de la plupart des maisons fait défaut.
Suite à l'indépendance nationale conquise en 1830, une lente prise de conscience de la valeur patrimoniale de cet ensemble architectural se fait jour au sein du Conseil communal de Bruxelles. Elle bénéficie d'abord à l'Hôtel de Ville dont la restauration est entamée en 1840. Les premières interventions sur les façades des maisons datent des années 1850. Mais il faudra attendre les années 1880 pour qu'une politique concertée, conçue à l'échelle de la place et programmée à long terme, soit mise en œuvre sous l'impulsion du bourgmestre Charles Buls. Cette seconde renaissance de la place, fêtée officiellement en 1897 mais effectivement achevée en 1920, marquera d'une empreinte indélébile l'aspect de la place, pour partie restaurée, pour une autre totalement reconstituée, en quelque sorte plus vraie que nature mais d'une saisissante cohérence visuelle (figure 1).

L'étude préliminaire (1998-1999)

La première étape de la réflexion, confiée à la Cellule Patrimoine historique de la Ville de Bruxelles, est antérieure à l'inscription de la Grand-Place sur la liste du Patrimoine mondial. Elle relevait du constat suivant : cet ensemble exceptionnel ne jouissait d'une protection légale qu'en reconnaissance de sa dimension publique.
Pourtant, la Grand-Place a bénéficié très tôt d'une protection légale. Elaborée en 1882, à la demande de Charles Buls, une convention a été signée entre les autorités communales et les propriétaires des maisons de la place, afin de garantir l'intégrité des façades restaurées aux frais de la Ville. Cette convention, qui interdit aux propriétaires d'entreprendre quelque intervention sans l'autorisation de la commune, en échange de l'engagement pris par cette dernière d'assurer la restauration et l'entretien des façades, est toujours d'application aujourd'hui.
Daté du 19 avril 1977, l'arrêté royal de classement des maisons de la Grand-Place entérine cet état de la protection, puisqu'il ne mentionne comme éléments dignes d'être préservés que les façades et toitures. Seuls l'Hôtel de Ville et la Maison du Roi bénéficient d'une protection étendue, depuis l'important arrêté de classement du 5 mars 1936 dont la liste reprend les principaux monuments civils et religieux de Bruxelles. Cette situation avait pour effet de confiner au rôle de décor urbain la dimension patrimoniale de la Grand-Place, au risque de laisser disparaître tout témoignage architectural des intérieurs des maisons.

Figure 1 : L'apparente unité stylistique de la Grand-Place de Bruxelles cache une complexité historique que les gestionnaires du patrimoine ne peuvent pas ignorer.
(© Cellule Patrimoine historique)

Un premier essai d'élargissement de la protection, tenté en 1993 par les autorités régionales, s'était soldé par une réaction hostile des propriétaires. Depuis cet échec, la Grand-Place attendait que l'on formule un bilan exhaustif de sa valeur patrimoniale. En 1998, cette mission a donc été confiée à la Cellule Patrimoine historique de la Ville de Bruxelles.
La première étape de ce travail a consisté en une recherche approfondie dans les archives de la commune. Des centaines de dossiers - dont un grand nombre n'avaient plus été ouverts depuis un siècle - ont été étudiés, classés et comparés afin de retracer les principales étapes de l'histoire des maisons. Confrontés les uns aux autres, les plans retrouvés au cours de ces recherches ont servi de base à l'établissement d'un canevas graphique à partir duquel les données recueillies sur le terrain peuvent être enregistrées. En un second temps, l'équipe de la Cellule Patrimoine historique a visité toutes les maisons de la place, mettant à jour les plans et collectant les informations susceptibles d'affiner la connaissance historique, esthétique et technique des bâtiments.
Le résultat de ce travail, présenté en cinq volumes (autant que le nombre d'îlots bordant la place), s'intitule *«Les maisons de la Grand-Place de Bruxelles, Etude historique et architecturale»*. Achevé en décembre 1999, cet outil de gestion pratique,

destiné prioritairement aux instances susceptibles d'intervenir sur les édifices, a été distribué en un premier temps aux services communaux et régionaux impliquées dans la protection du patrimoine.

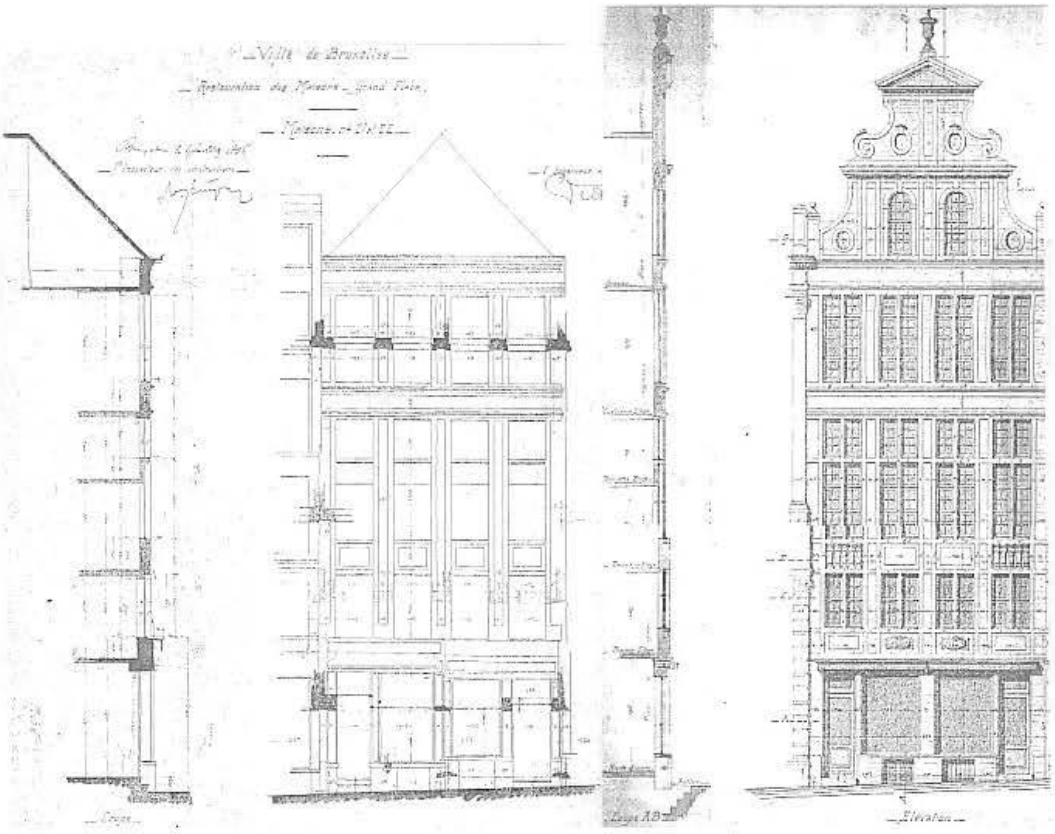

Figure 2 : *Joseph et Anne* : deux maisons jumelles réunies derrière une façade.
Relevé de l'état avant restauration et projet de restitution, 1895.
L'étude historique repose en partie sur ce type de document.
(© Archives de la Ville de Bruxelles)

Concrètement, chaque volume s'ouvre sur une présentation générale de l'îlot auquel il est consacré. Plans parcellaires anciens et modernes, gravures, dessins, cartes postales et photographies illustrent l'évolution des façades, synthétisée au moyen d'une élévation de leur état actuel mis en couleurs selon un code pré-établi. Selon la même logique, les plans juxtaposés de la série de maisons sont détaillés niveau par niveau, afin d'offrir une vision synthétique du bâti qui mette en évidence les interactions entre ces bâtiments, fortement liés au point parfois de s'interpénétrer.
Ensuite, chaque maison est étudiée séparément. L'historique de la construction et les étapes des transformations et restaurations successives effectuées au niveau de la façade sont détaillés et illustrés au moyen de documents iconographiques (figure 2). Le relevé niveau par niveau permet de dater les interventions qui ont affecté l'intérieur du bâtiment, grâce à un code de couleurs et des commentaires présentés à la manière de notes infrapaginales. Afin de faciliter les recherches ultérieures, l'étude est complétée par un inventaire exhaustif des documents d'archives communales relatifs au bâtiment.

Depuis son achèvement, ce travail sert de fil conducteur pour l'ensemble des démarches entamées par la Ville en matière de sensibilisation, d'entretien et de restauration du patrimoine majeur que constitue la Grand-Place.

Le livre (1999-2000)

Une politique de gestion du patrimoine architectural ne peut atteindre des résultats probants sans bénéficier de l'assentiment du grand public. Dans ce contexte, la divulgation des connaissances acquises lors de l'étude déjà citée constituait une étape importante du travail de la Cellule Patrimoine historique.
La richesse des informations réunies à cette occasion, non seulement sous forme écrite mais également au niveau iconographique, et le caractère prestigieux du sujet de l'étude avaient de quoi séduire un éditeur. Ce fut effectivement le cas puisqu'en novembre 2000 sortait de presse un livre intitulé *«Les maisons de la Grand-Place de Bruxelles»*. Cet ouvrage diffère des nombreuses publications consacrées au sujet par le thème abordé : la Grand-Place en tant qu'œuvre architecturale collective, créée et recréée, plutôt que comme théâtre symbolique d'événements historiques (figure 3).

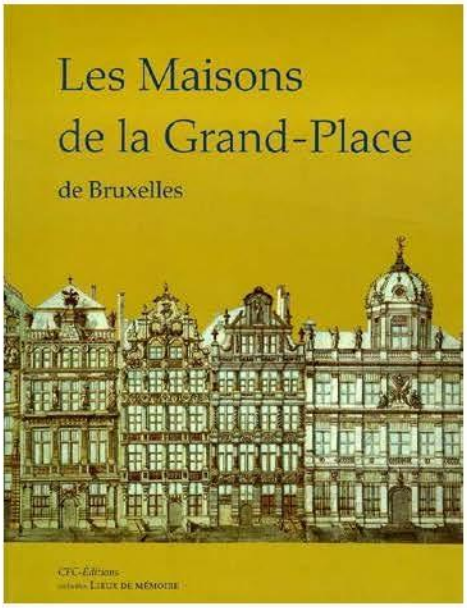

Figure 3 : Publié en collaboration avec CFC-Editions, le livre met à la portée d'un large public les résultats de l'étude historique.
(© CFC-Editions)

Le livre a été conçu, tant dans son contenu que dans sa présentation, de manière à respecter toutes les règles en matières de publication scientifique sans décourager un public plus large, susceptible de s'intéresser à cet ensemble urbanistique à la fois connu sous la forme de décor pour cartes postales mais ignoré en tant que témoignage des modes de construction et de vie à la fin du XVIIe et de l'évolution des théories de la restauration au XIXe siècle. Le but semble avoir été atteint : très bien accueilli lors de sa sortie de presse, l'ouvrage a connu une deuxième édition corrigée en novembre 2002.

Les propositions d'élargissement de classement (2000-2003)

La révision de l'étendue du classement pour les maisons de la Grand-Place constituait une des motivations de la rédaction de l'étude entamée en 1998. Sur base de ce travail préliminaire, la Ville de Bruxelles a donc introduit auprès du Service régional des Monuments et des Sites une série de 29 propositions d'élargissement de classement des maisons, ainsi qu'une proposition de protection de l'assiette de la place proprement dite.
Cette démarche s'avérait indispensable : l'inscription sur la liste du patrimoine mondial ne modifie aucunement la portée et l'étendue de la protection des biens ainsi

reconnus et les critères selon lesquels le classement des maisons de la Grand-Place avait été déterminé en 1977 commençaient à montrer leur faiblesse. Il s'agissait dès lors de relancer le projet de valorisation des intérieurs des maisons, non seulement au stade de la réflexion historique mais également en matière de protection légale du patrimoine bâti (figures 4 à 7).

Figure 4 à 7 : Les propositions d'élargissement du classement des maisons de la Grand-Place à certaines parties des intérieurs reposent sur un bilan de leur état de conservation.
(© Cellule Patrimoine historique)

Afin d'éviter des réactions négatives de la part des propriétaires, ces propositions ont été accompagnées d'une information à toutes les personnes concernées. Ainsi, la Ville a-t-elle organisé, le 19 mars 2002 à l'Hôtel de Ville, une séance d'information au cours de laquelle chaque propriétaire s'est vu remettre la partie de l'étude de la Cellule Patrimoine historique qui concernait leur maison. En outre, des représentants des administrations communales et régionales ont répondu aux interrogations des propriétaires relatives au changement de statut de leur bien.
Cette implication des propriétaires dans la démarche administrative avait pour but d'atténuer le sentiment négatif suscité par les procédures de classement, souvent perçues comme une punition ou une restriction au droit de propriété. Il est encore trop tôt pour mesurer à quel point ce travail de dialogue portera ses fruits. Les nouveaux chantiers de restauration des façades dont la Ville de Bruxelles a entamé la préparation serviront de test, notamment en matière de gestion du «facteur humain» entre administrations et propriétaires privés. Entre-temps, on peut souligner que cette

nouvelle série de propositions de classement n'a pas suscité de réaction négative de la part des propriétaires impliqués.

Entamée par la Ville de Bruxelles durant l'automne 2000, la procédure suit son cours légal. L'arrêté officiel d'ouverture de l'enquête préalable au classement date du 20 septembre 2001 et les premiers arrêtés définitifs de classement ont été signés le 7 novembre 2002. Les autres devraient suivre dans le courant de l'année 2003.

Les inspections des façades et l'état des lieux (2000-2002)

Profitant de la dynamique insufflée par le travail effectué, la Ville a repris ses campagnes d'inspection des façades des maisons de la Grand-Place. Une fois de plus, l'étude historique préliminaire constitue la base de la réflexion. L'introduction méthodologique de ce travail soulignait déjà la nécessité de compléter l'information relative aux façades, issue de la lecture et de l'analyse des documents d'archives, par une analyse physique des parements.

Figure 8 : Campagne d'inspection 2000, menée au moyen d'une nacelle, afin d'évaluer l'état de conservation des façades.
(© Cellule patrimoine historique)

Concrètement, cette seconde phase d'étude résulte des informations recueillies au cours de trois campagnes d'inspection, menées au moyen d'une nacelle, respectivement en 2000, 2001 et 2002 (figure 8).
Cette démarche s'est avérée indispensable à l'établissement d'un constat fiable de la composition et de l'état de conservation des parements des façades et à la description des pathologies rencontrées. Sur base de ces conclusions, des solutions techniques peuvent être esquissées, des recommandations formulées, des priorités définies et des projets de restauration envisagés.

A nouveau réparti en cinq volumes, le résultat de ce travail présente les façades maison par maison. Après un bref résumé du contexte historique, extrait des données réunies lors de la rédaction de l'étude historique générale, les informations sont présentées essentiellement sous un angle graphique.
Une première élévation mise en couleurs détaille les matériaux qui entrent dans la composition de la façade. Les trois autres dessins mentionnent les pathologies et leur éventuelle évolution d'une campagne d'inspection à l'autre. Enfin, une série de

photographies de détails accompagnées de légendes attirent l'attention sur des problèmes particuliers. Ce nouvel outil de gestion de la Grand-Place complète la première phase de l'étude, depuis juillet 2002.

Afin de rester cohérent dans la démarche d'ouverture vis-à-vis des propriétaires, chacun d'entre eux a reçu un exemplaire du constat graphique de l'état des façades des biens qui lui appartiennent. Le but est de les sensibiliser à la valeur de leur patrimoine et à la nécessité d'une intervention scientifique concertée.

La programmation de chantiers de restauration (2002-2003)

En sa séance du 8 mars 2002, le Collège des Bourgmestre et Echevins de la Ville de Bruxelles a chargé la Cellule Patrimoine historique de mener à bien la restauration de la façade de la maison *L'Ane*, au n° 39 Grand-Place, à titre d'exemple et de test pour les techniques à mettre en œuvre dans ce type de chantier.
Cet édifice, bâti à la fin du XVIIe siècle sur une étroite parcelle située dans un angle de la place, à l'extrémité de la rue au Beurre, est une propriété de la Ville. Sa modestie ne doit pas cacher l'intérêt majeur qu'il représente pour l'histoire de l'architecture : l'étude historique de 1999 avait déjà permis de démontrer qu'il s'agissait de la maison la mieux conservée de la Grand-Place. A l'exception de quelques transformations mineures, datant du XIXe siècle, elle est conservée dans son état original, ou plus précisément celui de sa reconstruction sur des caves médiévales, après le bombardement de Bruxelles en 1695.

Figure 9 : Echafaudage dressé devant la façade de *L'Ane* afin d'effectuer les analyses complémentaires nécessaires à la constitution du dossier de restauration. (© Cellule Patrimoine historique)

Au seuil du passage à l'intervention concrète sur le patrimoine, une série d'analyses complémentaires ponctuelles ont été commandées à des experts, afin de préciser les connaissances relatives à l'état des parements en pierre, à la nature des joints de mortier, à la position des structures métalliques, aux types d'enduits et de peintures, … Elles ont permis d'affiner la réflexion entamée plusieurs années plus tôt, dans l'étude historique (figure 9).
Le dossier, remis le 5 août 2002 au Service régional des Monuments et Sites afin d'obtenir l'autorisation d'effectuer les travaux de restauration prévus, débute par un résumé de la philosophie selon laquelle a été pensée la restauration. Il reprend l'étude historique et l'état des lieux déjà rédigés et réunit les cahiers des charges et métrés,

une documentation graphique importante, ainsi que le résultat des études complémentaires. Ayant reçu l'avis favorable des instances régionales, il servira de guide pour la restauration de la façade, qui sera réalisée par la Ville de Bruxelles dans le courant de l'année 2004.

La campagne suivante des travaux de restauration devrait porter sur une séquence de façades constituant la totalité d'un îlot, et ainsi marquer de manière forte la volonté de la Ville de reprendre le travail de restauration des façades de la place, dont les dernières campagnes avaient bénéficié à l'ensemble des *Ducs de Brabant* et à la maison *Le Cornet*, respectivement en 1986-1990 et 1990-1993.
Le choix s'est porté sur le groupe de qui réunit notamment les maisons *L'Etoile*, *Le Cygne* et *L'Arbre d'Or*, toutes trois propriétés de la Ville.
La rédaction du cahier des charges relatif à ce deuxième chantier a été entamée au début de l'année 2003.

Le complément au nouveau Plan particulier d'Aménagement du Sol (2002-2003)

Lorsqu'il fut abrogé en 1995, le Plan particulier d'Aménagement déterminant des prescriptions urbanistique spécifiques pour le quartier dit de l'*Ilot Sacré* avait depuis longtemps montré ses limites. La Ville de Bruxelles a donc mis en chantier un nouveau plan de ce type, actuellement en cours d'achèvement.
Dans ce contexte particulier, le Service des Plans et Autorisations de la Ville de Bruxelles a récemment chargé la Cellule Patrimoine historique de rédiger une étude historique complémentaire à ce nouveau Plan particulier d'Aménagement du Sol, relative à l'évolution morphologique de la zone environnant la Grand-Place, et qui correspond pour la plus grande partie de son périmètre à la zone tampon définie autour de la Grand-Place à la demande de l'UNESCO. Il est principalement destiné à aider les administrations compétentes à rendre des avis motivés sur les projets déposés dans le cadre d'une demande de permis d'urbanisme. Puisque ces derniers seront obligatoirement accompagnés d'une étude historique du bien, à fournir par le maître d'ouvrage, une étude générale du contexte s'avère indispensable à la lecture critique de ce nouveau type de document.

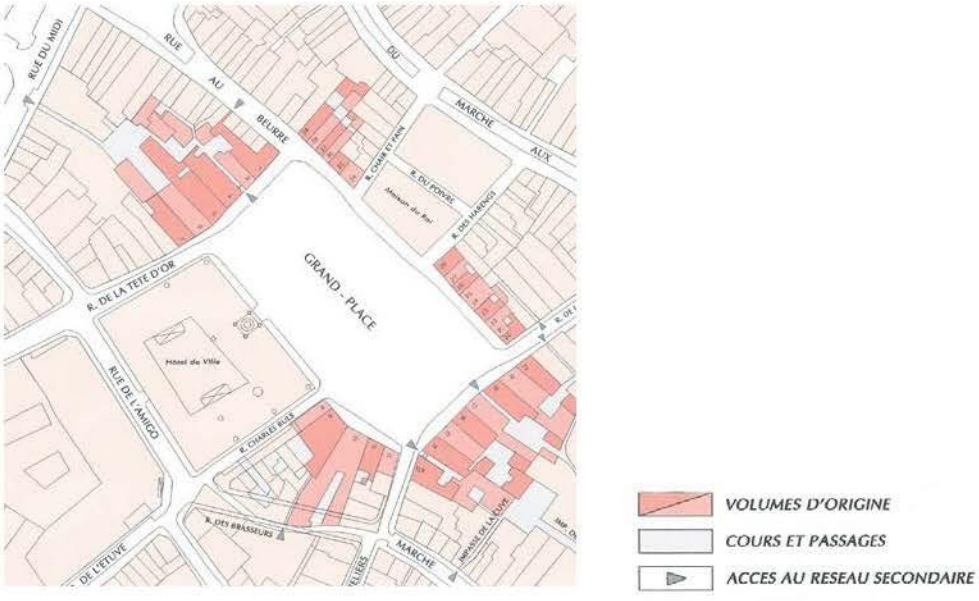

Figure 10 : Plan de la Grand-Place et de ses abords, avec restitution du parcellaire du XVIIe siècle et de la dispositions des zones bâties. La démarche a été élargie à l'ensemble de l'*Ilot Sacré*.
(plan E. Fruyt – © Service des Monuments et Sites)

La démarche est basée sur une confrontation entre les archives conservées – plans parcellaires, dossiers de demande d'autorisation de bâtir, photographies – et la situation de terrain. Dans ce bilan à large échelle du tissu urbain historique, il s'agit de souligner la persistance d'éléments anciens susceptibles de mériter une conservation, voire une mise en valeur, y compris au niveau des annexes et constructions en intérieur d'îlot (figure 10).
Intitulé *«Evolution du bâti dans l'Ilot Sacré»*, ce travail détaille le sujet à raison d'un îlot par volume. Après une présentation globale de l'îlot, chaque volume reprend, une rue après l'autre, tous les bâtiments qui en composent la séquence, avec mention des transformations ou reconstructions successives. L'information est présentée par tableaux et de manière graphique, afin de permettre une manipulation à la fois rapide et efficace.

Conclusion

La gestion de la Grand-Place de Bruxelles relève de nombreuses instances officielles, requiert des compétences variées et fait sentir ses effets dans des domaines parfois très éloignés de préoccupations d'ordre purement patrimonial.
La chance de la Cellule Patrimoine historique est d'être parvenue à rester présente à plusieurs niveaux de cette activité protéiforme puisque, sans constituer la seule de ses aires d'intervention, la Grand-Place de Bruxelles tient son équipe en activité depuis cinq ans.

Gageons que cette position privilégiée aura pour effet de garantir une cohérence dans l'accompagnement de la gestion de ce patrimoine complexe.

THROUGH INFORMED CONSERVATION TO INFORMED COMMUNITY: DANISH INTERSAVE TECHNIQUE'S IMPLEMENTATION IN ST. PETERSBURG

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Abstract

The parks and palaces ensemble of Tsarskoye Selo (the town of Pushkin) near St.-Petersburg is item of WHL and one of world-famed tourist destinations. The project "InterSAVE Russia: the administrative tool containing atlas and database on study of architectural values in the urban environment" devoted to this town was elaborated in the Pushkin Administrative District of St.-Petersburg in 2001-2002.

The work was grounded on the SAVE system (Survey of Architectural Values in the Environment) implementing in Denmark since 1982 and then in Bosnia, Kosovo, Estonia, Lithuania and aiming onto establishment of effective "transparent" management by cultural heritage. Using the SAVE we tried to give to Pushkin's community an instrument for the self-identification and reintegration of the unique town-planning whole.

Three components were developed:

computer database covering all buildings of municipality, including objective evidence, digital photos, evaluation and analytical data;

municipal atlas presenting an integrated view on cultural heritage, built and nature environment all over the municipality;

proposals for a team-work of authorities, entrepreneurs and locals for the balanced approach to the cultural values' conservation.

The project's results should be accessible to the people and serve for complex awareness on environmental, historical and cultural values of their locality.

Introduction. The need in heritage information

In a course of the broad program and planning work for Russian historic settlements we constantly meet a great deficiency of information about a heritage and, accordingly, a lack of understanding of its values both among the "simple" citizens and main town persons (and even among local professionals). In such a situation of mass incomprehension of a local town-planning heritage and its "superficial" perception distorted by propagation of the Soviet years, the realization of any environmental initiatives is very problematic (Ivanov [1]).

However even those countries, where active participations of locals in heritage conservation already became an everyday and legal norm, have also gone through similar period of social apathy and heritage misunderstanding. A radical turn has taken place during of civil society's development and purposeful work of the experts assisting to local communities. It is indicative, that the job on heritage education and "environmental" informing of citizens goes continuously and becomes more and more active in developed world.

"What are the best ways of understanding and recording the historic environment and how can that information best be disseminated to the widest possible audience?" (Clark [2]) – questions like this are today one of key points for conservationists. The answer is given in different ways: awareness-rising companies, eye-opener publications, public oriented guidelines edition, sites in the Internet, etc.

There is new, extended, complicated understanding of the heritage corresponding to a complicated reality. "In the information society, the approach to the heritage is a decisive factor, and is sometimes even more important than the heritage itself. The heritage is a medium for the collective memory, which is expressed through a series of mediators …it is the place of transition from «knowledge» to «know-how»" (Therond [3]).

Description of the SAVE system

One of such technologies aimed towards both preservation of cultural values and heritage information distribution is the SAVE system (abbreviation of the Survey of Architectural Values in the Environment), developed in Denmark in the beginning of 1980-s (InterSAVE [4]). Its initial task was a technique's creation for an operational assessment of urban built development's architectural quality with the purposes of local building traditions' preservation. Last years, however, this system finds a wide spread occurrence in many European countries (Bosnia and Herzegovina, Yugoslavia/Kosovo, Estonia, Lithuania) in more broad sense as a mean of the endangered heritage's inventory, administrative control by development of settlements and acquaintance of public with local environmental values.

SAVE is an operational and rather inexpensive tool of definition and all-round public explanation of architectural and town-planning merits of urban development. The technique provides an express estimation of buildings' estate, an aggregative account of money necessary for its putting in order, and also a revealing of most important qualities and elements of environment, a preservation of which should become a subject of public consent. Separate buildings and historical urban fabric as a whole are considered as a part of regional environment from the point of local building culture's maintenance and historical heritage's conservation. Main components of the system are: 1) Computer Database with objective information, evaluation and analytical data and digital photos on each building of municipality; 2) Municipal Atlas presenting an integrated view on cultural heritage, built and nature environment of the municipality. During the broad public distribution of the results of architectural and town-planning assessments most important outcomes of work become accessible to the managers, experts, investors and population. Thus system-defined representation of environmental values translates from experts to public, and the general reference point for all persons connected to development of the given territory creates.

SAVE in Pushkin

The city of Pushkin (the former town of Tsarskoye Selo) in surrounding of St.-Petersburg became the first Russian object of the SAVE system' implementation. The project "InterSAVE Russia: the administrative tool containing atlas and database on study of architectural values in the urban environment" was elaborated in 2001-2002 in the Pushkin Administrative District of St.-Petersburg in the frame of the European Program "Tacis Cross Border Co-operation Small Project Facility" by working

collective under the direction of the project coordinator arch. Ch.-H. Vejby (Denmark) and local consultants arch. A. Ivanov (Moscow) and art critic S. Gorbatenco (St.-Petersburg). The project should give to public a complex awareness on environmental, historical and cultural values of locality, drawing attention to a "second-order heritage". It is especially important in such a city like Pushkin that is full of first-class architectural monuments (the Park and Palaces ensemble of Tsarskoye Selo is one of world-famed tourist destinations and item of World Heritage List).

Realization of the project: the initial stage

At an initial stage of work in the first half of 2001 some preliminary tasks were carried out. Russian variant of the SAVE system's Methodical Guideline was prepared. It is translation of 3-rd Danish edition of the Guideline (SAVE [5]) with short editorial comments. The translation on Russian of the program's interface (the database in MS Access) and its design's updating were executed also. Special preliminary historical, architectural, topographical investigations have allowed creating documents necessary for a field building's assessment. The administrative district's territory was divided on 12 subdistricts according to naturalistic and historical borders. The code list for buildings assessment was prepared. It is a register of the basic building parameters, using by the assessors in a course of fieldwork. The assessment of each building is provided on the following parameters: construction period; architectural style; actual and initial use; construction of walls and roof; materials of socle, walls and roof; types of windows and doors; building's parts; architectural details; decorative elements; elements of a surrounding (from 7 up to 32 various positions in every block). We thinking that such a complex register comprehensively describing building from the architectural, artistic and constructive points of view is executed in Russia for the first time.

The field training of assessors was carried out with the evident analysis of characteristic buildings. The criteria both buildings' identification on formal parameters, and qualitative expert estimation of various sides of architectural value of buildings were established. Numerous organizational problems (arrangement of office, purchase of equipment, base cartographical information gaining, codification of buildings and streets, etc.) were solved also. At last, the Steering Committee of the project was created. It is public organization including the recognized experts from Russia and Denmark and representatives of authorities both of the Pushkin district and its partner-city – Danish town of Rønne.

Built development's database

The analysis of built environment within the framework of the SAVE system consists of two basic procedures – an assessment of separate buildings and surveying of town-planning structures.

In a course of a fieldwork the assessors fill in the identification sheets about each separate building, determine on a place the formal characteristics listed above. The most important part of the description is the building's qualitative estimation, which consists of 6 various marks: architectural value (it depends on a level of proportional and compositional harmony, outstanding work of famous architect etc.); cultural and historical value (known historical events, persons connected to the given building, evidence of achievement of building skill or technologies, presence of important

social functions); environmental value (degree of harmony with environment); originality (degree of authenticity of the saved ex-terrier); value of an establishment (degree of efforts and expenses necessary for putting in order of a building's external appearance; for historical buildings a conformity with architectural and restoration criteria must be consider also), and, at last, as an integrated final estimation – a preservation value of a building. A 9-level scale ("1" is a highest mark) is used for estimations.

A similar ball scale uses for the visual assessment of a technical estate of a roof, walls, windows and doors. The digital photographing of each house is also carried out (from 2 till 8-10 photos depending on complexity and detailed elaboration of object). The brief data on the architects, former owners of a building etc. are brought in to the field "Note" The results of an assessment are entered in the computer and then are exposed to a lot of consecutive checks by the assessors' group lieder and local consultants.

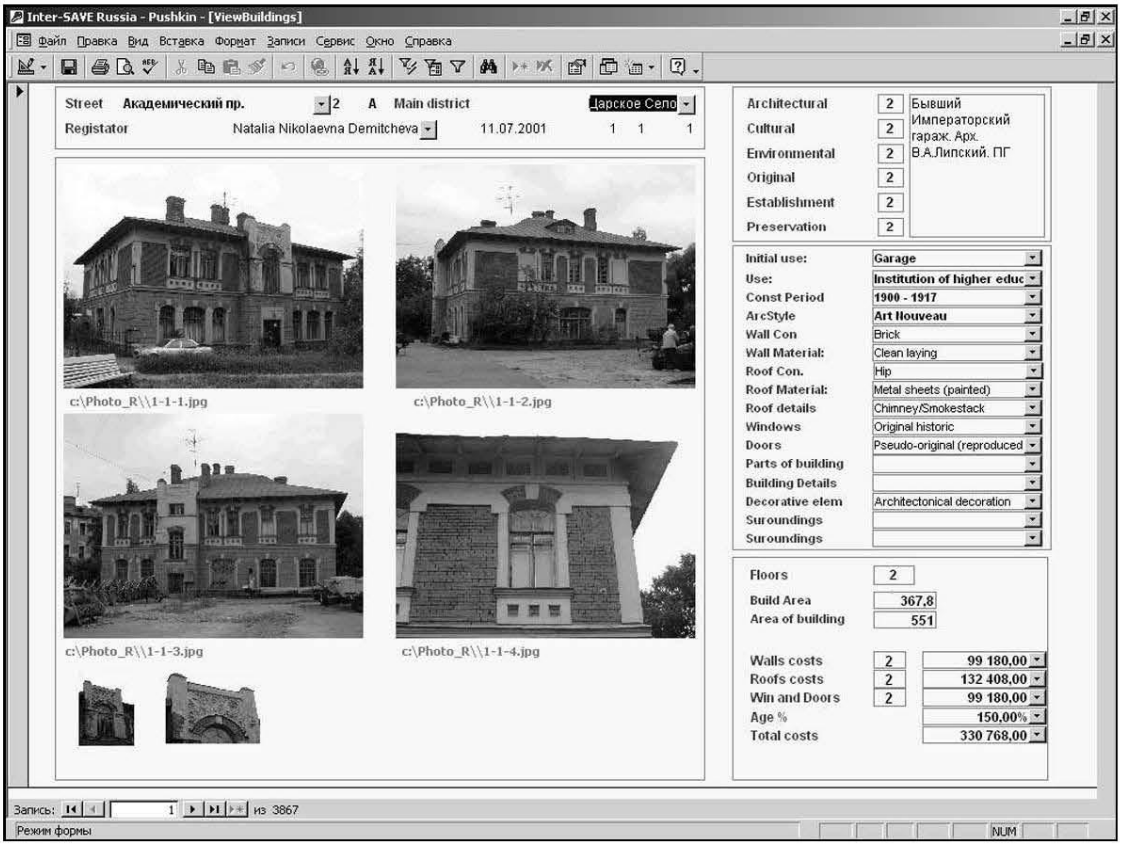

Figure 1. Pushkin Database. Building's query

During practical use of a database an automatic creation of the "Building Report" for each building is possible. Such a report includes the post address and unique codes of a building, number of floors, the construction area of building (is entered using the official data from the local Project and Inventory Bureau), assessment date, name of assessor, results of quality estimation, all parameters from the code list, photos, etc. The program is accessible for users with minimal computer skills and provides easy receiving of answers to queries about separate building or development as a whole by

any criteria or any groups of criteria. For example, it is possible to find out, how much buildings of this or that architectural style there are in Pushkin district or in its certain part and immediately to see their images, or to know how much buildings with the best preservation value have the worst estate of roofing coverings and, hence, require urgent preservation, etc.

About 3900 buildings arranged on all territory of district were assessed during the second half of 2001. Many building of military department, industrial and agricultural functions located on the Pushkin' district territory were described for the first time. Then the checking of the entered information, final debugging of the program interface and elaboration of the database's economic block were carried out. This part of the database, on the assumption of provisional average cost of reconstruction of 1 m^2 of the common building area, will carry out an automatically account of the investments necessary for the putting in order of external architectural appearance of each building or certain set of buildings. The database is intended finally for network use in the Administration of Pushkin District.

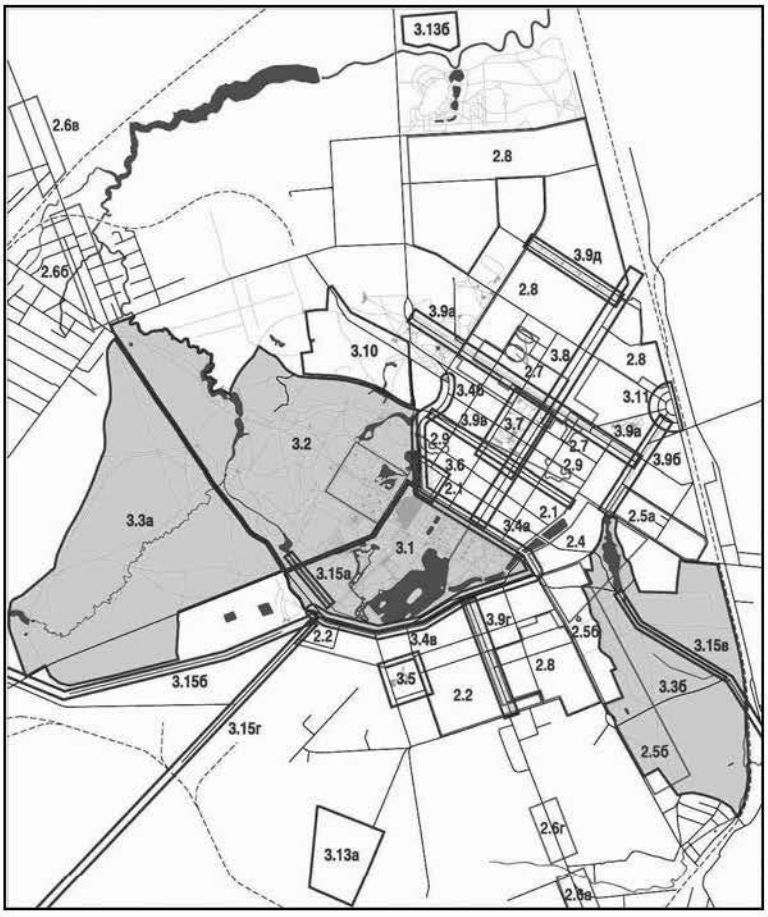

Figure 2. Pushkin District's Municipal Atlas. Interaction of built structures (grey areas – parks, in grey frames – building patterns and selected environmental elements)

Municipal Atlas

The work on the Municipal Atlas of the Pushkin District, which is the second main outcome of the project, was finished in the June 2002 (Gorbatenko, Ivanov [6]). The aims of the Atlas' elaboration were to acquaint the public with comprehensive values

of the District environment, to attract attention of the local and foreign investors and tourists. Famous palaces and parks of Tsarskoye Selo have had till now a dominating role in the public' and experts' perception. But the Atlas covers whole district's territory. Side by side with the universally recognised masterpieces, the special note is taken of the elements of natural, historical and cultural landscapes, the common development of the city of Pushkin, historical villages and settlements.

Atlas is devoted to the complex analysis both of cultural heritage and built environment. In the first part, according to the basic methodical triad of the SAVE "topography – history – architecture", basic landscape, architectural and planning features of area were described and brief review of the history of territory was given.

The central part of Atlas is devoted to the analysis of town-planning structures – there are complex integrated elements of environment including buildings, public urban spaces and landscapes (townscapes). In a number of cases the special attention to the behaviour and semantic "filling" of structures was given. The town-planning structures are differentiated on three groups: dominating features of territory, building patterns and selected environmental elements. The analysis of structures in the Atlas will include the brief text description, scale cartographical circuit with colour differentiation of buildings on final preservation value (as a result of a field assessment of separate buildings), historical and modern images, etc.

Figure 3. Pushkin District's Municipal Atlas. Photos from the chapter "Poetic of the town"

Dominating features of territory are its landscape, planning and architectural dominants, major space and structural ratios defining character of the environment. Objects of the description in this section become a unique landscape of the city and suburbs; palaces and parks as a main town-forming factor; a role of Tsarskoye Selo as a historic roads junction; micro-agglomeration of Tsarskoye Selo – Pavlovsk (another imperial residence at a distance of 2 km); Tsarskoye Selo as the Town of the Emperor's court department and as the "Town of muses".

Taking into account a poetic layer of environment and other aspects of unique genius loci was an essential addition to the SAVE technique, provoked by specificity

of the city of Pushkin and, after long discussions, approved by our Danish partners. Disclosing of an urban fabric's "symbolical filling" is important for an increasing of importance of the "city itself" in a counterbalance to the "garden-and-palaces" component traditionally dominated in the image of Pushkin.

Building patterns are most typical sites of urban and village development mirroring methods of organization of the residential environment and public spaces distributed in given area. In this section a description of changing of architectural styles, buildings materials and techniques, an examples of most characteristic buildings and a brief explanations of the ways, how the building patterns influence (or may influence) towards the style of life of inhabitants are given also. There are revealed 9 building patterns for Pushkin district.

Figure 4. Pushkin District's Municipal Atlas. Map of the border between parks and town

Selected environmental elements are most remarkable urban spaces, architectural ensembles and complexes, sites, separate objects, nets of characteristic objects (e.g. gates), representing self-dependent value in comparison with dominating features of territory and building patterns. Following items will be the themes of phenomenological description in this Atlas' section: special features of planning, architectural and semantic organization of the main parks; boundary between parks and town; Main Square and city market; "main street" of Pushkin; city boulevards; Privoksalnaya Square and Railway station; system of town and park gates; historical cemeteries; historical roads; canals, sluices and ponds; urban details, etc.

Work on the Atlas allows us to draw near to understanding of some topics that were not described before. There are, between others, the relationship between parks and town, which we can recognize as main components of local town-planning system. A correlation between zones of parks and palaces and "normal", common town seems to be a basic structural dichotomy of Tsarskoye Selo. Accordingly, the main structural "seam" of the urban environment is the border between parks and town. The degree of the town integrity depends, in the whole, even nowadays upon the character of the organization of this border – its transparency, permeability, saturation with its own micro-accents and micro-ensembles (Ivanov [7]).

Maps of the town of Pushkin showing of the buildings preservation value placed in the last part of Atlas together with reference section and brief recommendations for restoration and new construction in the Pushkin district addressed to the inhabitants, investors and city leaders.

Opportunities of project's development

The InterSAVE Atlas and database must be seen as complementary tools that are primarily useful to those whose interests and overall responsibilities concern assurance that development does not destroy or let perish but rather enhance the positive qualities of the natural and built environment of the territory, be that conservation, rehabilitation, reconstruction, development of new elements or demolition of the existing elements of such an environment.

The database is a frequently updated system of sets of data on parameters of these elements and assessment of their features and qualities, structured for rendering analytical typological and territorial reports on an element or groups of those referring to the selected parameters defining the abovementioned qualities. These reports are used to provide structured information for decision-making in planning and for monitoring purposes. The Atlas is a single report on survey of qualities of the territory, exposing dominating features for decision making on urban planning and management of built structures. While both reports generated from the database, and the Atlas may also be used as the separate sources of information and administrative tools: the database in monitoring and administrative decisions on permits, and the Atlas for planning purposes. However, the most efficient use is combined, as it allows supporting the long-term overall analysis of the atlas by actual information on the elements from the database.

Consequently, to make these two tools useful for the ultimate purpose – ensuring the continuity of qualities of the architectural environment for retaining its identity and enhancing the quality of life in it, access to their functionality must be provided to

the public authorities on the necessary levels. As the Atlas is providing the insight into the cohesion of qualities of the territory, it is most important to provide access to it for those who take crucial long term or large scale or high impact decisions on the planning and governance of the territory primarily in regard of built environment and assure that it is useful for both for their decision making and for motivation of requests of decisions they address to the higher level of management. The reports from the database for purpose of prioritization and strategic planning serve the same purpose and must therefore be seen in cohesion with the atlas.

After inception, the main factor of lasting use of the database is frequent update of data. In 2-3 years, upgrade of System must be considered, including remote data administration, distributed database technology, and Internet access, and elaboration of user customisable reporting interfaces. That will require migration to new generation of system, integrating Atlas and database into a common reference system, with added tracking of data history and referencing to GIS maps. Very important also is possible further migration of the data from MS Access to a MS SQL Server, providing it with dedicated user environment (custom-designed data access interface) for remote data management over the public Internet. Such migration would resolve technological challenges, and provide scalability for any extension of the system in the foreseeable future. More importantly, it would also pave a solid technological foundation for extending the functionality of the system, including publication of real time reports on the World Wide Web, addition of modules for e-commerce, and integration with other public databases, Internet portals and GIS systems.

In the future the database's information escalating is possible (an addition by the cartographical information etc.). Its complex network use in interrelation with existing and developed now databases of other administrative structures seems very fruitful. In the same time, ad exemplum of some Danish and Estonian municipalities, a development of the "model" offers on modernization of basic types of buildings, an edition of booklets on most prominent aspects of renovation (roof reparation, restoration of windows and doors, wall painting, etc.), a creation of special consulting bureaus, where inhabitants can receive advices of the experts-restorers are expedient. The public education on the environmental problematic and heritage values can ensure common understanding and support of efforts undertaken by the professionals for conservation of historical environment.

Of course, we must remember that the demand for the information that can be provided by the Atlas and database does not automatically exist. This demand must be created, and this can be done only if the decision makers in planning and management of the territory become aware of the possibilities that these tools provide in their own context of needs as they see them. InterSAVE can add advanced information on integrated architectural and territorial qualities with selective reporting on territories and types of buildings by multiple parameters and features, including costs estimates for various works of rehabilitation. This would make the combined systems a tool not just for administration of buildings and territories and service for investors, but also a useful tool for providing information for strategic planning and monitoring. Last but not least, integration of these two methodologies of information on the Internet would provide a tool for increasing public participation, by adding interfaces for interactive comments and reflections of the citizens on the Internet.

Conclusions

The project should give to different groups (authorities, private businessmen, locals, tourists, etc) new possibilities for complex awareness on environmental, historical and cultural values of locality and help to come nearer to achievement of the SAVE system's basic initial purpose – "an identification of local buildings in correlation to everyday life in the community, thereby strengthening local identity in the area" (Algreen-Ussing [8]).

An open access to the information on urban environment for everybody, who interested by the given settlement, on the one hand, and a creation of a universal database on building and the territories, on the other hand, will mean, in our opinion, qualitative break-through in the Russian system of the town-planning activity's organization, which may lead to transparent, open to citizen participation and heritage conscious administration of sustainable development of historic cities.

It is represented as a whole, that the SAVE system is in a trend of the most urgent tendencies of heritage conservation, and its implementation will be important step to the so-called "informed conservation" (Clark [9]).

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FUNDACIÓ ROSES HISTÒRIA I NATURA
GESTIÓN DEL PATRIMONIO INTEGRAL

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Soñar despierto, inventar fantasías e incluso alimentar ilusiones, son facultades que se suelen vincular con la infancia y con los niños. Etapas a las que es aconsejable regresar por los beneficios que ello significa, saludable ejercicio al alcance de todos ya que en ningún lugar se especifica qué edad hay que tener para sentirse como niños.
Nosotros, los ciudadanos de Roses, pese a tener ya a nuestras espaldas más de tres mil años de vida, practicamos esas facultades con suma complacencia y cada vez que nos desplazamos hacia Rhodes nos invade la sensación de viajar hacia nuestra infancia. En esta ocasión el poder estar aquí en Rhodes participando en el 7ª Coloquio Internacional de la Organización de las Ciudades Patrimonio de la Humanidad, es motivo de doble satisfacción. Es por ello que agradecemos a la Organización, y muy especialmente a nuestros hermanos rodios, la invitación a poder asistir y participar en este maravilloso congreso.
Acudimos como niños muy aplicados, con grandes de deseos de aprender, cargados de respeto y de admiración hacia sus mayores, es decir, hacia todos los miembros de las diferentes delegaciones de las Ciudades Patrimonio de la Humanidad. Su presencia, su trabajo nos llenan de ilusión, de fe, y tanto es así que les podemos asegurar que ya sabemos, sin duda alguna, que queremos ser cuando seamos mayores. Nosotros, al igual que nuestros hermanos rodios, queremos ser como ustedes, queremos ser miembros de la OCP, queremos, en definitiva, ser Patrimonio de la Humanidad.
Ese deseo es el que nos invita a soñar, y nos permite tener fe ciega en el futuro. Venimos a Rhodes a escuchar, a trabajar con convicción, a tomar buena nota de todo cuanto aquí se haga y se diga para luego poderlo contar en casa. Allí en Roses vamos a estudiar y a debatir todas las sugerencias, las observaciones y los consejos que ustedes puedan brindarnos sobre nuestra intervención. Vamos pues exponer algunas ideas, algunos proyectos que tenemos previstos basados en un hilo conductor

"El patrimonio no es sólo una herencia de nuestros padres
sino también un préstamo que nos hacen nuestros hijos".

ROSES Y EL PATRIMONIO INTEGRAL.

Aunque no tengamos ni fotos ni videos que lo certifiquen, los primeros turistas llegados a Roses, los rodios, seguro que se quedaron maravillados por el entorno siendo esa fascinación la causa que propició su definitivo asentamiento en la zona. Una bahía con estremecedoras puestas de sol, envuelta por las montañas de los Pirineos que como Afrodita nacen del Mediterráneo, con unas importantes posibilidades de garantizar la supervivencia así como el intercambio comercial.

La colonización griega empezó a dar forma a una ciudad por la que habrían de pasar romanos, visigodos, trovadores, juglares, monjes, duques, condes, generales, reyes..... En cada época el entorno y las formas de vivir de los seres humanos fueron construyendo un riquísimo patrimonio cultural erigido gracias a la triple interacción entre seres humanos, entorno y edificios. Este fascinante triángulo, entre arquitectura, naturaleza y antropología es el creador de nuestro patrimonio, sin que sea posible aislar a ninguno de los tres elementos que inciden en ello. Evidentemente debemos reconocer que esta particularidad no es exclusiva de Roses, se produce en todos los rincones del planeta de forma tal que nos permite poder disfrutar de una magnífica diversidad no sólo de estilos arquitectónicos sino también de diferentes formas de vivir en entornos absolutamente diferenciados. En esa diversidad está la gran riqueza de la humanidad.
La simbiosis de esos tres elementos, que nosotros calificamos como Patrimonio Integral, convierten un simple territorio en fenomenal tierra de acogida, y esta característica enriquece si cabe aún más todo este fascinante proceso de interacciones.
Nosotros en Roses hace ya más de 3000 años que nos dedicamos a ello y esta dilatada experiencia nos hace sentir orgullosos. El pasado siglo XX significó la certificación de nuestra capacidad receptiva, asimilativa e integradora, reconociendo, sin rubor alguno, que uno de los factores que más contribuyo a esa consolidación fue el definitivo establecimiento de la sociedad del bienestar en general.

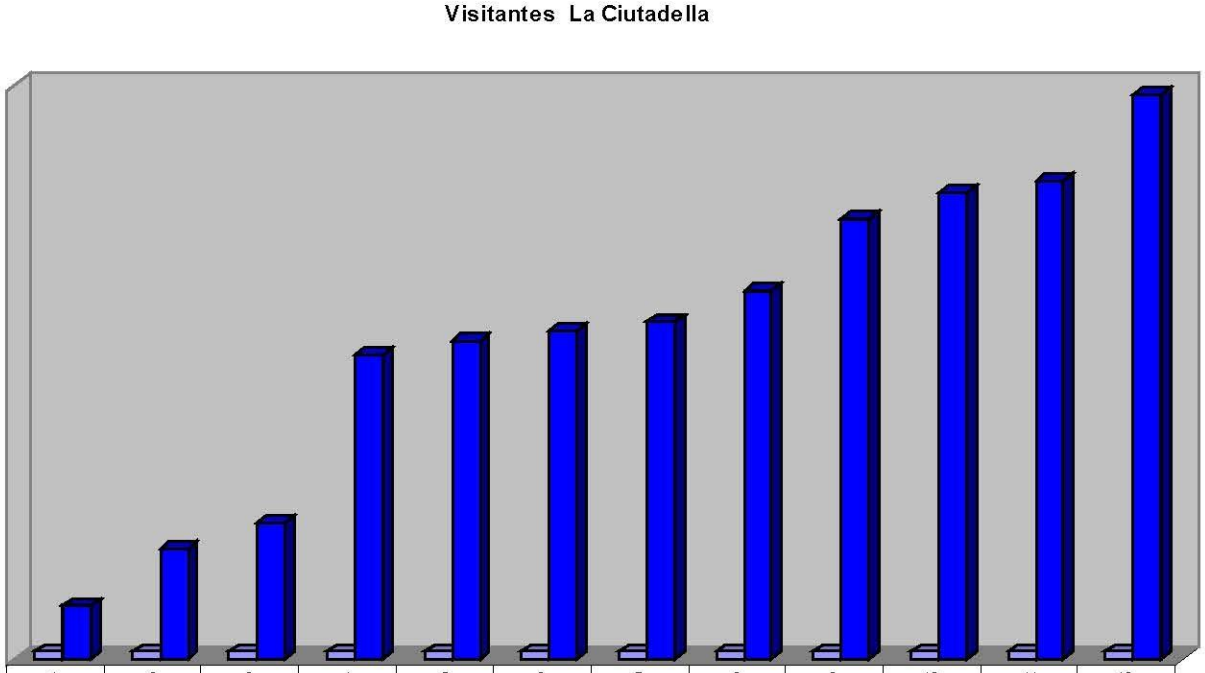
Ese sistema ofrece al ser humano la posibilidad de mejorar su calidad de vida mediante el tiempo libre y el tiempo de ocio. Según manifiesta la OMT (Organización mundial del turismo) ese flujo de gentes, 200 millones en el 2000, se verá triplicado en las dos primeras décadas del nuevo siglo y milenio. Los 2100 millones de turistas previstos para el 2020 ya no tendrán suficiente con una oferta de sol y playa sino que van a ser mucho más exigentes a la hora de programar sus vacaciones. Existe pues una importante demanda de valores añadidos. El patrimonio cultural, el reencuentro con la naturaleza, el "edutainment" se perfilan ya como vitales elementos que van a transformar no sólo los flujos turísticos sino que también, y más importante aún, los seres humanos implicados en ello. Es obvio pues que la cultura va a tener un importante papel en este siglo XXI, y ello debería de satisfacer a todos los segmentos implicados en la gestión de ese fascinante mundo ya que significará que de una vez por todas se dejará de considerar a la cultura como al patito feo de la aventura humana.

UNA FUNDACIÓN PARA EL PATRIMONIO INTEGRAL DE ROSES

Las rocambolescas paradojas de la historia han propiciado que Roses, conocido destino turístico de la Costa Brava, pueda convertirse en importante referente y en centro difusor de lo que hoy en día se conoce como Turismo Cultural.

Las primeras olas de turismo de los años cincuenta a punto estuvieron de hacer desaparecer el recinto de La Ciutadella. Fiebres y delirios especulativos urbanísticos querían convertir un espacio patrimonial en zona residencial. Afortunadamente la población se opuso y logro que en 1961 se declarara Conjunto Histórico Artístico Nacional. Sin embargo fueron necesarias dos décadas más para que el pueblo obtuviera aquello que por derecho le pertenecía. En diciembre de 1982 y previo pago de 50 millones Roses recuperaba su patrimonio histórico arqueológico, Se procedió a las restauraciones y rehabilitaciones mínimas para poder abrir sus puertas en 1991.

Des de entonces más de 1.000.000 personas, rosenses y turistas, han visitado el recinto y ha sido precisamente este interés uno de los factores que ha aconsejado crear una Fundación para que gestione el patrimonio integral de Roses



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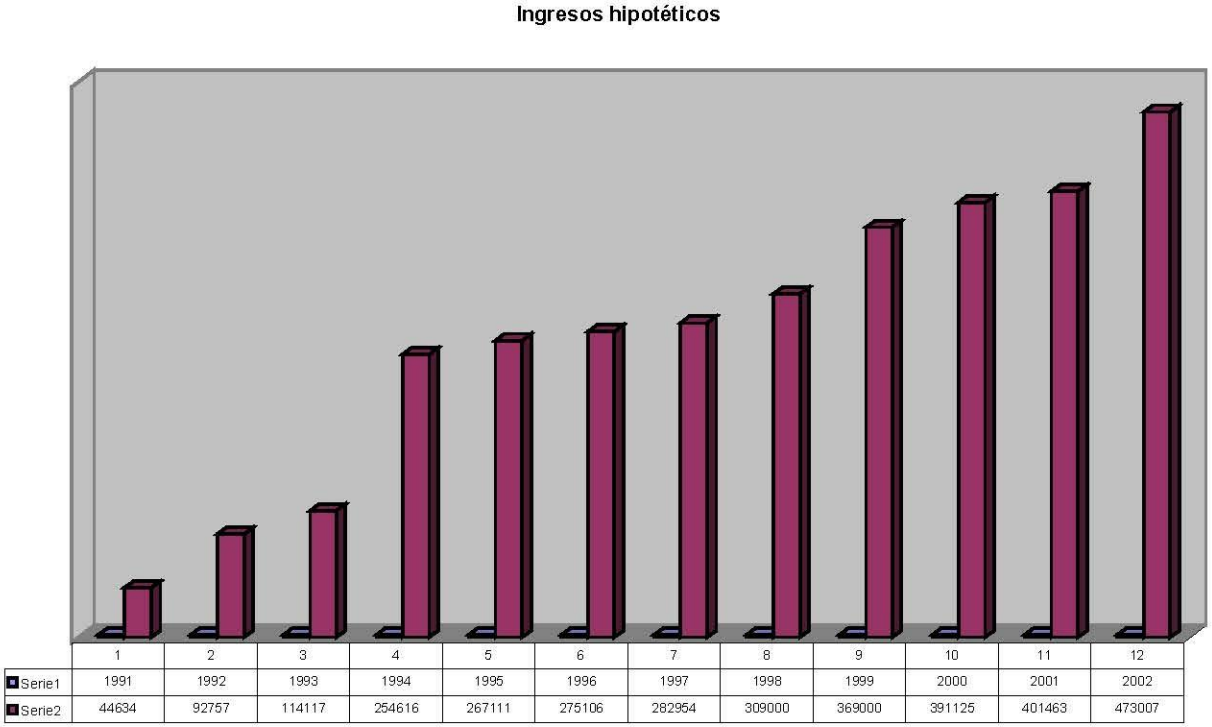

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La intersección de los cuadros estadísticos ofrece cifras sumamente interesantes. Suponiendo que cada uno de los visitantes, 1.091.640, hubiese pagado 3 euros en concepto de entrada, en una década La Ciutadella hubiese recaudado 3.274.690. Evidentemente es esa una quimera ya que de haber sido la entrada de pago probablemente la cifra no hubiese sido la misma y no obstante estudiarlo nos permite tener a mano importantes datos con los cuales se puede trabajar y extraer conclusiones.
La más importante de ellas es que el recinto podría ser autosuficiente, dejando entrever que la aplicación de nuevos y modernos criterios de gestión cultural podrían aportar suficientes recursos económicos que a subes permitiesen poder soñar con rehabilitaciones y recuperaciones. Obviamente todo ese flujo económico ha de ser sin afán lucrativo y reinvertido en el propio recinto.
En segundo lugar el volumen de ingreso hipotético sí que significa el 50% del capital aportado para lograr que el recinto estuviese en condiciones mínimas de ser visitado. Más de 6.000.000 de euros se han invertido durante esta década consiguiendo con ello que La Ciutadella de Roses se haya convertido en un magnífico recinto sobre el que es aconsejable, vital, audaz y notablemente inteligente seguir apostando e invirtiendo.
Afortunadamente así lo han entendido las diferentes instituciones nacionales y estatales que no han dudado en contribuir, mediante un plan quinquenal, con 3 millones de euros a la recuperación y a la difusión de La Ciutadella de Roses.
Para lograr todos esos objetivos se creó en mayo del 2002 la Fundación Roses Historia y Naturaleza, que como su nombre bien indica se hará cargo de la gestión de nuestro patrimonio integral. Cómo y con qué objetivos es lo que les vamos a exponer de forma muy sucinta y abreviada.

UN RECINTO: TRES PARQUES

La Fundación tendrá a su cargo cinco lugares del municipio en los cuales se ha producir una perfecta armonía entre Arquitectura, Naturaleza y Seres Humanos. Un sistema integral que la marca creada ya quiere indicar. Un logotipo común, y cada uno con sus propias particularidades y características.
El Castillo de la Trinidad albergará un Centro de Interpretación de la presencia militar y los difíciles procesos que vivió y sufrió la población hasta llegar al estado actual de paz y bienestar.

A su falda el Faro de Roses llevará a cabo un proyecto en el cual la formación de nuevas generaciones interesadas en el mundo de la pesca será el objetivo prioritario poniendo a disposición del público un museo sobre la cultura de la pesca, las costumbres marineras y sus artesanías tradicionales.
La zona megalítica permite contemplar una rica muestra de vestigios de los primeros pobladores de la zona, algunos de ellos de la etapa del Neolítico. Tres grandes dólmenes convierten la zona en parque de especial singularidad. El dolmen de la Creu de'n Cobertella del 2700 adC es el más grande de Catalunya.
Punta Falconera ubicada en el Parque Natural del Cap de Creus es la gran ilusión de la Fundación en tanto que allí deben de crearse las infraestructuras necesarias para acoger y formar jóvenes, residentes en albergues o colonias. La escuelas formativas han de abastecer de guías y comunicadores al resto de los lugares que gestione la Fundación, poniendo especial énfasis en el centro de interpretación del parque natural en ambas de sus dimensiones: terrestre y marítimo.
La Ciutadella de Roses es en estos momentos el diamante que hay que seguir puliendo, lo cual concentra buena parte de todas nuestras energías.
La Ley de Museos de 1990 aprobada por la Generalitat de Catalunya permitió la incorporación de La Ciutadella de Roses a la red museística. Ello permite que La Ciutadella sea a su vez: Subsede del Museo Nacional de Historia, subsede del Museo Nacional de Arqueología y Subsede del Museo Nacional de Arqueología subacuática. Estas cruciales vinculaciones convierten el recinto en Parque Histórico y Parque Arqueológico con sus correspondientes programas de eventos, investigaciones, seminarios, excavaciones, recuperaciones y rehabilitaciones.
Para poder adecuar todas la estrategias y nuevas gestiones hacia los objetivos que se pretendía se tuvo que revisar y redactar un nuevo plan director para el recinto. Mediante ese instrumento y paulatinamente durante un período no inferior a diez años se van incorporando los planteamientos establecidos. Visitas guiadas para diferentes sectores escolares, tercera edad, turistas. Iluminación de todo el perímetro de la muralla. Rehabilitación de la ciudad medieval. Recuperación del baluarte de Santa Maria etc etc
El primer paso será la inauguración del Museo con su correspondiente audiovisual, y la zona de servicios Evidentemente ello representa poder disponer de medios excelentes para explicar la compleja larga y dilatada historia del recinto. Como complemento museístico y como elemento innovador en la difusión de la arqueología y de la historia La Ciutadella de Roses ofrece al visitante la posibilidad de disfrutar con el Parque Antropológico.

EL PARQUE ANTROPOLÓGICO

Probablemente una de las apuestas más ambiciosas, más complejas, y también de mayor riesgo que tiene en sus manos la Fundación. La parte argumental, los cimientos, el *corpus doctus* se halla precisamente en los planteamientos de la UNESCO. A raíz del encuentro de 1970 en Venecia se empezaron a pincelar nuevos criterios que quedarían definitivamente establecidos en Méjico en el año 1982. La definición de cultura abría de par en par las puertas hacia nuevas visiones y por tanto criterios de gestión. "..engloba, además de las artes y las letras, los modos de vida, los derechos fundamentales del ser humano, los sistemas de valores, las tradiciones y las creencias". En la práctica la definición se convierte en la posibilidad de que se dejen atrás complejos, y de que se valoren recursos que se tienen al alcance de la mano, considerados muy a menudo banalidades. Con ello la cultura se acerca al ciudadano de a pie, que cree vivir apartado, alejado de la cultura. Esa puesta en escena de valores, esa posibilidad de hacerle ver que efectivamente el también forma parte de la cultura, contiene implícita la consiguiente carga de poder aumentar su orgullo y su autoestima, a la vez que nos ofrece la capacidad de tener disponibles efectivos y eficaces métodos para lograr el sueño dorado de la cultura en general y de la gestión cultural en particular: la implicación, la motivación y el interés del ser humano hacia temas culturales, lo cual le beneficia en su propio desarrollo como persona y por tanto beneficia también el colectivo y la comunidad en que vive.
De ahí que pensemos que nuestro proyecto de Parque Antropológico tiene ya de entrada alto riesgo, ya que si no somos capaces de "motivar" a los ciudadanos de Roses, buena parte de los otros planteamientos van a quedarse fofos, sin sal, sin el correspondiente picante que los hace deliciosos, atractivos o seductores.

El Parque Antropológico se presenta como un complemento museístico. Ello es así ya que nosotros contemplamos el Patrimonio desde una perspectiva integral, es decir al patrimonio de naturaleza y al patrimonio arquitectónico hay que añadir el patrimonio de los seres humanos, sus creencias, sus tradiciones sus formas de bailar de comer de divertirse...en definitiva de vivir. Obviamente somos muy conscientes que precisamente son esos los valores añadidos que el turismo cultural exige y precisa, lo cual nos estimula aún más a insistir sobre nuestros ciudadanos en la necesidad e importancia de tomarse muy en serio la cuestión.

La Ciutadella quiere dar a conocer la Cultura Popular tanto a los turistas como a los propios habitantes de Roses. Una gestión integral ha de poder permitir que unos y otros se beneficien de las propuestas que se presentan. Estas a su vez van a erigirse bajo un riguroso criterio de gestión: todos y cada uno de los eventos precisan la colaboración de voluntariado del pueblo pero a su vez exigen la implicación y la complicidad de las empresas de la zona a las que se les brinda la posibilidad de poder participar en esa atractiva nueva forma de mecenazgo que comienza a conocerse como Marketing Social.

El mecenazgo es desde tiempo inmemorial práctica habitual en la cultura mediterránea, se llame ahora patrocinio, colaboración o joinventure-partnershipmen. La cuestión de fondo sigue siendo la misma, la Administración no puede sufragar sola los altos costos que cualquier evento cultural hoy en día representa ya que además del hecho en sí a ello se añade un largo etcétera de costos por difusión, publicidad, posicionamiento de marca... La Ciutadella de Roses tiene previsto un mosaico de mil y un proyectos que sólo verán la luz si existe realmente esa complicidad entre sector privado-fundación y sector institucional, ya que guste o no todos tenemos los mismos clientes si bien que con diferentes objetivos. A su vez esos clientes, especialmente informados, tienen que saber quienes son los que practican el noble arte de devolver parte de los beneficios hacia el sector que los origina, lo cual contribuye a mantener el grado de fidelidad de los clientes hacia las marcas patrocinadores o de mecenazgo. Incluso aquí, en el panorama económico, en la Fundación pondremos en práctica una "visión integral" de la gestión cultural, puesto que no se nos escapa, ni lo más mínimo, que los actos culturales suelen tener un impacto periférico notable sobre el entorno en el que se desarrollan. Justo pues que se pretenda recuperar mediante pactos, negociaciones y consensos, buena parte de los ingresos que ayuda a crear, poniendo a disposición de "los mecenas" una excelente plataforma de promoción social.

Como se pueden imaginar, en este capítulo hay que ponerle riendas a la ilusión a la fantasía y al sueño no fuese que de tanto volar perdiéramos de vista la tierra que hay que pisar. La Fundación tiene previsto poner en marcha el Parque Antropológico de la mano de un criterio sencillo, fácil e inteligible. Con la llegada de cada estación, invierno, primavera, verano y otoño, se acogerá una semana de actos erigidos sobre tres conceptos claves y básicos: muestra gastronómica, música y mercado temático.

En estos momentos tenemos ya muy avanzado el verano del 2004 con el proyecto Fuego en la Bahía. Un tema de larga tradición popular en Cataluña que vamos a sincronizar cinco diferentes municipios. A partir de la noche de San Juan en La Ciutadella habrá un mercado relacionado con el mundo de la magia y el esoterismo, combinado todo ello con recitales de música étnica y muestra gastronómica típica de Roses como por ejemplo el suquet una receta a la cual se va invitar a todas las mujeres, abuelas y pescadores para que cada uno componga su particular versión.

Habrá que ver si somos capaces de estimular a las jóvenes generaciones a trabajar en el proyecto "Historia Viva", una muestra, una escenificación de los 3000 años de historia del recinto, inspirado en el "savoir faire" de los son et lumieres franceses o de los living history ingleses, si bien estos últimos no nos són en nada extraños ya que en febrero la población de Roses está acostumbrada a celebrar sus singulares fiestas del Carnaval. La experiencia que podamos acumular sobre este particular ha de poder servir para complementar las visitas escolares así como para ofrecer especiales atractivos a las visitas nocturnas del recinto. Todo ello, evidentemente, perfectamente sincronizado con una potente capacidad de servicios dentro de los cuales el merchandising de productos va a tener significativa relevancia, y ello sin ningún tipo de rubor ya que entendemos que la gestión y la difusión cultural no tiene porqué cerrar los ojos ante la gestión comercial o los criterios empresariales, de hecho la diferencia entre gestión cultural y gestión empresarial se halla en el destino que se le da a los beneficios obtenidos, si en un sector se dirige hacia el incremento de riqueza y poder adquisitivo en nuestro sector el beneficio revierte en la difusión, el mantenimiento y la conservación del patrimonio.

PATRIMONIO Y TURISMO CULTURAL

Como pueden apreciar nuestra capacidad de soñar es prácticamente inagotable y ya que se nos ofrece la oportunidad de presentar nuestros sueños aquí en Grecia, en Rhodes, en nuestra propia cuna, permítannos poder exponer las directrices tan sólo de un sueño maravilloso.

Desde Roses vamos a proponer la creación de una red que contemple toda la riqueza y valores que ofrece el legado griego en el mediterráneo. Las razones son más que obvias y no vamos a insistir en ello y sin embargo sí que queremos subrayar la existencia de un notable recurso que por tenerlo quizás demasiado cerca los "mediterráneos" no atinamos a saber explotar o trabajar de forma integral, a lo mejor porque no le damos la importancia que se merece, pero que otros europeos sí que admiran, veneran y adoran. Sí los mediterráneos diésemos a los "europeos nórdicos" la posibilidad de vivir intensamente el legado griego, in situ, live, on line, y todo ello envuelto por esos magníficos entornos que poseemos, ¿no creen que ello redundaría en beneficio mutuo e incluso contribuiría a intensificar aquel otro sueño que tenemos en común sobre la creación de una Europa sólida, firme, convencida de si misma ?

Nosotros creemos firmemente en ello y por esa razón vamos potenciaremos la difusión de nuestro centro helenístico como sistema integral de difusión, "edutainment" y a la vez captación de clientes. La armonía que perseguimos entre Historia-Arqueología y Antropología ha de consolidarse mediante el proyecto Sófocles, paso previo a la creación de la red Helios.

Tomando como hilo conductor el teatro pretendemos establecer un circuito rotativo de representaciones teatrales, de comedias, tanto en sus versiones originales como en adaptaciones o revisiones. Por ello desde aquí invitamos a las ciudades interesadas a participar en este sueño dorado que tendría como escenario aquellos rincones considerados preferenciales por los usuarios de Turismo Cultural, es decir Grecia, Italia, España y Francia. En todos ellos se pueden hallar ciudades hermanadas con ciudades griegas, en España hay nueve, y ese conjunto puede trabajar unido en pos de la consolidación de la célebre propuesta que lanzó Goethe con su "Visita a Italia" y que bien puede considerarse el hilo conductor del Grand Tour europeo. Un tema que nuestras capacidades de poder acoger de forma magnífica los visitantes interesados en ese sector emergente del Turismo, nos aconsejan no perderlo de vista, de hecho tenemos a nuestra disposición todos los ingredientes y tan sólo nos falta cooperar para no perder ese hilo conductor surgido de un pasado común y que nos puede proyectar hacia un futuro brillante preñado de ilusiones y sueños.

Ya para terminar identificar, muy brevemente, cual es nuestra máxima aspiración y por tanto el sueño que más nos seduce. Una vez más nuestra intrínseca vinculación con Rodees nos inspira positivamente y nos estimula a emular a nuestros hermanos rodios. Compartimos orígenes y hoy en día proyectos, y tenemos muchos rasgos en común. El turismo se ha convertido en nuestra principal fuente de ingresos, un recurso que el futuro nos aconseja trabajar conjuntamente dadas nuestras propias particularidades. Nuestro Patrimonio cultural nos posiciona de forma excelente para acoger todo tipo de nuevos retos, el del Turismo Cultural es sin lugar a dudas un magnifico banco de pruebas para poder examinar nuestras capacidades. Por ese camino vamos a andar juntos cooperando y estableciendo los más eficaces sistemas y métodos para mejorar nuestras ofertas, lo cual ha de saber proyectarse en esa hipotética red mencionada anteriormente, cuyo estandarte bien que pudiera ser aquella magnífica frase sobre la cual nosotros hemos erigido buena parte de nuestra filosofía y nuestra gestión

El patrimonio no es sólo una herencia de nuestros padres
sino también un préstamo de nuestros hijos

Es más que evidente que el patrimonio que hemos recibido en Roses es motivo de satisfacción y orgullo y por ello queremos mantenerlo, cuidarlo y difundirlo para que nuevas generaciones lo sigan disfrutando. Ojalá que ellos lo puedan vivir como Patrimonio de la Humanidad reconocido así por la UNESCO, nosotros vamos a hacer todo lo posible para que ese sueño sea realidad.

PUBLIC PARTICIPATION IN HERITAGE PROTECTION THROUGH PLANNING PROCESS IN KOTOR MUNICIPALITY

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Abstract

About one third of the Republic of Montenegro's cultural and historic monuments are located in the municipality of Kotor. The major part of the municipality is the Boka Kotorska Bay with the Old Town Kotor, which are protected as the World Natural and Cultural Heritage.
The Municipality Spatial Plan treats the cultural and natural heritage as a main resource for the future development. Due to the vast historic heritage, traditional customs and festivities, Kotor should primarily develop cultural tourism, what was not the case in the previous years. It is also proposed to balance the needs of visitors and the local population. During preparation of Local Environmental Action Plan it is strongly stressed to integrate cultural heritage protection with environmental management.
All assigned plans and projects should be prepared in co-operation with the local and central governments, NGOs and with the involvement of international and local heritage protection organizations. On the other hand, it is also needed to include general public in decision making through preparation of various campaigns. Therefore, the planned development should allow the higher quality of life along with the preservation of the authenticity in historic Old Town and the whole Kotor municipality .

Some facts on Kotor

Kotor is a medieval fortified seafaring town, located at the end of Boka Kotorska, a 33 kilometer-long gulf in Montenegro that has no match anywhere else in the Mediterranean basin. Before the 1979 earthquake, Kotor was one of the best-preserved fortified towns on the Adriatic coast, with numerous artistic and architectural monuments dating from 9th century onwards. From ancient times, this very old crossroads between the East and West and permeation of civilization and the culture, has represented the mix of styles and influences, creating the unique symbiosis of forms and elements of great artistic value and harmony.

Over 600 objects of the sacral, profane and fortification architecture from Neolithic age till nowadays are protected as cultural monuments that represent more than one-third of entire historical and cultural heritage of the Republic of Montenegro.

In devastating earthquake on April 15, 1979, 69 cultural monuments were destroyed and other seriously damaged, including some 110.000 endangered moveable exhibits.

In order to speed up the restoration after earthquake catastrophe, Kotor and the whole Kotor Bay, surrounded by the mountains Lovcen and Orjen, were put on the World Nature and Cultural Heritage List and on the special List of World Heritage in Danger, in the same 1979 year. 24 years after Kotor was removed from List of Heritage in Danger.

The territory of Kotor municipality consists of three macro zones with different characteristics: Kotor Bay, mountain hinterland and Grbalj Valley expanded towards the open sea.
The whole Bay, surrounded by the mountains Lovcen and Orjen, the sea, the old town Kotor and all historical and architectural heritage are under the protection of UNESCO.
The second, high mountain zone is part of the future National park Orjen, with beautiful configuration and nature, rarely habited.
Third zone is primary agricultural and working area, occupied only near traffic corridors, and with plenty of free space towards the open sea.

The main potentials of Kotor municipality are: excellent geo-strategic location; good traffic connections (highways, airport, harbor); unique cultural and historical heritage; dynamic landscape, sea and environment; biodiversity of ground and sea flora and fauna; both Mediterranean and continental climate in the same small region; oases of high quality agricultural land; old settlements with great ambient values.
This treasure of differences, concentrated in the Kotor municipality is the potential and quality worth saving, balancing of the development and protection and improving through planning process.

Review of previous planning activities

After disastrous earthquake, that had destroyed over two thirds of all buildings, a very wide construction activity started, which aim was to eliminate the consequences of this natural catastrophe. At the first time, an accent was put on reconstruction of demolished buildings, and construction of new apartment houses and other facilities.

In the period from 1982 to 1987 the Spatial plan [1] was made for the whole territory of Kotor municipality, as well as the Master plan of town Kotor [2]. These strategic plans gave basic directives for further development of this part of coast including the town itself in the following years. The main key point of new development policy was using the advantages of the exceptional position and rich cultural heritage, which could be accomplished through development of tourism. The Urban plan of the old town Kotor [3] was finished and it established basic rules of reconstruction and building in the protected, but demolished urban center. After that, some urban plans for other settlements in the Kotor Bay were made, which recognized concrete problems and proposed some solutions for these old communities.

During 90's, along with the crisis in former Yugoslavia, it turned out that planned activities were not in accordance with the possibilities of the space and the needs of its users anymore, or more exactly they had become an obstacle for development.

Treatment of natural, cultural and architectural heritage wasn't strictly defined and controlled. Financials means and activities planned for this purpose were used for communal equipment and other priority works of remaking a normal life. It was also hard to control investments and realizations. A large number of worthy objects and areas were neglected and ruined although the institutions for natural and cultural heritage protection registered them. Some reconstructions were not successfully done so they have lost characteristics of the time they were created in; some buildings and areas were not used in an appropriate way. New illegal or inappropriate buildings (especially seasonal and holiday houses) were built near very nice and old settlements. Also, the quality of infrastructure and tourist facilities was on low level.

Because of all these Kotor municipality launched an initiative to review the major parts of strategic planning acts. In the period from 1992 to 1995 the Spatial Plan of Kotor Municipality [4] was conducted according to the social and economic changes in the country.

The main idea of the Plan was setting general development conditions and potentials of the old town and the surrounding territory. Next to the adequate treatment of the old town of Kotor, special attention is dedicated to each of twelve coastal settlements in order to preserve their authenticity, and the activities suggested should bring them back to their naval tradition. An active approach to the preserving and protection of numerous monuments (which with their new function and purpose could be saved from deterioration and ruin) has also been applied. Ideas were numerous. According to some initial proposals it was anticipated that the objects, which are still demolished or ruined, should be reconstructed and turned into small hotels and boarding houses. The idea was also to turn numerous palaces into museums or public spaces, which would be used for various cultural programs. Another idea was to found an educational centers, in which courses, summer schools or master classes would be organized referring to modern technologies, traditional crafts and artistic skills.
One way to decrease concentration from the fragile Kotor Bay is development in Grbalj Valley, area near the open sea. This zone is planned for line of tourist resorts, hotels and sport fields in abundance of Mediterranean vegetation. Planning development on these bases will improve economy in this area and make new profit to the municipality. That will bring new and recollect inhabitants to live and work in familiar surroundings.

According to the guidelines from the Spatial Plan of the Municipality, the Amendment and modification of the Master Plan of the town of Kotor was completed in 1998 [5]. With this plan, planners tried to meet new needs and tendencies in regional development. It was proceed from the idea to test the possibilities of realization of some projects, which appeared, in the meantime, as a new chance for development of this area. It turned out to be that this type of segment changes and additions to the current plans, although vary rare in our planners practice, gives a possibility for the changes during the process that don't disturb general development strategy of the municipality.

After that, during 2001. the Urban Plan of old town Kotor [6] was amended to fit the changes of current living and economic trends. Basements of some buildings were not fully activated due to the fixed planned usage, so it was necessary to reconsider the

adopted solutions. It was suggested to allow all the basements in the Old Town to be used for commercial purposes. The intention was to increase the quality of tourist offer. The amendments of the Urban Plan gave specific guidelines for design and decoration of shops, agencies, stores and especially for the cafés and restaurants providing the balance with historic surroundings. Limits were given for the open terraces (patios) that were popular in the past ten years in the Old Town. In order to allow the free movement of visitors, it was suggested to keep the open terraces away from main tourist corridors, key historic buildings and sites. Special attention was given to urban mobiliar (chairs, tables, benches, garbage cans, parasols,) and information signs for tourists. For the first time local residents were actively involved In the process of plan drawing giving the valuable input considering the problems of noise, size of patios and living environment.

Current planning activities

The preparing of new Spatial Plan of Kotor municipality started recently, and this plan should give special attention to tourism as a key economic activity in the next 20 years. This approach is also confirmed with the Master Plan for development of tourism in Montenegro [7], where the area of Boka Kotorska Bay and the town of Kotor are recognized as one of two main tourist regions at the Montenegrin coast.

Due to its specific characteristics, the municipality of Kotor and the town of Kotor should offer specific types of tourism that need to be different from typical hotel and beach tourism. Therefore, having the rich history, heritage and numerous traditional customs and festivities, the town of Kotor should primarily develop the cultural tourism with the overall presentation of its heritage. The numerous daily visitors request the information desks and parking space close enough to the Old Town which is not accessible by cars.

The new tourist attractions would be the activation of 4 km of city ramparts as well as the building of a cable car route to the top of San Giovanni hill above the Old Town.

Another potential advantage is the existing traditional docks that can be used for yachts and boat anchoring. By the development of different types of nautical tourism the town of Kotor can gain the higher expenditure, however the special attention needs to be given to the environmental limits. In the past Kotor was one of the important passenger ports, so in the future it should be expected that numerous tourists will come from the cruising ships. This means that the port of Kotor should be adapted to accept the great number of visitors.

The third advantage are the specific types of accommodation in the traditional mansions and captain's palaces that could be renovated into the small pansions and hotels. In this way the financial means of owners, private businessmen and seamen that have great income could be activated for the purpose of tourism.

Eco-tourism is the possibility to use the rich tradition of the surrounding settlements in Grbalj Valley and Vrmac Hill, through the revitalization and development of small eco

farms, where healthy food could be produced for all tourist capacity on the coast. Also the ethnic food and traditional organic farming could be used for tourisms as well.

Role of public participation in planning process in Montenegro

Current public participation in the planning process in Montenegro is on the low level. The reasons for this can be found in the actual planning system as well as the in the mentality of population.

According to the Planning Law (1996), a citizen could participate in public hearings of drafts of various planning documents and give remarks and suggestions, which would not necessarily be automatically accepted by the planning team.
Citizens have rare opportunity to be directly involved in decision making, they can only exercise this right through their delegates and representatives in local assembly and municipality.

During the last few years, several NGO's became involved in some urban civil actions concentrating on improving quality of life in urban areas, heritage and environmental protection; and very often, their actions were against the proposed projects and plans.

However the most of population is not interested in taking a part in such actions directly. They rather prefer to give criticism and suggestions. This is product of mentality, and also of fear to be confronted with local and central governments.
General impression is that neither the citizens, nor the local authorities don't see the advantages of more public participation in all parts of life.

Some proposals for increased involvement of citizen and NGO's in preparing, creating, adopting and implementation of planning documents could be taken from procedure of preparing Local Environmental Action Plan [8].
Citizens should be supplied with true information on common problems and future projects and proposals. This information should be prepared in a non-technical way for wider population and disseminate in form of brochures and handouts. Also the more public awareness and participation can be obtained through public and media campaigns, various workshops and special web sites. It is very important to allow the citizens to voice their opinions and give suggestions as well.

It is advantageous to use the power of public opinion through a direct participation of a citizen, in public consultations, discussions and round tables, where citizens and specialists could give their opinions and contra arguments. These "conflicts of opinions" can produced some better solutions and different proposals. It is very important to prepare such meetings in earlier planning phase then current public inquiries. However, these meetings should not be only citizen initiatives, rather it should be also be an attempt of local authorities for making partnership.

In the next few years in Montenegro and Kotor Municipality also, a wider campaign for preparing and adopting spatial and urban plans on several levels will be conducted. So, it would be very useful to schedule the preparing of public hearings and round tables

which would involve citizens still in creating planning goals and targets. These results with pool data could give more quality input for planners and specialists and public opinion on use and protection of urban and free areas.

Conclusion

Development in this fragile area on commercial bases brings up a danger of uncontrolled growth and pollution in the surrounding. Finding the balance in development will protect from those negative effects. The principal results should be: an active responsibility towards the heritage, new activities mainly tourism, that correspond with the time and environment, as well as the return to tradition and preservation of natural and cultural heritage.

All assigned plans and projects should be prepared in co-operation with the local and central governments, NGOs and with the involvement of international and local heritage protection organizations. On the other hand, it is also needed to include general public in decision making through preparation of various campaigns. Therefore, the planned development should allow the higher quality of life along with the preservation of the authenticity in historic Old Town and the whole Kotor municipality

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ΕΦΑΡΜΟΓΗ ΠΡΩΤΟΠΟΡΙΑΚΩΝ ΜΕΘΟΔΩΝ ΚΑΘΑΡΙΣΜΟΥ ΚΑΙ ΣΤΕΡΕΩΣΗΣ ΠΕΤΡΑΣ ΣΤΑ ΠΛΑΙΣΙΑ ΤΟΥ ΠΡΟΓΡΑΜΜΑΤΟΣ BIOBRUSH

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Περίληψη

Το Φεβρουάριο του έτους 2002, ξεκίνησε, με ευρωπαϊκή κοινοτική χρηματοδότηση, το ερευνητικό πρόγραμμα *BIOBRUSH*, με συμμετέχοντα φορέα από την Ελλάδα το Τμήμα Μηχανικών Μεταλλείων, Μεταλλουργών και Τεχνολογίας Υλικών του Ε.Μ.Π. και επιστ. Υπεύθυνο, για το πρόγραμμα στην Ελλάδα, τον καθ. Α. Βγενόπουλο.

Σκοπός του προγράμματος είναι να αντιμετωπίσει με μία πρωτοποριακή τεχνική τις συνέπειες της διάβρωσης των λίθων των μνημείων της πολιτιστικής κληρονομιάς της Ευρώπης εξ αιτείας των διάφορων τύπων κρουστών. Η πρωτοποριακή αυτή τεχνική που είναι καθαρισμός και στερέωση της πέτρας με χρήση κατάλληλων μικροοργανισμών έχει σκοπό να αντιμετωπίσει τα αισθητικά και συντηρησιακά προβλήματα που έχουν δημιουργηθεί πάνω σε πέτρινες επιφάνειες μνημείων κάτω από τις διαφορετικές περιβαλλοντικές συνθήκες που επικρατούν στη Βόρεια και Νότια Ευρώπη.

Στα πλαίσια αυτού του προγράμματος αυτού έχουν απομονωθεί συγκεκριμμένα βακτηρίδια, κάποια από τα οποία έχουν την δυνατότητα να αφομοιώνουν τα νιτρικά και θειικά άλατα των κρουστών και κάποια άλλα να παράγουν ασβεστίτη που δρα στερεωτικά ως προιόν του μεταβολισμού τους. Έτσι χρησιμοποιώντας όλες τις προδιαγραφές ασφαλείας κάποιοι τέτοιοι μικροοργανιμοί χρησιμοποιούνται πειραματικά τόσο στο εργαστήριο όσο και in situ, προκειμένου να διαπιστωθεί πλήρως η δράση τους και τα αποτελέσματα αυτής στην επιφάνεια της πέτρας .Όλες οι αλλαγές που προκύπτουν στο πέτρινο υλικό καταγράφονται λεπτομερώς χρησιμοποιώντας τις πιό σύγχρονες γεωχημικές μεθόδους.

Το βασικό πλεονέκτημα της τεχνικής που θα προκύψει είναι α) η χρήση μιάς απόλυτα ήπιας μεθόδου καθαρισμού (σε σύγκριση με τις παραδοσιακές μηχανικές και χημικές μεθόδους) που σέβεται τις λεπτομέρειες του μνημείου και β) η αποφυγή χρήσης επικίνδυνων χημικών ουσιών που επιβαρύνουν το περιβάλλον και το χρήστη και που χρησιμοποιούνται ευρύτατα στίς συμβατικές μεθόδους συντήρησης.

Οι προοπτικές του προγράμματος είναι μεγάλες αφού –εφόσον έχει επιτυχή έκβαση- θα δημιουργήσει ένα αποτελεσματικό εργαλείο στα χέρια των Ελλήνων και ξένων συντηρητών που μπορεί να εφαρμοσθεί ευρύτατα σε μνημειακούς χώρους. Πρέπει εδώ να τονίσουμε ότι στους σκοπούς του προγράμματος εντάσεται και η εκπαίδευση των συντηρητών σε αυτές τις πρωτοποριακές μεθόδους συντήρησης Εκτός από το Ε.Μ.Π., στο *BIOBRUSH* συμμετέχουν , από πλευράς Ευρωπαικής Ένωσης, εκπαιδευτικοί και ερευνητικοί φορείς από Βρετανία (University of Portsmouth), Γερμανία (Stiftung Institut für Werkstofftechnik) και Ιταλία (Università

degli Studi di Milano, Syremont S.p.A.) ,και από πλευράς Ευρωπαϊκών χωρών εκτός Ε.Ε. από την Λετονία (Riga Technical University)

Στα πλαίσια του προγράμματος έχει συμπεριληφθεί και η μελέτη αποκατάστασης μνημείων της Ύδρας. Ο Δήμος Ύδρας, με δεδομένο το ενδιαφέρον του για τα θέματα της πολιτιστικής κληρονομιάς, βοηθάει έμπρακτα το ερευνητικό πρόγραμμα BIOBRUSH, παρέχοντας κάθε δυνατή διευκόλυνση για την εκτέλεσή του.

Εισαγωγή

Οι πάσης φύσεως κρούστες που δημιουργούνται πάνω στην επιφάνεια των μνημείων λόγω φυσικών επικαθήσεων και χημικών και φυσικοχημικών δράσεων των πάσης φύσεως ρύπων με το υπόστρωμα των δομικών υλικών,(Moropoulou et al**Erreur ! Signet non défini.Erreur ! Signet non défini.Erreur ! Signet non défini.** [8]) αποτελούν ένα σημαντικό πρόβλημα στην συντήρηση αποκατάσταση των μνημείων. Ο λόγος είναι ότι αυτές αποτελούν τόσο παράγοντα φθοράς όσο και παράγοντα αισθητικής ρύπανσης.Ο παράγων φθοράς εξηγείται από το γεγονός ότι πολλές επικαθίσεις λόγω του διαφορετικού συντελεστή θερμικής διαστολής του υλικού τους, καθώς και από διεργασίες κρυστάλωσης, ανακρυστάλωσης που εκδηλώνονται,ασκούν μηχανικές τάσεις στην επιφάνεια του πέτρινου υλικού του μνημείου που έχουν επικαθίσει . Οι μηχανικές αυτές τάσεις έχουν σαν αποτέλεσμα την επιφανειακή αποσάθρωση του πέτρινου υλικού του μνημείου. Ώσον αφορά τον παράγοντα της αισθητικής ρύπανσης εύκολα αντιλαμβανόμαστε ότι από τις επικαθίσεις αυτές ,πολλές φορές, δημιουργούνται ανεξίτηλες χρωματικές αλλοιώσεις στην επιφάνεια της πέτρας των μνημείων.

Στην προσπάθεια αντιμετώπισης αυτού του προβλήματος οι επιστήμονες που ασχολούνται με την συντήρηση αποκατάσταση των μνημείων επινόησαν διάφορες μεθόδους επέμβασης προς καθαρισμό των επικαθήσεων που μπορούν να συνοψισθούν σε δύο μεγάλες κατηγορίες α) τις μηχανικές μεθόδους και β)τις χημικές μεθόδους. Κατά την διάρκεια των δεκαετιών που προηγήθηκαν , η συσσώρευση πείρας και η καταγραφή των αποτελεσμάτων των μεθόδων αυτών πάνω στα μνημεία , δείχνουν την ύπαρξη επιβλαβών συνεπειών από την χρήση των μεθόδων αυτών , και οι οποίες συνέπειες μπορούν εκδηλώνονται σε δύο επίπεδα (Σουλικίδης[11]) . Το πρώτο αφορά την κατάσταση των μνημείων ,μετά την χρήση μιάς συγκεκριμμένης μεθόδου, η οποία εμφανίζεται σχεδόν πάντα χειρότερη εξαιτείας των μηχανικών μέσων που έχουν χρησιμοποιηθεί όσο ήπια και εάν είναι αυτά (πχ εκνέφωση απιονισμένου νερού στην προς καθαρισμό επιφάνεια), η χημικών μέσων που πάντα προσβάλλουν, εκτός από τις επικαθήσεις και υγιές υλικό. Το δεύτερο επίπεδο αφορά τις επιβλαβείς συνέπειες που αφορούν τον ανθρώπινο παράγοντα , δηλαδή τους κινδύνους που διατρέχει το προωποικό που εφαρμόζει αυτές τις μεθόδους. Οι κίνδυνοι αυτοί μπορεί να προέρχονται από πολλές αιτίες . Χαρακτηριστικά μπορούμε να αναφέρουμε την περίπτωση των αμμοβολών, μικροβολών κλπ , την χρήση Laser,και άλλες μέθοδοι οι οποίες είναι πολύ επικίνδυνες για το χειριστή τους(Friberg et al[3]). Ώσον αφορά την χρήση χημικών ουσιών είναι αυτονόητο ότι ακόμα και οι θεωρούμενες πιό ακίνδυνες, έχουν επιπτώσεις στον ανθρώπινο οργανισμό και στο περιβάλλον.

Έτσι το πρόγραμμα BIOBRUSH έχει σαν στοχο ακριβώς την απομάκρυνση αυτών των επικαθήσεων από την επιφάνεια της πέτρας με ταυτόχρονη στερέωση του υλικού που έχει αρχίσει να αποσαθρώνεται, με μία μεθοδολογία η οποία έχει σαν στόχο να απαλείψει όλα τα προηγουμένως αναφερθέντα μειονεκτήματα των συμβατικών μεθόδων. Την συγκεκριμμένη μεθοδολογία θα αναπτύξουμε στις επόμενες παραγράφους.

Ώσον αφορά την χώρα μας το πρόγραμμα θα διεξαχθεί σε επιλεγμένους αρχαιολογικούς χώρους από τους οποίους ιδιαίτερη σημασία θα δοθεί στον διατηρητέο ιστορικό οικισμό της νήσου Ύδρας σε συνεργασία πάντα με το Δήμο και την Δημοτική Επιχείρηση Ύδρας .Εδώ θα πρέπει να αναφερθεί ότι πολλά μνημεία που βρίσκονται στην αρμοδιότητα του Δήμου Ύδρας αντιμετωπίζουν: α)το πρόβλημα της φθοράς από κρούστες διάφορων τύπων αλάτων και β) το πρόβλημα των βιολογικών δράσεων που εκδηλώνονται τόσο πάνω στην επιφάνεια όσο και εντός της μάζας της πέτρας(Brebbia-Leftheris [2] , Πανταζίδου [10]).

Τα οφέλη που θα προκύψουν από την πειραματική εφαρμογή των καινοτόμων μεθόδων συντήρησης μπορούν να συνοψισθούν ως εξής.
1.Σεβασμός και διατήρηση των καλλιτεχνικών και μη χαρακτηριστικών των πέτρινων μνημείων με ταυτόχρονα ικανοποιητικά αποτελέσματα ωσον αφορά τον καθαρισμό και την στερέωση των πέτρινων επιφανειών.
2.Εκπαίδευση-εξιδείκευση του προσωποικού του εμπλεκόμενου στο πρόγραμμα ,μέσω των συμμετεχόντων φορέων, σε καινοτόμες μεθόδους συντήρησης-αποκατάστασης μνημείων.
3.Ανάπτυξη μιάς μεθόδου ασφαλούς για την υγεία του προσωποικού που την εφαρμόζει καθώς και γιά το περιβάλλον.

Μεθοδολογία

Η έρευνά μας εξελίχθηκε και εξελίσσεται σε επτά θεματικούς άξονες ώσον αφορά την πραγματοποίηση των σκοπών του προγράμματος που έχει αναλάβει η ελληνική ομάδα.
1.Επιλογή αρχαιολογικών χώρων κατάλληλων γιά τους σκοπούς του προγράμματος.
2.Βιβλιογραφική τεκμηρίωση-συγκέντρωση αναγκαίων επιστημονικών δεδομένων.
3.Συστηματική δειγματοληψεία πέτρινου υλικού και επικαθήσεων με μη καταστροφικές μεθόδους.
4.Συστηματικές γεωχημικές αναλύσεις των δειγμάτων τόσο αυτών των προερχομένων από την Ελλάδα , όσο και δειγμάτων από χώρες που συμμετέχουν στο πρόγραμμα Biobrush .
5.Προσωμοιώσεις καθαρισμών,με ταυτόχρονη στερέωση, επικαθήσεων πάνω σε πέτρινο υλικό, με χρήση επιλεγμένων μικροβίων στο εργαστήριο και συστηματική παρατήρηση της δράσης των μικροοργανισμών
6.Καθαρισμοί ,με ταυτόχρονη στερέωση, επικαθήσεων πάνω σε πέτρινο υλικό με χρήση επιλεγμένων μικροβίων στις περιβαλλοντικές συνθήκες των αρχαιολογικών χώρων
7. Επεξεργασία αποτελεσμάτων-Συμπεράσματα.
Οί παραπάνω άξονες μπορούν να αναλυθούν ως εξής.
1. *Επιλογή αρχαιολογικών χώρων κατάλληλων γιά τους σκοπούς του προγράμματος.*
Εδώ χρησιμοποιήθηκαν τα παρακάτω κριτήρια γιά την επιλογή του κατάλληλου αρχαιολογικού χώρου στον ελληνικό χώρο α) Δυνατότητα λήψης δείγματος από

υλικό χαμηλής αρχαιολογικής-καλλιτεχνικής αξίας . β) Εύκολη πρόσβαση του τόπου από την έδρα του Εθνικού Μετσοβίου Πολυτεχνείου που είναι και ο χώρος διεξαγωγής των αναλύσεων κλπ. γ) Διασφάλιση συνεργασίας των τοπικών αρχών.

Με βάση τα παραπάνω κριτήρια επελέγησαν ο αρχαιολογικός χώρος της Επιδαύρου, ο προιστορικός οικισμός Φυλακωπής της Μήλου , και ο παραδοσιακός οικισμός της Ύδρας. Εδώ θα πρέπει να τονισθεί ότι ο διατηρητέος οικισμός της Ύδρας έχει ιδιαίτερη σημασία για μας αφού λόγω της μικρής του απόστασης από το μητροπολιτικό κέντρο, δέχεται μεγάλο αριθμό επισκεπτών , έχει γίνει γνωστός (και μέσα από τις ενέργειες της δημοτικής αρχής) σε διεθνές επίπεδο , και έχει γίνει το κέντρο πολυπίκοιλων πολιτιστικών δραστηριοτήτων. Για όλους τους παραπάνω λόγους κρίναμε σκόπιμο να ασχοληθούμε ιδιαίτερα –στα πλαίσια του προγράμματος- με τον οικισμό αυτόν.

2.Βιβλιογραφική τεκμηρίωση-συγκέντρωση αναγκαίων επιστημονικών δεδομένων.

Κατά την διάρκεια αυτού του σταδίου συγκεντώθηκαν όλα τα απαραίτητα βιβλιογραφικά στοιχεία που αφορούν τους επιλεγέντες αρχαιολογικούς χώρους.Οι πηγές μας ήταν οι αρμόδιες Εφορίες του Υπουργείου Πολιτισμού, ο Δήμος Ύδρας , το Ιστορικό Αρχείο Ύδρας. Σημαντικά στοιχεία ωσον αφορά τις κλιματολογικές συνθήκες που επικρατούν στις παραπάνω περιοχές λάβαμε από την Εθνική Μετεορολογική Υπηρεσία . Τέλος έγινε χρήση ηλεκρονικών βιβλιοθηκών μέσω Internet και εκτεταμένη χρήση της βιβλιοθήκης του ΕΜΠ.

3.Συστηματική δειγματοληψεία πέτρινου υλικού και επικαθήσεων με μη καταστροφικές μεθόδους.

Η συστηματική δειγματοληψεία η οποία εκτελέσθηκε και εκτελείται στα πλαισια του προγράμματος έχει δύο σκοπούς .Α) να γίνει εξακρίβωση της φύσης και του είδους του πέτρινου υλικού από το οποίο αποτελούνται τα μνημεία των αρχαιολογικών χώρων που επελέγησαν για τους σκοπούς του προγράμματος. Β) να παρακολουθηθεί η δράση των μικροοργανισμών οι οποίοι καταναλώνουν το υλικό των επικαθήσεων ,και αυτών που ο μεταβολισμός τους έχει στερεωτικό αποτέλεσμα για την πέτρα.Η δειγματοληψεία έγινε και γίνεται με μη καταστροφικές μεθόδους.(Κατσίνης,Καγκέλη[5]) Με τον όρο μη καταστροφικές μεθόδους εννοούμε είτε την λήψη μίας πολύ μικρής ποσότητας δείγματος (μερικά χιλιοστά του γραμμαρίου) με μία ελαφρή απόξεση η τρύπα, είτε την λήψη θραυσμάτων πέτρινου υλικού τα οποία βρίσκονται στο έδαφος αλλά που μπορούμε να πιστοποιήσουμε την ακριβή θέση τους στο μνημείο και φυσικά είναι μή χρησιμοποιήσιμα σε ενδεχόμενη αναστύλωση. Εννοείται ότι η δειγματοληψεία έγινε πάντα με την παρουσία αρμόδιου αρχαιολόγου. Ωσον αφορά την δειγματοληψεία που γίνεται από καινουργιο πέτρινο υλικό γιά τον σκοπό προσωμοιώσεων στο εργαστήριο οι παραπάνω περιορισμοί δεν υφίστανται. Η συστηματική δειγματοληψεία για να είναι αντικειμενική πρέπει να καλύπτει όλες τις διαφορετικές πλευρές του μνημείου και οι οποίες να παρουσιάζουν διαφορετική ορυκτολογική η άλλη σύσταση των επικαθήσεων η των προιόντων του μεταβολισμού των μικροοργανισμών(Μπούρας[9]). Τέτοιες διαφορές στην σύσταση δημιουργούνται από παράγοντες όπως η διαφορετική απόσταση του σημείου δειγματοληψείας από το έδαφος, ο προσανατολισμός του σημείου σε σχέση με τον ήλιο , τους επικρατούντες στην περιοχή ανέμους κλπ.Συνολικά μέχρι στιγμής έχουν συλλεγεί και αναλυθεί με μία σειρά μεθόδων,στο ΕΜΠ,γιά τους σκοπούς του προγράμματος, αριθμός 30 δειγμάτων.

4.Συστηματικές γεωχημικές αναλύσεις των δειγμάτων τόσο αυτών των προερχομένων από την Ελλάδα , όσο και δειγμάτων από χώρες που συμμετέχουν στο πρόγραμμα Biobrush .

Στά συλλεγέντα δείγματα καθώς και σε αυτά που πρόκειται να συλλεγούν εφαρμόζονται μία σειρά αναλυτικών μεθόδων προκειμένου να γίνει δυνατή η πολύπλευρη αξιολόγηση τόσο του είδους και της φύσης του πέτρινου υλικού και των επικαθήσεων, όσο και των αποτελεσμάτων της δράσης των μικροοργανισμών πάνω στην πέτρα.Η ομάδα αναλυτικών μεθόδων που εφαρμόζει η ερευνητική ομάδα του ΕΜΠ είναι η ακόλουθη:

1) Περιθλασιμετρία ακτινών Χ
2) Οπτική μικροσκοπία .

Οι μέθοδοι αυτές εφαρμόζονται για να διαπιστωθεί το είδος και ο ιστός του πέτρινου υλικού.

3) Προσδιορισμός συνολικού οργανικού άνθρακα (TOC)
4) Ποιοτικός και ποσοτικός καθορισμός ελαφρών υδρογονανθράκων με εκρόφηση και αέριο χρωματογραφία.(Κατσίνης[4])

Οι μέθοδοι αυτές εφαρμόζονται για τον καθορισμό της φύσης των επικαθήσεων πάνω στην επιφάνεια της πέτρας.

Γενικώτερα στα πλαίσια του προγράμματος εφαρμόζονται οι εξής αναλυτικές μέθοδοι.

1)Ηλεκτρονική μικροσκοπία μικρανάλυση(SEM)
2) Χρωματογραφία Ιονισμού(IC)
3)Αέρια χρωματογραφία/Φασματοσκοπία μάζης (GC/MS)
4)Φασματοσκοπία υπερύθρων(FTIR)
5)Μικροσκοπία φθορισμού(FDA)
6)Υψηλής απόδοσης υγρή χρωματογραφία (HPLC)
7)Μικροανάλυση ακτινών Χ (EDAX)

5.Προσωμοιώσεις καθαρισμών,με ταυτόχρονη στερέωση, επικαθήσεων πάνω σε πέτρινο υλικό, με χρήση επιλεγμένων μικροβίων στο εργαστήριο και συστηματική παρατήρηση της δράσης των μικροοργανισμών.

Προκειμένου να παρακολουθηθεί η δράση των μικροοργανισμών πριν αυτοί εφαρμοσθούν στο πέτρινο υλικό του μνημείων, κρίθηκε σκόπιμο να εφαρμοσθούν σε δοκίμια ίδιου υλικού με αυτό των μνημείων που επελέγησαν για τους σκοπούς του προγράμματος. Τα δοκίμια αυτά έχουν υποστεί τεχνητή γήρανση με διαφόρων τύπων επικαθίσεις οι οποίες όπως εξηγήσαμε σε προηγούμενη παράγραφο αποτελούν σημαντικό παράγοντα φθοράς της πέτρας.Έτσι για τον σκοπό αυτό, στα εγαστήρια μικροβιολογίας των πανεπιστημίων και ερευνητικών φορέων που συμμετέχουν στο πρόγραμμα έχουν απομονωθεί τρείς ομάδες μικροοργανισμών.

1. Βακτηρίδια που ανάγουν τα θειικά και νιτρικά άλατα (May[7])
2. Βακτηρίδια που βιοαποικοδομούν τους υδρογονάνθρακες και οργανικό υλικό(Koestler[6])
3. Βακτηρίδια που παράγουν σαν προιόν του μεταβολισμού τους ασβεστίτη (Atlas,et al[1]).

Ταυτόχρονα έχει αναπτυχθεί και το όχημα-υλικό μεταφοράς των μικροοργανισμών από τον τόπο παραγωγής στον τόπο εφαρμογής. Αυτό το όχημα –υλικό που αποτελείται κυρίως από σεπιόλιθο-αταπουλγίτη διασφαλίζει ικανοποιητικές συνθήκες αναπαραγωγής και διαβίωσης των μικροοργανισμών.

Όπως αντιλαμβανόμαστε η δράση των μικροοργανισμών αυτών πάνω στο πέτρωμα που έγκειται α) στον καθαρισμό επικαθήσεων νιτρικών-θειικών αλάτων

καθώς και οργανικού υλικού και υδρογονανθράκων, β) στην στερέωση χαλαρών επιφανειών της πέτρας μέσω της απόθεσης ασβεστίτη στους πόρους,θα παρακολουθηθεί με συστηματική δειγματοληψεία η οποία θα περιλαμβάνει και λεπτές τομές πετρώματος οι οποίες θα μελετώνται με πετρογραφικό μικροσκόπιο και ηλεκρονική μικροσκοπία –μικροανάλυση. Επίσης για τον ίδιο σκοπό χρησιμοποιούνται και όλες οι προαναφερθείσες αναλυτικές μέθοδοι. Τέλος πρέπει να τονισθεί ότι γίνεται προσπάθεια στίς προσωμοιώσεις αυτές να επικρατούν ανάλογες συνθήκες υγρασίας-θερμοκρασίας με αυτές των αρχαιολογικών χώρων.

6.Καθαρισμοί ,με ταυτόχρονη στερέωση, επικαθήσεων πάνω σε πέτρινο υλικό με χρήση επιλεγμένων μικροβίων στις περιβαλλοντικές συνθήκες των αρχαιολογικών χώρων

Η φάση αυτή της ερευνάς μας ουσιαστικά αποτελεί το επόμενο βήμα μετά τις εργαστηριακές δοκιμές που περιγράψαμε προηγουμένως. Έτσι στην φάση αυτή οι μικροοργανισμοί των οποίων η δράση έχει εξακριβωθεί και αποδειχθεί η ωφελιμότητά τους γιά τους σκοπούς συντήρησης –αποκατάστασης του μνημείου , θα εφαρμοσθούν πλέον στούς επιλεγέντες αρχαιολογικούς χώρους. Η εφαρμογή αυτή θα γίνει είτε κατευθείαν πάνω σε συγκεκριμμένα σημεία των μνημείων που παρουσιάζουν ανάγκη καθαρισμού με ταυτόχρονη στερέωση , είτε πάνω σε απομονωμένα δομικά στοιχεία των μνημείων (θράυσματα λίθων του μνημείου κλπ) που παρουσιάζουν τα ίδια προβλήματα. Όλες αυτές οι ενέργειες θα γίνουν με την σύμφωνη γνώμη των υπευθύνων αρχαιολόγων και συντηρητών.

7. Επεξεργασία αποτελεσμάτων-Συμπεράσματα.

Κατά την τελική αυτή φάση θα γίνει η επεξεργασία και εκτίμηση συνολικά των αποτελεσμάτων σε όλα τα στάδια της έρευνας. Επίσης θα γίνει η αποτίμηση της αποδοτικότητας της μεθόδου τόσο όσον αφορά το επιδιωκόμενο αποτέλεσμα που είναι ο καθαρισμός των επικαθήσεων πάνω στην επιφάνεια του πέτρινου υλικού των μνημείων με ταυτόχρονη στερέωση των αποσαθρωμένων επιφανειών, όσο και η λειτουργικότητα της από πλευράς εκτέλεσης από το εξειδικευμένο η υπό ειδίκευση προσωποικό.

Συζήτηση

Όπως τονίσθηκε και στην εισαγωγή οι σκοποί του προγράμματος Biobrush μπορούν να συνοψισθούν στα παρακάτω: Α) Ανάπτυξη μιάς μεθόδου συντήρησης-αποκατάστασης μνημείων ,και ειδικώτερα στον τομέα των καθαρισμών και της στερέωσης , η οποία να προκαλεί στο μνημείο τις λιγότερες δυνατές φθορές από όλες τις μέχρι τώρα γνωστές μεθόδους . Ταυτόχρονα η μέθοδος αυτή προσφέρει απόλυτη σχεδόν προστασία στους χειριστές της και στο ευρύτερο περιβάλλον πάλι σε σχέση με τις μέχρι τώρα γνωστές μεθόδους. Β) Η εκπαίδευση του νέου προσωποικού καθώς και η εξιδείκευση του ήδη πεπειραμένου, στον τομέα της συντήρησης πέτρας, που θα προκύψει στα πλαίσια του προγράμματος αποτελεί μεγάλο όφελος. Στο θέμα αυτό συμβάλλει τα μέγιστα ο Δήμος και η Δημοτική Επιχείρηση Ύδρας με τον δήμαρχο κ. Αναστόπουλο.

Ένα έυλογο ερώτημα , το οποίο αποτέλεσε και κύριο μέλημα γιά το ερευνητικό επιτελείο του προγράμματος Biobrush , είναι το εάν οι μικροοργανισμοί που θα χρησιμοποιηθούν είναι με οποιονδήποτε τρόπο επικίνδυνοι για τον άνθρωπο. Στο αντικείμενο αυτό εργάσθηκαν εντατικά οι έμπειροι μικροβιολόγοι της ερευνητικής ομάδας που ανήκουν στα Πανεπιστήμια του Πόρτσμουθ, του Μιλάνου και του

ερευνητικού ινστιτούτου IWT της Βρέμης. Το αποτέλεσμα των προσπαθειών τους ήταν να απομονωθούν ποικιλίες μικροοργανισμών που ήδη υπάρχουν στην φύση (έδαφος-φυτά) και δεν έχουν καμία απολύτως επίπτωση στην υγεία του ανθρώπου. Έτσι οι μικροοργανισμοί αυτοί μπορούν να χρησιμοποιηθούν ελεύθερα για τους σκοπούς της συντήρησης αποκατάστασης μνημείων.

Εκτιμώντας τα μέχρι τώρα αποτελέσματα της έρευνας που άρχισε το Φεβρουάριο του 2002 και αναμένεται να ολοκληρωθεί σε τρεία έτη μπορούμε να πούμε ότι αυτή προχωρεί πολύ ικανοποιητικά επιλύοντας βασικά προβλήματα όπως αυτού του συγχρονισμού ενεργειών των διαφόρων ερευνητικών υποομάδων, και της συνεργασίας των ερευνητών με τις τοπικές αρχές. Κλείνοντας αυτήν την παράγραφο θα πρέπει να πούμε ότι λεπτομερή αποτελέσματα της έρευνας θα δημοσιοποιούνται με κάθε ευκαιρία στο μέλλον ούτως ώστε η επιστημονική κοινότητα να έχει την δυνατότητα να πληροφορείται και να αξιολογεί την ερευνητική αυτή προσπάθεια.

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THE SYSTEM OF WORLD HERITAGE CITIES' COMPARATIVE ASSESSING AND DESCRIPTION, AS A MEAN FOR THEIR CULTURAL PROPERTY'S BETTER AWARENESS AND INTERPRETATION (SOME EXPERIENCE FROM RUSSIA).

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Abstract

The most beautiful and merited cities of different countries become the more and more substantial part of the World Heritage – this "Golden Fund" of the mankind's cultural and natural property. That makes actual task to develop the comparative approach to these cities' heritage identification, integration into everyday life and interpretation. The special aspect of this task relates to establishing a mean for better information of broad masses in different countries about these phenomena of culture.

There were some studies worked out in Russia lately, been aimed at creation the concise descriptions of World Heritage Cities, which would be accessible to people from the street, but at the same time bring a little of professional data. The idea was to do these descriptions in Russian and for Russians and other Russo phone countries, where there is the bad shortage of the Paris Convention languages' knowledge in masses. They have to be instruments both for education and training.

The paper contains proposals for World Heritage Cities' classification on their WH Sites sizes and position in the city, for the structure of their concise descriptions, for some national terminology translation, etc.

It would be accompanied with a case of such description on the example of the Greek World Heritage Cities.

The task of World Heritage Cities' concise descriptions

World Heritage Cities – what they are? Why there has been arisen a need of this sort of mankind's cultural heritage's subjects special detachment? In what do they differ from other, so to say, "ordinary" monuments of history and architecture have been inscribed into the World Heritage List? How the heritage conservation in these cities can influence on the modern life, on the cultural continuity of generations, on the sustainability of our world's development? Thus, what did become for us the motive for these cities' heritage special preservation and management?

The answer is apparently in that most beautiful and merited cities of different countries become the more and more substantial part of the World Heritage Commonwealth – this really "Golden Fund" of the mankind's cultural and natural property. That fact has made the actual task to develop a target approach to these cities' heritage identification, integration into everyday life and interpretation. The special aspect of this task relates to establishing a mean for better information of broad masses in different countries about these phenomena of culture using approaches of the education and training.

Trying to solve this aspect some countries have found themselves in a more difficult situation because their broad masses (not excluding masses of professionals) are rather week

in English or French as the official languages of the World Heritage Convention, Committee, Centre and of all their documents, including the List itself, the Operational Guidelines, the Format for Nominations, the Brief Descriptions of Sites, etc. And the Russian Federation is undoubtedly one of such countries.

We also have seen some gap in the information about World Heritage Sites (including the specially interested for us Cities) between the fundamental, high professional, very voluminous works in thick volumes and the most popular, advertising, very light-weighted booklets or short articles in the known World Heritage encyclopedias, have been published in Spain, Japan, Germany, in some other places and lately in Russia.

So we were successful in the organization of some studies in this country, been aimed at creation the concise descriptions of World Heritage Cities, which would be both accessible to people from the street and at the same time bring a little of professional data. The idea was to do these descriptions in the beginning in Russian and for Russians and other Russo phone countries. They have to be instruments both for education and training. Later – who knows, may be they would become interesting for other countries too.

The World Heritage City's concept and evaluation of their quantity

In the beginning of this work we were obliged to imagine, which of World Heritage Sites can be considered as the urban ones, that is as World Heritage Cities. The question isn't so simple as it looks at once. Much depends on our interest to the subject and our aims in this studying. There were some doubts as to answer on this question even in the OWHC's staff in the early stage of its existence.

So let's see at two OWHC Secretary General Reports had been published in 1996 with only 6-months interval.

In the first one there was put a limitation for the Organization's membership, which made welcome only to cities, whose historic centres had been inscribed on the World Heritage List. Then 122 cities answered to this demand, and other 75 remained out as having only separate monuments or their groups in the List.

But only a bit later the OWHC Board of Directors proposed to limit the membership to cities in which sites have been included on the World Heritage List are located. They just mean here any sites, not only historic centres, what was corroborated by the following practice. We in Russia know that firstly by our City of Kazan's membership, with only its Kremlin as the Site.

The activity in listing and counting of the World Heritage Cities is going now on several channels. Some lists of possible members are produced by the Organization itself. The World Heritage Centre (Dr. Minja Yang) made and distributed in 2002 between professionals the list and counting of the Urban Heritage in the World Heritage List. They found that among the 730 sites inscribed on this List, 344 are urban heritage, among which, 189 are historic cities and towns and 155 are monuments or other cultural properties in an urban context.

We couldn't also refrain from this activity. The first result was presented at the 6th OWHC Symposium of 2001 in Puebla, Now we corrected it with inclusion of 2000, 2001 and 2002 approved nominations on the List. Our figures say that among 750 sites (plus twenty of 2002

in comparison with the WH Centre's ones) more than a half locates in 356 cities and towns. From them 226 urban settlements are the World Heritage Sites themselves (as a whole) or contain such sites in forms of historic centres, quarters, areas, etc. Other 130 settlements have the World Heritage Sites as separate monuments, group of monuments or sometimes - cultural landscapes.

It is seen that our figures rather near to the WH Centre's ones. But there are some differences in the content and structure of two lists. The main is in basing of ours on cities and towns themselves but sites. So, for instance, one nomination of Flemish *Beguinages*, Belgium made twelve points in our list on the number of cities with such ensembles. We also organize our list on the alphabetical order of cities but countries.

Thus, we tried to propose the full-systematized inventory of World Heritage Cities as the whole WH Sites, with WH Sites inside them or as parts of bigger WH Sites. All cities divided on seven classes and some sub-classes in depend of their WH Sites' types. The result of this distribution consists in Table 1, repeating the form has been presented in Puebla, but with figures on the end of 2002.

The full World Heritage Cities' inventory

The full inventory's table had been prepared in 2002 had near 350 points on 15-16 pages. Each point was revealing in cells of nine table's columns:

1. CITY - the name of the settlement as it is in the English version of the WH List, with some local variants in brackets.

2. COUNTRY - the name of the country as the Side of WH Convention, with possible addition in brackets is related to the separate part of this country (say, Bermuda for Saint George, UK Site).

3. POPULATION - the number of this settlement's citizens (in thousands) in 2000, or maximally near to this date. In a case of the urban agglomeration the better decision is the city with nearest surroundings with the fully developed territories. It would be fine to give also the population on the World Heritage Site's territory, but we haven't enough data for that yet.

4. YEAR OF INSCRIPTION - it is clear. Sometime the second date can be added if there are two sites of one profile in this city (as, for instance in Barcelona, Spain or in Berlin, Germany).

5. NOMINATION NUMBER - it is clear too. And again in some rare cases the second number can be added (as for the same Barcelona or the twin nominations of Lahore, Pakistan and Stockholm, Sweden).

6. SUBJECT OF SITE - it is shortened character of this WH Site's type, say - historic centre, or cathedral, or fortress, or something else, as a base for the city, where this site locates, classification. The selection of the common or proper noun for this character is free and depends only on the mentioned purpose.

7. CRITERIA - it is clear as taking directly from the World Heritage List.

8. TOWN'S CATEGORY - it is determining on the Operational Guidelines for the Implementation of the World Heritage Convention. The historic towns of its p.27 (the main category II) are dividing in accordance with p.29 to four categories and denoting as T-I, T-II, T-III and T-IV. The cultural landscapes in accordance with p.39 are dividing to three main

categories and denoting as L-I, L-II and L-III. The historic villages (not urban settlements) are denoting as V.

9. SITE'S CLASS - it is the end result of the inventory, which is defining as it has been showed in the Table 1.

Table 1 **The evaluation of the World Heritage Cities quantity (as it looks in the end of 2002)**

1.		The city as a whole (example - Bamberg, Germany)	43			
1-a.		City as a whole, with additional elements, are specially mentioned in the WHSite nomination, in its limits or in surrounding (example - Venice and its lagoon, Italy)	12	55	55	
2.		The large part of a city (example – Medina in Fez, Morocco)	Including versions: 2.1., 2.2., 2.3.			
2-a.		A large part of city with additional elements, are specially mentioned in the WHSite nomination, in its limits or in surrounding (example - Historic centre of St.-Petersburg and monuments in its vicinities)				
	2.1.	The site has named as a whole city, but actually presents only its large part (example - Valletta, Malta)	2	2		225
	2.2.	The historic city centre, or similar planning formation (example - Historic centre of Krakow, Poland)	107	128	159	
	2.2-a.		21			
	2.3.	The town-planning complex, system of the areas, street, quays, quarters, etc. (example – the system of three places in Nancy, France)	28	29		
	2.3-a.		1			
3.		The cultural landscape in a city (example - Sintra, Portugal)	10	11	11	
3-a.			1			
4.		The set of several monuments in a city, which isn't an uniform ensemble or unite complex (an example - a temple, cemetery and private mansion of Confucius in Qufu, China)	53	106	106	106
5.		The separate monument in a city (example – the Hospicio Cabañas in Guadalajara, Mexico)	53			
6.		The city in a structure of settlement system, or a large natural-landscape complex (example - Gardaya in the group of settlements of M'Zab Valley, Algeria)	24	24	24	24
7.		The city (small settlement) as the addition to the more important monument or complex inside of the WHSite (example - Chora on the island of Patmos, Greece, where the dominant element of the WHSite is the Monastery of St. John Evangelist)	1	1	1	1
		IN ALL:	356	356	356	356

ALTOGETHER:

Sites of urban heritage (points 1, 2, 3, 7.) - 226
Sites of architectural and other types of heritage in cities (points 4, 5.) - 106
Sites of urban heritage as a part of regional heritage (point 6.) - 24

As we are counting the settlements in our inventory, but WH Sites, there is a big influence on the result lately of the group nomination, when one WH Site has its elements in more than one city, town or village. Such practice existed earlier too - let's remember the M'Zab Valley, Algeria or the Belfries of Flanders and Wallonia, Belgium (the last one was elements in 30 different settlements!). But that were still exceptions up to 2002, when from eight cultural heritage novices in the WH List there were three with big groups of settlements - the Rhine Valley, Germany (13 small towns, but castles and others), the Val de Noto, Italy (8 historic towns), the Tokaji Wine Region, Hungary (near 10 towns and villages). That is making some problems, by our opinion, both for our classification with counting and for the OWHC membership policy.

But after all, we have done this World Heritage Cities full inventory only for getting a background, a common picture of the World Heritage's distribution in the urban environment. Our main subjects of interest were and are now the World Heritage Sites of just urban scale and their relations to the settlements as a whole.

Today situation with World Heritage Cities' concise descriptions

Following of our classification and methodic approach, had been firstly presented by us in Puebla, we carried out up to now the concise comparative descriptions of more than 45 World Heritage Cities.

They were from our country, other countries of the CIS (Ukraine, Georgia, Azerbaijan, Uzbekistan), Baltic countries (Lithuania, Latvia, Estonia), some countries of the Central and Eastern Europe (Poland, Czech Republic, Slovakia, Hungary). So we are going as on the spiral around our country's boundaries. But we also trying to do some examples of descriptions for cities of other more specific and even exotic for us countries, In this collection we have up to now the World Heritage Cities of Greece, Malta, Portugal, Mexico and Brazil. Our next step we want to direct to some countries of the Moslem world, whose cities have a big specific in the planning, architecture, mode of life and even conservation terminology. The first such countries for us could evidently be Egypt and Syrian Arab Republic, where to our happy fate have brought us lately.

At the Symposium in Puebla we tried to illustrate our description approaches on examples of the Mexican World Heritage Cities. And, with nine of them, that became the case of an internal comparison, the mean to explain of both their common and individual uniqueness, what was not so easy task but had big importance for purposes of education and training peoples in other countries.

The example of World Heritage Cities' description for Greece

Now in Greece there is a possibility to bring another case with only one really urban scale's World Heritage Site - the Medieval City of Rhodes. It is the truth as the Chora on the Patmos Island has been included in the World Heritage nomination sooner as the addition to the St John Monastery, and the attempt of inscribing the Old City of Corfu hasn't brought a success yet, what is pity.

In this situation the comparisons in our description of Rhodes as the World Heritage City have to be based on the drawing of some other really medieval urban sites in the World Heritage List (let's nominate, say, Carcassone, France or Visby, Sweden). Other comparisons can be found in the cities also have been earlier a long time under the Turkish dominance (for instance, Nessebar, Bulgaria or Aleppo, Syria). At last especially in the case of Rhodes it is interesting to trace of common and different heritage features on the historic way of the military and charitable Order of St John of Jerusalem, as now almost all main points on this way have found themselves under the World Heritage's umbrella - Jerusalem, Acre, Rhodes, Valletta.

Our descriptions of World Heritage Cities are making in accordance with the separate country have the short introduction is related to some common features of an urban heritage and its conservation there.

For the case of Greece it has the fixation of any official list of historic cities absence but very small number of, as they named here, "traditional settlements". Then there is telling about of the specificity of the country's history with changes periods of the unprecedented blowing and of the global destructions, what has resulted on an urban heritage formation and conservation. It stressed the special role of archaeological remains in many Greek historic cities, with giving Thessalonica and Rhodes as examples. It is also mentioned some interesting historic settlements in this country but the World Heritage ones. They can be from the national Tentative List (in the case of Greece it is mentioned Corfu) or from other sources (say, from 1980-s - 1990-s Melissa Publishing House's serial on the traditional Greek architecture's complexes). After date of this country's joining the 1972 Paris Convention, there is also information about the membership of Greek historic cities in other organization and association of the conservative field of the worldwide or continental scale (say, about the Athens's membership in the League of Historical Cities).

The case of the World Heritage City of Rhodes representation

We proposed the World Heritage City's representation formula in its concise description in Puebla (appendix 2 to the presentation). So, there is need now only to demonstrate as its demands can be satisfied in a concrete description - in our to day case of Rhodes.

We believe that there isn't necessary to do the special commentary on the formula's points of "The data on the provision on the List" and " The general definition of the City", everything is clear with their carrying out. But the next points aren't so easy to fulfill.

"The brief information on the geographical provision and site of the City" is relatively easy to be realized in the first half. In relation to the City's territory natural feature it is very important don't forget to give information about the modernly hilly character of its relief, about the vertical marks rising from see level on the shore up to 80-100 m at the place of the former Rhodes Acropolis, about the position of the City's place in relation to the whole island, see water spaces, other islands, etc. All that is obviously clear, but it is often omitted in concise descriptions.

It isn't probably any difficult in answering the point of "The basic marks of historic development in the case of Rhodes". The only difficulty is in putting such rich contents into a small volume of concise description. But it is very important don't forget to stress the periods have left incomes to the city's urban heritage. In the case of Rhodes these periods are of the new city foundation on the Hippodamos's scheme, the Hellenistic, the Byzantium, of course the St John Order, the Turkish and even the Italian (the last one means much for the history of conservation in Rhodes both in positive and doubtful sense)

It stands to reason that the main point of the representation formula is "The brief characteristic of architectural, town planning and other cultural heritage". In the case of Rhodes, just as practically in any World Heritage City's case, the content of this part of the description has to be very individual, trying to catch of this site's integrity.

The first step is to make a clear picture of the site's territory, its boundaries, its position in relation to the natural landscape features and the whole city's structure. For Rhodes it means to demonstrate as the modern city and its medieval part are setting in the territory have been embraced by the Hippodamos planning of the 5th cent. BC. Then the position and boundary of the Medieval City, as the WH Site, has to be pointed and described, together with its portioning and stages of development (all that about Upper and Lower Towns - Kollakio and Burgo).

Then the turn comes of some all-site's building and structures, if any. The Medieval Rhodes has such subject of a bright quality in its Order's fortification system of surprising power and beauty, which is surrounding a whole site.

Then the character of streets and squares planning is going with their development of meaningful monuments and typical mass buildings. The historic part of Rhodes is represented here with the Street of Knight (one of better of such type have been conserved in Europe) and the Socrates Street. They are as some kind of poles in image and functions. There are also described here the buildings of the Medieval City differ by large originality and picturesque from all historic period, including ones are typical for St John Order - the Palace of Grand Masters, Castellania, Admiralty and other.

The last point of the representation formula is of "The activity of conservation of a heritage", let it is given only as a reference. This part is especially important for the purposes of education and training. It relates both to the site's conservation history survey and its modern acts and problems. And in the case of Rhodes the both sides are brightly represented by Italian colonial authority's actions of 1920s-1930s in a history part and by the establishing and activity of the Service of Conservation and Restoration of the Rhodes Medieval City after 1985. Of course, the international cooperation and help have to be also mentioned and properly commented.

Conclusion

So, it can be seen that the case of the World Heritage City of Rhodes concise description is the beautiful example and mean for providing the education and training of professional staff,

of municipal managers and of interested peoples from the street in the field of a cultural heritage integrated conservation and sustainable development.

There is some special problem in preparing of Russian descriptions of the foreign World Heritage cities. It appears owing to the rarity of competent persons properly knowing the subject who could be able to check the work, find possible mistakes and give recommendations on its enhancement. We are trying to solve this problem by appealing to bi-lingual men and women of any kind: from cultural departments of embassies and national tourist representations in Moscow, former students of Russian universities in the appropriate countries, emigrants from Russia to these countries, etc. In very rare cases we take a liberty of doing translations of our descriptions on English, fully realizing their imperfection. But in the case of Greece and Rhodes we have done that and hope for the condescension and some advice of the colleagues who would read this description.

In the end of 2001 the Russian Government has approved the Federal Target Programme on Historic Cities and Towns Architecture's Conservation and Development, which was worked out by our INRECON. It became the unique step of the state in understanding and helping to more than 400 such settlements are existing in this country. The proper knowledge of such outstanding examples as the World Heritage Cities, their urban heritage and its conservation would have the great meaning for education and training of people, which will take part in the implementation of this programme.

REVITALIZATION OF THE KOTOR FORTRESS

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From ancient times, the Bay of Kotor (*Bocche di Cattaro*) (fig.1) has represented a strategically important geographic region. Its three spacious connected bays (Herceg Novi, Tivat and Kotor bays) form one of the best natural harbors in the world.
The main town and stronghold of the Bay, Kotor (*Cattaro*), was founded at the foot of the mount of St. John, on a strategically suitable alluvial plain among the river Skurda, the sea and the spring of Gurdic. Ever since the ancient times, this fortified town, although practically isolated at the deep end of the bay, and for two centuries surrounded by Ottomans territory, had never fallen in the arms of the enemy.
In difficult times for building of Kotor, topographical conditions were a determining factor for choice of town location, urban development and its survival (fig. 2). The oldest fortification "gradina"(remains of a fortified town) might have been at the top of the mount of St. John[1] ever since the Illyrian times. Up to present days, there are no traces of an earlier Roman fortified settlement, which had certainly existed in the area of present day town, called either *Catarum*[2] or *Acruvium*[3]. Nevertheless, the existence of a Roman or Greek fortification is quit certain. The very location of the town testifies about the need for fortifying, and Acruvium, which is most likely a Roman predecessor of the Byzantine Kotor (*Dekaderon*) has got a fortified town status ("*oppidum civium Romanorum*").
By settling of Slavs during 7th and 8th century, great movements of people in this area were completed. Djelcic mentions the year 638 A.D. as the beginning of settling of the Serbs in the Bay of Kotor[4]. They relatively quickly occupied the area next to the very town walls, but within the town, the Roman element prevailed until 10th century, and its culture a much longer.
Constantine Porfirogenit brought the first news about Kotor after the settling of Slavs. According to him, the Saracens had set the lower town of Kotor[5] on fire in 867. This indirectly suggests that at that time there were upper and lower towns, i.e. the fortress on the hill of St. John. The fact that the Saracens did not succeed to occupy the fortress suggests that it had already possessed extensive defensive values in comparison to the town itself.
Economic prosperity of the era of Serbian dynasty Nemanjic (1168-1371) was a necessary condition for a solid construction of the town perimeter, whose plan, greatly, corresponds to the contemporary one.
After the fall of Serbian medieval empire there was a tumultuous period, thus Kotor, after numerous requests, managed in 1420 to put itself under the Venetian protection. The Venetians were gradually cutting down privileges, which had been recognized at the time of surrender, and the town was constantly stagnating, because out of a commercial center it became a military one. This, however, had as its consequence the increase of interest for town fortifications.

After the Venetian period came the Austrian one (1814-1918) during which Kotor fortress was constantly in function, and since then permanently neglected and exposed to decay.
Only the earthquake in 1979, beside the great damages, gave an impulse for research, projecting and up to a certain point even to protection and revitalization of town fortifications. Here is a description of their condition, with indications of the degree of research being done, of protection, restoration and of the status of actual as well as of possible future revitalization.
On the southern part of the town ramparts, by the sea, close by the strong spring of Gurdic, a tower was built in 1470.[6] which got its name after that spring (fig. 3). It represents the first large Venetian intervention on strengthening the old Kotor fortifications. Gurdic tower is relatively well preserved despite being founded on cavernous calcareous terrain next to the

spring. The interior of the tower (casemates, corridors, cannon holes), some twenty years ago, was turned into a shelter, what was one of the obstacles to the initiatives for its revitalization. The range of ideas for putting the tower into function was wide: from town lapidaries, restaurant to a discotheque. The greatest and practically the only technical problem regarding the revitalization of the tower will be the protection from humidity, which is a common problem with other similar buildings.

Close to the Gurdic town gate, at the site of the former monastery of St. Francis, destroyed by the Venetians in 1657 in order not to serve to the Ottomans during their attack on Kotor[7], at the first half of the 18th century a defense corridor was built to control the entrance to the town[8] (fig. 4-down right). Only a small fragment of that corridor has been preserved until our days, and it is in a rather poor state. There is a plan to functionally link it to the archaeological site of St. Francis monastery where the works have been going on for a long period of time now. The fragment of the defense corridor would be suitable for an information point, ticket office and so on.

North of Gurdić tower, towards the old Venetian military hospital (now Cultural center), there was a bastion marked on the plan of captain Francesco Gironci from 1785. as "*Piattaforma S. Francesco rovinosa*" (fig. 4). At the end of 19th century, the Austrian authorities destroyed this bastion for the purpose of tracing of the road along the coast. In its place, in the direction of the medieval Kotor wall strengthened by buttresses, an escarpment was built, which according its opus is hard to distinguish from the Venetian walls. This part of the rampart, as well as the footpath of the old walls, constructed on consoles and segmented vaults among them, can be suitably used for tours of the town. Bastions and artillery platforms, which strengthened the rampart, are suitable for various tourist purposes, for restaurants, as well as for cultural presentation of the town.

Bastions Corner and Valier and probably even the part of the rampart between them, were built after the great 1667 earthquake[9]. Bastion Corner[10] (fig. 5-right) has been insufficiently explored and should be revitalized in accordance with results of final research.

Bastion Valier (fig. 5-middle) was being explored on several occasions. In its interior, the remains of a medieval town rampart were found together with a gate with the characteristics of Romanesque-Gothic styles of 14th century. A project of revitalization was made[11] which anticipates a restaurant and a gallery between the old rampart and the outer walls of the bastion, and in front of the old gate, from the inside, the entrance and the terrace of the restaurant in front of the gate.

Going further along the footpath above the main town gate "*Porta Marina*", which is at the same time a gallery providing access to individual rooms of the Town guard tower complex, Rector's palace and Town hall (fig. 6), one comes to one of the most important fortified points of the town - bastion "*Citadela*" or "*Campana*" (fig. 7). At the time of its construction, at the beginning of 16th century, when rector Diedo (*provveditore Vettore Diedo*) was governing Kotor, *Citadela* was an autonomous town fortification, which could be defended in case of the siege of the town. Later on it was linked with neighboring curtain, northern and western, and in 1613 by the construction of two big cannon openings, a so called "*Piazza Soranzo*"[12] was formed, as a lower artillery position towards the port and town gate. After research works in 1983 the project of revitalization was made for the northern sector of town ramparts[13], which adequately valued and presented the Citadel, cannon holes, ramps and so on. At the beginning of 1990, an investor appeared, interested in revitalization of the *Citadela* bastion complex and its fitting into a tourist ensemble from the Town guard tower to the Town hall[14]. Research gradually grew from the mere clearing the earth dike into systematic removal of everything that did not "fit" into the new adaptation of the complex into a tourist center. Inappropriate new building, visually and in form imperiled the monumental construction tissue.

At the other, eastern part, of the northern curtain, which was already in 1950s transformed into a footpath by the construction of the parapet and by removal of concrete bunkers and other recent annexes, there is a bastion *Bembo*, in some historical sources known even as *Vendramin* (fig. 4). Without previous research works and stricter conservation guidelines, but also without serious failures from the point of view of protection and monumental presentation, this bastion, even before 1979 earthquake, was adapted for the purpose of the town summer theatre stage.

The Venetians were strengthening the old medieval Kotor rampart by means of escarp and buttresses and sometimes even by another wall from the inside[15], or a sequence of vaults under right angles. Apart from the one at Gurdic region, near the theatre, a part of the medieval wall has been preserved between bastions *Bembo* and *Riva* near the northern town gate and the bridge over the Skurda (fig. 8). The footpath in this part, despite being attractive because of the views of the town, the river and the fortifications on the hillside, has been neglected and blocked.

The last bastion in the town region, from which commences fortification belt along he hillside, is called *Riva*. It served as the summer theatre stage from 1950's until the construction of the new one on *Bembo* bastion. It has not been taken care of, and it has not been explored.

It deserves to be mentioned that there is a project for the of conservation and sanation works of the town walls along the coast made in 1983. by the Republic Institute for the Protection of Cultural Heritage-Belgrade[16]. Protection and revitalization of fortifications on the hillside (fig. 9) is still greater problem and in many aspects a non-defined question. This sector of the fortress is highly inaccessible, neglected and, contrary to the coastal part, in the last eighty years it has not had any, even temporary, function.

Total construction tissue, although originally of high physical quality, unavoidably falls apart and is being degraded. Towers, bastions, curtains, artillery posts, barracks, warehouses, cisterns, roads and so on – are permanently being damaged under atmospheric influences, vegetation, earthquakes...

Nevertheless, numerous monumental values of this part of Kotor fortifications, together with the attractiveness of the environment and views, are a solid prerequisite for finding out possibilities and interests for their revitalization. Naturally, the main problems in this sense are infrastructure, communication etc., and they have to be generally resolved. Strategic orientations in the sense of purpose, in the first place should be linked with tourism, culture and so on.

Basic question is whether the main building at the top of the hill St. John, castle (fig. 10) should be connected with the town by means of a cable car (as was the case in 1918) or should there be a supply access road from the side of Spiljari from where it would be relatively easy to start the work of revitalization of the rest of the fortress by means of existing ramps and stairs. A sequence of mutually connected tourist points would correspond with old towers, bastions and crew buildings. Apart from sightseeing the fortress on the hillside there would, naturally, be an easier way for more frequent and mass visits of lower and coastal parts of the fortress.

For a part of Kotor fortifications on the hillside neither research works nor revitalization project has been done. Of project documentation there is a detailed photogrammetric recordings of defense walls, whose construction, nevertheless, can be considered a great undertaking[17].

Regional Institute for the protection of cultural heritage together with UNESCO, (Participation Program 2002-2003), Ministry of Culture and local community actually are doing their best to organize adequate revitalization of the Kotor fortress.

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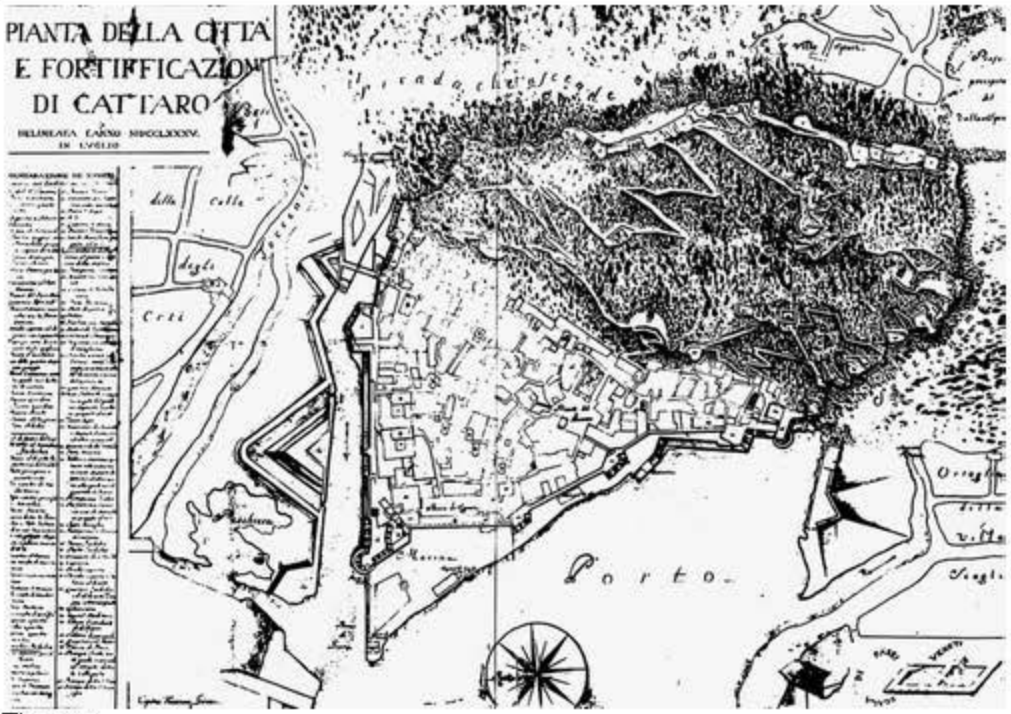
Photographic overview of Kotor town and fortress.



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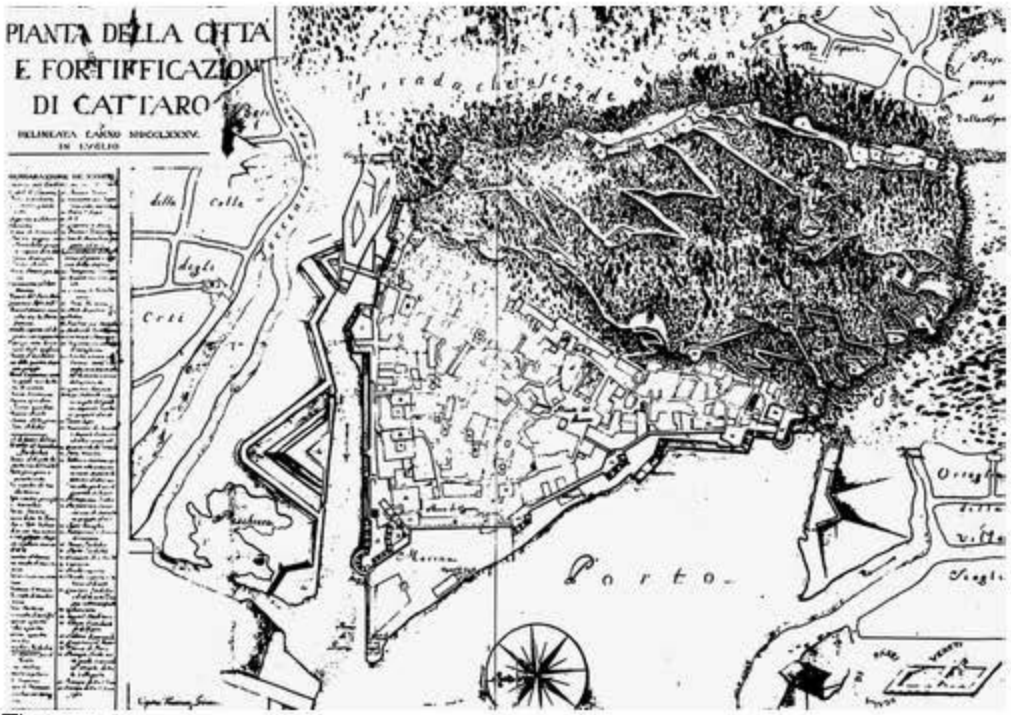

Figure 4
Pianta della Cittá e Fortificazioni di Cattaro, Francesco Gironci, 1785., private collection.

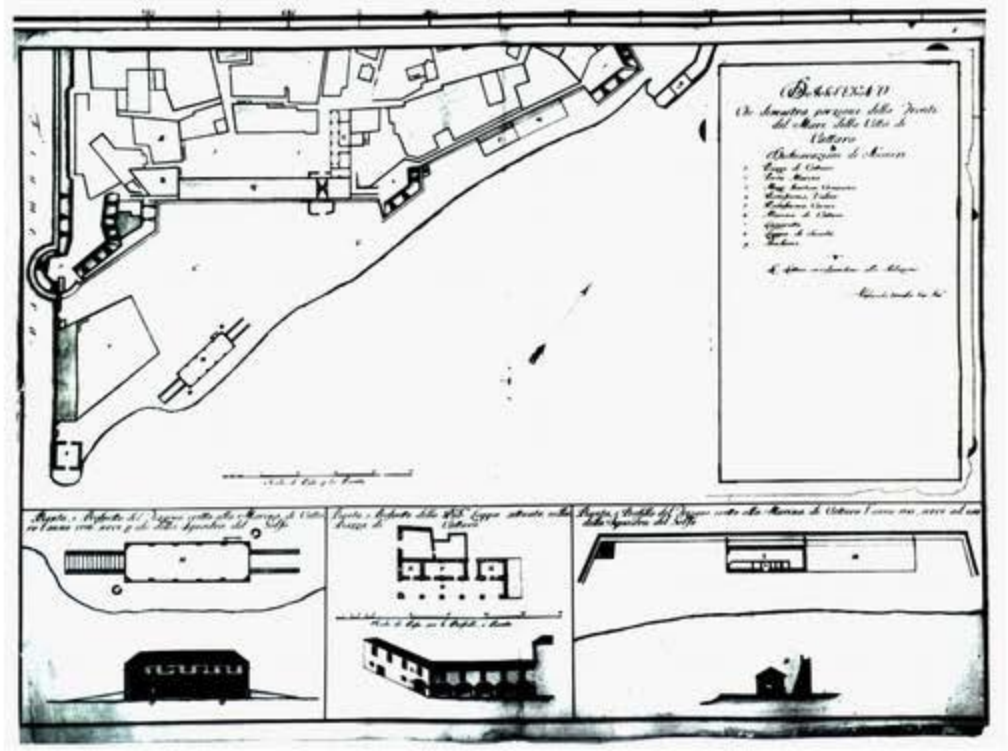

Figure 5
Archivio di Stato, Venezia, Provveditori alle Fortezze (ex B. 83, dis. 121), Alessandro Ganassa, 18th c.

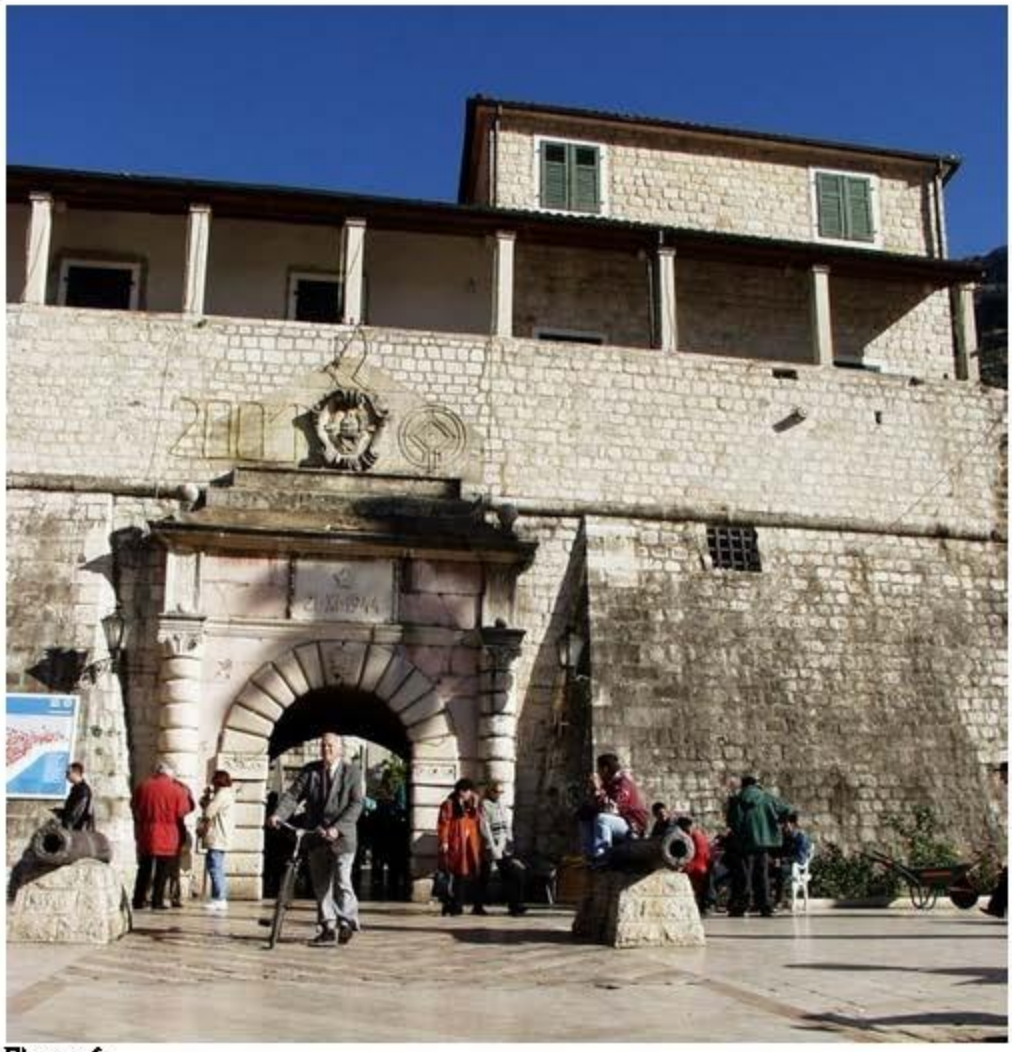

Figure 6

The sea gate - "Porta Marina", 1555. with town guard tower and the Major Hall ("Palazzo del Provveditore").

Figure 7
"Cittadela" or "Campana" bastion with north rampart (XVI c.).

Figure 8
A part of north medieval rampart with bridge and gate.

Figure 9
The northeast sector of the fortress on the hill.

Figure 10
Castle on the top of the hill and a part of east ramparts (backside to Spiljari village).

STUDIES OF MICROORGANISMS AND BIODETERIORATION OF HISTORICAL BUILDINGS OF THE MOSCOW KREMLIN

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The ensemble of the Moscow Kremlin is an unique monument of the archaeology, history, town-planning, architecture and art, and is of an exceptional importance for the city of Moscow.

The World Heritage Committee put the "Ensemble of the Moscow Kremlin and Red Square" on the World Heritage List in the December 1990.

The beginning of the formation of the ensemble refers to XII century. Now it includes both the unique ancient archaeological cultural layer and civic and church architecture monuments of and architecture of defencive works of XIV-XVII centuries, created by eminent Russian and foreign masters.

The ensemble has passed through many wars, fires, reconstuctions and renovations. Significant consequences have arise after construction of the Palace of Congresses in 1959-1961. Hydrological regime of the Borovitski hill was changed, and as result led to intensive microbial damage.

Microbiological studies of biodeterioration processes were conducted from 1979 till 2000. The main microorganisms, which participate in biodestruction of Moscow Kremlin Cathedrals, were revealed. We studied interior and exterior walls, mural paintings, stone foundation and air microflora. As the result of biomonitoring of Dormition, Annunciation and other Cathedrals the recommendations were worked out.

Now the number of microorganisms decreased. The microbiological study is an essential for preservation and protection of historical heritage.

Key words: Moscow Kremlin, limestone, microorganisms

Introduction

Moscow together with 97 other European cities is in the World Heritage List UNESCO's. Moscow is the capital of Russia, which for the first time was mentioned in the chronicle at 1147. Historical center of town is the Moscow Kremlin, which is architectural ensemble, which was build during several centuries (XII-XIX).) At 1367 wooden walls were replaced by white stone walls (limestone) and at the end of XV century, length of walls was more then 2 km. 18 towers were build and Kremlin became a real fortress, which endure a lot of sieges. Dormition Cathedral, the main temple of Moscow and Russia, was build in 1475-1479 (architect Aristotel Fiorovanti). Lately, Annunciation Cathedral was create by builders from Pskov. At the beginning of XVI c, Archangel Michael Cathedral became the vault for Russian tsars. Construction of the civil buildings (mainly palaces) took place at XVII-XIX cc. Last building was Palace of Congresses at 1961.

The aim of our research was to investigate microbial biodiversity and its impact on historical buildings of Moscow Kremlin.

Methods

For the study of microflora on the limestone surface we used "bacprint" technique. When it was possible to take enough amount of sample the method of dilution was used. Viable microorganisms were enumerated by plate count. We used following media: meet pepton agar, Tiller media with yeast extract and potato extract agar, nutrient wort agar, liquid media for nitrifying and thionic bacteria and sugar-containing media. Electron microscopy of ultrathin sections of biofilm from the stone surface were examined in electron and SEM microscopes. It is allow see a relationship between different microorganisms. We used the luciferin-luciferase [Ugarova[1]] method to measure the quantity of adenosine-triphosphate acid (ATP) in microorganisms on the unit of surface of stone or in 1 g of sample. By this method we can compare biological activity, which exist on different historical objects and determine the amount of cells approximately.

Results and discussion

We studied microorganisms and its activity at the walls of ancient building from 1979-2000 [Lyalikova[2], Medvedeva-Lyalikova[3]]. White stone (limestone from M'yachkovo) is very resistant to temperature change but now corrosion process is accelerated due to environmental pollution (acid rains). We investigate the role of different microorganisms, which grow in the nutrient media with pieces (cubes) or crashed limestone. It was shown that the biggest dissolution of calcium took place at the presence of acid-forming bacteria: bacilli were grown on sucrose and thionic bacteria on thiosulphate, where 1,1 and 1,2 g of dissolved Ca was detected and weight loss reached 1,7 and 2%, respectively (Fig. 1). *Nitrosolobus multiformis*, isolated from walls of Dormition Cathedral, dissolve 0,8 g/L Ca after 10 weeks of incubation. At the same time weight loss make up to 0,6%. Pure cultures of green algae don't dissolve limestone. However, simultaneous development of algae and bacteria in the mineral medium form 0,2 g/L dissolved Ca. Necessary to note, that bacteria increase porosity of stone and therefore accelerate its destruction. Also, our observations are show that the pentelic marble been destroyed by nitryfing bacteria more quickly (1,5 g/L Ca after 8 weeks of incubation and pH was decreased from 8 to 5,5).

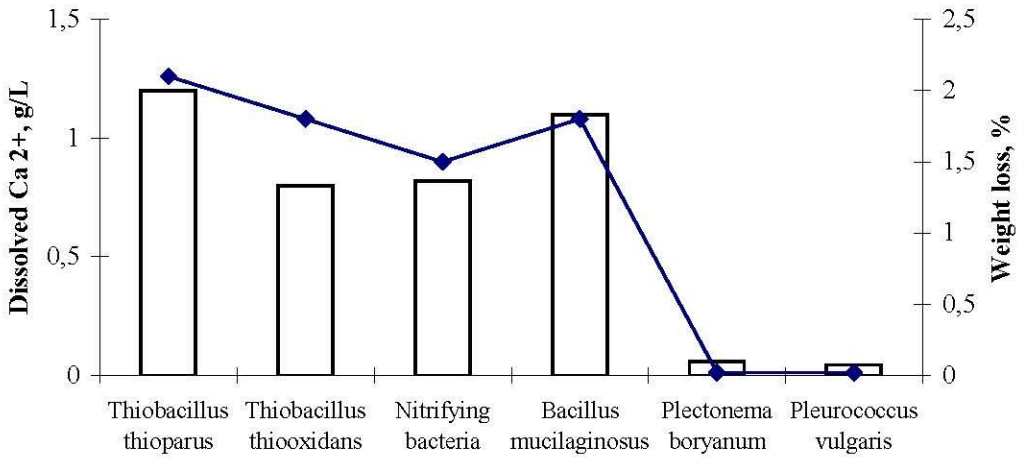

Figure 1. The impact of microorganisms on limestone degradation.

Nitrifying bacteria were detected at the walls of Dormition Cathedral and its amount was determined as $1*10^6$ cells/g of stone. Also, these bacteria were detected at limestone from quarry. The source of energy for nitrifying bacteria is the ammonium.

Construction of heavy, massive building of Congress Palace destroyed the water balance of Borovitski Hill. Oxigen-containing water reached layers, which before that they were in the anaerobic conditions. This is accelerated destruction of organic matters of "cultural layer" (rich on protein and amino acids). Underground water, containing ammonium, moved up and get pores of limestone, where nitrifying bacteria used ammonium salt and produce acids.

Besides traditional dilution methods for calculation of bacteria luciferin-luciferase technique was used. Number of bacteria reached $(1\text{-}2{,}75)*10^5$ cells/g in 1991 (Table 1). Lately, number of bacteria decreased, probably due to reduction of inflax of ammonium compounds.

Table 1. The samples of weathering on white stone, where nitrifying bacteria were found.

N	Sample	ATP	MPN* of cells per g
1	Dormition Cathedral XV c	0,020 nm/g	$2{,}75*10^5$
2	Same Cathedral, south portal	0,016 nm/g	$2{,}00*10^5$
3	Same place, west wall near entrance	0,016 nm/cm^2	$2{,}00*10^5$
4	Same place, east wall of building, out side	0,010 nm/g	$1{,}40*10^5$
5	Chamber of justice, basement, west wall	0,014 nm/g	$1{,}75*10^5$
6	Same place, sarcophagus XVII c	0,006 nm/cm^2	$0{,}74*10^5$
7	Same place, plaster	0,006 nm/cm^2	$0{,}74*10^5$
8	Same place, sarcophagus after restorative cleaning	0,0075 nm/cm^2	$0{,}93*10^5$

*MPN – most probable number

As any sedimentary rocks, limestone contains organic matter, which allows some heterotrophic bacteria develop. Content of organic carbon in some limestone samples was 0.01%. X-ray microanalysis is show presence of biogenic elements: phosphor and iron. Model experiments with fungi (family *Deuteromycetae*) show development of black mycelium on the surface of limestone cubes after 6 days.

Study of the ultrathin sections under electron microscope is allows identify some microorganisms according its morphology. Also, its shows that some dead microorganisms can be use by another one. Figure 2 (a, b) present *Azotobacter*, it is very important member of microbial community, which fixate N_2 from air. On the Fig. 2b capsule of *Azotobacter* was used by actinomycetes. Different bacteria lay around dead alga cell on Fig. 2c. Also, actinomycetes can used fungal cell wall (Fig. 2g). We find *Nitrosospira briensis* (Fig. 2d) attached to the mineral surface and *Nirosolobus multiformis* around gram-negative bacteria (Fig. 2h).

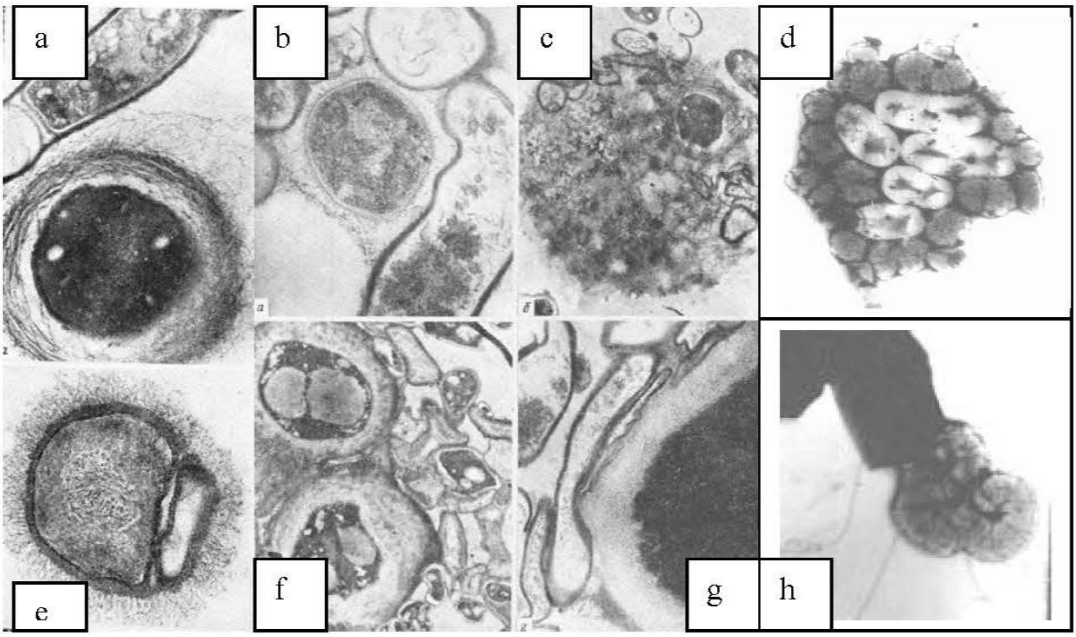

Figure 2. Ultrathin sections of biofilm from frescoes. a- *Azotobacter* and actinomycetes; b- *Azotobacter* capsule are using by actinomycetes; c- dead cell of microalga and different bacteria around; d- *Nirosolobus multiformis* around gram-negative bacteria; e- *Rhodococcus* sp.; f- association of actinomycetes and algae; g- fungal cell wall are using by actinomycetes; h- *Nitrospira briensis* attached to the mineral surface.

During 1995 Dr. Petushkova monitored three main Kremlin Cathedrals. Samples were taken from walls, sarcophagi and basements. Also, the excavation at Dormition Cathedral allows take ancient foundation. Besides nitryfing, thionic bacteria, which produce sulfur acid, were wide spread. (Table 2 and Fig.3). Heterotrophic bacteria and fungi were detected as well.

Table 2. The location of probes in the Cathedrals.

Archangel Michael Cathedral	
A2	East wall, 80 cm from floor, destroyed brick
A3	Same place, 190 cm, destroyed brick
A8	Sarcophagus N 53 A-812, vertical side, limestone
A9	Sarcophagus N 54 A-785, horizontal side, destroyed limestone
A11	Sarcophagus N 51 A-837, horizontal side, black spots on limestone
Annunciation Cathedral	
B12	Altar basement, south wall, 110 cm, colored limestone
B13a	Same place, 165 cm, salts on limestone
B14	North wall, near floor, pink colored limestone
Dormition Cathedral	
D0	Central pit, limestone bricks 1472
D1	North pit, west side, salts on limestone
D7	West entrance, right wall, destroyed floor

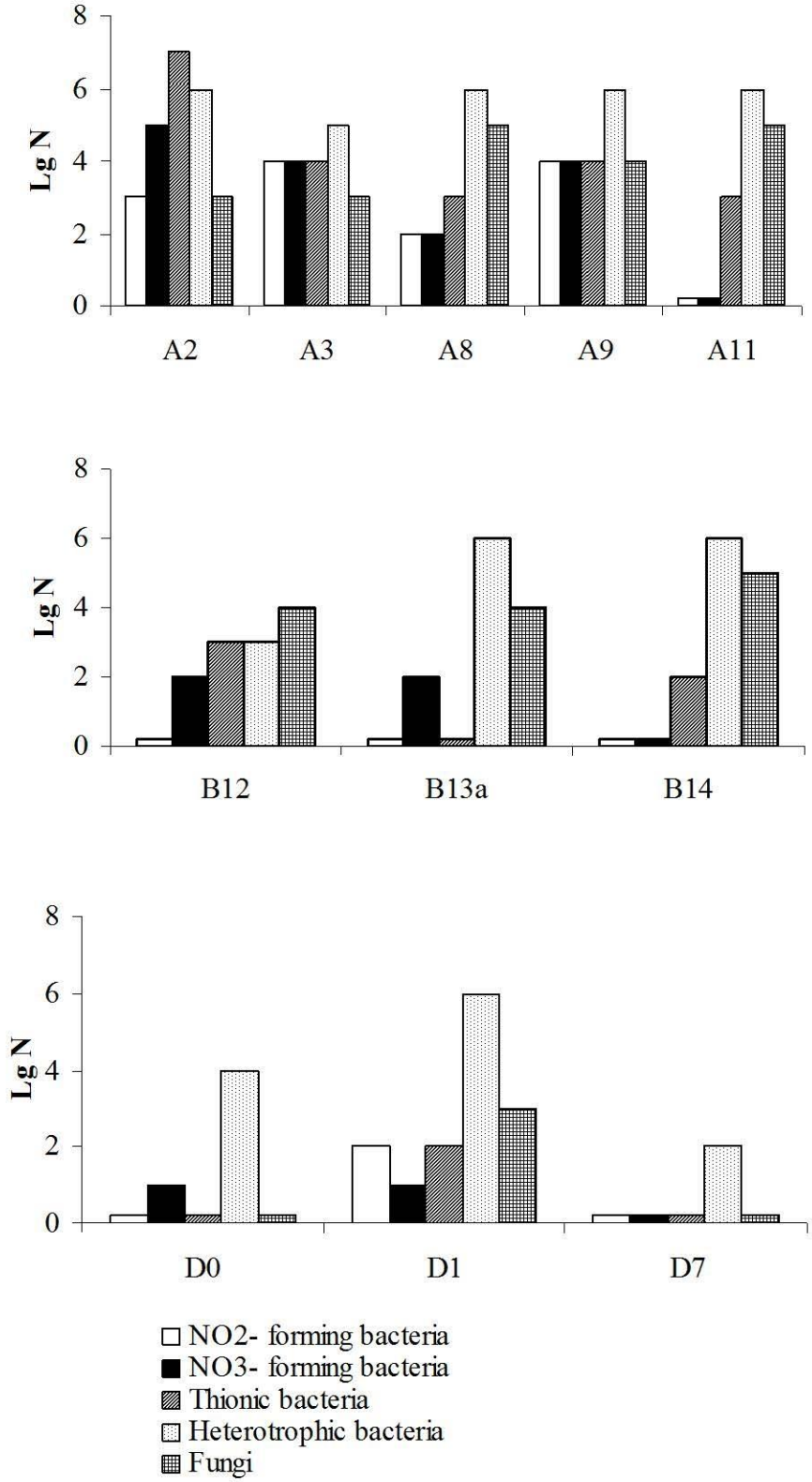

Figure 3. The amount of microorganisms in the samples from A- Archangel Michael, B- Annunciation and D– Dormition Cathedrals in the march 1995, where N- number of cells per g of sample.

Conclusion

As it was mentioned above, construction of Congress Palace resulted in sharp increasing of bacterial number and acceleration of destruction of Cathedrals of XVcc. Necessary considerate the architectural rule: which prohibit to construct massive buildings with deep foundation in the historical area.

Considering different sources of ammonium, which used by nitrifying bacteria, we are paid attention to a number of visitors in the Cathedral. According to investigation of Space Institute (Moscow, Russia), men produce 8 mg NH_3 per hour. After 1000 visitors during 1 hour, amount of NH_3 could be 8 g, enough for bacterial development. Therefore, it is necessary to decrease the number of visitors.

Also, keep in mind usual precaution for humidity.

The cited examples point to the importance of microbial deterioration processes associated with architectural monuments and to the necessity of microbiological control to conserve the cultural heritage of humanity for future generation.

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3. Medvedeva-Lyalikova N.N., Petushkova Ju.P., Khizhjak T.V., Krumbain W.E. Microflora and biodeterioration of lime-stone and marbles from Russian monuments. Eurocare-Euromarble, Proceedings, Workshop, 7 October 1996, Patras, Greece, pp.173- 179.

ΚΑΤΕΡΙΝΑ ΜΑΝΟΥΣΟΥ-ΝΤΕΛΛΑ
Αρχιτέκτων 4ης Ε.Β.Α.

ΜΕΣΑΙΩΝΙΚΗ ΤΑΦΡΟΣ ΤΗΣ ΠΟΛΗΣ ΤΗΣ ΡΟΔΟΥ.
«Μετασχηματίζοντας το μνημειακό χώρο με τους πολίτες, για την πόλη»

«Κάθε πολιτισμός άφησε τη δική του αστική κληρονομιά και συνέβαλε στο να καθοριστεί το πλαίσιο όπου οι άνθρωποι συνεχίζουν ακόμη και σήμερα να ζουν ανάμεσα στους καταναγκασμούς του παρελθόντος, ενώ οι συνθήκες που καθόρισαν τη δημιουργία αυτού του παρελθόντος έπαψαν να ισχύουν».

Fernard Braudel, Maurice Aumard - Filippo Coarelli
«Η Μεσόγειος, ο Χώρος και η Ιστορία»

Είναι φανερό ότι το ζήτημα της «προστασίας, διαμόρφωσης και ανάδειξης του μνημειακού συνόλου των μεσαιωνικών οχυρώσεων της πόλης της Ρόδου» έχει ήδη απασχολήσει μέχρι σήμερα πολλές γενιές ανθρώπων και θα συνεχίσει να απασχολεί και τις επόμενες γενιές*.

Αυτό που σίγουρα κερδήθηκε μετά από σκληρές μάχες των κατά καιρούς υπευθύνων, είναι να έχουμε τη μοναδική οχύρωση μεσαιωνικής πόλης στην Ελλάδα, που διατηρείται σχεδόν ανέπαφη, στη μορφή που την άφησαν οι Ιππότες του Αγίου Ιωάννη το 1522 (εικ. 1).

Ιστορικής σημασίας πρωτοποριακή ενέργεια υπήρξε η κήρυξη από τους Ιταλούς της «Μνημειακής ζώνης της μεσαιωνικής πόλης», που περιέλαβε και ζώνη προστασίας - πρασίνου- γύρω από τις οχυρώσεις και την τάφρο, ήδη το 1929[1] (εικ. 2).

Εξίσου σημαντική όμως ήταν και η σθεναρή αντίσταση του πρώτου Έλληνα Εφόρου Αρχαιοτήτων Ιωάννη Κοντή, αλλά και όλων αυτών που τον διαδέχθηκαν μέχρι σήμερα, απέναντι σε κάθε ενέργεια υποβάθμισης και κατάληψης χώρων του μνημειακού συνόλου και ιδιαίτερα του αρχαιολογικού χώρου της μεσαιωνικής τάφρου.

Μετά την ένταξη της μεσαιωνικής πόλης της Ρόδου στον «Κατάλογο των Πόλεων της Παγκόσμιας Κληρονομιάς» με απόφαση της UNESCO το 1988[2] και σύμφωνα με τις σύγχρονες αντιλήψεις, το ελληνικό κράτος έχει την υποχρέωση να αναλάβει την προστασία και την ανάδειξη των μνημείων και των μνημειακών συνόλων που περιλαμβάνει «προς Όφελος της Ανθρωπότητας».

Ήδη όμως από το 1983 είχε διαφανεί η πρόθεση των συναρμόδιων κρατικών και τοπικών φορέων για την αναβάθμιση των χώρων του μνημειακού συνόλου των οχυρώσεων και της τάφρου[3]. Το 1987 ξεκινούν οι πρώτες επεμβάσεις συντήρησης - αποκατάστασης των οχυρωματικών κατασκευών από ομάδα επιστημόνων και τεχνικών του Γραφείου Προγραμματικής Σύμβασης ΥΠ.ΠΟ. – Τ.Α.Π.Α. – Δήμου Ροδίων, οι οποίες συνεχίζονται και

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* Το παρόν άρθρο αποτελεί τμήμα του αδημοσίευτου *Σχεδίου προστασίας – διαμόρφωσης – ανάδειξης του μνημειακού συνόλου των μεσαιωνικών οχυρώσεων της πόλης της Ρόδου. Μέρος Α΄. Χερσαίο τμήμα οχυρώσεων και αρχαιολογικός χώρος μεσαιωνικής τάφρου,* που εκπονήθηκε στο πλαίσιο της 4ης Εφορείας Βυζαντινών Αρχαιοτήτων το Σεπτέμβριο του 2000. Το Σχέδιο εγκρίθηκε με απόφαση του Υπουργείου Πολιτισμού στις 14-2-2003, μετά από ομόφωνη γνωμοδότηση του Κεντρικού Αρχαιολογικού Συμβουλίου.

[1] L. Ciacci, *Rodi Italiana (1912-1923),* Venezia 1991, σ. 140 κ.ε., σχ. 63.

[2] UNESCO, *Cités souvenir, cités d'avenir, Villes du Patrimoine Mondial,* Musée de la Civilisation, Québec 1991, σ. 128.

[3] Κ. Μανούσου-Ντέλλα, *Μεσαιωνική πόλη Ρόδου. Έργα αποκατάστασης (1985-2000),* Ρόδος 2001, σ. 62.

μετά το 1995 από το Υπουργείο Πολιτισμού (4η Εφορεία Βυζαντινών Αρχαιοτήτων και «Επιτροπή Παρακολούθησης Έργων στα Μνημεία της Μεσαιωνικής Πόλης της Ρόδου» του Τ.Δ.Π.Ε.Α.Ε.).

Η ίδια σχεδόν τεχνική ομάδα μετασχηματίσθηκε και οργανώθηκε, στο πλαίσιο και των τριών πιο πάνω φορέων, σε έναν αξιόλογο και αξιόμαχο μηχανισμό υλοποίησης έργων μεγάλης κλίμακας, τόσο σε ό,τι αφορά την αποκατάσταση - στερέωση των κατασκευών, όσο και τη διαμόρφωση - ανάδειξη των χώρων του αρχαιολογικού περιπάτου της τάφρου. Στο πλαίσιο της ομάδας αυτής[4], που λειτουργεί μέχρι σήμερα με την ενεργή στήριξη του Επιτίμου Εφόρου Αρχαιοτήτων κ. Ηλία Κόλλια, προέδρου της «Επιτροπής Παρακολούθησης Έργων στα Μνημεία της Μεσαιωνικής Πόλης της Ρόδου», εξειδικεύεται προσωπικό, τόσο επιστημονικό - τεχνικό, όσο και εργατοτεχνικό, και καλλιεργείται ένας δυναμισμός και μία δυνατότητα παρέμβασης για αντιμετώπιση όλων των ειδών των προβλημάτων στο μνημειακό σύνολο.

Σήμερα, μετά από 16 χρόνια επεμβάσεων και παρά τα σημαντικά προβλήματα επιδείνωσης της κατάστασης διατήρησης των οχυρωματικών κατασκευών κατά την ίδια χρονική περίοδο, μπορούμε να πούμε ότι έχει συντελεστεί μια θεαματική αλλαγή στη μορφή των μνημειακών χώρων, αλλά και στην αντίληψη των πολιτών της Ρόδου γενικότερα για τις οχυρώσεις και ειδικότερα για το πολιτιστικό τοπίο της τάφρου.

Το καλοκαίρι του 2000 για πρώτη φορά παραδόθηκε στο κοινό το σύνολο του αρχαιολογικού περιπάτου της τάφρου[5] (σχ. 1). Κύριο χαρακτηριστικό της σύγχρονης παρέμβασης στις μεσαιωνικές οχυρώσεις και την τάφρο, εκτός των άλλων, είναι η ελεύθερη απόδοση του χώρου προς τους πολίτες και τους πολυάριθμους επισκέπτες της πόλης, σύμφωνα με τις σύγχρονες αντιλήψεις περί ενεργού προστασίας και εξασφάλισης της μελλοντικής συντήρησης και διαχείρισης των μνημείων από το κοινωνικό σύνολο, που επιτυγχάνεται μόνο με τη λειτουργική επανένταξή τους στη σύγχρονη ζωή της πόλης[6].

1. Διαμόρφωση του ιστορικού τοπίου της τάφρου

Ο ελεύθερος χώρος της μεσαιωνικής τάφρου είναι ένα κατεξοχήν «ανθρωπογενές περιβάλλον», που διατηρεί την αρχική του μορφή ως οχυρωματικό «χαντάκι», παρότι οι συνθήκες που καθόρισαν τη δημιουργία του έπαψαν προ πολλού να ισχύουν (εικ. 3). Ο χώρος αυτός, που πρόσφατα χαρακτηρίστηκε ως «αρχαιολογικός χώρος»[7], μας παραδίδεται φορτισμένος με ιστορικές μνήμες όλων σχεδόν των εποχών της πόλης, σε μία κατάσταση εξαιρετικά εύθραυστης οικολογικής ισορροπίας (εικ. 4).

Η τάφρος είναι ένα «πολιτιστικό τοπίο», στο πλαίσιο του οποίου συνδυάζονται με τρόπο μοναδικό η έννοια του σημαντικού για τη διαχρονική εξέλιξη της πόλης της Ρόδου αρχαιολογικού χώρου με το φυσικό περιβάλλον και το δομημένο-μνημείο, με την ιδιαίτερη βαρύτητα που το χαρακτηρίζει.

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[4] Εκτός από την αρχαιολόγο Άννα-Μαρία Κάσδαγλη, στενή συνεργάτη σε όλη αυτή την πορεία, πρέπει να αναφερθεί η ουσιαστική συμμετοχή του επιβλέποντος τα έργα Κυριάκου Θαρρενού, ιδιαίτερα στον τομέα των εφαρμογών συχνά πρωτότυπων αρχιτεκτονικών και τεχνικών λύσεων. Επίσης ο καθηγητής του Α.Π.Θ. κ. Κυριαζής Πιτιλάκης υπήρξε στενός συνεργάτης, η συμβολή του οποίου δημιούργησε πρότυπη μεθοδολογία στερεωτικών επεμβάσεων στις ογκώδεις οχυρωματικές κατασκευές, κυρίως σε ό,τι αφορά την έδρασή τους και τα γεωτεχνικά προβλήματα των επιχωμένων τμημάτων τους. Τέλος, πρέπει να τονιστεί η συμβολή του μεγάλου συνεργείου εργατοτεχνιτών, που έδωσαν και δίνουν την ψυχή τους και το ταλέντο τους στις εξειδικευμένες τεχνικές εργασίες που αναλαμβάνουν, μαζί με την αγάπη τους, που είναι πηγή ζωής για τα μνημεία.

[5] Κ. Μανούσου-Ντέλλα, ό.π. (σημ. 3), σ. 94-95.

[6] Δ. Ζήβας, *Τα μνημεία και η πόλη,* Αθήνα 1991.

[7] Αποφασιστικής σημασίας ενέργεια για τη μελλοντική διαχείριση του μνημειακού συνόλου των οχυρώσεων είναι ο χαρακτηρισμός του ελεύθερου χώρου της μεσαιωνικής τάφρου ως «αρχαιολογικού χώρου», του οποίου την ευθύνη ανάδειξης, συντήρησης και λειτουργίας θα αναλάβει το Υπουργείο Πολιτισμού δια της 4ης Εφορείας Βυζαντινών Αρχαιοτήτων (ΦΕΚ 11093/τ. Β/21-8-01).

Ενταγμένη στην πόλη της Ρόδου, σε έναν από τους πιο χαρακτηριστικούς χώρους της Μεσογείου και σταυροδρόμι ναυτικού εμπορίου, δέχτηκε μια διαδοχή πολιτισμών, που συσσωρεύτηκαν ο ένας πάνω στον άλλο.

Στην αρχική της μορφή υπήρξε χώρος αδιαμόρφωτος και χώρος λατόμευσης - άντλησης υλικού για την κατασκευή των τειχών, όπου δεν προβλεπόταν η παρουσία του ανθρώπου και κυριαρχούσε το φυσικό πέτρωμα, η άγρια φυσική βλάστηση αλλά και τα σκουπίδια, ιδιαίτερα σε περιόδους ειρήνης. Σε περιόδους πολιορκίας, οι υπερασπιστές της πόλης φρόντιζαν για την αποψίλωση και την καθαριότητα του χώρου, ώστε να διατηρεί τα χαρακτηριστικά για τα οποία κατασκευάστηκε, ως χώρος διαχωρισμού της φονικής οχύρωσης από τη γύρω ύπαιθρο στον οποίο ο εχθρός να βρίσκεται εντελώς ακάλυπτος απέναντι στα πυρά των πολιορκούμενων.

Η ουδέτερη ζώνη γύρω από την οχύρωση (terra deserta) περιελάμβανε τη βαθιά σκαμμένη τάφρο και το περιμετρικό οχυρωματικό πρανές (glacis) στη στάθμη του κάμπου προς την ύπαιθρο.

Στη διάρκεια των αιώνων που ακολούθησαν τη μακρόχρονη πολιορκία και την τελική άλωση της ιπποτικής πόλης από τους οθωμανούς Τούρκους το 1522, ο μεν χώρος του «glacis» χρησιμοποιήθηκε ως εκτεταμένο μουσουλμανικό και εβραϊκό νεκροταφείο (εικ. 5), εισάγοντας την ανθρώπινη παρουσία με εντελώς ειδική μορφή, ο δε χώρος της τάφρου περιήλθε σε μία κατάσταση χαρακτηριστικής αστάθειας, ως όριο ανάμεσα στη ζώνη της αστικής επικράτειας και στα καλλιεργημένα χωράφια και κήπους έξω από την πόλη[8].

Η διαδικασία κατασκευής των οχυρωματικών έργων υπήρξε μία δυναμική ενέργεια του ανθρώπου, που είχε στόχο να καθυποτάξει τη φύση, εντάσσοντας τις ογκώδεις επιχωματωμένες κατασκευές (terre-plein) των προχωμάτων και των προμαχώνων ως κυρίαρχα στοιχεία γύρω από την πόλη. Αποτέλεσμα της σημαντικής αυτής δράσης υπήρξε συχνά η πλήρης αλλοίωση του φυσικού αναγλύφου του εδάφους και βέβαια η εξαφάνιση της φυσικής βλάστησης από τους χώρους των οχυρωματικών κατασκευών και της νεκρής ζώνης γύρω τους (εικ. 6).

Στη διάρκεια της μακράς περιόδου ειρήνης που ακολούθησε την οθωμανική κατάκτηση (pax ottomana), ο χώρος της τάφρου υπέστη συνεχείς μεταλλαγές εκμετάλλευσης, ιδιαίτερα κατά την περίοδο μετά την Ενσωμάτωση, που υποβάθμισαν αισθητά το χώρο και τον κατέστησαν σταδιακά χώρο δράσης περιθωριακών στοιχείων.

Μετά τη δυναμική ιταλική παρέμβαση απομάκρυνσης των νεκροταφείων από το χώρο του «glacis» και τη συστηματική διαμόρφωση περιμετρικού πάρκου, επήλθε ισορροπία, αφού αναπτύχθηκε μια μικρή παρυφή δάσους στην καρδιά της σύγχρονης Ρόδου ως ζώνη προστασίας της τειχισμένης πόλης (εικ. 7).

Αντίθετα στην τάφρο, παρά τις κατά καιρούς προσπάθειες για έλεγχο και εξυγίανσή της, η διαπιστωμένη εύθραυστη ισορροπία και η απουσία ανθρώπινης χρήσης οδηγούσε σε υποβάθμιση των μνημειακών χώρων και μη συμβατή χρήση τους (εικ. 8).

Είναι σαφές ότι η φύση έχει την τάση να ξανακερδίζει γρήγορα το χώρο από τον οποίο εκδιώχθηκε εξαιτίας της δράσης του ανθρώπου. Αυτό είναι προφανές και στο μνημειακό σύνολο των οχυρώσεων της Ρόδου, όπου το μικροκλίμα ευνοεί κάθε είδους βλάστηση, τόσο στους ελεύθερους χώρους της τάφρου, των προτειχισμάτων και των επιχωματωμένων τμημάτων, όσο και πάνω στις ίδιες τις τοιχοποιίες των οχυρωμάτων (εικ. 9). Ιδιαίτερα στα σημεία που το μνημείο αστοχεί με εκδήλωση κατάρρευσης, όπως στα τμήματα του αναλήμματος της τάφρου (contrascarpa), η φύση εισβάλλει, καλύπτοντας τα ερείπια με πυκνή βλάστηση και δέντρα, που στερεώνουν τα νέα αυτά πρανή (εικ. 10).

[8] F. Braudel, M. Aumard, F. Coarelli, *Η Μεσόγειος. Ο χώρος και η ιστορία,* Αθήνα 1990.

Η έντονη αυτή παρουσία της φύσης στη σύγχρονη μορφή του μνημείου αποτελεί ευχάριστη έκπληξη για τον επισκέπτη-περιπατητή και ποικίλλει το ιστορικό τοπίο της τάφρου.

Στο πλαίσιο της σύγχρονης παρέμβασης, που ήδη βρίσκεται σε εξέλιξη, συντελείται μια θεμελιακή αλλαγή του χαρακτήρα του χώρου και επιδιώκεται να επιτευχθεί μια νέα ισορροπία. Η ισορροπία αυτή θα πρέπει να έχει στόχο την ανάδειξη του πολιτιστικού τοπίου, έτσι ώστε ο επισκέπτης να απολαμβάνει την ευχαρίστηση του περιπάτου σε ένα εξαιρετικό φυσικό περιβάλλον, ταυτόχρονα με την περιπλάνησή του στο χρόνο και τη μεταφορά του στις διάφορες ιστορικές περιόδους της πόλης, με κυρίαρχη βέβαια την ιπποτική περιόδο. Είναι φανερό εξάλλου ότι, εφόσον ο συγκεκριμένος χώρος εντάσσεται στο μεσογειακό περίγυρό του με τα ιδιαίτερα χαρακτηριστικά της ένωσης της θάλασσας με τον ήλιο, του αναγλύφου με τη βλάστηση μιας φύσης γενναιόδωρης και ενός παράξενου κλίματος, εχθρικού προς τη ζωή των φυτών, η επίτευξη κάποιας ισορροπίας θα πρέπει να βασιστεί στην εξασφάλιση συνεχούς προσοχής και φροντίδας. Μόλις ο άνθρωπος χαλαρώσει, ο χώρος της τάφρου έχει την τάση να κυριεύεται από σκουπίδια και αγριόχορτα και να ξαναγίνεται βάλτος. Η εύθραυστη ισορροπία του τοπίου, που χαρακτηρίζεται από τέτοιες αντιθέσεις, δημιουργεί ιδιαίτερες απαιτήσεις διαχείρισής του μετά την ολοκλήρωση της διαμόρφωσης.

Σημαντικό ρόλο στο χαρακτήρα διαμόρφωσης του πυθμένα της τάφρου έχει και η διαχείριση και εμπλουτισμός της φυσικής βλάστησης στα διάφορα τμήματα του χώρου. Ο χώρος της τάφρου είναι ένα χαρακτηριστικό οικοσύστημα του Αιγαίου[9] με έδαφος σχετικά φτωχό και ευαίσθητο. Στη μορφή που μας παραδόθηκε περιλαμβάνει αρκετά μεγάλα δέντρα, τα οποία αναπτύχθηκαν εκεί μετά την τουρκοκρατία, είτε ως αυτοφυή είτε ως κατάλοιπα παλαιότερων διαμορφώσεων. Αυτοφυή πρέπει να είναι πολλά κυπαρίσσια, οι γραμμιθιές, η μελικουκιά, η τρικουκιά και πιθανόν κάποιες χουρμαδιές[10]. Τα δέντρα αυτά, μεταξύ των οποίων και μια σπάνια βελανιδιά και μια τρικουκιά (κουδουμηλιά), από τις λίγες που υπάρχουν μόνο στη Ρόδο και την Κρήτη, θεωρούνται διατηρητέα στοιχεία του μνημειακού περιβάλλοντος, πολύτιμα για τη νέα διαμόρφωσή του. Βέβαια δεν συνιστάται η αύξησή τους, ιδιαίτερα προς την πλευρά των τειχών, των πύργων και των προμαχώνων.

Λόγω των εκτεταμένων χωματουργικών εργασιών των τελευταίων χρόνων, δεν έχουν απομείνει παρά ελάχιστοι θάμνοι, αρκετές αυτοφυείς λυγαριές και πικροδάφνες, που έχουν αναπτυχθεί κυρίως στη βάση του αναλήμματος. Η βλάστηση που καλύπτει τα σημεία που δεν έχουν διαταραχθεί πρόσφατα αποτελείται κυρίως από ετήσια αγρωστώδη, ετήσια και πολυετή αγριολούλουδα και λίγα φρύγανα και είναι υποβαθμισμένη λόγω της συνεχούς βόσκησης ζώων μέχρι το 1998.

Κατά τη νέα διαμόρφωση της τάφρου, σύμφωνα με τις σύγχρονες αντιλήψεις για την ανάδειξη των πολιτιστικών τοπίων, επιδιώκεται μέσα από τις αντιθέσεις στην απόδοση του ύφους του ιστορικού τοπίου των διαφόρων τμημάτων της, ο τονισμός των χαρακτηριστικών κάθε χώρου, χωρίς να δημιουργείται πάρκο περιπάτου καλλωπιστικών φυτών (εικ. 11).

Έτσι διακρίνουμε:

α) Την ένταξη χώρων πρασίνου ως υλικού πλήρωσης των μη βραχωδών τμημάτων και πλαίσιο ανάδειξης των μνημείων εκεί όπου προβλέπεται η διαμόρφωση πρανών φυσικού εδάφους ως χώρων επισκέψιμων και χρηστικών, και

β) χώρους αποψιλωμένους και χέρσους, εκεί όπου αναδεικνύονται αρχαία ίχνη σε βραχώδες υπόστρωμα ή επιλέγονται για την ανάδειξη του αρχικού χαρακτήρα του οχυρού.

Οι χώροι πρασίνου πρέπει να πληρούν κάποιες βασικές προϋποθέσεις αρχιτεκτονικής ένταξης, κυρίως όσον αφορά την εσωτερική τους κλίμακα και τις δυνατότητες κυκλοφορίας και χρήσης τους, ώστε να είναι χώροι προσιτοί στους περιπατητές.

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[9] Κ. Βασιλάκης, «Το φυσικό περιβάλλον του Αιγαίου», *Επτά Ημέρες. «Αιγαιοπελαγίτικη φύση»* (*Καθημερινή,* 4-6-2000), σ. 2-3.

[10] Σ. Γεραβέλης, *Πρόταση φυτοτεχνικής διαμόρφωσης του τοπίου της τάφρου,* Ρόδος, Οκτώβριος 1998.

Το γρασίδι, που έχει ήδη εγκατασταθεί, προτείνεται να επεκταθεί και στα νέα πρανή, πιθανότατα εμπλουτισμένο με σπόρους αγριολούλουδων (χαμομηλιού και άκανθας), που επιτυγχάνουν ταχεία εδαφοκάλυψη και προστασία του εδάφους από τη διάβρωση. Οι χώροι πρασίνου αυτού του τύπου προτείνεται να εμπλουτισθούν με τη σπορά ή φύτευση ντόπιων ειδών, εδαφοκλιματικά προσαρμοσμένων (εικ. 12), που να μην έχουν μεγάλες απαιτήσεις ποτίσματος, να μη χρειάζονται ιδιαίτερη φροντίδα για συντήρηση, να είναι ανθεκτικά σε ασθένειες και πλούσια σε μυθολογικές και ιστορικές αναφορές[11]. Προτείνονται τα παρακάτω είδη:

α) Φυτά της μυθολογίας: μυρτιά, ασφόδελος, λυγαριά, ελιά, νάρκισσος κλπ.

β) Αρωματικά φυτά: ρίγανη, μέντα, λεβάντα κλπ.

γ) Θάμνοι των μεσογειακών θαμνότοπων: σχίνος, αλισφακιά, λαδανιά, θυμάρι, σπάρτο, ασπάλαθος, πουρνάρι κλπ.

Συστηματική παρατήρηση του χώρου της τάφρου κατά τα τελευταία 15 χρόνια έχει οδηγήσει στο συμπέρασμα ότι τα επιμέρους τμήματά του, ανάλογα με τον προσανατολισμό τους, παρουσιάζουν διαφορετικό μικροκλίμα και ευνοούν ιδιαίτερους τύπους βλάστησης, ακόμη και την ίδια εποχή του χρόνου, όπως π.χ. χαρακτηριστικά διαπιστώνεται στην περίπτωση των αυτοφυών λυγαριών του τομέα της «γλώσσας» της Γερμανίας (εικ. 13). Ανάλογα λοιπόν με το μικροκλίμα γίνεται και η επιλογή του τύπου βλάστησης κάθε τμήματος της τάφρου, ώστε να δημιουργηθεί ένα φυσικό τοπίο σαν αυτό που θα υπήρχε από μόνο του, αν ο χώρος είχε μείνει αδιατάρακτος για αρκετό χρονικό διάστημα.

Η φυσική βλάστηση του χώρου εποχιακού χαρακτήρα προτείνεται να διατηρηθεί σε όλη την έκταση της τάφρου ως κοινό στοιχείο σύνδεσης των επιμέρους διαμορφώσεων, ακόμη και στα τμήματα που επιδιώκεται να διατηρούνται χέρσα με ειδικούς ψεκασμούς - καταπολέμηση της ανεπιθύμητης βλάστησης.

Οι χώροι αυτοί των «φυσικών λιβαδιών» προτείνεται να καθαρίζονται συστηματικά μετά το τέλος της ανθοφορίας και να οργώνονται ώστε να διατηρούν μια περιποιημένη χωμάτινη όψη, εκεί όπου δεν προβλέπεται χρήση τους κατά την καλοκαιρινή περίοδο. Έτσι το έδαφος θα διατηρεί τους σπόρους μέχρι την εκ νέου ανάπτυξη των φυτών την επόμενη χειμερινή περίοδο. Στα σημεία όπου διατηρείται αδιατάρακτη η φυσική βλάστηση, όπως π.χ. πίσω από το πρόχωμα της Αγγλίας προς τα ανατολικά, προβλέπεται προσεκτικό καθάρισμα των ανεπιθύμητων ειδών με τα χέρια δυο ή τρεις φορές το χρόνο, ώστε να παραμένουν τα αγρωστώδη και όσα άλλα φυτά δεν ενοχλούν την ομοιομορφία του τοπίου (εικ. 14).

2. Θεωρητικό πλαίσιο – Γενικές αρχές των επεμβάσεων

Στο πλαίσιο των γενικών αρχών που ήδη έχουν διατυπωθεί[12], προχώρησαν και προχωρούν μέχρι σήμερα πειραματικές επεμβάσεις, που ακολούθησαν την κατασκευή υπόγειου αγωγού για την απορροή των ομβρίων υδάτων προς το λιμάνι της Ακαντιάς και προς το Μανδράκι.

Στα δύο αυτά ακραία τμήματα της τάφρου αποφασίσθηκε να υλοποιηθεί η διαμόρφωση, σε βαθμό που να καθίσταται ο χώρος επισκέψιμος και να προσελκύει τους ενδιαφερόμενους να τον περπατήσουν και να γνωρίσουν καλύτερα το οχυρωματικό συγκρότημα της πόλης της Ρόδου.

Μετά την επίχωση της εκσκαφής στον άξονα της τάφρου και τη διαμόρφωση των φρεατίων στις παρυφές του συνεχούς δρομίσκου που τη διασχίζει, τονίζοντας τη γραμμική ανάπτυξη του περιπάτου και οδηγώντας τον περιπατητή, ακολούθησε συστηματική επιφανειακή διερεύνηση - αναγνώριση της εδαφικής υπόστασης του πυθμένα της.

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[11] Ν. Μάργαρης, *Κείμενο εργασίας για την ανάπλαση της τάφρου της Ρόδου,* 3-4-1997.

[12] Κ. Μανούσου-Ντέλλα, «Προς ένα σχέδιο ολοκληρωμένης αποκατάστασης του μνημειακού συνόλου των μεσαιωνικών οχυρώσεων της πόλης της Ρόδου», *Πρακτικά 4ου Διεθνούς Συνεδρίου για τη Συντήρηση των Μνημείων της Μεσογείου,* Ρόδος, 6-11 Μαΐου 1997, σ. 576-595.

Παρατηρώντας τη μορφή του φυσικού πετρώματος στις παρειές του χώρου, σε συνδυασμό με τα λαξεύματα και τις αρχαίες στοές που αποκαλύπτονται στα τμήματα που ο φυσικός βράχος εμφανίζεται επιφανειακά, διαπιστώνεται ότι η τάφρος χρησιμοποιήθηκε κατά την ιπποτική περίοδο ως χώρος συστηματικής λατόμευσης υλικού για την ανέγερση των οχυρωματικών κατασκευών. Ο χαρακτήρας αυτός του «λατομείου» καθίσταται κυρίαρχος ιδιαίτερα στο κεντρικό τμήμα –τομέας «γλώσσας» της Αγγλίας– αλλά και στο βορειοδυτικό τμήμα του χώρου, από τον προμαχώνα της Ωβέρνης μέχρι το παλάτι του Μεγάλου Μαγίστρου (εικ. 15). Είναι αξιοσημείωτο ότι η λατόμευση στο βραχώδες υπόβαθρο της ελληνιστικής «ιπποδάμειας» πόλης της Ρόδου έφερε στο φως, κατά μήκος της τάφρου, σημαντικά λείψανα της υποδομής της αρχαίας πόλης ως στοιχεία λαξευτά στο φυσικό βράχο, όπως τμήματα των αποχετευτικών αγωγών και του υδρευτικού δικτύου, σε συνδυασμό με αναρίθμητα πηγάδια, ιδιαίτερα στο βραχώδες έξαρμα βόρεια του προμαχώνα του αγίου Γεωργίου (εικ. 16).

Η μεσαιωνική τάφρος της Ρόδου είναι ένας χώρος όπου συνδυάζονται με τρόπο μοναδικό η έννοια του αρχαιολογικού χώρου με το φυσικό περιβάλλον και το δομημένο - μνημείο- με την ιδιαίτερη βαρύτητα που χαρακτηρίζει το οχυρωματικό σύνολο της Ρόδου.

α) Η ένταξη της τάφρου στην καρδιά της ελληνιστικής ιπποδάμειας πόλης της Ρόδου και το σημερινό επίπεδό της, που είναι 2-5 μέτρα χαμηλότερο από τη στάθμη των οδών της αρχαίας πόλης, επαυξάνουν τη σπουδαιότητά της ως αρχαιολογικού χώρου (εικ. 17). Πρέπει επίσης να σημειωθεί ότι στο εσωτερικό των προχωμάτων και προμαχώνων διατηρείται, στις περισσότερες περιπτώσεις, το φυσικό έδαφος και στα σημεία των καταρρεύσεων ή των επεμβάσεων στις μεσαιωνικές κατασκευές χρειάζεται αρχαιολογική έρευνα και μελέτη της στρωματογραφίας του εδάφους, που έχει πολλά να προσφέρει στη γενικότερη έρευνα για την πόλη της Ρόδου (εικ. 18).

β) Ταυτόχρονα η τάφρος αποτελεί έναν χώρο, όπου αναδεικνύονται θαυμάσια η σχέση του φυσικού με το δομημένο περιβάλλον όλων των ιστορικών περιόδων της πόλης και διατηρούνται ορατά αρκετά γεωλογικά στοιχεία σχετικά με το υπέδαφος και τον υδροφόρο ορίζοντα της πόλης της Ρόδου. Η εμφάνιση των δύο σχηματισμών του φυσικού ψαμμίτη, στον οποίο εδράζονται οι κατασκευές (του σχηματισμού της Ρόδου και του σχηματισμού Ασγούρου), και κυρίως η ύπαρξη χώρων συστηματικής λατόμευσης κατά μήκος της τάφρου, απ' όπου προήλθε το υλικό κατασκευής των μεσαιωνικών οχυρωματικών έργων, ποικίλλουν το περιβάλλον και δίνουν αισθητικό αποτέλεσμα μοναδικό για την ανάδειξη της ιστορικής εξέλιξης του χώρου (εικ. 19).

γ) Τέλος πρέπει να τονισθεί ότι ο χώρος της τάφρου είναι ένας ελεύθερος χώρος της πόλης με καταπληκτικό μικροκλίμα, που ευνοεί κάθε είδους βλάστηση, προσφέρει τη μοναδική θέα του επιβλητικού μνημείου των οχυρώσεων της Ρόδου, απ' όπου δίνεται η δυνατότητα επίσκεψης και κυκλοφορίας στους περισσότερους χώρους και στα περισσότερα επίπεδα του αμυντικού συστήματος και υπάρχει δυνατότητα πρόσβασης σε πολλά σημεία της μεσαιωνικής πόλης (εικ. 20).

Σημαντικό ζήτημα αρχής, που πρέπει από την αρχή να ξεκαθαριστεί, είναι ποιος πρέπει να είναι ο ρόλος που θα έχει ο χώρος της τάφρου στη δομή της σύγχρονης Ρόδου, σύμφωνα με τις νέες αντιλήψεις για την ένταξη των μνημείων στη ζωή της πόλης.

Πρέπει να τονισθεί ότι ο χώρος αυτός διατήρησε μέχρι σήμερα (οπωσδήποτε μέχρι το 1983) στοιχεία του αρχικού του χαρακτήρα της ουδέτερης ζώνης –«χαντάκι»–, που διαχωρίζει τη φονική οχύρωση από τη γύρω περιοχή ως ζώνη προστασίας και απομόνωσης, και καλύπτεται στο μεγαλύτερο τμήμα της από τα πυρά των υπερασπιστών της πόλης.

Στόχος της σημερινής επέμβασης είναι να μετατραπεί σε χώρο επισκέψιμο από το κοινό, που θα μπορεί να μεταφέρεται στην ατμόσφαιρα της τάφρου, δοκιμάζοντας σε κατάλληλα επιλεγμένες κεντρικές περιοχές της τα συναισθήματα δέους, ερημιάς και μοναχικότητας που προκαλεί ο περίπατος στο άμεσο περιβάλλον ενός φοβερού για την εποχή του οχυρού.

Η επέμβαση για αναβάθμιση του μνημειακού χώρου δεν πρέπει λοιπόν να τον μετατρέψει σε ένα ακόμη πολυσύχναστο τμήμα μιας από τις πιο τουριστικές μεσαιωνικές πόλεις της Ευρώπης.

Η περιήγηση της τάφρου θα πρέπει να είναι συνειδητή επιλογή του επισκέπτη που επιθυμεί να αναπαυθεί σε ένα χώρο περισυλλογής και αναψυχής και να απολαύσει τη θέα των μνημειακών οχυρωματικών έργων, τα οποία θα τον μεταφέρουν σε άλλη εποχή και θα τον πλουτίσουν συναισθηματικά (εικ. 21).

Ιδιαίτερο ενδιαφέρον παρουσιάζει η αντίληψη για το χώρο της τάφρου, όπως εκφράζεται σε άρθρο της ιταλικής περιόδου[13] σχετικό με τις εργασίες σ' αυτήν, η οποία πλησιάζει κατά πολύ τις σύγχρονες απόψεις για το χώρο. Το βόρειο τμήμα της τάφρου φαίνεται ότι διαμορφώθηκε ως ανθόκηπος κατά τα επόμενα χρόνια της ιταλικής περιόδου, ενώ στην περίοδο αυτή πιθανότατα ανάγεται και η φύτευση των επιβλητικών σήμερα φοινικόδενδρων που δεσπόζουν στη θέα του χώρου, ιδιαίτερα από την πύλη d'Amboise (εικ. 22). Ο χαρακτήρας αυτός της τάφρου ως διαμορφωμένου χώρου χάθηκε κατά τον Β΄ Παγκόσμιο Πόλεμο, οπότε χρησιμοποιήθηκε εκ νέου ως χώρος στρατωνισμού φρουράς.

Μεγάλο κεντρικό τμήμα της χρησιμοποιήθηκε τότε ως στρατόπεδο συγκεντρώσεως Ελλήνων Δωδεκανησίων, που ξεσηκώθηκαν εναντίον των Ιταλών κατακτητών[14] (εικ. 23).

Μετά την ενσωμάτωση της Δωδεκανήσου στην Ελλάδα, αναφέρεται εκ νέου χρήση του χώρου για καλλιέργεια και βοσκή ζώων, και μάλιστα μετά από ενοικίαση των αρμοδίων δημοσίων υπηρεσιών. Οι εκμεταλλευτές του χώρου χρησιμοποιούσαν ακόμη και τα εσωτερικά των πύργων και προμαχώνων, στα οποία δεν ήταν δυνατή η προσπέλαση της Αρχαιολογικής Υπηρεσίας. Στα χρόνια που ακολούθησαν, η κατάσταση του χώρου παρέμεινε υποβαθμισμένη, ενώ η ανεπιθύμητη βλάστηση δημιούργησε αδιαπέραστα τμήματα, κυρίως πίσω από τα προχώματα. Στα χρόνια αυτά η κατάσταση διατήρησης των οχυρωματικών κατασκευών επιδεινώθηκε αισθητά λόγω της ανεπαρκούς συντήρησής τους.

Η εικόνα εγκατάλειψης που παρουσίαζαν όλα αυτά τα μεταπολεμικά χρόνια οι οχυρώσεις της Ρόδου είχε ως αποτέλεσμα την αδιάφορη και αρνητική στάση των πολιτών, οι οποίοι συμπεριφέρονταν συχνά στο χώρο ως σκουπιδότοπο. Είναι χαρακτηριστικό ότι, μέχρι περίπου το 1986, τμήμα της τάφρου κοντά στην γέφυρα του αγίου Αθανασίου εχρησιμοποιείτο επίσημα ως «χώρος ρίψης μπάζων» (εικ. 24), ενώ στο ίδιο περίπου σημείο εκβάλλουν ακόμη και σήμερα (!!!) οχετοί ομβρίων αλλά και ακαθάρτων από το κεντρικότερο τμήμα της πόλης (εικ. 25). Η κατάσταση αυτή ευνοούσε βέβαια τη δράση περιθωριακών ατόμων και ομάδων με καταστροφικές ή άλλες τάσεις, καθιστώντας το χώρο απροσπέλαστο και συχνά επικίνδυνο, ενώ συχνά αναφέρεται σε έγγραφα του αρχείου της Αρχαιολογικής Υπηρεσίας ως εστία μόλυνσης και ασχήμιας για την πόλη της Ρόδου (εικ. 26).

Η οργανωμένη επέμβαση για αναβάθμιση του μνημειακού αυτού χώρου ξεκίνησε το 1983 με το ριζικό καθαρισμό - ξεμπάζωμα του πυθμένα της τάφρου[15], παρότι συχνά δημιούργησε προβλήματα και επιτάχυνε την εκδήλωση σημαντικών φθορών, που οφείλονταν κυρίως σε προβλήματα θεμελιώσεων των κατασκευών.

Η αλλαγή της αντίληψης των πολιτών της Ρόδου για το χώρο των οχυρώσεων υποβοηθήθηκε ιδιαίτερα από την ένταξη πολιτιστικών χρήσεων στους δύο σημαντικότερους προμαχώνες (του Αγίου Γεωργίου και του Carretto), κυρίως όμως από την ένταξη και

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[13] A. Maiuri, G. Jacopich, «Rapporto generale del Servizio Archéologico a Rodi e nelle isole dipendenti dall'anno 1912 all' anno 1927 », *Clara Rhodos* I (1928).

[14] Στ. Σελλάς, *Το στρατόπεδο συγκεντρώσεως των Δωδεκανησίων Ελλήνων υπηκόων της 28ης Οκτωβρίου 1940 –«Concentramento»– στη Ρόδο,* Ρόδος 1996.

[15] Ά. Ποζιόπουλος, «Οι φθορές στις οχυρωματικές κατασκευές και η αποτελεσματικότητα των επεμβάσεων της περιόδου 1983-1996 », *Πρακτικά 4ου Διεθνούς Συνεδρίου για τη Συντήρηση των Μνημείων της Μεσογείου,* Ρόδος, 6-11 Μαΐου 1997, σ. 635-646.

επιτυχημένη λειτουργία του θεάτρου της μεσαιωνικής τάφρου, που αργότερα ονομάσθηκε θέατρο «Μελίνα Μερκούρη» (εικ. 27).

Η σημερινή πιο οργανωμένη παρέμβαση, συνολικά στο μνημειακό χώρο των οχυρώσεων, σηματοδοτεί τη μεταβατική περίοδο προς μια νέα αντίληψη για την τάφρο και τη σημασία της για την πόλη της Ρόδου ως ελεύθερου χώρου περιπάτου - αναψυχής με έντονο το χαρακτήρα του αρχαιολογικού μνημειακού χώρου και τη δυνατότητα οργάνωσης ειδικών μουσειακών - εκθεσιακών και πολιτιστικών εκδηλώσεων (εικ. 28).

Η μεταστροφή αυτή της κοινής αντίληψης επιτυγχάνεται σταδιακά με την απόδοση όλο και περισσότερων χώρων στο κοινό, σε κατάσταση που να δημιουργούνται ευχάριστες συνθήκες περιπάτου και παραμονής σ' αυτούς και να φέρνουν σε επαφή τους επισκέπτες του χώρου με τα μνημεία όλων των εποχών που περιλαμβάνονται στα όριά του. Κύρια χαρακτηριστικά που εφαρμόζονται στη συνολική οργάνωση του αρχαιολογικού περιπάτου είναι (σχ. 1):

1. Η διατήρηση της αυτοτέλειας του χώρου ως αρχαιολογικού και του σαφούς διαχωρισμού του από τη νεότερη πόλη της Ρόδου, με δύο κύριες εισόδους, από το Μανδράκι και την Ακαντιά.

2. Η καλή επικοινωνία του με ενδιάμεσες εισόδους – εξόδους στο ύψος των κύριων πυλών της οχύρωσης, που λειτουργούν ως κόμβοι σύνδεσης του χώρου τόσο με την τειχισμένη, όσο και με τη νεότερη πόλη της Ρόδου.

3. Η διευκόλυνση της πρόσβασης, στα σημεία που το επιτρέπει η αρχιτεκτονική διάρθρωση του χώρου, προς το εσωτερικό της τειχισμένης πόλης, της οποίας αποτελεί οργανικό τμήμα.

Εξάλλου, οι γενικές αρχές που εφαρμόζονται κατά τη διαμόρφωση των χώρων του οχυρωματικού συνόλου είναι οι ακόλουθες (σχ. 2):

1. Ο περίπατος αναπτύσσεται γραμμικά κατά μήκος της τάφρου, όπως και κατά μήκος των οχυρωματικών κατασκευών (στον περίδρομο και τα προτειχίσματα) και του περιμετρικού πάρκου, επί του οχυρωματικού πρανούς προς τη σύγχρονη πόλη (εικ. 29).

2. Για λόγους τόσο αισθητικούς όσο και ενίσχυσης των θεμελιώσεων των οχυρωματικών κατασκευών, αλλά και καλύτερης φυσικής απορροής των ομβρίων υδάτων προς τον κεντρικό υπόγειο αγωγό, επιλέγεται η μορφή του στενού δρομίσκου πλάτους 4 μ. περίπου, που συνήθως διατάσσεται κεντρικά στο χώρο με πρανές από φυσικό έδαφος προς τη βάση των τειχών (εικ. 30). Άλλωστε αυτή είναι η μορφή του χώρου πριν τις πρόσφατες αποχωματώσεις, όπως τεκμηριώνεται από πλήθος παλαιότερες φωτογραφίες του αρχείου της Υπηρεσίας (εικ. 31).

3. Όπου αυτό είναι δυνατόν, με επιφανειακό καθαρισμό αποκαλύπτεται ο φυσικός βράχος, ο οποίος παραμένει ορατός στη διαμόρφωση του χώρου, ενώ επιδιώκεται τονισμός όλων των ιχνών, λαξευμάτων κλπ. των αιώνων, που μεσολάβησαν από την ίδρυση της πόλης της Ρόδου μέχρι σήμερα (εικ. 32).

4. Στις επιφάνειες όπου κατά τον επιφανειακό καθαρισμό δεν εντοπίσθηκε το φυσικό πέτρωμα, γιατί η λατόμευση έχει προχωρήσει βαθύτερα και κρίνεται απαραίτητη η αντιστήριξη των θεμελιώσεων των κατασκευών, εφαρμόζεται ως «υλικό πλήρωσης» κατά τη διαμόρφωση των χώρων το πρανές φυσικού εδάφους με φύτευση φυσικού γρασιδιού, τύπου «ουκάντα» (εικ. 33).

Η λειτουργία των πρανών είναι πολλαπλή. Εκτός από τον ανακουφιστικό τους ρόλο στη στάθμη θεμελίωσης των ογκωδών κατασκευών και την καλή τους συμπεριφορά για την απομάκρυνση - κατεύθυνση των ομβρίων υδάτων προς τα σημεία απορροής (φρεάτια) με αποφυγή της διαβρωτικής τους δράσης στη στάθμη της θεμελίωσης των τειχών, έχουν αισθητικά και λειτουργικά πλεονεκτήματα για το χώρο.

Από την πειραματική εφαρμογή τέτοιου τύπου διαμορφώσεων φυτεμένου πρανούς παρατηρήθηκε ότι:

α) Αισθητικά εντάσσεται ομαλά στο ιδιαίτερα φορτισμένο περιβάλλον και, χωρίς να τραβά την προσοχή, προσφέρει την απαραίτητη ποικιλία και ξεκούραση για το μάτι ως υλικό συνοδείας της διαμόρφωσης. Πρέπει εξάλλου να σημειωθεί εδώ ότι χαρακτηριστικό της τάφρου είναι η ύπαρξη αγρωστώδους βλάστησης, αυτοφυούς, σε αδιατάρακτα τμήματα του χώρου (στον πυθμένα της τάφρου και τα επιχώματα).

β) Ως υλικό επίστρωσης ευνοεί την καθαριότητα του χώρου, ενώ είναι προσιτό στους επισκέπτες σαν επιφάνεια καθιστικού, παιγνιδιού και λοιπών δραστηριοτήτων.

γ) Σημαντικό στοιχείο είναι η αποφυγή του επίπεδου στο πυθμένα της τάφρου και η δημιουργία ενός φυσικού «ανάγλυφου», που ζωντανεύει το χώρο και οδηγεί το μάτι προς τα σημαντικά από άποψη θέας σημεία του χώρου (εικ. 34).

3. Χαρακτήρας ανάδειξης των επιμέρους περιοχών της τάφρου

Δακρίνουμε λοιπόν πέντε χαρακτηριστικούς τομείς της τάφρου, σε καθέναν από τους οποίους τονίζεται ένας κυρίαρχος χαρακτήρας, χωρίς να διασπώνται η ενότητα της διαμόρφωσης και η συνέχεια στην ανάπτυξη του περιπάτου. Σε όλους αυτούς τους τομείς, εξάλλου, διαπιστώνεται η αποσπασματική διατήρηση σημαντικών τμημάτων ενός ακόμη ενιαίου μνημειακού συνόλου της υποδομής της ελληνιστικής ιπποδάμειας πόλης.

Α) Ο τομέας της «γλώσσας» της Ιταλίας και της Προβηγκίας (εικ. 35, σχ. 3).

Περιλαμβάνει τους επιβλητικούς προμαχώνες του Carretto και του Αγίου Ιωάννη και είναι το πρώτο τμήμα της τάφρου που άρχισε να αξιοποιείται, με αφορμή την ένταξη του υπαίθριου θεάτρου και τη χρήση του ημικυκλικού πυροβολείου του Carretto ως χώρου περιοδικών εκθέσεων.

Ο τομέας αυτός χαρακτηρίζεται από την πολυγωνική χάραξη των τειχών, που οφείλεται στο γεγονός ότι στο μεγαλύτερο τμήμα τους ευρίσκονται εκτός του «ιπποδάμειου» πολεοδομικού ιστού της μεγάλης ελληνιστικής πόλης[16]. Η εξέλιξη της οχυρωματικής γραμμής στην περιοχή αυτή σχετίζεται με την αρχική διαμόρφωση και σταδιακή επίχωση του αρχαίου λιμένα της Ακαντιάς, κατά τη διάρκεια του 15ου αι.

Η διάταξη αυτή των οχυρώσεων, που δημιουργεί ευχάριστα πλατώματα και γυρίσματα στην τάφρο, ευνοεί την ένταξη χώρων ειδικών δραστηριοτήτων αναψυχής, πολιτιστικών λειτουργιών και εκπαιδευτικών προγραμμάτων, τόσο στους στεγασμένους χώρους των προμαχώνων όσο και στους υπαίθριους χώρους και ευρυχωρίες με θέα τις οχυρωματικές κατασκευές.

Η θεατρική λειτουργία θεωρείται ως απολύτως συμβατή με το χαρακτήρα ανάδειξης των χώρων της μεσαιωνικής τάφρου. Θεατρικά δρώμενα είναι δυνατόν να προσαρμόζονται στα διάφορα τμήματα και διαπλατύνσεις του πυθμένα της, με την προϋπόθεση ότι θα χρησιμοποιούνται κινητά στοιχεία εξοπλισμού, τα οποία θα απομακρύνονται από τον αρχαιολογικό χώρο άμεσα και με ευθύνη των διοργανωτών (εικ. 36). Η λειτουργία μόνιμης εγκατάστασης υπαίθριου θεάτρου στον τομέα της «γλώσσας» της Προβηγκίας μεταξύ των πύργων Γ και Δ θεωρείται αποδεκτή και επιθυμητή.

Αυτή τη στιγμή προχωρά ευρείας κλίμακας αναδιοργάνωση του χώρου του υπαίθριου θεάτρου «Μελίνα Μερκούρη», που αποτελεί και το κυρίαρχο στοιχείο της διαμόρφωσης και σημείο αναφοράς του τομέα αυτού, μετά την αποξήλωση της ευτελούς, προσωρινής και αντιαισθητικής μεταλλικής κατασκευής, που λειτούργησε, παρόλ' αυτά, με εξαιρετική επιτυχία επί 19 συνεχή χρόνια (εικ. 37).

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[16] Κ. Μανούσου-Ντέλλα, «Ρόδος. Στοιχεία πολεοδομικής ανάλυσης μιας μεσαιωνικής οχυρωμένης πόλης», *ΔΧΑΕ* ΚΑ΄ (2000), σ. 27-42

Βασική αρχή της αναδιοργάνωσης του χώρου είναι να ολοκληρωθεί με την ένταξη του νέου θεάτρου η διαμόρφωση του πυθμένα της τάφρου, αναπαράγοντας, όσο είναι δυνατόν, το αρχικό ανάγλυφο του εδάφους πριν τη διατάραξη που υπέστη κατά τη θεμελίωση της κατασκευής που πρόσφατα αποξηλώθηκε (εικ. 38).

Το νέο θέατρο πρέπει να διαχέεται στο φυσικό τοπίο, εξασφαλίζοντας τις οπτικές φυγές της συνέχειας του περιπάτου της τάφρου και προς τις δυο κατευθύνσεις. Η κανονική χάραξη και η σαφής γεωμετρία του χώρου θέασης προκύπτει κυρίως από την εφαρμογή των ανθρωπομετρικών δεδομένων της χρήσης του χώρου και ξαφνιάζει ευχάριστα, υποδηλώνοντας την έντονη παρουσία της ανθρώπινης κλίμακας στο μνημειακό χώρο.

Η συμμετρία της ακτινωτής του διάταξης έρχεται σκόπιμα σε αντίθεση με τη σύνθετη πολυγωνική διάταξη των οχυρωματικών έργων, που στην περιοχή αυτή χαρακτηρίζεται από έντονη ανησυχία, δημιουργώντας ένα ευρύχωρο πλάτωμα στο σημείο κατασκευής του θεάτρου (εικ. 39).

Βασικός στόχος της νέας διαμόρφωσης του χώρου είναι:

1. Η θεατρική δραστηριότητα στο χώρο της τάφρου να είναι πιο ήπια και προσαρμοσμένη στην κλίμακα της υψηλής ιστορικής και αισθητικής αξίας του μνημειακού περιβάλλοντος, έτσι ώστε να ατονήσει η συχνά μέχρι σήμερα παρατηρούμενη υπερσυγκέντρωση θεατών σε σχέση με τις δεδομένες και περιορισμένες δυνατότητες του χώρου.

2. Οι κατασκευές που θα γίνουν να είναι πλήρως αναστρέψιμες και εν μέρει αφαιρούμενες κατά τη χειμερινή περίοδο, δηλαδή για οκτώ μήνες, από τον Οκτώβριο έως το Μάιο, ώστε να αναδεικνύεται η διαμόρφωση του φυσικού τοπίου που θα μπορεί και πάλι να χρησιμοποιείται ως χώρος καθιστικού ή υπαίθριου αμφιθεάτρου για συγκεντρώσεις, ομιλίες ή εκπαιδευτικά προγράμματα.

Τη λειτουργία του τομέα αυτού της τάφρου, σε άμεση σχέση με τη γειτονιά της μεσαιωνικής πόλης, ευνοεί και η δυνατότητα άμεσης επικοινωνίας μέσω των προσβάσεων που μπορούν να λειτουργήσουν (σχ. 1, 3):

α) Στον προμαχώνα του Carretto, μετά την απομάκρυνση των παραγκοειδών κατασκευών, που κλείνουν το άνοιγμα της παλιάς πύλης της Ακαντιάς, πίσω από τον προμαχώνα της Ιταλίας, πριν καταργηθεί το 1501 για λόγους ασφαλείας.

β) Στον τομέα της «γλώσσας» της Προβηγκίας, μεταξύ των πύργων Β και Γ, δυτικά του θεάτρου, που διαπερνά το κυρίως τείχος και οδηγεί και σήμερα στο εσωτερικό της πόλης.

Β) Ο τομέας της «γλώσσας» της Αγγλίας (εικ. 40, σχ. 4).

Πρόκειται για το κεντρικό τμήμα των χερσαίων οχυρώσεων ανάμεσα στους δυο κύριους προμαχώνες με πύλες της οχύρωσης, του αγίου Ιωάννη και του αγίου Αθανασίου ή της Αγγλίας. Περιλαμβάνει το νοτιότερο τμήμα των οχυρώσεων και αναπτύσσεται σε μια ευθεία, χάραξη που έχει προκύψει από το ιπποδάμειο ρυμοτομικό σύστημα της ελληνιστικής πόλης, τα ρωμαλέα όρια των οδών της οποίας χρησιμοποιήθηκαν πιθανότατα για την έδραση των μεσαιωνικών τειχών.

Το τμήμα αυτό χαρακτηρίζεται από την έντονη εμφάνιση, στο επίπεδο της τάφρου, σημαντικών λειψάνων της υποδομής της αρχαίας πόλης σαν στοιχεία λαξευτά στο βράχο, στις παρειές της τάφρου. Τμήματα αποχετευτικών αγωγών, υπόγειες δεξαμενές και πηγάδια μπορούν να αναδειχθούν εδώ σαν χώροι επισκέψιμοι από το κοινό, ενώ είναι δυνατόν να διαμορφωθούν παλιές προσβάσεις από και προς το εσωτερικό της μεσαιωνικής πόλης. Επτά πορείες παράλληλες μπορούν να αξιοποιηθούν με κατάλληλη οργάνωση, στα πλαίσια του τομέα αυτού των τειχών, ώστε να αναδεικνύονται με τρόπο μοναδικό και κατανοητό στο κοινό η δομή και η αμυντική διάρθρωση του οχυρωματικού συστήματος.

1. Η πορεία επί του περιδρόμου του κυρίου τείχους, με εξαιρετική θέα προς τις οχυρώσεις αλλά και το εσωτερικό της πόλης. Ήδη ο περίπατος αυτός λειτουργεί με περιοδικότητα δυο φορές την εβδομάδα, οπότε είναι επισκέψιμος από το κοινό με εισιτήριο.

2. Η πορεία επί του συνεχούς προτειχίσματος στη βάση του τείχους, όπου αντιλαμβάνεται κανείς την αλληλουχία των τεσσάρων χαρακτηριστικών τετράγωνων πρώιμων πύργων του 15ου αι. μεταξύ των πυλών. Από το επίπεδο του προτειχίσματος υπάρχει δυνατότητα επικοινωνίας με το αρχαίο αποχετευτικό δίκτυο και τον υπόνομο της «πλατείας» οδού Ρ15, που διατρέχει όλο αυτό το ευθύγραμμο τμήμα της οχύρωσης.

3. Η πορεία της παλαιότερης τάφρου, των αρχών του 15ου αι., της οποίας η αρχική στάθμη ήταν τουλάχιστον κατά 5-7 μ. ψηλότερα και επί της οποίας έγινε συστηματική λατόμεύση για την επέκταση των οχυρωματικών κατασκευών στο τέλος του 15ου – αρχές 16ου αι.

4. Η πορεία επί του επιμήκους προχώματος της Αγγλίας, του οποίου η βόρεια πλευρά έχει βασισθεί επί του αναλήμματος της παλαιάς τάφρου, ενώ στο εσωτερικό του έχει διατηρηθεί το φυσικό έδαφος με σημαντική επίχωση πάνω από την αρχική του στάθμη, επενδυμένο με λιθοδομή στη νότια, ανατολική και δυτική πλευρά του.

5. Η πορεία της νεότερης τάφρου, που διανοίχθηκε μετά το 1480, και το επίπεδο του πυθμένα της, παρά τη συστηματική λατόμευση που διακρίνεται στο δυτικό του τμήμα, είναι αισθητά υψηλότερο από αυτό της παλαιότερης τάφρου.

6. Η πορεία του χείλους του αναλήμματος (contrascarpa), όπου έχει διατηρηθεί σε ερειπιώδη μορφή η οχυρωματική διάταξη «καλυμμένου δρόμου» (strada coperta), που αποδίδεται πιθανότατα στον Ιταλό μηχανικό Basilio dalla Scuola[17] (εικ. 41).

7. Το οχυρωματικό πρανές (glacis) έξω από την οχύρωση προς την πόλη, το οποίο στο τμήμα αυτό δεν έχει υποστεί σημαντικές επεμβάσεις κατά την ιταλική περίοδο, δεν έχει διαμορφωθεί και διατηρεί την αρχική του κλίση προς την ύπαιθρο, που εξασφάλιζε και την ομαλή απομάκρυνση των ομβρίων υδάτων.

Η διαμόρφωση των οχυρωματικών κατασκευών στον τομέα αυτό θα έχει στόχο την ανάδειξη του χαρακτήρα του φονικού οχυρού και του δέους που προκαλούσε στους ευρισκόμενους στο εσωτερικό ή γύρω από αυτό. Ο τονισμός των γυμνών βράχων και η διατήρηση των χώρων αποψιλωμένων, όπως ήταν πριν από κάθε πολιορκία, θεωρούνται απαραίτητα στοιχεία μιας τέτοιας διαμόρφωσης. Η αξιοποίηση χαρακτηριστικών σημείων θέας ή επαφής των επτά παραλλήλων περιπάτων για κατανόηση και αλληλοσυσχετισμό των αμυντικών στοιχείων θα προσδώσει ιδιαίτερο ενδιαφέρον στην επίσκεψη και παραμονή στο χώρο.

Γ) Ο τομέας της «γλώσσας» της Ισπανίας (εικ. 42, σχ. 5).

Πρόκειται για το τμήμα της τάφρου μεταξύ του προμαχώνα του Αγίου Αθανασίου και του προμαχώνα της Ισπανίας. Το τμήμα αυτό χαρακτηρίζεται από την έλλειψη σημαντικών στερεωτικών προβλημάτων των οχυρωματικών κατασκευών και από την καλή πρόσβασή του μέσω της πύλης του Αγίου Αθανασίου, που μπορεί να θεωρηθεί κόμβος κυκλοφορίας στις διάφορες στάθμες των οχυρώσεων μεταξύ της μεσαιωνικής και της νέας πόλης της Ρόδου.

Η χάραξη του τμήματος αυτού δεν σχετίζεται άμεσα με το «ιπποδάμειο» ρυμοτομικό σύστημα της ελληνιστικής πόλης και αναπτύσσεται υπό γωνία ως προς αυτό. Η θέση του, περίπου στο κέντρο του περιπάτου της μεσαιωνικής τάφρου, και η ευρυχωρία που δημιουργείται στα νότια του και δυτικά της γέφυρας του Αγίου Αθανασίου, στην οποία έχουν αναπτυχθεί μεγάλα δέντρα με πολύτιμη σκιά, ευνοούν την οργάνωσή του σαν χώρου αναψυχής, καθιστικού και ανάπαυσης των περιπατητών. Ο συνδυασμός της διαμόρφωσης αυτής με την κατεύθυνση των επισκεπτών από και προς τη μεσαιωνική πόλη και την

[17] G. Gerola, *L'opera di Basilio dalla Scuola per le fortificazioni di Rodi,* Βενετία 1915.

ενημέρωσή τους σχετικά με τις δυνατότητες επίσκεψης και άλλων χώρων στο μνημειακό σύνολο πρέπει να καθορίσει το χαρακτήρα του ευρύτερου τομέα μέχρι τον προμαχώνα της Ισπανίας. Η δομή εξάλλου των οχυρώσεων της περιοχής αυτής παρουσιάζει ενδιαφέρουσα ποικιλία εσωτερικών, ημιυπαίθριων και υπαίθριων χώρων με άνετη πρόσβαση και πολλαπλές δυνατότητες κίνησης στο χώρο (προτείχισμα, εσωτερική και εξωτερική τάφρο, πρόχωμα και προμαχώνες).

Πρόσφατα, κατά τη διάρκεια αποχωμάτωσης που έγινε για τη διέλευση κεντρικού αποχετευτικού αγωγού γύρω από τον προμαχώνα του αγίου Αθανασίου, αποκαλύφθηκαν σημαντικά υπολείμματα της κατάρρευσης του ιπποτικού προμαχώνα κατά τη β΄ πολιορκία των οθωμανών το 1522[18], ενσωματωμένα στον πυθμένα της τάφρου. Οι διερευνητικές εργασίες, που προχώρησαν αμέσως μετά, οδήγησαν στην αποκάλυψη τμημάτων του αρχικού περιγράμματος του προμαχώνα που κατασκεύασε ο D'Aubusson, το οποίο δεν συμπίπτει απόλυτα με την κάτοψη του ανακατασκευασμένου μετά το 1522 τμήματός του, όπως τεκμηριώνεται από την εντοιχισμένη επιγραφή στο δυτικό του μέτωπο[19].

Για την ανάδειξη του ευρύτερου περιβάλλοντος χώρου και του κυρίαρχου χαρακτήρα του ως «πεδίου μάχης» του 1522, προβλέπεται σημαντική ταπείνωση της στάθμης του πυθμένα της τάφρου και της γραμμικής πρόσβασης στο κέντρο του και διαμορφώνονται έντονα πρανή με φύτευση προς το αντίκρημνο, έτσι ώστε να δημιουργούνται χώροι ανάπαυσης στη σκιά των δέντρων αλλά και συνολικής θέας των νέων στοιχείων που θα προβληθούν ιδιαίτερα στη νέα διαμόρφωση με κατάλληλη ενημέρωση, ώστε να γίνονται αντιληπτά από τους επισκέπτες του χώρου.

Προτείνεται παράλληλα η παρουσίαση ειδικά επεξεργασμένου οπτικοακουστικού προγράμματος, σχετικού με τις περιγραφές των πολιορκιών της Ρόδου, στο μεγάλο θόλο (πυροβολείο) κάτω από την πρόσβαση της πύλης του αγίου Αθανασίου, αφού ολοκληρωθεί η αποκατάσταση της ζημιάς στη βορειοδυτική γωνία του.

Δ) Ο τομέας της «γλώσσας» της Γερμανίας και της Ωβέρνης (εικ. 43, σχ. 6).

Ο τομέας αυτός καταλαμβάνει το δυτικό τμήμα του οχυρωματικού περιβόλου, στον οποίο δεσπόζει ο επιβλητικός προμαχώνας της Ωβέρνης ή του αγίου Γεωργίου, το πιο ογκώδες και εξελιγμένης μορφής οχυρό της Ρόδου.

Το τμήμα αυτό αναπτύσσεται σε μια ευθεία από τον προμαχώνα της Ισπανίας μέχρι τη γέφυρα της πύλης d'Amboise ή του Πρωτομαστόρου, που οδηγεί στο παλάτι του Μεγάλου Μαγίστρου. Η χάραξή του ακολουθεί το «ιπποδάμειο» ρυμοτομικό σύστημα της ελληνιστικής πόλης, επί των ορίων των οδών του οποίου εδράζονται οι μεσαιωνικές οχυρωματικές κατασκευές. Στο επίπεδο του πυθμένα της τάφρου εξάλλου διατηρούνται πλήθος λειψάνων της υποδομής της αρχαίας πόλης, αρχαίοι αποχετευτικοί αγωγοί αλλά και δαιδαλώδεις υδρευτικές στοές, καθώς και χώροι δεξαμενών, σε συνδυασμό με σύστημα αρχαίων πηγαδιών.

Σημαντικά αρχαία λείψανα διατηρήθηκαν σε τομή στις παρειές ενός εκτεταμένου μεσαιωνικού λατομείου.

Χαρακτηριστικό για την αρχαιολογική όψη που προσδίδει στον ευρύτερο χώρο είναι το αδιευκρίνιστης προέλευσης βραχώδες πλάτωμα στα βόρεια του προμαχώνα του Αγίου Γεωργίου, από το επίπεδο του οποίου υπάρχει δυνατότητα πρόσβασης τόσο στον προμαχώνα όσο και στη μεσαιωνική πόλη, στα δυτικά του παλατιού του Μεγάλου Μαγίστρου.

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[18] E. Rossi, *Assedio e conquista di Rodi nel 1522 secondo le relazioni edite e inedited dei Turchi,* Roma 1927, και R. Paribeni, «Rodi e l'ultima difesa dei Cavalieri nel 1522», *Rassegna italiana nel Mediterraneo,* Roma 1922.

[19] E. Rossi, «L'iscrizione ottomana in Persiane sul bastione della Torre di S. Maria a Rodi», *Annuario della Scuola Archéologica di Atene,* τόμ. VIII-IX (1925-1926), σ. 341-344.

Ο ευχάριστος και άνετος περίπατος του βορειότερου και ανατολικού τμήματος της τάφρου στα όρια αυτού του τομέα αλλάζει, προβάλλοντας έντονα το χαρακτήρα του αρχαιολογικού χώρου με δυνατότητα ενημέρωσης, πρόσβασης και ανάδειξης των αρχαίων λειψάνων. Ιδιαίτερα μετά τον επιβλητικό προμαχώνα του αγίου Γεωργίου, ο περίπατος παίρνει το χαρακτήρα εισαγωγής στα εσωτερικά τμήματα της τάφρου. Η διαλεκτική σχέση του φυσικού τοπίου με το μνημείο γίνεται καθοριστική της ανάγνωσής του, παραπέμποντας σε άλλη διάσταση χρόνου και προκαλώντας πλούσια συναισθηματική αντίδραση.

Ε) Ο τομέας της «γλώσσας» της Γαλλίας (εικ. 44, σχ. 7).

Ο τομέας αυτός καταλαμβάνει το βόρειο τμήμα της μεσαιωνικής τάφρου, από την πύλη d'Amboise μέχρι την έξοδο του χώρου δια της παλιάς λαχαναγοράς και των σημερινών δημοτικών καταστημάτων προς το Μανδράκι. Χαρακτηριστικό του χώρου είναι ότι ακολουθεί την αρχαία χάραξη του ιπποδάμειου ρυμοτομικού συστήματος, σχετίζεται όμως και με τη διαμόρφωση των αρχαίων νεωρίων και του κήπου του Μεγάλου Μαγίστρου στα βόρεια του παλατιού.

Στα ανατολικά ο χώρος χαρακτηρίζεται από την απουσία βραχώδους πετρώματος στις παρειές του, λόγω της σχέσης του με τα νεώρια και την αρχαία διαμόρφωση του πολεμικού λιμένος («Μανδράκι»), ενώ φαίνεται ότι το ελληνιστικό άνδηρο, επί του οποίου εδράζεται το βυζαντινό και ιπποτικό τείχος, αποτελεί το όριο της πόλης προς το χώρο των νεωρίων και πρέπει να περιελάμβανε σημαντικά μνημειακά κτίσματα της ελληνιστικής πόλης (ίσως και το ναό του Ηλίου με τον περίφημο Κολοσσό της Ρόδου).

Ο χώρος αυτός έχει τον χαρακτήρα της κύριας πρόσβασης προς τον περίπατο της τάφρου και, λόγω της στενότητας και ευθύτητάς του, δεν επιδέχεται μεγάλη ποικιλία ως προς τη διαμόρφωση. Το στοιχείο που δεσπόζει στο τμήμα αυτό είναι το επιβλητικό παλάτι του Μεγάλου Μαγίστρου και οι βυζαντινές οχυρώσεις στα βόρειά του. Ιδιαίτερο ενδιαφέρον παρουσιάζει και η τριπλή διάρθρωση της τάφρου –βυζαντινής, α΄ ιπποτικής και β΄ ιπποτικής– πίσω από το πρόχωμα της πύλης d'Amboise και οι δυνατότητες επαφής και επικοινωνίας των χώρων μέσω της καπονιέρας του Carretto, που προβάλλει στα βορειοδυτικά του τομέα αυτού.

Στ) Στοιχεία υποδομής της ελληνιστικής ιπποδάμειας πόλης (σχ. 8).

Πρόκειται για υπόγειες στοές, σκαμμένες στο φυσικό πέτρωμα σε διάφορα επίπεδα, που μπορούν να διακριθούν σε δύο κατηγορίες:

1) *Αποχετευτικοί αγωγοί των οδών του ιπποδάμειου ρυμοτομικού συστήματος.* Ευρίσκονται σε αρκετά υψηλή στάθμη, κάτω από το επίπεδο των οδοστρωμάτων των αρχαίων οδών, και έχουν κατεύθυνση Β-Ν ή Α-Δ (με 3° απόκλιση προς τ' ανατολικά), ακολουθώντας τον προσανατολισμό των αρχαίων οδών[20]. Εντυπωσιακός είναι ο υπόνομος της Ρ10 στον τομέα της «γλώσσας» της Ωβέρνης, της Ρ30 και της Ρ31β στον τομέα της «γλώσσας» της Αγγλίας, που διαπερνούν κάθετα το πρόχωμα και είναι βατοί, συνδέοντας την παλαιότερη με τη νεότερη τάφρο, και της Ρ15, που διασχίζει τον τομέα της «γλώσσας» της Προβηγκίας και της Αγγλίας και προς τις δυο πλευρές της τάφρου.

Όπως φαίνεται σε σχετικό έγγραφο της ιταλικής περιόδου (13 Μαΐου 1942), που απευθύνεται προς το Διοικητή των νησιών και έχει συντάξει ο Luigi Morricone, διερευνήθηκαν τα δύο τμήματα του υπονόμου αυτού εκατέρωθεν της τάφρου. Αυτό που κατευθύνεται προς τα ανατολικά και η είσοδός του βρίσκεται σήμερα στη βάση της contrascarpa, πίσω από το θέατρο της τάφρου καταλήγει στα 85 μ., κοντά στην αρχαία εκβολή του προς την Ακαντιά, κάτω από το τότε εβραϊκό νεκροταφείο και σημερινό πάρκο της οδού Βύρωνος. Εκεί σταματά η τοιχοποιία εσωτερικής επένδυσής του και βρίσκεται σε στάθμη περίπου 3 μ. πάνω από την επιφάνεια της θάλασσας. Οι Ιταλοί πρότειναν τη διάνοιξη

[20] Ι. Κοντής, *Συμβολή εις την μελέτην της ρυμοτομίας της Ρόδου,* Ρόδος 1954, και W. Hoepfner, «Η πολεοδομία της κλασικής περιόδου», *Αρχαιολογία* 63 (1997), σ. 25-39.

πρόσβασης από το επίπεδο του πάρκου προς την τάφρο μέσω του υπονόμου αυτού, αλλά δεν πρόλαβαν να την πραγματοποιήσουν και αυτή είναι μια υπόθεση που πρέπει να διερευνηθεί εκ νέου, με ευκαιρία τη νέα διαμόρφωση του πάρκου, της τάφρου και του θεάτρου «Μελίνα Μερκούρη».

Το σκέλος του υπονόμου που κατευθύνεται προς τα δυτικά, ακολουθήθηκε σε μήκος 319 μ. και διακόπτεται από τη θεμελίωση των μεσαιωνικών τειχών κοντά στο τέμενος Χουντάι (σημερινή εκκλησία Αγίων Θεοδώρων) και στη λεγόμενη «πόρτα του Μύλου», που οδηγούσε στον περίδρομο του τείχους. Οι Ιταλοί πρότειναν εδώ τη διάνοιξη μιας υπόγειας στοάς κάτω από το τείχος και τη διαμόρφωση εισόδου από το εσωτερικό της πόλης, αφού αποκατασταθούν και τα οπαία εξαερισμού της στοάς. Ο υπόνομος αυτός είναι και σήμερα βατός, πρέπει όμως να διερευνηθεί η ακριβής κατάληξή του προς τα δυτικά και η δυνατότητα σύνδεσής του με τη συνέχειά του δυτικότερα ή με το εσωτερικό της πόλης. Για το σκοπό αυτό πρέπει να ελεγχθεί συστηματικά η εσωτερική παρειά του «terre-plein» του τομέα της «γλώσσας» της Αγγλίας, καθώς και το προτείχισμα στο οποίο διαπιστώνεται η ύπαρξη οπαίων αερισμού και καθόδων επικοινωνίας με το αρχαίο αυτό δίκτυο. Είναι προφανές ότι το κυρίως τείχος του τομέα της «γλώσσας» της Αγγλίας πατά πάνω στον αρχαίο υπόνομο της οδού Ρ15, ο οποίος έχει χρησιμοποιηθεί για τη διευθέτηση προσβάσεων επικοινωνίας των διαφόρων τμημάτων της οχύρωσης με το εσωτερικό της πόλης.

2) *Λείψανα του δαιδαλώδους υδρευτικού δικτύου της ελληνιστικής πόλης.* Μια συστηματική αρχαιολογική διερεύνηση είναι ήδη σε εξέλιξη[21] στους διάφορους τομείς της τάφρου, όπου διατηρούνται διάσπαρτα λείψανα στομίων πηγαδιών, σε συνδυασμό με την ύπαρξη εισόδων υπογείων υδρευτικών στοών, καθώς και πολλές δεξαμενές λαξευτές στο βράχο του υποστρώματος της αρχαίας πόλης (σχ. 9, 10).

Ήδη από την ιταλική περίοδο έγινε συστηματική αποχωμάτωση ενός τμήματος του αρχαίου υδρευτικού δικτύου στα βόρεια του προμαχώνα της Ισπανίας, στον τομέα της «γλώσσας» της Ωβέρνης. Στο σημείο αυτό οι υδρευτικές στοές προχωρούν αρκετά βαθιά κάτω από τις οχυρώσεις και το μεσαιωνικό πολεοδομικό ιστό και διακόπτονται από καθιζήσεις σε διάφορα σημεία, ενώ διαπιστώνεται συχνά κατακόρυφη επικοινωνία με φρεάτια λαξευμένα στο φυσικό βράχο και μεγάλο αριθμό πηγαδιών (εικ. 45).

Το συγκρότημα αυτό είναι δυνατόν να αναδειχθεί περισσότερο, αφού αποχωματωθεί ο βράχος επιφανειακά στην τάφρο και εμφανισθούν τα αρχαία λαξεύματα και τα ίχνη της μεσαιωνικής λατόμευσης. Τμήμα εξάλλου των στοών μπορεί να γίνει επισκέψιμο, αφού καθαριστεί εσωτερικά και γίνουν εγκαταστάσεις φωτισμού και κατάλληλη ενημέρωση για το χώρο.

Το σημαντικότερο όμως από αισθητική και αρχαιολογική άποψη συγκρότημα υδρευτικών στοών αποκαλύφθηκε στην περιοχή του τομέα της «γλώσσας» της Γερμανίας, μεταξύ του προμαχώνα του αγίου Γεωργίου και της πύλης d'Amboise (σχ. 11). Στο χώρο αυτό, που η τάφρος έχει το μεγαλύτερο πλάτος και φθάνει περίπου τα 70-80 μ., τα τελευταία χρόνια και με αφορμή τις εργασίες κατασκευής υπόγειων αποχετευτικών αγωγών στον άξονα της τάφρου αποκαλύφθηκαν τμήματα υδρευτικών αγωγών και στοών σε διάφορες στάθμες, τόσο στο πλάτος της τάφρου όσο και στα υπολείμματα του φυσικού βράχου και προς τις δύο πλευρές της.

Ιδιαίτερα ο βράχος που διατηρείται σε μεγάλη έκταση στα βόρεια του προμαχώνα του αγίου Γεωργίου (σχ. 12) περιλαμβάνει σημαντικά λείψανα πολλών υδρευτικών δεξαμενών, μνημειακών κλιμάκων λαξευτών στο βράχο και στοών, στις οποίες οδηγούν σκάλες μικρότερης κλίμακας. Το δίκτυο αυτό βρίσκεται σε επαφή με τη στάθμη της πόλης μέσω αναρίθμητων πηγαδιών.

[21] Η ανασκαφική έρευνα προχωράει με ευθύνη των συναρμόδιων Εφορειών Αρχαιοτήτων, με υπεύθυνη αρχαιολόγο την κ. Α.Μ. Κάσδαγλη.

Πιθανότατα πρόκειται για υπόγειους χώρους των κατοικιών ή ευρύτερων οικιστικών συνόλων (οικοδομικών τετραγώνων), προορισμένων να δεχθούν κάποια χρήση που είχε ανάγκη την άμεση επαφή με το νερό. Είναι γνωστό εξάλλου ότι κατά την αρχαιότητα τα υδρευτικά δίκτυα ανήκαν στο δημόσιο, αλλά οι δεξαμενές και τα πηγάδια ήταν κατά κανόνα ιδιωτικά και είχαν σχέση με την κατοικία[22].

Η αρχή λειτουργίας του εκτεταμένου υδρευτικού συστήματος, το οποίο, όπως σταδιακά αποκαλύπτεται[23], λειτουργούσε στη Ρόδο, βασίζεται στη δομή γεωλογικού υποστρώματος της πόλης και στην ύπαρξη δύο γεωλογικών σχηματισμών του διαπερατού σχηματισμού Ρόδου και του αδιαπέρατου σχηματισμού Ασγούρου, στην επαφή των οποίων και με κλίση 15% περίπου προς τα ανατολικά και βόρεια γίνεται η κυκλοφορία του νερού[24].

Το σύστημα των «qanat»[25], που εφαρμόστηκε και στη Ρόδο, έχει προέλευση το Ιράν, αλλά ευρεία διάδοση σε όλες τις χώρες της ανατολικής Μεσογείου (εικ. 46). Η μελέτη της εφαρμογής του στη μεγάλη ελληνιστική πόλη της Ρόδου, όπως και στην αρχαία πόλη της Λίνδου από τον Κλεόβουλο[26], θα προσθέσει δύο ακόμη παραδείγματα από τα πιο εκτεταμένα ίσως υδρευτικά δίκτυα του αρχαίου κόσμου.

Εκτός από όσα αναλυτικά μέχρι εδώ αναφέρθηκαν σε ό,τι αφορά τη γενική διευθέτηση του μνημειακού συνόλου, πρέπει να τονίσουμε τη σημαντικό ρόλο που έχουν οι τρεις χερσαίες πύλες που βρίσκονται σήμερα σε λειτουργία (δηλαδή η πύλη d'Amboise, η πύλη του αγίου Αθανασίου και η πύλη του αγίου Ιωάννη), ως βασικά σημεία θέασης και συνολικής αντίληψης του χώρου της τάφρου και των μνημειακών οχυρωματικών κατασκευών (σχ. 1).

Συνήθως στον άμεσο περιβάλλοντα χώρο των πυλών αναπτύσσονται κομβικά σημεία του οχυρωματικού συμπλέγματος και επιτυγχάνεται επικοινωνία ανάμεσα στο περιμετρικό πάρκο (glacis), το εσωτερικό της τειχισμένης πόλης, τον πυθμένα της τάφρου και όλες τις στάθμες (προτειχίσματα και περίδρομο των τειχών. Η διαλεκτική σχέση ανάμεσα στις τρεις αυτές γέφυρες και τον περίπατο που αναπτύσσεται στον πυθμένα της τάφρου και τις διάφορες στάθμες των οχυρώσεων και του πάρκου είναι χαρακτηριστική, ιδιαίτερα στην περίπτωση της γέφυρας της πύλης d'Amboise ή του Πρωτομαστόρου, που είναι η πιο πολυσύχναστη είσοδος των επισκεπτών του παλατιού του Μεγάλου Μαγίστρου και της μνημειακής ζώνης της οδού Ιπποτών (εικ. 47).

Μέσω των κόμβων αυτών σύνδεσης των διαφόρων τμημάτων της πόλης και του οχυρωματικού συνόλου πρέπει να ενημερώνονται και να κατευθύνονται σωστά οι επισκέπτες προς τους σημαντικότερους αρχαιολογικούς χώρους και μνημεία όλων των εποχών στο εσωτερικό της τειχισμένης πόλης.

Μια σημαντική διάσταση του μνημειακού - αρχαιολογικού χώρου είναι και η παρουσίαση της έννοιας της παλαιότητας και της φθοράς που υφίσταται από το πέρασμα του χρόνου. Οι παλιές καταρρεύσεις τμημάτων στις ογκώδεις κατασκευές των προχωμάτων και του αναλήμματος (contrascarpa) συνήθως έχουν ενσωματωθεί με το έδαφος στη νέα τους μορφή και έχουν στερεωθεί από τις ρίζες των μεγάλων δέντρων που θεωρούνται διατηρητέα στοιχεία του ιστορικού τοπίου και κοσμούν πλέον τα νέα αυτά «πρανή» (εικ. 10).

Από άποψη ιστορική αλλά και αναστηλωτική, η ορθή επιλογή θα ήταν να παραμείνουν στη νέα τους κατάσταση ισορροπίας, αφού στερεωθούν κατάλληλα. Έτσι θα επιτελούν

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[22] A.T. Hodge, *Roman Aqueducts and Water Supply,* London 1991, σ. 48-66.

[23] Ανάλογες υπόγειες δεξαμενές και πηγάδια, σε συνδυασμό με σκαλιά λαξευτά στο φυσικό βράχο, έχουν αποκαλυφθεί σε πολλά σημεία της πόλης της Ρόδου και προφανώς σχετίζονται με τη λατόμευση του φυσικού πετρώματος για την οικοδόμηση των κτισμάτων της ελληνιστικής πόλη, βλ. σχετικές δημοσιεύσεις στα Χρονικά του *Αρχαιολογικού Δελτίου.*

[24] Κ. Πιτιλάκης, *Αρχαιολογικός χώρος Νυμφαίου – Διερεύνηση γεωλογικών γεωτεχνικών συνθηκών,* Θεσσαλονίκη 1999.

[25] A.T. Hodge, ό.π., σ. 20, σχ 6, ή ετρουσκικό «cuniculus», σ. 47, σχ. 22.

[26] Γρ. Κωνσταντινόπουλος, Αρχαία Ρόδος, Αθήνα 1986, και Ν. Παπανικολάου, «Το μυστικό της Λίνδου», *Γεωτρόπιο* (*Ελευθεροτυπία*), σ. 32-35.

πολλαπλή διδακτική λειτουργία, όσον αφορά τις συνθήκες του αρχικού εδαφικού υποστρώματος (αρχαιολογική διαστρωμάτωση), αλλά και τις κατασκευαστικές μεθόδους που εφαρμόσθηκαν στις διάφορες ιστορικές περιόδους και στα διάφορα τμήματα των οχυρώσεων.

Τέλος, πολύ σημαντικό στοιχείο της νέας μορφής και αντίληψης του χώρου των οχυρώσεων της Ρόδου, και τουλάχιστον για την επόμενη εικοσαετία, είναι η διάταξη κατά διαστήματα, κατά μήκος του περιπάτου, μεγάλων οργανωμένων εργοταξίων για τη συντήρηση - αποκατάσταση προβληματικών ή επικίνδυνων τμημάτων των οχυρωματικών κατασκευών, με κύριο στόχο την πρόληψη περαιτέρω καταρρεύσεων και τη διάσωση των πολύ σημαντικών αυτών μεσαιωνικών μνημείων (εικ. 48).

Οι εργοταξιακοί αυτοί χώροι παίζουν σημαντικό ρόλο στη μεταστροφή της αντίληψης για το μνημείο, εισάγοντας ακριβώς την έννοια της ανάγκης συνεχούς συντήρησης και προστασίας του προς όφελος της Ανθρωπότητας και με στόχο να αποδοθεί με ασφάλεια στις επόμενες γενιές που θα το διαχειρισθούν στο μέλλον.

Τα εργοτάξια πρέπει να είναι χώροι τακτοποιημένοι και ελκυστικοί στο κοινό, με έντονο εκπαιδευτικό χαρακτήρα, τόσο για παιδιά όσο και για ενήλικους. Λόγω του μεγέθους και της μεγάλης συνήθως χρονικής διάρκειας των εργασιών αποκατάστασης στις οχυρώσεις, πρέπει να λαμβάνεται μέριμνα ώστε τα εργοτάξια να είναι, περιοδικά τουλάχιστον, επισκέψιμα από το κοινό. Είναι δε χρήσιμο να παρέχεται επιτόπου η απαραίτητη ενημέρωση σχετικά με τις αιτίες φθοράς, τα προβλήματα και την εξέλιξη του έργου.

Στην πορεία λοιπόν, στο εσωτερικό ενός από τα σημαντικότερα οχυρωματικά μνημεία της Ανθρωπότητας, οι εργοταξιακοί χώροι εναλλάσσονται με τους διαμορφωμένους και αρχαιολογικούς χώρους σε μια μοναδική ισορροπία. Στόχος είναι η πλήρης και ολοκληρωμένη ανάδειξη του επιβλητικού και πολυσύνθετου μνημειακού συνόλου με όλες τις διαστάσεις του, ώστε να εξακολουθεί να γοητεύει τους επισκέπτες και να επισκιάζει τα πάντα στο περιβάλλον του.

Και ενώ η ολοκληρωμένη μορφή του μνημειακού συνόλου, όπως προδιαγράφεται με τη μελέτη διαχείρισης και ανάδειξής του που έχουμε ανά χείρας, αποτελεί το όραμα τουλάχιστον της επόμενης εικοσαετίας, πρέπει εδώ να κατατεθεί η συναρπαστική εμπειρία της συνύπαρξης και συμμετοχής των πολιτών στον προς διαμόρφωση χώρο και σε όλα τα στάδια των επεμβάσεων. Οι χρήστες του μνημειακού περιβάλλοντος του οχυρωματικού συνόλου, κάτοικοι της πόλης, επισκέπτες, εργαζόμενοι στο χώρο, ακόμη και περιθωριακοί, που κινούνται στα όριά του για δικούς τους λόγους, ευαισθητοποιούνται και οικειοποιούνται τα έργα, όταν βεβαιωθούν ότι, εκτός από την αποκατάσταση – ανάδειξη των μνημείων, αποσκοπούν και στην αισθητική βελτίωση της πόλης και, επομένως, στην αναβάθμιση της ποιότητας ζωής τους.

Η συστηματική παρακολούθηση της ευρηματικής χρήσης των χώρων για ποικίλες δραστηριότητες πολιτισμού, άθλησης, ανάπαυσης – περισυλλογής και αναψυχής, ατομικά ή σε ομάδες, δίνει πολύτιμα στοιχεία για την προσαρμογή των διαμορφώσεων στην κοινωνική διάσταση της λειτουργίας του πολιτιστικού τοπίου και στην ανθρώπινη κλίμακα, της οποίας στην ουσία επιχειρείται η επανένταξη (εικ. 49).

Με αυτές τις προϋποθέσεις είναι δυνατόν να εξασφαλιστεί η διαρκής συντήρηση των ορατών στοιχείων του παρελθόντος, ταυτόχρονα και ως δυναμικών στοιχείων του μέλλοντος μιας ιστορικής πόλης.

ΚΑΤΑΛΟΓΟΣ ΕΙΚΟΝΩΝ

Εικ. 1 Γενική άποψη της μεσαιωνικής πόλης και των οχυρώσεων του εμπορικού λιμανιού (φωτογραφικό αρχείο Αρχαιολογικής Υπηρεσίας, Ιούνιος 2000 – Ν. Κασέρης).

Εικ. 2 Η μνημειακή ζώνη της μεσαιωνικής πόλης της Ρόδου.

Εικ. 3 Απεικόνιση της τάφρου κατά την πολιορκία του 1480 από τον G. Caoursin.

Εικ. 4 Γενική άποψη της τάφρου (τομέας «γλώσσας» της Ωβέρνης) κατά την ιταλική περίοδο.

Εικ. 5 Άποψη των χώρων του οχυρωματικού πρανούς (glacis) πριν την απομάκρυνση των νεκροταφείων.

Εικ. 6 Γενική άποψη των οχυρώσεων της πόλης της Ρόδου. Τομέας «γλώσσας» Αγγλίας (A. Gabriel, 1911).

Εικ. 7 Γενική άποψη του προμαχώνα του αγίου Αθανασίου από τα ανατολικά (αεροφωτογραφία 1989).

Εικ. 8 Η κατάρρευση τμήματος αντικρήμνου στον τομέα της «γλώσσας» της Ωβέρνης.

Εικ. 9 Γενική άποψη της τάφρου στα βόρεια του Παλατιού του Μεγάλου Μαγίστρου κατά την ιταλική περίοδο.

Εικ. 10 Γενική άποψη του τμήματος Π6 από την πλευρά της τάφρου.

Εικ. 11 Γενική άποψη διαμόρφωσης στο βορειοδυτικό τμήμα της τάφρου.

Εικ. 12 Χαρακτηριστική εικόνα μεσογειακού θαμνότοπου στη Ρόδο.

Εικ. 13 Γενική άποψη αυτοφυούς βλάστησης στον τομέα της «γλώσσας» της Ωβέρνης.

Εικ. 14 Εικόνα φυσικής βλάστησης του χώρου κατά την άνοιξη του 2000.

Εικ. 15 Γενική άποψη εκτεταμένης λατόμευσης στον τομέα της «γλώσσας» της Ωβέρνης.

Εικ. 16 Γενική άποψη του βραχώδους εξάρματος στα βόρεια του προμαχώνα του αγίου Γεωργίου.

Εικ. 17 Στοιχεία της υποδομής της ελληνιστικής ιπποδάμειας πόλης. Αποχετευτικός αγωγός.

Εικ. 18 Άποψη της εσωτερικής τάφρου – λατομείου.

Εικ. 19 Γενική άποψη του χώρου πρόσβασης στον προμαχώνα του αγίου Γεωργίου από τα βόρεια.

Εικ. 20 Σημερινή άποψη του τομέα «γλώσσας» της Ωβέρνης.

Εικ. 21 Γενική άποψη της τάφρου στα όρια των τομέων της Γερμανίας και της Γαλλίας.

Εικ. 22 Γενική άποψη φοινικόδεντρων στην περιοχή της πύλης D'Amboise.

Εικ. 23 Εγκαίνια μνημείου σε ανάμνηση του «Concetramento» – στρατοπέδου συγκεντρώσεως στο χώρο της μεσαιωνικής τάφρου.

Εικ. 24 Γενική άποψη χώρου ρίψης μπάζων στον τομέα «γλώσσας» της Αγγλίας (φωτογραφία αρχείου 25/11/1980).

Εικ. 25 Άποψη της τάφρου στον τομέα «γλώσσας» της Αγγλίας μετά από βροχή.

Εικ. 26 Χώρος στάθμευσης στον τομέα της "γλώσσας" της Γαλλίας.

Εικ. 27 Άποψη του θεάτρου μεσαιωνικής τάφρου «Μελίνα Μερκούρη» πριν από παράσταση.

Εικ. 28 Η δυτική απόληξη του προχώματος της Αγγλίας μετά την αποκατάσταση.

Εικ. 29 Γενική άποψη του προμαχώνα του Carretto από το περιμετρικό πάρκο.

Εικ. 30 Γενική άποψη της κύριας πρόσβασης στο χώρο από το Μανδράκι.

Εικ. 31 Ζωγραφική απεικόνιση ιταλικής περιόδου του τομέα της «γλώσσας» της Προβηγκίας στην περιοχή της πρόσβασης στην αρχαία στοά της Ρ15.

Εικ. 32 Γενική άποψη του βραχώδους πλατώματος -«λατομείου»- στα βόρεια του προμαχώνα της Ωβέρνης.

Εικ. 33 Χώρος καθιστικού στα βόρεια του προμαχώνα του αγίου Αθανασίου.

Εικ. 34 Γενική άποψη των πρανών του φυσικού εδάφους στον τομέα «γλώσσας» της Γαλλίας.
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Εικ. 36 Μεσαιωνική παράσταση του «θεάτρου δρόμου» το καλοκαίρι του 1999 στο βορειοδυτικό τμήμα της τάφρου.
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REVITALIZATION OF THE HISTORIC CORE OF SPLIT

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The paper presents the Project, aimed to intensify the processes of the revitalization of the historic core of Split. The project is launched in the time of restricted economic strength of the country and the city itself, due to the well-known situation, homeland war and transition process. The objective of the project is the revitalization of the urban structure of the historic core, provision of the financial means to support the revitalization, particularly the means not originating from the usual financing funds, approved by the Ministry of Culture and city budget.

The Project is particularly demanding and serious due to the fact that it is to be implemented within the historic city, the core of which is the antique imperial Diocletian's Palace, in the exceptionally valuable historic construction structure, that has been recording the continuity of the transformation from the antique palace into the baroque city, for 1700 years, within the historic urban structure, which is undoubtedly the spiritual and spatial center of the modern City, the most important social space, the historic memory of his inhabitants.

The Project assumptions are based on the commercial value of the space within the historic core, that is mostly owned or co-owned by the City of Split. The considered spaces are those that have appeared after the demolition of the buildings and the ruined ones, mostly out of function at present. The investments in the revitalization of this segment of the historic core, implementing one of the specified models: city-investor, public-private partnership, concession or sale, will result in financial profit, that will have to be strictly reinvested into the revitalization of the cultural heritage in the historic core.

Strictly prescribed work method which requires the prior identification of the space development criteria by the respective competent state and city authorities, followed by the public presentation and subsequent public discussions, to precede any commercialization procedure, will eliminate any possibility to manipulate with these objectives.

It has to be emphasized that the Project objective is primarily the revitalization of the urban structure of the historic core, if possible, through the restitution of the autochthonous historic medieval urban matrix. The new contents in these spaces will support the idea of preserving the multifunctionality of the subject area and the adequate participation of the traditional functions of the core: residential function, work and free time.

Project of activation of the spatial resources of the core in the function of its revitalization

On history, significance and values of the historic core of Split
The historic core of Split is the spiritual and spatial center of the modern Mediterranean City, second largest town in Croatia, and the city that has been developing in the course of 1700 years of the uninterrupted urban life.

The establishment of the City is related to the construction of the Roman Emperor Diocletian's Palace, which dates back to the end of the 3rd centiry and the beginning of the 4th century,

although the archaeological investigations have proved the existence of the earlier historic layers of the significant buildings, dating from the 1st century A.C.

The historic part of the city has developed within the millenium transformation of the antique imperial palace, resulting in the historic construction structure, rich in layers of various architectonic strata, consisting of the buildings that were constructed, respecting the historic range of the architectonic styles, from the classical style, Romanesque, Gothic to the recent times.

Figure 1. Reconstruction of Diocletian's Palace (E.Hebrard)

The beginning of the transformation of the antique Palace into the City dates to the time after the destruction of Salona, the capital of the Roman province Dalmazia, back to the 7th century and subsequent settling of the inhabitants of Salona into the Palace. Their settling has clearly resulted in the adapting of the architectonic structure of the emperor palace to the whole range of the new requirements, starting with the residential buildings to those intended to satisfy the city administration and religious functions. The full symbolism of such a transformation is best represented in the transformation of the Roman Emperor Diocletian's mausoleum into the cathedral, devoted to the City patron saint, St. Domnio, the bishop of Salona, murdered on the order of Diocletian himself.

That is the moment when the history changes its appearance, the end of the history of Diocletian's Palace and the beginning of the City history, the history we can read so much in the books about, but thanks to the favorable circumstance that the City has never been destructed, we can also read and perceive it while simply walking through the historic core, noticing the richness of distinctive layers of architectonic structure that have managed to preserve the precious traces of different historic periods, architectonic styles and cultures. This rich stratigraphy has been preserved to the present time, due to the tolerance, culture, we dare even add, due to the rational and intelligent approach of its citizens. The historic City has developed, the ultimate achievement of the human civilization.

Along with the architectonic stratigraphy, nonetheless was created also the proud and honorable history of this City, which although permanently influenced by different Mediterranean cultures, remains firmly rooted into the national Croatian history and culture, which represent its final dominant features.

The result of this historical and construction continuity is the historic core of Split, the space inheriting exceptional significance and values.

The importance of this space for the citizens, its function in the wider urban city structure, in the whole region?

We can freely say that it represents the spiritual and spatial City center, the most significant and most precious social space within the City. The sociological investigations that were performed proved that the citizens from the wider city areas feel like staying in the historic core, and rather often, they do come to this place, which in their approach has acquired the meaning of the historic memory, the quality of identification with the City and with its history, the communications facility in performing daily routine activities, due to the fact that the core has traditionally been the central daily provision space.

The multifunctional quality, so typical for the historic Mediterranean centers contributes to the liveliness and attractiveness of the core: the residential role, the only function that lasts permanently 24 hours a day, the quality of the space where daily work activities are being performed and the quality of the free & leisure time space for the permanent and temporary participants to the core life, in the events aimed to the public use or in the free spaces.

The families go there for a walk, to spend their free time, due to the fact that they feel this space as truly human, measured exactly to the human needs, comprehensive in the variety of its functions, communicative as it's inevitable to meet, in such a restricted area, friends, acquaintances and strangers as well. Such a space offers them all what they miss in modern quarters of the town, which are nothing more than mere bedrooms crowded within the huge mastodonic buildings, deprived of any humanity, with the environment limited to the crowded parking places, and as the worst, the ambiance that in the best tradition of the past ruling system hasn't established the system of maintenance of the buildings, definitely leaving the impression of being permanently neglected.

Figure 2. Historic core of Split, developed in the transformation of the antique Palace into the City

The inhabitants of these town quarters, anyway only a mile or two distant from the city center, whenever going to the historic core, use to say: I'm going to the City, what clearly identifies all what is expected from the City in return, and that such a quality in the wider urban structure is being attributed exclusively to the historic core.

The state of condition of the construction resources and core management

We could say that the relationship towards the historic core has certain elements, which are hard to be explained rationally. The significance of the palace for the citizens, its value as the world cultural heritage, its importance as the central tourist destination along the east coast of the Adriatic sea are totally contradictory to its disturbing state of preservation, the present condition of the buildings in the construction sense, and the quality standard level of the space, particularly the residential one.

The detailed analysis performed in respect to the construction resources of the palace have shown very miserable state of preservation of all the constructive elements of the buildings, particularly the residential ones, mostly abandoned by the old tenants who moved in to the more attractive quarters of the town, having adapted the buildings to be further rented, as a rule to the lower social structure of population.

On the contrary, the ground floors of these buildings are exceptionally attractive. The interest for such a space, particularly along the communication routes reaching high intensity of pedestrian traffic, resulted in the extremely high commercial value, consequently motivating the rehabilitation processes, clearly without any consideration of the overall state of the building itself.

The economic terminology would identify the subject process as the systematic pulling out of the substance, i.e. of the inherent value of the historic core, practically meaning that the profit was being pulled out on account of rented flats, further extra profit, pulled out on account of the attractive business premises, was realized as a result of the frequent communication within the core, due to its importance and value. The salesmen can attribute the share in the profit exclusively to their position in the historic core, and definitely not to their competence in business dealings. Unfortunately, no mode has yet been found to classify the part of this extra-profit as the annuity on the utilization of the cultural-monument patrimony, pertaining to the society, which might represent the financial resources for the revitalization of the historic core.

The lack of the initiative on the part of the private owners of the flats can be easily understood, as they have always been expecting the state to finance their maintenance, considering that the buildings have been classified as the national cultural heritage. On contrary, the behavior of the state and city administration in the past fifty years is hard to explain, as the business spaces were nationalized, and the rent collected on the account of these spaces in the historic core, was used by the City administration to finance other projects and various costs, in spite of the overall awareness of the preciousness and significance of the core and the respective necessity of investments into the maintenance funds.

Figure 3. View of the historic core from the west, in 1708 (Juster)

Strategy of the revitalization of the historic core of Split

The revitalization of the historic core, all the programs and plans, are being implemented in conformity with the revitalization strategy, officially identified by the City of Split. The same can be briefly resumed:

- preservation of the function of the spatial and spiritual center of the City
- rehabilitation of the cultural patrimony in conformity with the current European theory and practice

- rehabilitation of the urban structure of the historic core, implicitly including the restoration of the buildings and increasing of the quality level of the conditions necessary for the performing of all the functions of the core
- preservation of the multifunctionality of the core, the basic characteristic of all the historic Mediterranean cities : residential function, work and free & leisure time
- management of the spatial resources of the historic core in the way that would recognize its economic potential as the element of its further revitalization. Considerations of the historic core as one of the essential economic resources of the City.

Entrepreneurhip model of launching the core revitalization

The necessity to provide for the systematic revitalization of the historic core has finally been recognized with all the authorities, on the state and city level. However, due to the whole range of objective circumstances, the recent homeland war, transitional period of the country, it is obvious that the economic potentials of the City and the country are undoubtedly restricted, thus limiting the possibility to provide for the financial means to support the exigent restoration of the cultural heritage.

In recent years, the City administration has been, in coordination with the World Bank, trying to implement the revitalization project that had to be financed through the WB credit, along with the participation of the City. Unfortunately, exactly due to the above stated reasons, the said project hasn't been realized. In looking for the other possible business entreprenuership models of the revitalization, the City administration has elaborated the Project of the activation of the neglected spatial resources of the core, in function of its revitalization, which project is being presented in the subject paper. Our intention was not to emphasize that such a model might be universally applied and optimal in any conditions, but definitely presents the model which, in the given circumstances, in the City of Split, can prove to be very efficient and intensify the processes of the revitalization of the core.

The essence of such a model is practically very simple. It is based on the fact that the space of the historic core, considering the previously exposed elements, proves to be exceptionally attractive, and that the development and restitution of the ruined historic structures or the abandoned endangered buildings of historic significance, and their further commercialization, respecting the rigorous criteria, to be presented in the further text, could accumulate the considerable financial means, that can be further reinvested in the revitalization of the endangered cultural heritage, primarily the most precious ones, antique Peristyle, cathedral etc. The part of these financial means will have to be used to participate in the maintenance of the

Figure 4. Riva, the promenade along the sea, in front of the medieval city, represents its most important social space

private property residential fund, particularly relative to the low standard apartments and those that happen to be in miserable state of preservation, considering the construction point of view, as these apartments definitely represent distinctive and highly precious cultural heritage.
Since the spaces are mostly owned by the City, the identification of all the rigorous spatial criteria of the intervention, will be followed by the decision of the City administration as to the selection of one of the following models: city administration in the role of the investor, establishment of the public-private partnership or the respective sale of the single spaces. It has to be emphasized that the financial means are going to be used exclusively for the revitalization of the historic core.

Method of work implemented in the Project of the activation
The Project is going to be realized in two phases, the first being the elaboration of the Strategy, which is the essential feature in the overall work process.

The strategy will identity the spatial criteria of the intervention or the recostruction, if it concerns the existing construction structures. The identification and approval of the spatial criteria is going to be based solely on the valorization of the certain space, preservation of the historic layers, and relationship to the surrounding constructions, harmony with the structure of the function of wider space of the core and definition of the possible destinations of use. This planning process will be performed in the respective team, consisting of the competent city departments, Ministry of culture, independent sociologists, art historians, architects etc.

The proposals submitted by the team are going to be further verified in the focus groups, civil and professional associations and groups of citizens having totally different professional orientation, and clearly, after the proposals have been formulated, in course of further exhibitions and open public discussions, they will be presented to the public.
The crucial importance is attributed to obtaining the general consensus on the criteria that are going to be implemented into the Strategy, identifying any single location. It must never be forgotten, that the historic core is deeply rooted in the souls of all the citizens, and that all of them, considering its significance, are interested in all that's going on within the City walls. The City core is definitely not "the property" of the narrow group of experts; it belongs to all the people, to the National Trust officers, to the housewives, physicians, bricklayers, architects etc.

Figure 5. Southeast part of Diocletian's palace, the open space appearing after the demolition of the historic urban structure

Only after the approval of the Strategy, followed by the public consensus on the proposed, the realization of the financial model might start. It eliminates any possibility of the eventual entrepreneur's interest to influence the identification of the Strategy; and also the definition of the criteria of the future interventions that wouldn't be

in conformity with the values of the space and the intentions of preserving the cultural heritage and other values of the space.

Presentation of the Project in several characteristic examples

It has to be emphasized that all the interventions can generally be considered as the attempts to restitute the disappeared historic urban structure, functions and urban matrix. The selected work procedure varies from case to case, depending on the size and monumental significance of the space. The selected solutions can be on the level of relatively simple elaboration of the rehabilitation project of the individual historic building, or the identification of the criteria for the revitalization of the ruined structures, to be obtained through the organization of workshops, town-planning & architectonic tenders, practically in such a procedure that will definitely provide for the highest quality of the submitted proposals and followed by the general consensus of the wide public and professionals on the proposed .

Southeast part of Diocletian's palace The restitution of the disappeared urban structure, that was demolished in the sixties of the last century, in the course of the rehabilitation of the eastern halls of Diocletian's substructures and the deteriorated condition of the buildings, whose basement were merely on the dike in the substructures. The demolition was also the consequence of the former approach on the purification of the buildings, favoring one single historic layer, in our case, the antique Palace.

Figure 6. Complex of the medieval convent of St.Clara and partial restoration of the original Palace structure

Medieval ruins of the complex of buildings inside Diocletian's palace

The complex of buildings which best illustrates the unnecessary condition of single segments of the buildings, which are aimed to be removed within the realization of the Project. The present condition is the result of the falling in of the medieval buildings. The future destination of the complex is identified as business-commercial in the ground floor and residential on the upper floors, considering the favorable position of the building, providing for the good conditions for the implementation of the residential function.

Figure 7. Ruined medieval complex of buildings inside Diocletian's palace.

Palace Skočibučić-Lukaris on Peristyle The space of the antique Peristyle with the endangered (shored) Skočibučić-Lukaris palace, the building rich in architectonic layers. On completion of the restoration works, the building will house the distinctive city administration functions, aiming to relive the tradition, when the Peristyle, in the early Middle Ages was civil and spiritual center of the city, with the cathedral and town hall. The revitalization of the Peristyle started with complex restoration works in 2002, financed by the donation grant, approved by World Monuments Fund and Antique Foundation.

Figure 8. View on Peristyle and shored Skočibičić-Lukaris palace

PRESERVATION OF ARCHITECTURAL HERITAGE BETWEEN CULTURAL STRATEGIES AND PRACTICE OF CONSERVATION. THE CASE OF ANCIENT BITONTO.

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The present contribution examines strategies for the preservation of architectural heritage concerning the ancient town of Bitonto, near Bari.

In the second half of the twentieth century the situation of the ancient town results particularly difficult because of its reduced hygienic conditions, its progressive depopulation and the lack of safeguard of the enormous cultural existing patrimony. At first, this situation has carried local administrations to promote fit planners predestined to the recovery and to the conservation of the old town. But these solutions resulted ineffective.

More recent administrations have instead selected other instruments to save the heritage threatened with abandonment and impoverishment that is the parallel and consequent action between divulgence of information and punctual but particularly effective interventions. This strategy, whose linee-guide had been traced time back by Roberto Pane, carries out itself in interventions of restauration of key-buildings and in the fostering of scientific knowledge of local heritage.

Today this experience achieves interesting effects related with the awareness of cultural values and the keeping alive of the ancient town.

1. A short account about shape peculiarities of ancient Bitonto.

Bitonto, in *Terra di Bari* (Italy), is today a city of around 53,000 inhabitants. The old centre constitutes an integral part of the urban structure. It is, according to recent surveys, among the biggest ones of Puglia.

The existence of the town is documented already since IV Century B.C.[i]. At first as a peucetic settlement, later as a community of the Magna Greece, it is called "mutatio" (place of change of horses) along the *Via Traiana* in the Imperial Age.

Present form of the ancient town corresponds approximately to the medieval plant, saturated with buildings from following periods. The boundary shape of the centre follows the one of the Angevin walls, which extends largely parallel to Lama Tiflis (depression of the soil that constituted the bed of a prehistoric river and that is crossed today by a course of occasional waters). In the north the border form of the center is attested on more regular lines, being in flat areas. The inside form appears itself poly-focus with blocks along the course of light levels.

In XVIII Century the city begins to expand out of the walls, at first occasionally, later, in XIX Century, following a planning which will characterize the structure of the nineteenth-century city.

The territory of Bitonto is object of an agricultural settlement for which the landscape results today dominated by the cultivation of olive-trees and by architectural events like convents, hamlets, small churches, ancient roads and stone equipment.

This historical experience is condensed in the notable cultural patrimony, today object of conservative politics, characterized by Medieval, Renaissance, Baroque and nineteenth-century architectures, by the archeological urban environment and the rural landscape.

Figure 1. Bitonto. Ancient centre (*Carta Tecnica dell'Italia Meridionale,* Element nr.438053).

Figure 2. Bitonto. Ancient centre. View of entrance *Porta Maya*.

2. State of the old town in the second half of XX Century.

In the second half of the past century the old town goes through a critical phase. The historical environments are in a state of physical and social degradation. Important public functions are also expunged from the old centre. This situation determines the exodus of families living there, together with a progressive abandonment of the real estate.

The phenomenon goes on for about forty years, despite any attempts of local authorities of finding a solution. In 1955 they are counted approximately 16.000 inhabitants in the ancient centre (the global capacity is of about 25.000).[ii] In the eighties the problem of the depopulation turns to be particularly serious. According to the effected census the number of inhabitants results lower than 6.000 units.[iii] More than the 60% of buildings is defined degraded. A good deal of residential areas turns out to be under-used. Urban equipment, both public and private, is scarce. The single income is on the average strongly below that of the new Bitonto. The elderly population prevails. They record, besides, phenomena like rarefaction of cultural tourism, closing of historical shops, social segregation, increase of juvenile delinquency and withdrawal.

To these data it corresponds a high percentage of requests for assignment of lodgings of popular house-building in other areas of the town. Similar phenomena are feared also in the neighbouring Molfetta and Giovinazzo, where the old nucleus will be totally abandoned.

In the case of Bitonto, however, the big dimension of the ancient town, the number still high and the strong social taking root of residents, the position of some main urban points of reference (high schools, the Orphanage *Institute Maria Cristina di Savoia*, the *Centro Ricerche di Storia ed Arte*, artisan structures, etc.) that were important factors of frequence and crossing, have prevented the total abandonment.

To the conditions of impoverishment of the ancient centre corresponds also the progressive substitution of *extra-moenia* nineteenth-century buildings, considered worthless, with constructions of modern conception and greater volumes.

3. *Pane Plan* and following town planning initiatives.

Already before the approving the General Town Plan, local Administration arranges a planning scheme specific for the ancient centre. The task is entrusted to illustrious Prof. Roberto Pane, whose proposal (1971) will be called *Piano di risanamento e conservazione del centro antico.*

Pane Plan consists of a survey of physical and historical-artistic conditions of the ancient centre together with a flexible rule based on principles of the *Carta di Venezia.*[iv] At the base of this instrument there is the concept of the "case for case", according to which it is impossible proposing standard interventions and binding rules in an environment grown on both building and social secular stratification. A wide possibility of interventions was allowed, though within the safeguard of the extant, without a defined prescription concerning building operations and expressly excluding any projectual uniformity.[v]

The plan gives indications on a new arrangement of inside mobility by restricting the vehicular access and conceiving neighbouring car parking.

Noteworthy it is also the proposal of active participation of residents, among which a more learned delegation was to control the interventions. According to Pane, after imposing the conservation of the extant, the revitalization of Bitonto old town could have happened from its own inside, also thanks to a machinery of participation and building interventions co-ordinated by the Town Authority and checked by cultivated local forces.

The lack of conventional rules confuses the public organs delegated to its approval; as a consequence *Pane Plan* is never adopted.[vi] On the contrary, it is approved the General Town Plan that freezes the situation of the ancient centre, arranging that, in absence of specific planning, only restorative and preservative interventions are allowed. This case seems paradoxically to correspond with *Pane Plan*. The General Town Plan instead stated that, after producing a detailed plan, interventions could be accomplished, even though massive (demolitions, transformative actions, substitutions…).

In accordance with this logic, it is commissioned the so-called *Piano di Recupero* regarding the ancient centre in the '80s, which elaborates a summary typological list of buildings; moreover, it points out areas subjected to *allowed*, *prescribed* and *forbidden interventions* according to the National Law Nr.457 of 1978 and, in the end, indicates homogeneous under-areas to which a planning of detail is to postpone.

This instrument contradicts the whole formulation of *Pane Plan*: it tries to help immediate solutions in execution of the interventions, that become so stereotyped.

Competent authorities don't approve the *Piano di Recupero* as it is considered too much incisive. Measures for the ancient centre are postponed to detailed projects, that will be never accomplished.

The non-adoption of *Pane Plan*, the ineffectiveness of the *Piano di Recupero* and the obsolescence of the General Regulator Plan (made out-of-date by the later normative) determine a chaotic state in the planning scheme of the ancient areas.

The lack of any key-rules and politics for the ancient centre returning to life cause disorientation in building operators, who prefer directing their investments in new areas of city expansion.

4. A recent strategy for keeping alive the ancient town.

In this confused period, there are fulfilled occasional restorative interventions on buildings of public interest, among which they are remarkable operations of settlement of the Town Library inside *Palazzo Rogadeo*; of the Sacred Art Museum in the Episcopal Palace; of the *Centro Ricerche di Storia ed Arte* and of the Church Record Office in the Seminary Building. To these interventions they correspond a few operations of private initiative on residential edificies that carry to an increased concourse of the old town.

This event appears sufficient for corroborating the hypothesis of a practicable old town rebirth, also through the spreading effect of a few, but strategic interventions on the remarcable public heritage.

The undertaken strategy is, therefore, founded on the followings points, aiming at giving again a central role to the old nucleous in the city life:

1) location of selected functions in special buildings;
2) cultural-public characterization of the settled functions;

3) interventions based on architectural restaurative methods;
4) infrastructures functional to the goals;
5) measures for disseminating cultural heritage values and higher participation.

The placing of peculiar functions aims at achieving physiological conditions for a renewed concourse of those places, besides the social fusion between residents of cultural different levels. In this sense, public educational functions seem to have the maximum polarizing character, tolerable by an ancient site.

The general character of the interventions according to the restorative disciplinary contents encourages the growth of the enjoying quality of these places: enrichment of historical-aesthetic data; better availability of spatial resources, at one time not known; liberation of spaces to the cultural tourism; stimulus of educational local activities, opportunity of scientific studies and cultural education.

Infrastructures and incentives aim functionally at growing the value of real estates, as to stimulate the immovable market and the installation of tertiary services, in such a way giving back credibility to the old centre life.

Target of sensitizing is to make people conscious of their own cultural identity and heritage. Moreover, the participation helps both to acknowledge actual resources which represent potential factors of renaissance and to further justified consent to the very measures of rebirth.

So it is a simple strategy managed by programs, regulations and inspections, all of which form the elements of a flexible direction achieved by authorities delegated to the preservation and with the participation of building and cultural operators.

5. Characteristics of interventions, state of fulfilment, first effects.

A few available resources are allotted to buildings that are considered important for their glamour, position and re-exploitable function. Among the programmed interventions, financed with municipal and European funds, let's remember in particular the restoration of *Teatro Umberto*, of the Cathedral, of *Piazza Cattedrale*, of the Angevin Tower, of *Institute Maria Cristina di Savoia*.

In the heart of the ancient centre, the Romanesque Cathedral, recognized as the most representative monument of ancient Bitonto, has also been object of a recently concluded restoration. The works have resulted in the discovery of ancient underground chambers densely stratified and, particularly, of a palaeo-Christian church lying below it. The Cathedral has recently reopened, returned to cult and to culture also owing to museum spaces of the underlying archaeological environment.

Piazza Cattedrale has received an intervention of new configuration of the pavement stones that, remodelling the vehicular traffic, has removed it from the Romanesque monument. The program concerning these interventions embraces also the restoration of the eighteenth-century *Guglia della Madonna*. Documentary researches have led to the discovery of a plinth zone concealed under the pavement and whose liberation would reveal the body of the column in its original erection.

Teatro Umberto, built in the first half of the nineteenth century and in disuse during XX C., has recently been restored and it is going to be used for performances, according to its capacity. The position, tangent to the urban walls, makes it easily attainable from both the outside and inside. The presence of a square in front of the ancient nucleus

encourages the aforesaid new destination. Restorative works have brought about the discovery of further neighbouring spaces and of an urban door, so making the documentary and functional value of this architecture increase.

The *Angevin Tower*, an imposing building situated in *Piazza Cavour*, represents another important place for public relations of the ancient centre. Presently it is object of restorative works which have carried to the liberation of the noteworthy fundamental tower-shaped room and to the discovery of further chambers, among which there are remains of a little church contained in the walls. This building will be intended principally for museum.

Also the building where the *Institute Maria Cristina di Savoia* is located, is object of important restorative works connected to a program of new purpose, and considering its remarkable spatial potentialities. The social peculiarity of its functions will be combined with a cultural use of its rooms. The program, at present partially accomplished, includes the insertion of further reception-spaces, together with conference-halls, thematic museums and cultural services.

The program of preservation includes important interventions: renovation of *Piazza Cavour* and completing the restoration of *Palazzo Rogadeo* and *Palazzo Sylo-Calò*, jewels of the local Renaissance and Baroque tradition. In particular the *National Gallery of Art* will be situated inside *Palazzo Sylo-Calò*.

Within this program minor nineteenth-century housing, outside the old centre, is also considered, trying to rescue it from modern town-planning replacement. It falls within this goals the adaptation of the building where the *Fondazione Ungaro* is located, and where *Municipal Record Office* and the *Archaeological Museum* are settled, together with special rules within the Executing Plans which protect the nineteenth-century housing traits.

Restorative activity goes parallel to infrastructure restoration and to installations of heating-plants and reconstruction of the ancient centre paving-stones.

To such operations it joins a substantial work of awareness and information, thanks to the collaboration between local Administration with consultative organs and cultural local associations to decide the old town destination, and also through public occasions where the town community is informed about characteristics, objectives and results of these interventions. Moreover, there are initiatives that exploit spaces of the ancient centre for performances and intellectual activity[vii].

Some of the aforesaid interventions and initiatives are being carried out, some others have already been programmed. Nevertheless, the hoped effects are evident since now, as shown by several restorations of residences and premises that ratify a building return in the ancient centre.

At the moment there are not reliable data on the actual quantity of the resettlement, but an increment of population in the ancient centre is visible and proved by the rising of restorations of secondary buildings to be lived in.

The growth of intellectual participation is also corroborated with a number of scientific and associative enterprises. In particular, the latter are led by educational training of the *Politecnico di Bari*, that have made the ancient town of Bitonto search-centre, laboratory of restoration and of town history.

Figure 3. The Romanesque Cathedral and its square, already restored. On the right, it's visible the *Guglia della Madonna* (XVIII C.).

Figure 4. *Teatro Umberto* (XIX C.) on restoration.

Figure 5. The Angevin Tower and a near building on restoration.

Figure 6. *Institute Maria Cristina di Savoia* (XV-XIX C.) on adaptation.

Figure 7. A private house by *Piazza Cattedrale,* recently restored.

Figure 8. Building of the Archaeological Museum, recently re-utilized.

6. Revitalization and role of the restoration.

Times, events and the complex material and social stratification have not allowed, till now, to predispose a conventional town plan for ancient Bitonto. This is one of the elements that require consideration: in the end a planning scheme has turned to be unnecessary for keeping alive the ancient centre.

It could therefore be thought that, in analogous conditions, a rebirth can be pursued without plains, but through informed programs for detailed and specific intervention,

finding again in the very ancient centre those genetic features that can become starting-points for its own revival.

In these programs the role of restoration is fundamental. The revealing character that of such interventions amplifies in fact the cultural wealth. Moreover, the operative codes based on the contributions of restoration as a discipline can assure a conservative content, a cultural control of each single intervention and a concrete flexibility in the progressive knowledge of an object. The town-planning means could be instead addressed above all to the government of surrounding conditions (as the neighbouring mobility), which can indirectly protect the ancient nucleus.

The non-application of *Piano di Risanamento e Conservazione del centro antico,* edited by Roberto Pane, should be explained quite on the base of these considerations. This instrument was not town-planning, but only indicative and advisory. A means that - as already in the convictions of his editor - lacked in a systematic and normative content, required an intellectual maturity objectively difficult for the time.

The strategy of the keeping alive and revitalization adopted today for ancient Bitonto consists quite in the delayed and adjourned application of indications contained in the *Pane Plan*, to confirm that, as said before, an ancient centre already holds factors and starting-points for its rebirth in its own inside[viii].

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[i]Cfr. the main studies on ancient Bitonto:
Pasculli G., *Storia di Bitonto*, Bitonto 1962;
Mongiello G., *Bitonto nella storia e nell'arte,* Bari 1970;
Sylos L., *Bitonto nella storia*, Bitonto 1986;
Aquafredda V., *Bitonto attraverso i secoli*, N.E. Bitonto 1996.
Scivittaro A., *Architettura del Rinascimento a Bitonto*; Bitonto 1975
AA.VV. *Atlante del Barocco in Italia. Terra di Bari e Capitanata*, Roma 1996.

[ii]Cfr. Documentation of the *Comune di Bitonto - Piano Regolatore Generale*, 1959, and Public Register.

[iii]Cfr. Documentation of the *Comune di Bitonto - Piano di Recupero*, 1980.

[iv]The *Carta Internazionale di Venezia* was promulged during the works of the 2nd International Congress of Architects and Operators of Historic Monuments, wich took place in May 1964.

[v]Cfr. Pane R. e Civita M., *Comune di Bitonto – Piano di Risanamento e Conservazione del Centro Antico.* Archivio del Comune di Bitonto, Ufficio Tecnico, 1971. From the illustrative report:...*né d'altra parte è da credere che la tutela e la sussistenza di un Centro Antico possano essere soddisfatti dall'applicazione di criteri tipologici ... E cioé raggruppando edifici in un intervento standardizzato e negando, per conseguenza, quella singola individualità che, se pur modesta, costituiva la ragion d'essere di quei valori di ambiente che erano da tutelare... Si dovrà per conseguenza insistere , cercando di spiegare come il problema del restauro, quale problema ecologico generale e che presuppone e si collega con quello storico-estetico, non può essere risolto da un puro e semplice intervento tecnico, ma da una vera e propria rivoluzione culturale, e cioé con altre parole, che la sussistenza e la tutela dei valori ambientali dovrà tener conto della*

necessità di soluzioni molteplici, da intendere e distinguere caso per caso; mentre una semplificazione sistematica, operata così spesso altrove, in nome di una riduzione razionalistico-economica, è solo distruttrice dei valori che si vogliono tutelare... Si ribadisce quindi l'assoluta esclusione di qualsiasi criterio che implichi uniformità di intervento, tenendo invece presente che - come sempre in materia di restauro storico-artistico - detta normativa deve limitarsi a suggerimenti tendenti ad escludere proprio quegli interventi che rispondono allo standard produttivo... E' necessario far capo alla partecipazione attiva della pubblica opinione... Il caso specifico del Centro Antico di Bitonto ... non può trovare soluzioni se non nelle forze e nelle iniziative che Bitonto stessa è in grado di esprimere ... Il suo Centro Ricerche di Storia ed Arte Bitontina deve tener presente il precipuo compito, che ... deve consistere nella costante attenzione rivolta alle modificazioni che si propongono, e che si vanno attuando nell'ambito stesso del Centro che è oggetto dei suoi studi e delle sue cure;... In a altre parole, i cittadini più esperti e partecipi debbono sentirsi i primi diretti tutori del loro ambiente d'arte e di storia... L'abbandono, così come si determina, suggerisce dapprima un incentivo al proprietario per il restauro dell'immobile e successivamente le condizioni di esproprio per la formazione di un demanio comunale, in maniera che il suddetto complesso edilizio possa essere riciclato per mezzo di interventi pubblici. Quanto all'uso, non è superfluo ribadire il concetto che, laddove non è possibile restituire l'originaria funzione (generalmente di abitazione, negozio, ufficio, chiesa) è necessario proporre un uso la cui funzione sia compatibile con la peculiarità della fabbrica e delle sua situazione urbanistica, e cioé come detta la Carta di Venezia. Centri sociali, biblioteche, uffici decentrati della amministrazione, come gli archivi, ed altre attività consimili, potranno essere decisi di volta in volta in rapporto alla domanda del servizio e alla disponibilità del contenitore. Solo una tale elasticità consente, col recupero, la partecipazione alle reali esigenze della vita associata".

[vi]Some of the reasons of its non-approval were the unconventional content and the *vis polemica* (directed to some public organs) of his study, that didn't allow an immediate understandig of intentions. Cfr. Pane R. e Civita M., *Comune di Bitonto – Piano di Risanamento e Conservazione del Centro Antico*. Archivio del Comune di Bitonto, Ufficio Tecnico.

[vii]The aforesaid interventions and initiatives are part of cultural program wanted and coordinated by the present administration, and in particular by the Major professor Nicola Pice.

[viii]Kind thanks go to Dr. Daniela A. Carbone for having collaborated to the translation of this paper.

Bioremediation for Building Restoration of the Urban Stone Heritage in European States (BIOBRUSH)

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BIOBRUSH is a consortium of scientists, industrialists and conservators funded by the EU Fifth Framework Programme that will investigate how bioremediation can be used for conservation of stone and brick in heritage buildings, stoneworks and frescoes affected by air pollution. The project will identify appropriate non-pathogenic micro-organisms to destroy mineral salt crusts as well as organic compounds, and other bacteria that can produce bio-calcite which helps to consolidate stone materials. Treatment combinations will be tested in laboratory and in-situ under different climatic conditions as well as in urban and industrialised areas of Northern and Southern Europe. This innovative method is expected to be reversible, easily controllable and possibly cheaper compared to current practice. This paper will review current research findings and explore possible practical conservation strategies and their implications for preservation of cultural heritage.

Introduction

The problem of a crumbling cultural heritage at historical sites is a very real problem in European cities and urbanised developments. In the last decades alterations such as black crusts, nitratation, sulphation and, in particular conditions, the presence of dust, residual hydrocarbons and other organic pollutants have markedly increased, leading to corrosion. All the studies confirm that the alternations are caused by inorganic atmospheric pollutants such as nitrogen oxides and sulphur dioxide produced by the combustion of petroleum and its derivatives. The compounds, which are the main cause of accelerated deterioration of exposed stone-works, are oxidized in the air into nitric and sulphuric acid,

respectively, that, after deposition on the surface of stone carbonates, are converted into sulphates and highly soluble nitrates, which are easily washed away by rain.

Bioremediation and conservation methodologies

Attempts to limit or retard the deterioration processes on historic buildings have been made in many ways by application of conservation treatments using both inorganic and organic products. However, the changes in surface properties of stone objects puts the success of such conservation treatments in doubt since the penetration and functional adherence of stone protectives, such as fixatives or water repellent coatings, will be complicated and occasionally ineffective (Koestler, 1999). The use of mechanical processes for the removal of nitrate and sulphate present in the crusts can also cause the loss of original surfaces. The conventional physico-chemical cleaning methods are often disadvantageous, because they can cause colour changes in the rocks or excessively remove the original rock material; several treatments can act also on the unaltered substrates inducing an acceleration of degradation phenomena (Heselmeyer et al., 1991). In addition, the range of techniques to restore materials altered by the presence of organic residues pose another set of risks and dangers that limit their application so that the use of inappropriate treatment methodologies can often induce more final damage compared with the original.

There is growing evidence that microorganisms could be used to reverse the deterioration processes through bioremediation. In particular, the ability and potential of microorganisms to utilize sulphate, nitrate or organic residues respectively to form sacrificial layers of calcite on mineral surfaces has been impressively demonstrated (Atlas, 1988; Lal Gauri, 1989; Orial, 1992, Ranalli et al., 1999; Castanier et al., 1999). Microorganisms have also been shown to reverse the deterioration processes on historical objects of art. On a laboratory scale selected bacterial strains (such as *Pseudomonas stutzeri, P. aeruginosa Desulfovibrio vulgaris, D. desulfuricans*) were not only able to denitrify and desulfuricate harmful masonry salts such as nitrate and sulphate (Lal Gauri *et al.*, 1988; Heselmeyeer *et al.*, 1991, Ranalli *et al.*, 1996) but also mineralise organic residues or pollutants like carbohydrates, waxes or hydrocarbons that commonly occur in crusts on stonework (Warscheid *et al.*, 1991; Saiz-Jimenez, 1997; Ranalli *et al.*, 1999). Other microorganisms,

including *Bacillus cereus,* have been shown to protect the exposed mineral surfaces, by the formation of sacrificial layers of calcite. These may be dissolved in a polluted environments but they can be renewed when necessary (Orial *et al.*, 1992; Tiano 1995; Orial *et al.,* 1997; Castanier *et al.*, 1999; Mastromei *et al.*, 1999; Tiano *et al.*, 1999; Urzi *et al.*, 1999). To date there has been no systematic approach to incorporate these new methodologies based on bioremediation processes into the conservation practice. The BIOBRUSH project aims to sequentially link mineralisation processes of desulfurication, denitrification and organic removal to the consolidation phenomenon of biocalcification,. To this end the project brings together microbiologists, material scientists, conservators and industrial consultants.

The BIOBRUSH consortium

BIOBRUSH, a 6-partner research consortium of experienced scientists, industrialists and end-user conservators has been formed to study the feasibility of using bioremediation to restore buildings in cities. While aiming to link mineralisation and biocalcification processes and it will also investigate different heritage materials under different climatic situations and integrate the findings into conservation policies in practice. It's purpose is to supplement, not replace, existing conservation technologies, which can often be ineffective or toxic to end-users or the environment, and establish the limitations of bioremediation in conservation practice.

1. The University of Portsmouth (Coordinator): *heritage microbiology research*
2. Institute for Material Science IWT/MPA: *industrial end-user*
3. University of Milan: *heritage microbiology research*
4. Technical University of Riga: *conservation science*
5. National Technical University of Athens: *conservation science*
6. Syremont: *industrial end-user*

Research Strategy

The project strategy requires the selection of appropriate mineral materials, bacteria and application systems so that the treatment options can be identified and then tested in laboratory and *in situ* building trials. The new bioremediation treatment will then be applied and its performance monitored under the different climatic and environmental conditions in Northern and Southern Europe.

The research programme has been divided into a series of 7 work packages, which have a clear set of tasks and deliverables.

Contributions from the BIOBRUSH partners to Workpackage 1 have resulted in the production of a database of cultural heritage sites with a range of materials that can be used for testing the feasibility of bioremediation technology. The database contains information on the type of material, its availability, chemical composition and microbiological data together with historical and geographical details of the sites. From this database two different materials have been selected, one from Northern Europe and one from Southern Europe, for further analysis in Workpackages 4 and 5.

Table 1. Summary of material types identified and analysed in Workpackage 1.

Material	Location	Country
Red Travertine	Tholos monument	Greece
White marble	Tholos monument	Greece
Calcareous sandstone (Kechrees)	Tholos monument	Greece
White volcanic andecitic tuff	Phylakopi Settlement	Greece
Red volcanic andecitic tuff	Phylakopi Settlement	Greece
Grey triassic limestone	Hydra fortifications	Greece
Calcareous tuff	Matera Cathedral	Italy
Gotland sandstone	Lübeck Townhall,	Germany
Caen limestone	Chichester Catheral	UK
Oberkirchner sandstone	Riga Brethren Cemetary	Latvia
Calcareous tuff	Riga Brethren Cemetary	Latvia
Rembate sandstone	Latvian Academy of Art	Latvia
Roman travertine	Riga Brethren Cemetary	Latvia
Gotland calcareous sandstone	Tashi Manor and St Trinity Church	Latvia
Lime mortar – stone wall	Cesis medieval castle	Latvia
Lime mortar - brick wall	Cesis medieval castle	Latvia
White lime plaster - internal wall	Cesis medieval castle	Latvia

The selection of bacteria showing activities that mineralise organic pollutants and remove nitrates and sulphates (by denitrification and sulphate reduction respectively), which are commonly found in stone weathering incrustations is the remit of Workpackage 2. In addition, bacteria that deposit calcite minerals in stone will be selected. Isolates are currently being tested for the capacity to

cause human disease and to determine their potential as bioremediation agents for treatment of weathered stone.

The third Workpackage aims to select a delivery system that can be used to apply and direct the bioremedial agent to the surface of the stone. A number of delivery vehicles are currently being evaluated in laboratory, those showing the highest adhesion capacity for the selected microorganisms and the lowest risk to human health during application will be chosen.

During Workpackage 4 the performance of selected bacteria and delivery systems will be evaluated using thin sections of stone to assess both nitrate and sulphate removal, the $CaCO_3$ precipitation and the effectiveness of the system. In addition, in order to establish the impact of the microbial population on the sound stone sample, mineralogical, porosimetric and chemical analyses on the substrate will be performed. Both beneficial and adverse effects will be assessed.

The evaluation of the bioremediation system will be extended in Workpackage 5 to include stone blocks in order to assess possible changes in porosity and mechanical features as well as mineralogical and chemical structure. It also includes an examination of the influence of climate and environment on the activity of the bacteria during treatment. Both beneficial and adverse effects will be assessed.

Workpackage 6 will assess the performance of a number of treatment options applied to stone at historic sites. This will be done in consultation with conservators and will involve application and monitoring at monthly intervals using non-destructive methods. A full risk assessment covering human health, the heritage and its environment will be carried out. The work will be done at sites in Northern and Southern Europe.

Quality control, dissemination and publication of the research findings is the concern of Workpackage 7.

Risk assessment and reduction in BIOBRUSH

There are a number of obstacles and questions to be overcome if bioremediation techniques and treatments are to gain wide acceptance by conservators. **BIOBRUSH** will carry out a risk/benefit analysis of the new technique.

A new bioremediation treatment should:

- Reduce the damaging potential of salts in damaged crusts

- Render hydrocarbons easily removable
- Not migrate – and be environmentally safe
- Not leave residues enhancing further biodeterioration
- Leave the stone surface colour as close to the original as possible
- Leave the stone surface with properties similar to the rest of the stone body
- Produce an identifiable sacrificial surface
- Be non-toxic to human users/environment
- Be of reasonable cost
- Be easy to apply, manage and monitor under extreme *in situ* conditions
- Be reversible and controllable.

Any new procedure that avoids these problems will be of immediate benefit to the end-users of such technologies, the conservators or industrial consultants. The problem is often caused by the growth of microorganisms in conjunction with environmental pollution in cities or physical forces. The possibility of combating this using different groups of microorganisms that first destroy the unsightly crusts and then restore the strength of the surface material is an attractive prospect.

Educational aims

Restriction of communication has often resulted in the development of advanced and sophisticated techniques that have never been widely used either due to the special training they required or to their difficulty to be applied *in situ*. The BIOBRUSH investigation builds on and extends existing research and focuses on real practical outcomes. It is hoped this will help to reassure and convince the end-users that such procedures have a future in conservation. BIOBRUSH intends to persuade user-groups by direct involvement and education that an approach based on bioremediation is effective, safe and practical. This will require a concerted approach based on sound evidence and good science.

It is a central aim of this project to bring together the people who will be able to educate, inform and influence opinion among user-groups. Four of the partners are Universities and involved in education of future generations of scientists, conservators and industrialists; two are directly concerned with the education of

conservators and therefore have a direct influence on the attitude of the conservation community to the new possibilities offered by technology based on bioremediation. Graduate students have been appointed to carry out the research work and they will influence the way in which the next generation of heritage scientists relate to bioremediation. Two members of the consortium are industrial partners that are directly concerned with solving conservation problems across a wide front. Their involvement ensures that practical issues are always to the fore and ensure that the outcomes of the BIOBRUSH initiative will be made known to the practitioners. Thus the consortium believe that BIOBRUSH will act to energise research and teaching in these institutions and stimulate further local and national investment

Expected impacts

The final goal of BIOBRUSH will be to provide an effective, environmental-friendly biotechnological tool for restoration and conservation of artistic stoneworks central to the European heritage. The emphasis will be on practical treatment options based on bioremediation, which are safe for humans, heritage and the environment and yet flexible enough to be adapted to the prevailing material, exposure and climatic conditions. This innovative technology will enhance conservation strategies and provide new products for industry that in turn will create more employment in tourism or the conservation industries. In addition a culture collection will be established for conservation use to arrest or control the damage to the cultural heritage in European cities.

BIOBRUSH will help to preserve monuments within the city community in which the citizens of Europe live and preserve a visible record of the development of Europe. In addition to maintaining the integrity of the city environment this project will contribute to the education of European citizens. Preservation of the cultural heritage in the form of buildings and monuments not only protects our cities today but preserves them for the citizens of tomorrow. As Europe develops rapidly in a physical way there is a social and political need to conserve cultures and traditions which are embodied in the buildings within its cities. This will lead to greater understanding as a consequence of maintaining awareness of the development of cultural diversity within Europe.

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QUANTITATIVE CHROMATIC CHARACTERIZATION OF THE PATRIMONY ISSUES OBTAINED FROM LEATHER AND PARCHMENT

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ABSTRACT

Patrimony represents a national treasure evolving from the culture and spirituality of the people. Therefore it must be continuously recovered, protected and developed by all generations as priceless heritage. Referring to the Romanian patrimony items under restoration at present some works have been done for partial or complete replacing of degraded materials both as result of ageing under atmospheric and biologic agents.

The aim of this study is testing different new leather and parchment materials under UV radiation a 220-380nm domain, in order to simulate the accelerated destruction in photo-oxidative conditions. The following materials have been studied: book binding leather obtained from calf hide, tanned by different systems (vegetable or vegetable and chromium), parchment obtained from different kinds of animals.

The evolution of chromatic characteristics (luminosity, shade and chroma) at different exposure time was quantified by diffuse reflectance technique in visible domain range and CIE – Lab software. Based on the chromatic stability after UV exposure, the most stable types of leather and parchment have been selected for applications in patrimony restoration.

INTRODUCTION

A very important part of the museum patrimony is represented by leather and parchment objects which include precious historical information. Such kind of objects is represented by book bindings, manuscripts, charters, belts, arm covers, sword sheaths, etc.

The most representative leather and parchment Romanian patrimony objects* (images 1 and 2) taken into consideration for our study are the following: Romanic Greek Evangelic book, Old Printing by Theodosie Metropolitan from 1693, Bucharest Bible from 1688, Old printing by Serban Cantacuzino, Evangelic from 1697, Old printing by Antim Ivireanu, Penticostarion from 1742, document on parchment by Simion Moghila 1601 and document on parchment by Mihail Racovita from 1731.

The restoration of patrimony objects from leather or parchment involves in many cases the replacement of irremediable destroyed parts with new parts. The manufacture of new pieces of leather and parchment for museum purpose assumes realization of special characteristics, adequate for each patrimony object. One of the most important characteristics is the structural compatibility and durability of new leather and parchment materials. Such a structural compatibility of new leather and parchment involves reproducing the performance of old technologies by using natural auxiliary materials, vegetable extracts and special handmade operations.

The assessment of leather and parchment durability is performed by using different kinds of artificial ageing simulation followed by chemical, physical-mechanical and instrumental analyses.

Our paper presents an objective instrumental procedure for evaluation of durability characteristics of new leather and parchment materials manufactured for museum use.

EXPERIMENTAL

In order to produce new leather and parchment items for museum purpose we tested different kinds of technologies and chemical auxiliary materials, especially selected to fulfill specific characteristics required for such materials. The main characteristics needed for leather and parchment for museum restoration purpose are the following: structural compatibility with restoration patrimony object, physical-mechanical strength, colour preservation on artificial ageing.

Leather and parchment manufactured were selected by means of physical-mechanical and chemical tests. From this point of view the most resistant types of leather and parchment were:

- leather tanned with chestnut (2C), chestnut and chromium (4C), oak (2A), oak and chromium (4), mimosa (2M), mimosa and chromium (4M), quebracho (2Q), quebracho and chromium (4Q), mimosa in static conditions (M1), and quebracho in static condition (1Q);
- parchment obtained from lambskin, unhaired with enzymes (P1), sulphide and lime (P4), unhaired with lime (P6);
- parchment obtained from calfskin, unhaired with lime (P5) and from kid, unhaired with lime (P8).

In order to assess the durability of leather and parchment, different types of experiments have been proposed for the simulation of environmental conditions which contribute to oxidative, hydrolytic or thermal degradation [1 - 5].

In our previous works [6 - 9] different kind of artificial ageing have been performed by simulating the thermal degradation in cyclic exposure times (at 70^0C, 168 hours - cycle I, 336 hours - cycle II and, 504 hours - cycle III) followed by physical, mechanical, chemical, instrumental analyses (DTA, DSC, UV-VIS-NIR, IR). Another type of ageing performed was under artificial light condition using a xenotest device.

The main results of thermal ageing have led to the conclusion that the nature of leather and parchment degradation is oxidative.

The color change of different kinds of leather and parchment samples under thermal and artificial light conditions allowed the selection of the most stable variant.

In order to establish a reliable method of evaluation of new leather and parchment materials manufactured for museum purposes we have also tested the thermal-photo oxidative degradation under UV radiation in 220-380 nm domain, in a special room, at 50 - 70^0C, in oxidative conditions.

The color change of samples was assessed by measuring the chromatic characteristics (luminosity, shade and chroma) by diffuse reflectance technique in UV-VIS-NIR range (spectrometer V 570, JASCO). The main chromatic characteristics were processed with CIE-Lab software. The technique allows also the evaluation and selection of different kinds of treatments for leather and parchment maintenance.

RESULTS AND DISCUSSION

The chromatic characteristics obtained for initial and after photo-oxidative ageing (at 250 hours exposing time) leather and parchment samples are presented in tables 1 and 3. In tables 2 and 4 are presented the chromatic characteristics expressed as differences between final and initial state.

Chromatic modification of leather and parchment surface under thermal, UV or artificial light conditions represents a result of predominantly oxidative [2, 9] degradation of proteins by generation of ketone groups [8] and simulates in a satisfactory way the natural ageing of leather and parchment. Artificial ageing in thermal photo - oxidative conditions leads to the modification of the main chromatic and organoleptic characteristics (softness, touch).

By corroboration of chromatic characteristics measured by diffuse reflectance technique, CIE-Lab software, and organoleptic assessment of leather and parchment exposed at UV radiation, it was possible to select the suitable samples for restoration purpose as follows: 4C, 2A, 2Q - for leather samples, and P8 - parchment sample, as the most resistant and appropriate materials for restoration propose.

Table 1 – Chromatic characteristics for leather samples exposed at UV radiation

Sample symbol and type of tannage	Chromatic characteristics					
	L*		C*		h_{ab}	
	initial	250h	initial	250h	initial	250h
2C chestnut	38,96	42,96	16,19	20,69	64,38	71,69
4C chestnut/chromium	31,97	43,13	10,35	11,35	52,10	61,02
2A oak	45.04	38,96	15,68	16,20	70,64	64,38
4A oak/chromium	29,83	32,74	6,41	8,06	45,88	60,36
2M mimosa	55,78	46,77	16,00	25,10	65,86	61,18
4M mimosa/chromium	49,92	45,44	15,20	20,58	58,26	60,10
2Q quebracho	55,82	49,97	21,82	23,46	64,70	61,00
4Q quebracho/chromium	45,72	40,37	20,80	19,19	58,10	56,00
M1 mimosa	70,83	69,01	16,28	23,40	63,01	70,81
1Q quebracho	66,96	65,15	19,41	23,96	73,00	75,45

Table 2 – Modification of chromatic characteristics of leather samples exposed at UV radiation (%)

Sample	Modification of chromatic characteristics				
	Initial sample	After UV exposure	L*	C*	h_{ab}
2C chestnut			+10,3	+27,7	+11,1
4C chestnut/chromium			+6,8	+9,7	+17,1
2A oak			-13,8	+3,3	-8,8
4A oak/chromium			+9,7	+25,7	+31,6
2M mimosa			-16,2	+56,9	+7,1
4M mimosa/chromium			-9,1	+35,5	+3,2
2Q quebracho			-10,4	+7,5	-5,7
4Q quebracho/chromium			-11,7	-7,8	-3,6
M1 mimosa			-2,6	+43,6	+12,4
1Q quebracho			-2,7	+23,4	+3,4

Table 3 – Chromatic characteristics for parchment samples exposed at UV radiation

Sample	Chromatic characteristics					
	L*		C*		h_{ab}	
	initial	250h	initial	250h	initial	250h
P1	72,90	72,37	26,01	31,50	88,21	83,58
P4	68,46	82,06	14,70	25,74	81,08	86,93
P5	82,40	88,81	7,30	9,76	75,73	87,48
P6	76,61	83,17	3,90	10,90	77,22	87,38
P8	80,26	88,86	14,24	17,92	80,18	89,84

Table 4 – Modification of chromatic characteristics of parchment samples exposed at UV radiation (%)

Sample	Modification of chromatic characteristics				
	Initial sample	After UV exposure	L*	C*	h_{ab}
P1			-1	+21,2	-5,2
P4			+19,9	+75,1	+7,2
P5			+7,8	+33,7	+15,5
P6			+8,6	+179,5	+13,2
P8			+10,7	+26,0	+12,0

CONCLUSION

- Quantitative chromatic characterization of leather and parchment samples under simulated conditions of accelerated thermal photo-oxidative degradation represents a valuable method to select the most adequate type of leather or parchment materials for museum restoration use.

- The thermal – photo oxidative deterioration simulates the natural ageing effect of leather and parchment through protein deterioration, creation of ketone groups, affecting the color characteristics.

Image 1: Document on parchment by Simion Moghila 1601

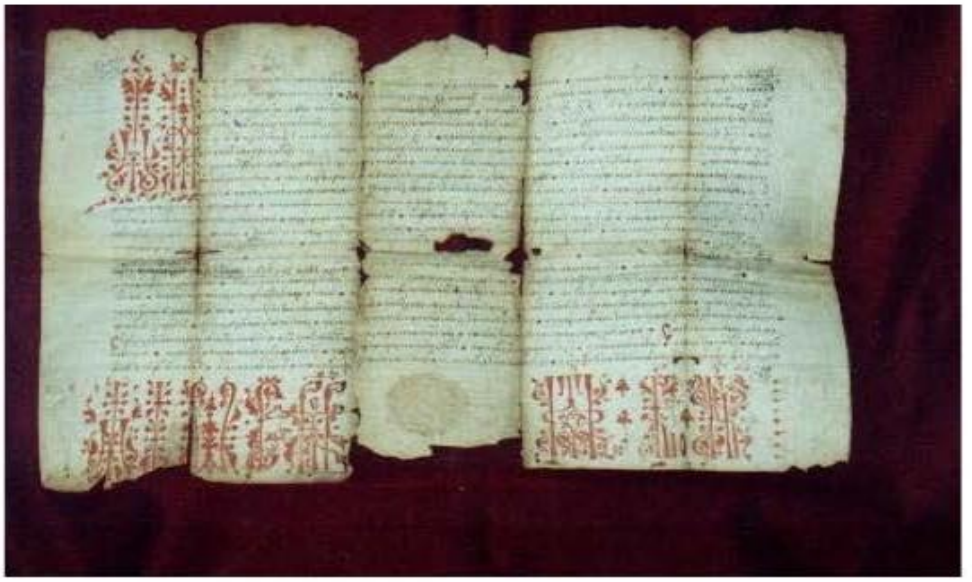

Image 2: Old printing by Serban Cantacuzino, Evangelic from 1697

References:

[1] STEP Leather Project, Evaluation of the Correlation between Natural and Artificial Ageing of Vegetable Tanned Leather and Determination of Parameters for Standardization of an Artificial Ageing Method.

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[7] Miu L., Gaidau C., Niculescu O., Bocu V., Meghea A. – « Manufacturing of Vegetal Tanned Leathers and Parchments Used for Restoration Purposes ", 5th Conference Cultural Heritage Research, May, 2002, Cracow, Poland

[8] Meghea A., Giurginca M., Miu L. – "Spectral Methods for Physical-Chemical Characterization of Historic Leather and Parchment", 5th Conference Cultural Heritage Research, May, 2002, Cracow, Poland

[9] Budrugeac P., Miu L, Bocu V., Popescu C. – "The Use of the Thermal Analysis Methods in Investigation of the Thermal Degradation of Leather for Cultural and Historical Objects", ESTAC, September 2002, Barcelona, Spain

"INNOVATIVE TECHNOLOGIES AND STRATEGIC PLANNING METHODOLOGY FOR ASSESSING AND DECISION MAKING CONCERNING PRESERVATION AND MANAGEMENT OF HISTORIC CITIES"

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Abstract

In situ NDT & E techniques validated in lab, as applied in the historic city of Rhodes, and the historic centres of Athens, Heraklion and Patras, proved to be an effective tool, which provide scientific support with regard to environment/materials/structures interaction. The integrated management of the acquired data develops a strategic planning of the sustainable preservation of historic cities.

The application of the innovative technologies and the development of a strategic planning methodology occur in representative examples of historic cities and historic city centers according to their needs and future perspectives. In particular, the medieval city of Rhodes (World Cultural Heritage Monument), and the historic centre of Heraklion within the Venetian Fortifications require for their preservation integrated environmental management within urban and land use planning of the city. On the other hand, historic centre of Athens faces the necessity (on the threshold of the Olympic Games of 2004) of rehabilitation and protection of historic buildings which can reveal the historic physiognomy of the historic centre and at the same time promote people's accessibility to cultural heritage. Finally, the historic centre of Patras, challenged by the institution of the European Cultural Capital in 2006, requires a pilot integrated fostering and planning of Cultural Heritage within the development of the City as a whole.

Furthermore, in this work it is demonstrated that the appropriate management of the data obtained from NDT & E techniques using spatial data management like AutoCAD on buildings scale and GIS on complexes scale, will permit local authorities and stakeholders to plan preservation strategies following objective criteria with transparency.

Therefore, the use and dissemination of innovative techniques for materials characterisation and information technologies will contribute to the formation of informed societies and will promote social participation and control in planning urban sustainability with awareness to the protection of cultural heritage.

Introduction

The preservation and management of historic cities is a rather complicated issue depended on multiple parameters regarding social, economic, administrative, cultural, and environmental factors. Even if those factors may differ from city to city the

objective of sustainable urban development and enhancement of cultural identity is a common challenge. The direct correlation between the above-mentioned objectives is apparent especially in terms of life-cycle models of a historic city. In particular, their achievement could be grounded through a multi-directional planning which should consist of four major strategic axes, [1]:

1. Sustainable city planning and rational resource management.
2. Protection, conservation, and enhancement of cultural heritage.
3. Development and demonstration of technologies for safe, economical, clean, effective and sustainable preservation, recovery, construction, dismantling and demolition of the built environment, especially for large groups of buildings.
4. Comparative assessment and cost effective implementation of strategies for sustainable transport systems in an urban environment.

These four interrelated strategic axes are contoured by an integrated framework of medium and longer-term objectives, addressing the priorities on which we should focus, in order to preserve and manage a historic city.

Specifically, the first strategic axe aims to improve the urban governance and decision making, the quality of urban life, the economic development, competitiveness and job creation in city centers and city neighborhoods increasing step-by-step the citizen participation in all the above mentioned processes and finally articulating urban policies with regard to socio-economic, environmental and cultural impact, [1]. In parallel, the second axe targets to improve the means of damage assessment on cultural heritage develop innovative conservation strategies and finally promote the integration of cultural heritage in the urban setting for progressing tourism and cultural heritage access by the local population, [1]. Moreover, the third axe focuses on sustainable construction and reconstruction of large groups of buildings and urban infrastructures, optimum use of urban land and rehabilitation of brownfield sites, as well as comparative assessment and cost effective implementation of strategies for sustainable transport systems, through long-term strategic approaches consisting of feasible step changes, [1]. Finally, the forth axe aims to upgrade methodologies in urban planning regarding sustainable urban transport and demonstrate novel transport forms and related infrastructures in order to improve environment, mobility, accessibility and quality of life, [1].

This work reveals how the integrated planning of the second strategic axe (Protection, conservation, and enhancement of cultural heritage) can contribute significantly or even play the leading part to the accomplishment of the rest three strategic axes and consequently to the preservation and management of a historic city. In this work will be presented how the use of innovative technologies and the acquired advanced scientific results, regarding environmental impact and damage assessment on cultural heritage and conservation strategies, as well as evaluation of conservation materials and interventions can develop conservation strategies and effective management tools. These tools can support political, social, economic and environmental decisions towards the sustainable preservation and management of a historic city.

Particularly, non-destructive testing and evaluation techniques, such as Digital Image Processing (DIP), Fiber Optic Microscopy (FOM), Infrared Thermography (IR-Thermo), Ultrasonic (US) measurements and Ground Penetrating Radar (GPR), are applied on architectural surfaces of historic buildings/complexes for research

purposes such as: (a) materials quality control, (b) environmental impact assessment - materials and weathering mapping, (c) evaluation of conservation materials compatibility and conservation interventions effectiveness on the scale of architectural surfaces and historic masonries, (d) strategic planning for the conservation interventions and (e) environmental management for the protection of cultural heritage. Finally, the integrated management of the acquired data by Auto-Cad on buildings scale and GIS on complexes scale develops a strategic planning methodology for the application of compatible materials and conservation interventions and the environmental management of historic cities. It is concluded that the presented innovative planning tools, through the protection of cultural heritage, the environmental management and the reassigning of urban and suburban planning, enhance the cultural identity of a historic city and consequently support the development of Cultural Tourism promoting sustainable urban development.

Results and discussion

Innovative technologies for the development of a strategic planning methodology

- **Digital Image Processing (DIP)**

The applied Digital Image Processing technique, regards the conversion of the varying surface energy content, interpreted through the colour variations of a captured image, to a false colour system, which renders and distinguishes the real degradation process. The basic principal of the method is that the different levels of light reflected and diffused by the surface, correspond to the irregularity of the damaged stone surface. The final results arise from the application of the proper false colour system through a process of applying various colour maps and by assessing and evaluating them with physicochemical retrieval codes (textural and microstructural characteristics), [2]. The Digital Image Processing technique can be validated according to texture analysis by porosimetric data and microscopic textural investigation with scanning electron microscopy.

Detailed materials mapping for the evaluation of conservation interventions compatibility, is presented in figure 1. In particular, alveolar disease varying from disintegration to pitting, cavities, interconnected cavities and full face caves can be distinguished and quantified in pictures b, b', whilst incompatible restoration materials, hard carbonate and biogenic crust, partial replacement by new incompatible building stones are introduced in images a, a', [2, 3].

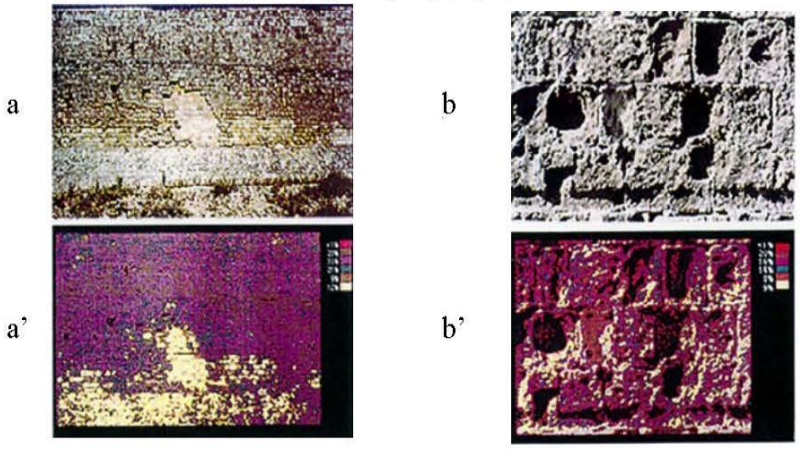


Figure 1: Digital Images Processing at the Medieval Fortifications of Rhodes. Moropoulou A., Koui M., Zezza F. et al [2]. Scientific Project: "Environmental impact assessment and redesign of underground networks (infrastructure) in order to protect the historical masonry of the Medieval City of Rhodes" Scientific Responsible: A. Moropoulou, NTUA, financed by Ministry of Urban Planning and Environment, 1995-1997 – [4].

- **Fiber Optics Microscopy (FOM)**

Fiber Optics Microscopy is applied in the field (by PICO SCOPEMAN - MORITEX), in several magnifications, x25, x50, x100, x200. The images are stored in a video system, and they are processed in the laboratory, [5]. FOM can study the surface morphology before and after a cleaning intervention by indicating the cleaning method's abrasive levels or its selectivity, (fig. 2a-2b), [6]. In addition, after consolidation treatments, information concerning micro-structural modifications in porous materials, as well as the deposition mechanism of the applied materials, can be gathered, (fig.2c-2d), [7]. FOM can be validated in lab by FTIR (Fourier Transform Infra-red Spectroscopy) in cleaning and consolidation interventions evaluation, while in the case of evaluation of consolidation treatments porosimetric data are as well required.

(a) Black organic depositions, before cleaning, Pentelic marble, Athens Academy (x25)

(b) Black organic depositions, after cleaning, Pentelic marble, Athens Academy (x25)

(c) Untreated porous stone of Rhodes, (x50)

(d) Consolidated porous stone of Rhodes, (x50)

Figure 2: Fiber Optics Microscopy Investigation.
(a-b) Evaluation of cleaning intervention on Athens Academy façade – Moropoulou A., Delegou E. T. et. al, [6].
(c-d) Evaluation of consolidation treatments – Moropoulou A., Tsiourva Th., et. al, [7]. Scientific Project: "Environmental impact assessment and redesign of underground networks (infrastructure) in order to protect the historical masonry of the Medieval City of Rhodes" Scientific Responsible: A. Moropoulou, NTUA, financed by Ministry of Urban Planning and Environment, 1995-1997 – [4].

- Ultrasonics (US)

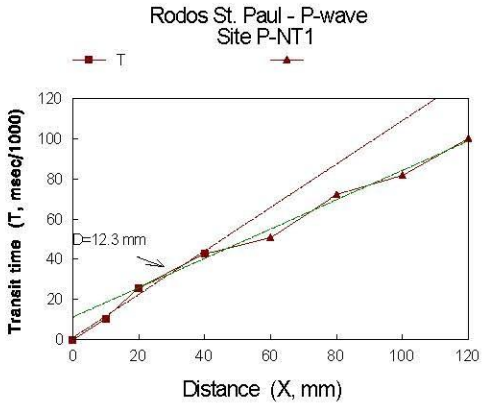
Ultrasonic measurements can determine the weathering depth of a material or even assist in order to compare various materials (sound and weathered) within a structure. The ultrasonic velocity is related to the moduli of elasticity of rocks, such as Young's modulus and Poisson's ratio. Furthermore, it is a very good index for rock quality classification and weathering determination (ASTM 597, ASTM D 2845- 8,). The depth of weathering at a stone surface can be evaluated using the indirect ultrasonic velocity technique. In this case the transmitter is placed on a suitable point of the surface and the receiver is placed on the same surface at successive positions along a specific line. The transit time is plotted in relation to the distance between the centres of the transducers. A change of slope in the plot could indicate that the pulse velocity

near the surface is much lower than it is deeper down in the rock. This layer of inferior quality could arise as a result of weathering, [8]. The thickness of the weathered surface layer is estimated as follows:

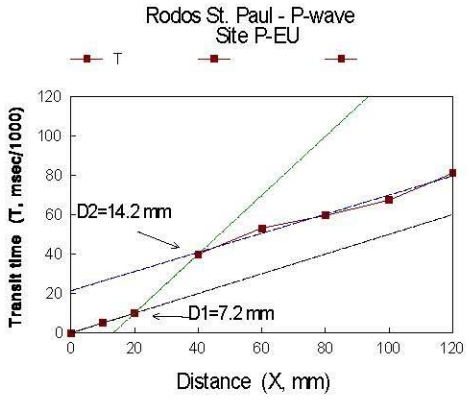
$$D = \frac{Xo}{2}\sqrt{\frac{Vs - Vd}{Vs + Vd}}$$

Vs: Pulse velocity in the sound rock (Km/s)
Vd: Pulse velocity in the damaged rock (Km/s)
Xo: Distance at which the change of slope occurs (mm)
D: depth of weathering (in mm)

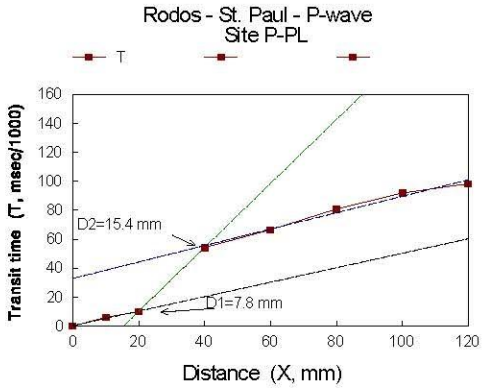
Ultra sonic measurements were performed on untreated (NT) and treated parts of the porous stone of medieval city of Rhodes [8, 9] and the corresponding plots are presented in figure 3. Ultrasonic velocities measured on untreated surfaces of the stone (NT) present change of the regression slope that corresponds to the depth of the weathered zone. The slope of the treated areas is smaller than the untreated ones: this phenomenon can be related to the improvement of the elastic behavior of the stone after the treatment, in comparison with the second part of the curve which represents the sound and untreated inner part of the stone. The shift in the curves can be attributed either to insufficient impregnation depth or to the reflection phenomena at the interface. US can be validated in lab by elasticity modulus measurements and porosimetric data.



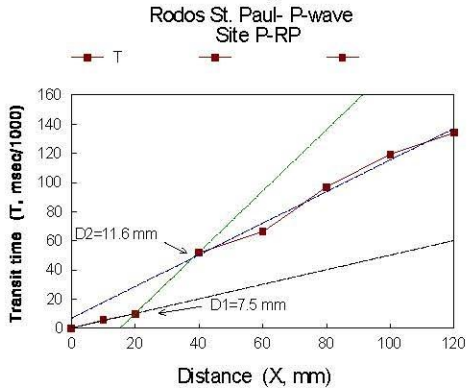
Untreated Stone



Stone Treated with Acryl Siliconic Resin



Stone Treated with Colloidal Silica Dispersion



Stone Treated with Ethyl Silicate

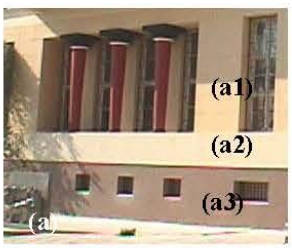
Figure 3: Estimation of Consolidation Depth of porous stones (Medieval City of Rhodes).
Moropoulou A., Christaras B., et al, [8]- Moropoulou A., Tsiourva Th., et. al, [9].

Scientific Project: "Environmental impact assessment and redesign of underground networks (infrastructure) in order to protect the historical masonry of the Medieval City of Rhodes" Scientific Responsible: A. Moropoulou, NTUA, financed by Ministry of Urban Planning and Environment, 1995-1997 – [4].

- Infrared Thermography (IR-Thermo)

Infra Red Thermography is a measurement technique providing thermal maps. A thermographic system consists of an IR Detector (TVS - 2000 MK II LW) and a Processor (AVIO Thermal Video System). The IR Detector uses germanium optics with a peak coating at about 10 μm, manufactured by mercury-cadmium-telluride (Hg-Cd-Te) which gives a spectral response between 8 and 12 μm wavelengths and requires a stirling cooler system (He gas 99,99%). The IR Detector is connected with a processor that detects the electronic signal, stores it in memory, processes it according to a given software and presents it in an LCD, by the form of a thermograph. The temperature range of an IR Detector spans from -40°C to +300°C. Infrared Thermography measures the thermal radiation emitted by the material – structure being examined and renders the image of the surface area in colours, in relation to a temperature scale, [10].

In the investigation of the National Bank of Greece historic building in Nafplio (figure 4), IR-Thermo disclosed temperature readings and their distribution on the examined architectural surfaces by the rendering of different colours. The investigation revealed that the beige painted lime plaster presents intermediate to low temperature values (a1-b1), [11]. This is attributed to moisture withholding deriving from the acrylic putty application (a cement based material rich in organic components) that prevents the respiration behaviour of the lime-plastered surfaces by constraining its water movement and vapour permeability, [12]. The respiration behaviour among cement, organic and lime-based materials varies because of the differences noticed not only in their chemical and mineralogical composition but also in their microstructure (i.e. total porosity, pore size distribution, pore radius), [10, 12]. Thus, there is different permeability among such materials leading to physicochemical incompatibility, [10]. The new light beige painted cement plaster, demonstrates the lowest temperature readings (a2-b2), since cement materials are hydrophilic, withholding moisture. Finally, the hammered plaster high temperatures (a3-b3) appear not only due to the plaster's superficial relief, but also because the plaster's moisture evaporation rate is not prevented, since acrylic putty was not applied, [1]. In order to validate IR-Thermo, different types of simulating masonry prototypes are monitored by the technique in lab during water absorption curves (capillary) and/or evaporation phenomena, [10].



(a) Photo of the adjacent investigated surface,
(b) Thermal Image,
(a1-b1) beige painted plaster,
(a2-b2)new light beige painted plaster,
(a3-b3) dark brown painted hammered textured plaster

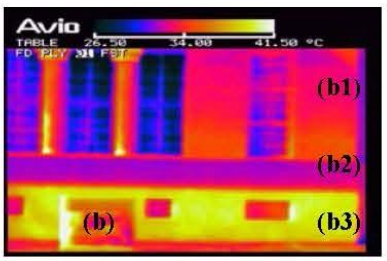


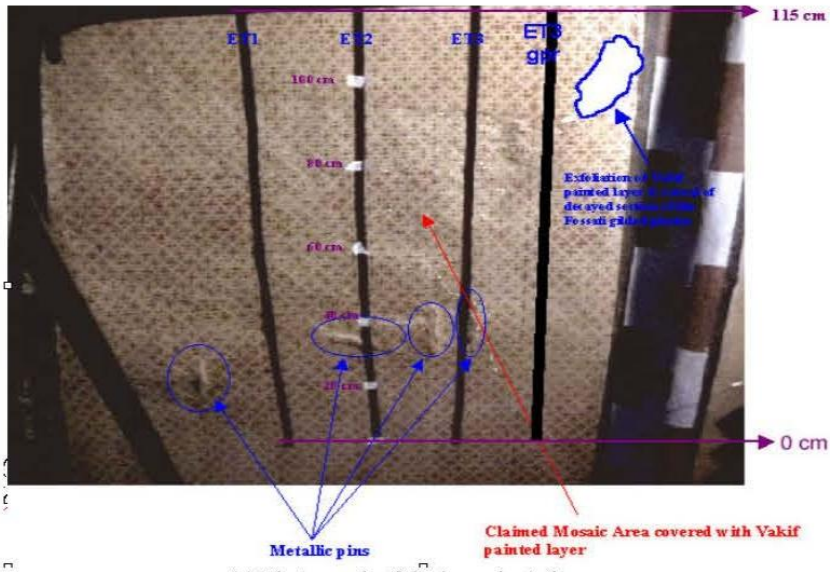
Figure 4: Historic building in Nafplio – IR-Thermo investigation.
Moropoulou A., Avdelidis N. P., [11].

Scientific Project: "Planning and Programming of Conservation Materials and Interventions on the Facades of the Historic Buildings of National Bank of Greece", Scientific Responsible: A. Moropoulou, NTUA, financed by National Bank of Greece, 2000-2002 – [13].

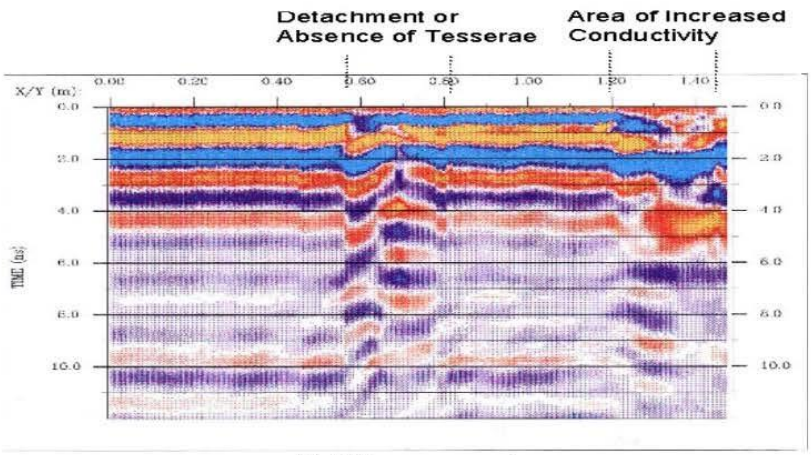
- Ground Penetrating Radar (GPR)

GPR is an electromagnetic method, involving propagation of EM waves. A Ramac-GPR system is utilised, using an antenna of 1 GHz. The antenna transmits short pulses of electromagnetic energy, which they are reflected from interfaces in the material(s), due to the changes of the dielectric properties. GPR data are used for determining the thickness, as long as there is a clear and adequate dielectric contrast among layers and so it is possible to pick up an echo allowing the location of interfaces, [14].

Major interventions in the past, in Hagia Sophia in Istanbul where different mosaic categories of invaluableness are presented, have caused aesthetic problems leading to some cases to severe damage of the mosaic. Such example is the intervention occurred in the early 1900's, under the General Directorate of Pious Foundations, mostly known as the "Vakif intervention". The plaster of this intervention was covered with an opaque yellow pigment in a glue medium. Stencil ornaments in pattern were applied on this yellow ground. So, in this work [14], a plastered mosaic surface (characteristic Vakif intervention surface) in the Hagia Sophia dome is presented. The surface was situated between the 19th and the 20th rib at the northwest part of the dome, 16 metres from the centre of the dome. Figure 5a shows the examined surface. GPR can reveal surfaces of plastered mosaics, in which areas of detached tesserae, as well as areas with moisture problems and presence of salts are displayed (figure 5b). The boundaries of problematic areas are detectable, due to the differentiations of the EM waves transmission, [14].



(a) Photograph of the investigated area



(b) GPR measurement

Figure 5: Ground Penetrating Radar Measurement of area in the Hagia Sophia dome. Moropoulou et.al, [14].
Scientific Projects: "Conservation of Hagia Sophia and Byzantine Monuments in Konstantinoupoli", financed by Greek Ministry of Culture, 1998-1999, [15], "Greek-Turkish Educational Cooperation for the Earthquake Protection and Conservation of Monuments", financed by the Greek Ministry of Education and Religion, 2000-2001, [16], Scientific Responsible: Moropoulou A.,

- Planning of historic buildings conservation interventions, using integrated information systems: Mela Palace in Historic Centre of Athens

The architectural drawings of the Mela Palace historic building façades were created in AutoCAD, (figure 6b), [17]. These drawings function as the base map, where all the acquired non-destructive data can be recalled, since they are stored in a database. This integrated information system can be activated presenting all the available data of the investigated areas on screen, [18]. Therefore, the materials façades (i.e. stuccos, painted plastered surfaces, decorative plasters resembling edge cornered stones, white marble and grey marble surfaces) can be displayed on screen classified according to their architectural description and physico-chemical characteristics (figure 7), [13, 18].

(a) Photo of Mela Palace in Athens historic centre – North Façade

(b) AutoCAD Design of Mela Palace North façade,
Michael S., Master Thesis NTUA, [17], Supervisor: Moropoulou A.,

Figure 6: Photo and AutoCAD design of Mela Palace North façade
Scientific Project: "Planning and Programming of Conservation Materials and Interventions on the Facades of the Historic Buildings of National Bank of Greece", Scientific Responsible: A. Moropoulou, NTUA, financed by National Bank of Greece, 2000-2002 – [13].

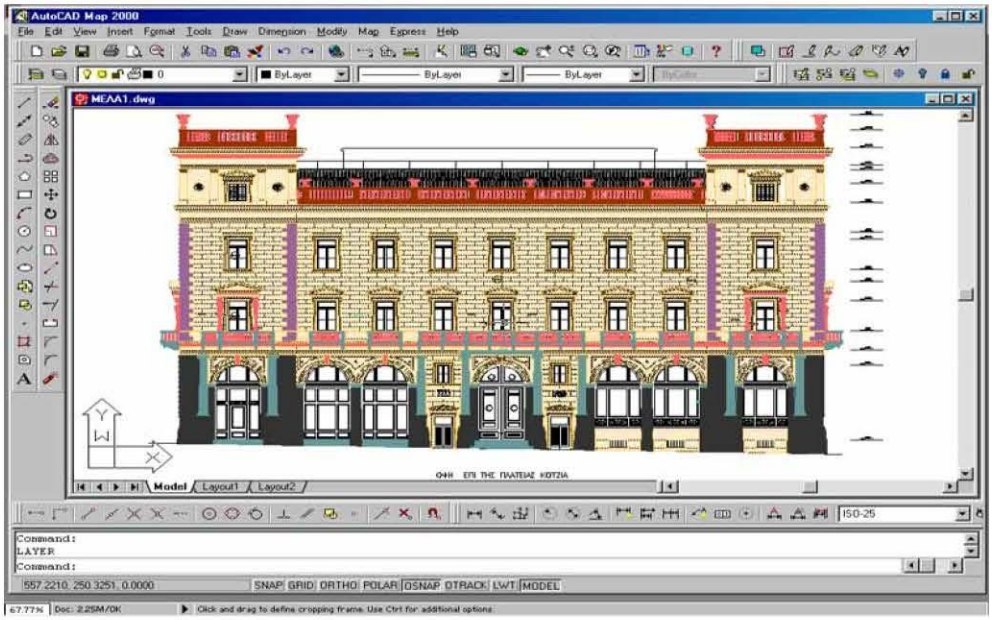
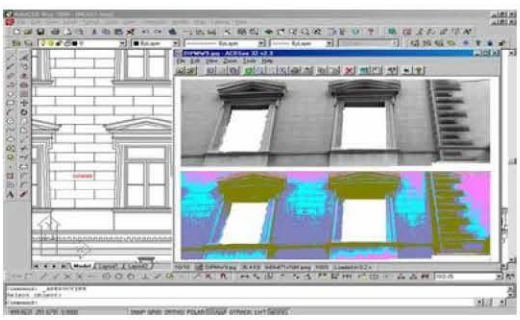
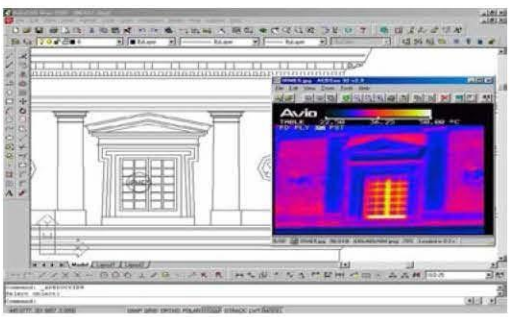


Figure 7: Materials Mapping, using the Integrated Information System of AutoCAD, (Moropoulou A., Avdelidis N. P., Delegou E. T., et. al, [18].
Scientific Project: "Planning and Programming of Conservation Materials and Interventions on the Facades of the Historic Buildings of National Bank of Greece", Scientific Responsible: A. Moropoulou, NTUA, financed by National Bank of Greece, 2000-2002 – [13].

Moreover, environmental impact assessment can be achieved through the management of DIP and IR Thermo images. Several pseudo colours (in a colour mode) or shades of grey (in black and white format) through DIP images attribute the displayed decay patterns, whereas the IR Thermo images record the temperature distribution of the investigated surfaces (figure 8), [13]. In particular, the DIP image presents the painted plaster surfaces of the west façade, presenting with the different shades of grey the dust fall & black depositions area, the washed out surfaces, the blackish depositions and the firm painting, [18]. The IR Thermo image shows moisture deposits at the areas of decorative plasters, stuccos and pilasters comparing to the rest plastered area, [18].



(a) Decay Mapping through Management of DIP Images, west façade



(b) Decay Mapping through Management of Infrared Thermographs, east façade

Figure 8: Decay mapping through NDT management.
Moropoulou A., Avdelidis N. P., Delegou E. T., et. al, [18].
Scientific Project: "Planning and Programming of Conservation Materials and Interventions on the Facades of the Historic Buildings of National Bank of Greece", Scientific Responsible: A. Moropoulou, NTUA, financed by National Bank of Greece, 2000-2002 – [13].

Finally, the management of the AutoCAD mapping results can achieve planning of conservation interventions. Thus, figure 9 presents the areas where the removal of plaster's external paint, using a wet micro blasting method of 2.5 bar maximum pressure, is suggested, and the areas where a siloxane-based paint should be applied, [13, 18].

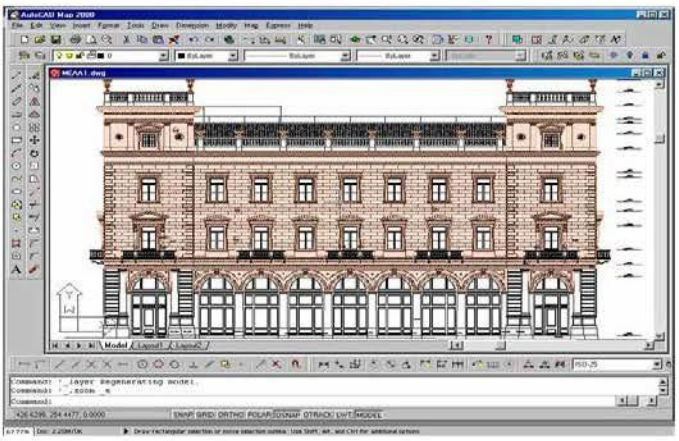


Figure 9: Planning of Conservation Interventions by the Management of AutoCAD Mapping Results.
Moropoulou A., Delegou E. T., Avdelidis N. P., et al, [18]
Scientific Project: "Planning and Programming of Conservation Materials and Interventions on the Facades of the Historic Buildings of National Bank of Greece", Scientific Responsible: A. Moropoulou, NTUA, financed by National Bank of Greece, 2000-2002 – [13].

- Preservation planning as a tool for a sustainable historic city: medieval city intra muros of Rhodes & historic city centre of Heraklion within the Venetian Fortifications

A Geographical Information System (GIS) can be used in order to manage a multidisciplinary database, including environmental, functional, materials and structural data [5]. Integrated environmental planning can be accomplished by the analysis of all the relevant data with the objective of eliminating the negative impact of the natural and artificial (man-made) environment on historic fortifications, with the purpose of preventing additional damage and preserving the compulsory conservation level – intensity, whilst the historic site is revitalised in the course of further treatments – uses and its role is reinforced. Finally, integrated management can be suggested in terms of preservation of historic sites as intervention to materials and structures (figures 10, 11, 12, 13, 14), urban planning and environmental management to eliminate environmental loads, as well as development and rehabilitation of the places – sites and buildings by introducing new uses (cultural and recreational activities and tourism), [19].

In particular, infra red thrmography investigation on the medieval city intra muros of Rhodes, revealed that the humidity contents and their distribution among the

masonry surfaces provide information about the differential behaviour of various materials in the masonry as well as the impact of the microclimatic variations on the same building material, since the water evaporation cycles are controlling the weathering effects in porous media, [5]. The management of infra red thermographs by GIS in order to evaluate the conservation state of the underground networks (infrastructure) and their impact on the medieval fortifications of Rhodes, demostrate that the induced humidity does not over-exceed the critical levels and consequently the planning of underground networks is acceptable, (figure 10), [20]. Furthermore, the integrated management of other NDT results (i.e. figure 1, 2c-d, 3) achieve the environmental management and valuation of uses for the medieval city of Rhodes, (figure 11), [4, 5].

Respectively, the GIS management of main air pollutants concentrations (CO, O_3, NO, NO_2, SO_2, figure 12), on Venetian Fortifications of Heraklion for the years of 1997, 1998, 1999, along with the results of soluble anions concentrations (Cl^-, NO_3^-, SO_4^{2-}, figure 13) in monument samples accomplishes the environmental impact assessment as well as it contributes to the environmental management and valuation of uses for the historic centre of Heraklion city, (figure 14), [21, 22].

Therefore, the medieval city of Rhodes and the historic centre of Heraklion within the Venetian Fortifications, require for their preservation, integrated environmental management within urban and land use planning of the city, as figures 11, 14 demonstrate respectively.

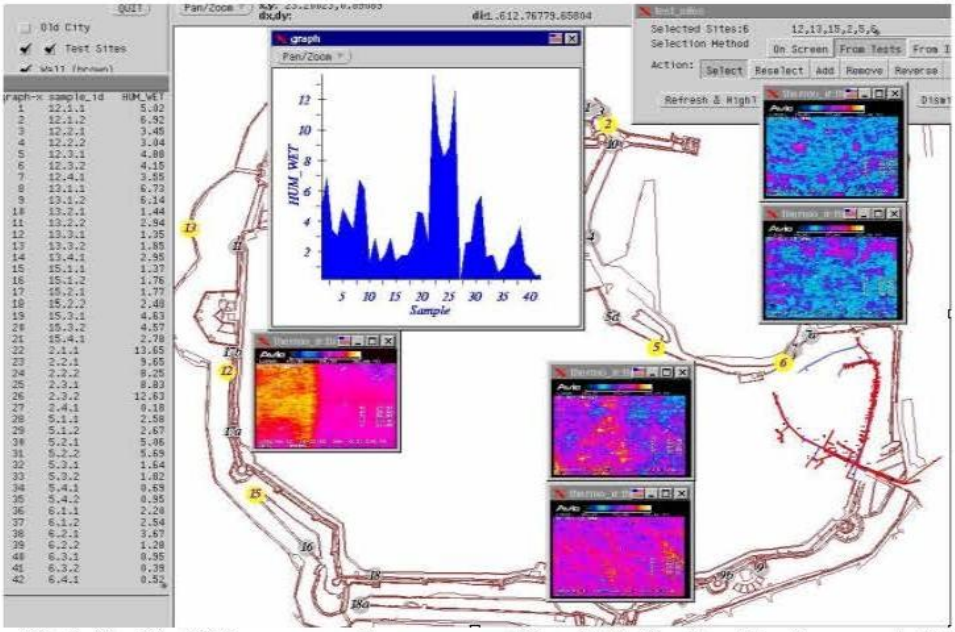


Figure 10: Infra Red Thermographs managed by GIS for the Environmental Impact Assessment and related management regarding the planning of underground networks in the medieval city of Rhodes.

Moropoulou A., Kourteli Ch., Koui M., et al [5, 19, 20].

Scientific Project: "Environmental impact assessment and redesign of underground networks (infrastructure) in order to protect the historical masonry of the Medieval City of Rhodes" Scientific Responsible: A. Moropoulou, NTUA, financed by Ministry of Urban Planning and Environment, 1995-1997 – [4].

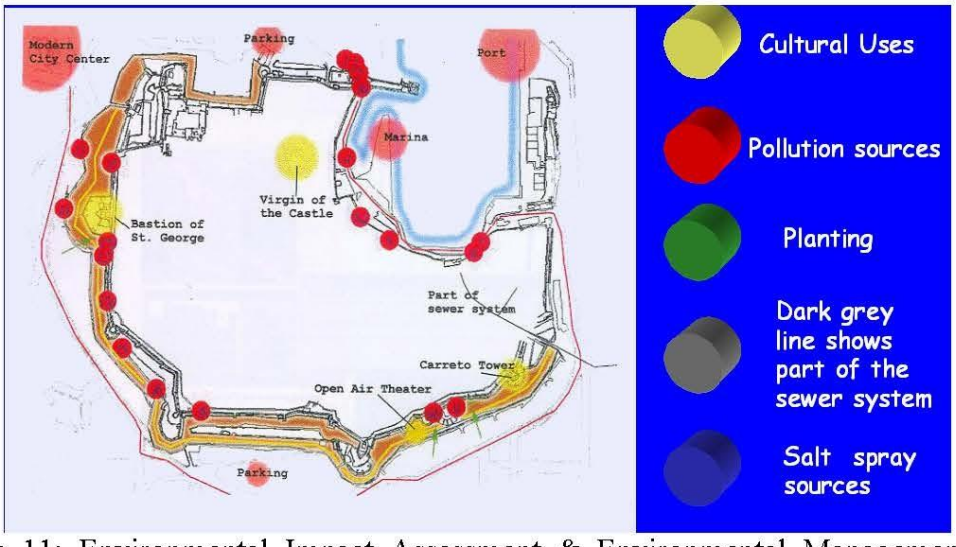


Figure 11: Environmental Impact Assessment & Environmental Management and Valuation of uses by GIS for the medieval city of Rhodes.

Moropoulou A., Kourteli Ch., et al [5, 19, 20].

Scientific Project: "Environmental impact assessment and redesign of underground networks (infrastructure) in order to protect the historical masonry of the Medieval City of Rhodes" Scientific Responsible: A. Moropoulou, NTUA, financed by Ministry of Urban Planning and Environment, 1995-1997 – [4].

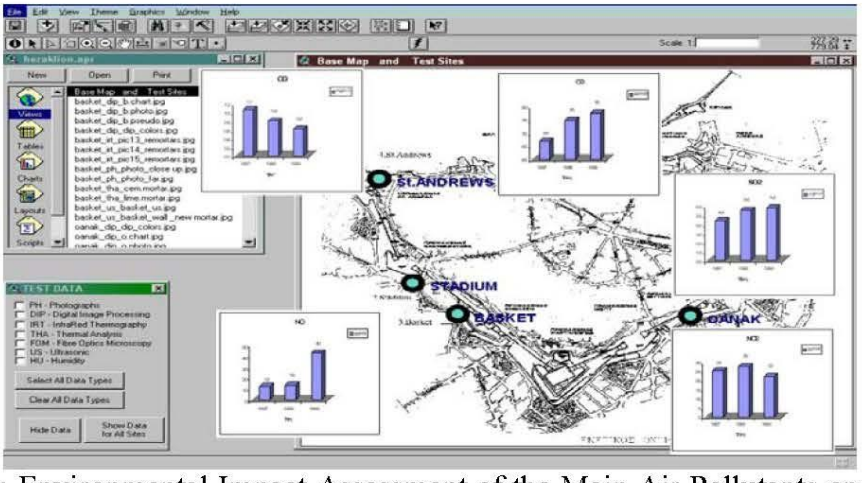


Figure 12: Environmental Impact Assessment of the Main Air Pollutants on Venetian Fortifications of Heraklion using GIS.

Scientific Project: "Environmental Impact Assessment on Historic Cetres & Complexes Using DIP and other NDT and E Techniques – Management Bases", Scientific Responsible: Moropoulou A., financed by Regional Enterprising Programmes of Crete, 1996-1998 – [21].

Galati A., Master Thesis, NTUA, [22], Supervisor: M. Koui

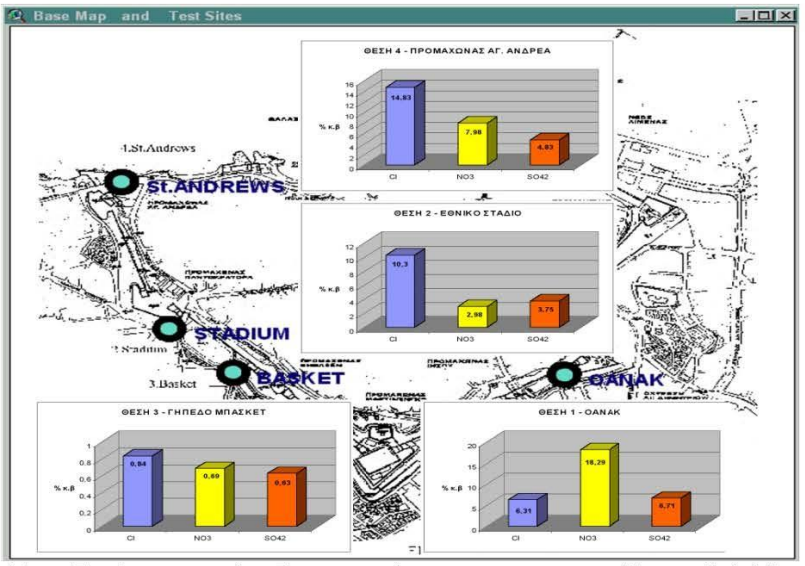


Figure 13: Environmental Impact Assessment regarding Soluble Anions Concentrations (Cl^-, NO_3^-, SO_4^{2-}), on Venetian Fortifications of Heraklion using GIS.
Scientific Project: "Environmental Impact Assessment on Historic Cetres & Complexes Using DIP and other NDT and E Techniques – Management Bases", Scientific Responsible: Moropoulou A., financed by Regional Enterprising Programmes of Crete, 1996-1998 – [21].
Galati A., Master Thesis, NTUA, [22], Supervisor: M. Koui

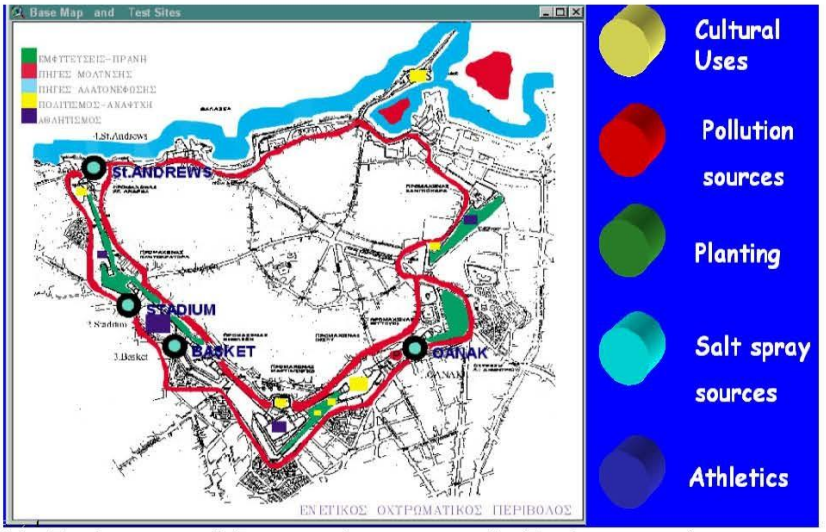


Figure 14: Environmental Impact Assessment & Environmental management and valuation of uses by GIS for the Venetian Fortifications of Heraklion.
Scientific Project: "Environmental Impact Assessment on Historic Cetres & Complexes Using DIP and other NDT and E Techniques – Management Bases", Scientific Responsible: Moropoulou A., financed by Regional Enterprising Programmes of Crete, 1996-1998 – [21].
Galati A., Master Thesis, NTUA, [22], Supervisor: M. Koui

- The protection of cultural heritage and the development of Cultural Tourism: Historic centre of the city of Patras

The success of a programme that plans and applies the integrated linking of historic buildings, monuments and archaeological sites within the city scale, improves their accessibility and subsumption within the urban setting, and process rapidly the

development of cultural tourism. Previous successful programmes (institution of the European Cultural Capital in Glasgow – Scotland, Olympics in Barcelona - Spain), proved that financing the preservation of cultural heritage is an investment of high performance with perspectives of direct self-finance or even finance other future construction works. Since city of Patras is challenged by the institution of the European Cultural Capital in 2006, an integrated planning of Cultural Heritage within the development of the City as a whole is following suggested.

More specifically, the tourist renewal and exploitation of the cultural heritage of Patras, that is the historic buildings, the monuments and the archaeological sites, which define its identity (Monuments in historic centre, Monuments in city plan out of historic centre and Monuments out of city plan, figure 15), is meaningful in terms of the sustainable development only when:

- The city historic center is reformed and integrated with the historic buildings and monuments that surround it, (monuments of historic centre integrated with monuments out of historic centre within city plan, figure 16), [23].
- The city centre (historic and modern) is connected with the monuments of the suburban plan through special shaped tourist and cultural routes (figure 17), [23].
- Special decision-making is acted out, during the extension of the urban and regional planning, for the protection of areas with historic and ecological interest and/or of natural beauty, [23].

Finally, the reformation and the exploitation of historic buildings, monuments and archaeological sites must be connected with indicated conservation studies and works through a holistic approach in city management. Consequently, historic sites integration into city context with a web of pedestrian zones, as well as their reformation/renewal through urban and architectural interventions will develop a coherent whole, which will reveal aesthetical and touristic the city.

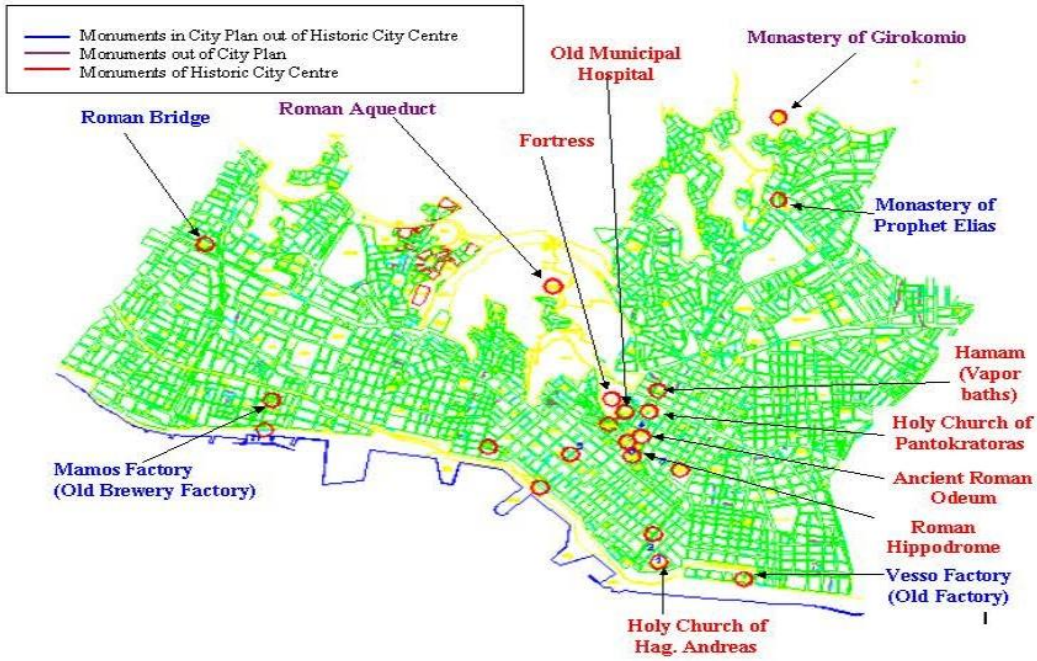


Figure 15: Presentation of the Distribution of Historic Buildings, Monuments and Archaeological Sites in the city of Patras, by GIS. (Urban Planning & Applications Department of Municipality of Patras), Moropoulou A., Delegos Th. S., [23].

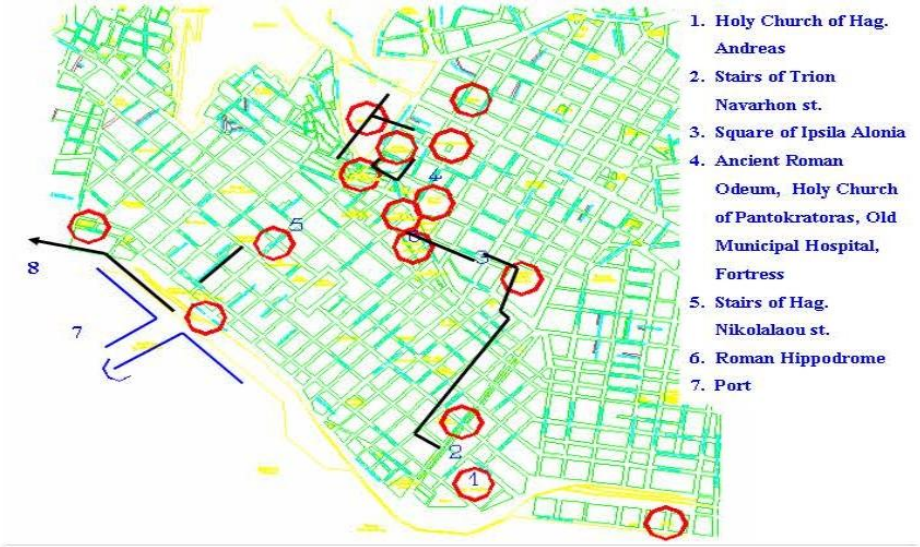


Figure 16: Presentation of the suggested tourist and cultural routes for the city of Patras within city plan by GIS.
(Urban Planning & Applications Department of Municipality of Patras), Moropoulou A., Delegos Th. S., [23].

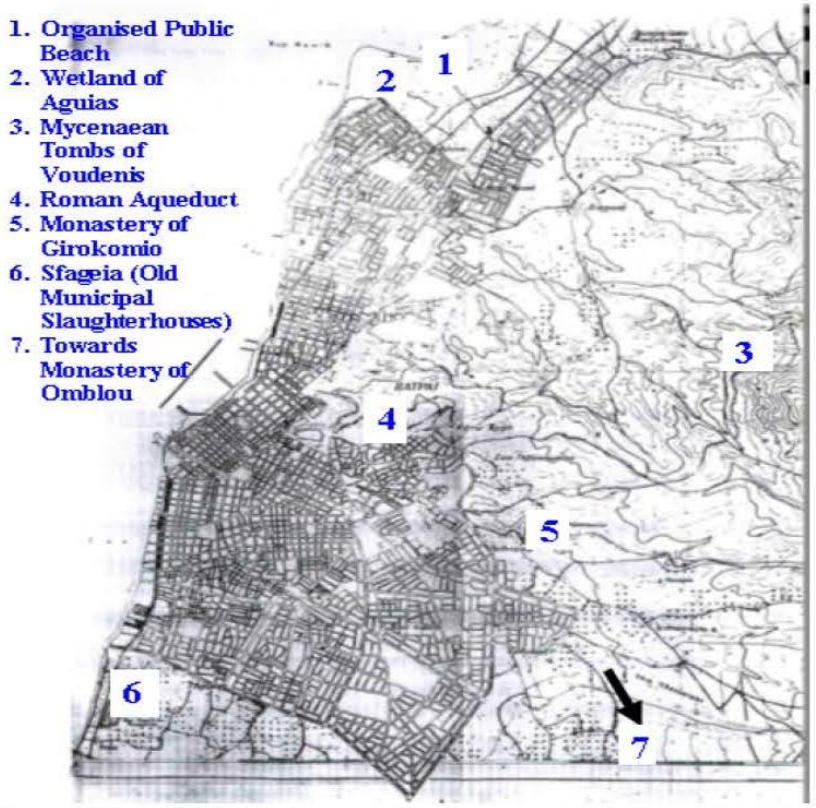


Figure 17: Sites of Historic, Architectural, Environmental and Tourist Interest located out of the city plan of Patras.
(Urban Planning & Applications Department of Municipality of Patras), Moropoulou A., Delegos Th. S., [23].

Conclusions

It is concluded that three main axes could accomplish the strategic planning methodology for the assessing and decision-making regarding the preservation and management of the historic cities and/or historic centers. In particular the:

- Strategic planning of the conservation interventions on historic buildings, using data management in integrated information systems for their rehabilitation and protection. Therefore, the historic physiognomy of the historic centre is revealed and people's accessibility to cultural heritage is promoted, (Athens historic centre paradigm).
- Strategic planning of integrated environmental management, as a tool for the sustainable development of historic cities and/or historic centers, using geographical information systems for their preservation within urban and land use planning of the city, (the paradigms of medieval city of Rhodes and historic centre of Heraklion within the Venetian Fortifications).
- City development as a whole, through the protection of cultural heritage, the planning of special tourist and cultural routes and finally the progress of Cultural Tourism, (the paradigm of historic centre of Patras).

Consequently, the use of innovative technologies like NDT & E techniques validated in lab and the acquired advanced scientific results, regarding damage assessment on cultural heritage and conservation strategies, when integrated into tools like AutoCAD and GIS have a major contribution to the preservation and management of a historic city and gradually to its sustainable development, because these effective management tools shape the political, social, economic and environmental urban development in terms of sustainability.

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SOCIO-ECONOMIC, LEGISLATIVE-CULTURAL AND STRUCTURAL PROPOSALS FOR THE REHABILITATION OF TRADITIONAL DIYARBAKIR HOUSES IN TURKEY

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ABSTRACT

As a result of the changes in the user requirements, the traditional houses became insufficient to provide the contemporary comfort conditions, abandoned by the real owners or rented. The lose of function made the traditional Diyarbakır houses became a residence for the people moved from the countryside to the city. They had worked on agriculture and animal husbandry before, but after migrating to the city, naturally, became unemployed. The traditional Diyarbakır houses that are designed as living quarters for patriarchal families became accommodations that had to be shared by more than foreign families. The changes in traditional houses, due to physical and social causes, form serious problems in transition of cultural heritage to the future. The climate, social, urban structures, and the construction materials affected the form of the houses. A restoration method is given to keep the houses alive.

INTRODUCTION

The rehabilitation of the houses will provide modern lifestyle standards to the inhabitants and the sustainability of the cultural heritage. Stone building, as a craft facing extinction, must be survived to repair traditional Diyarbakır houses efficiently. In order to increase the income, to keep handcrafts that are on the way of extinction alive and to keep the sustainability, a conservation method is needed. In this paper, it is suggested that the conservation of the traditional Diyarbakır houses in the historical region of the city called as "Surici", is possible in theory with participation of the inhabitants. The conservation policies developed for Diyarbakır traditional houses constitutes theoretical and bureaucratic dimensions with socio-economic, legislative and cultural proposals and practical dimensions with regional and structural appreciations.

STUDY

The city of Diyarbakır, founded on the East side of a basalt plateau which stretch from volcanic mountain Karacadag to the Tigris River is located on a plain one hundred meters above the Tigris River (Gabriel [1]). In order to have detailed information about the roots of the traditional houses, it is essential to have a look on the short history of the city.

Çayönü Hill dated to 7250-6750 BC. was the first residential area in the region. The area has fame with its authentic architecture and use of copper mine (Beysanoğlu [2]). It is obvious from the remains of Sumer and Akad, the area between upper Tigris River and Euphrates River called as Subartu at 3000 BC. and the warriors lived there called as Subarus. The first civilized society of the upper Tigris River was Hurrians.

The city was under the management of Asurians at 825-775 BC., Urartus at 775-756 BC., and again Asurians at 736-654. Romans managed the city at 69 BC. and at 640 Heraclius started his travel from Amida (The old name of Diyarbakır) and reached to the River Euphrates that had a bridge on it formed by the rafts (Ramsey [3]). At 305 BC the city was converted to Christianity and later at 636 the city was under Islamic civilizations.

Climate

In the winter season the region is under the effect of the high-pressured cold weather. It is cold and rainy in winter, hot and dry in the summer time. The region shows a rain order of Mediterranean climate.

Structure Of The City

Although it is not known when the city and its walls created, the first residential area in the city was the acropolis called Ickale (the inner city) due to Gabriel. In the south of Ickale there was an amphitheatre dated to VI. century which now does not exist. When the Islamic armies conquered the city, at 639 the church in the city called Saint Thomas was converted to a mosque called Great Mosque. The most important structure in the city that defines the character of the city is the city walls. Due to Gabriel in 1940, the area surrounded by the walls was one thousand seven hundred meters from east to west and one thousand three hundred meters from north to south.

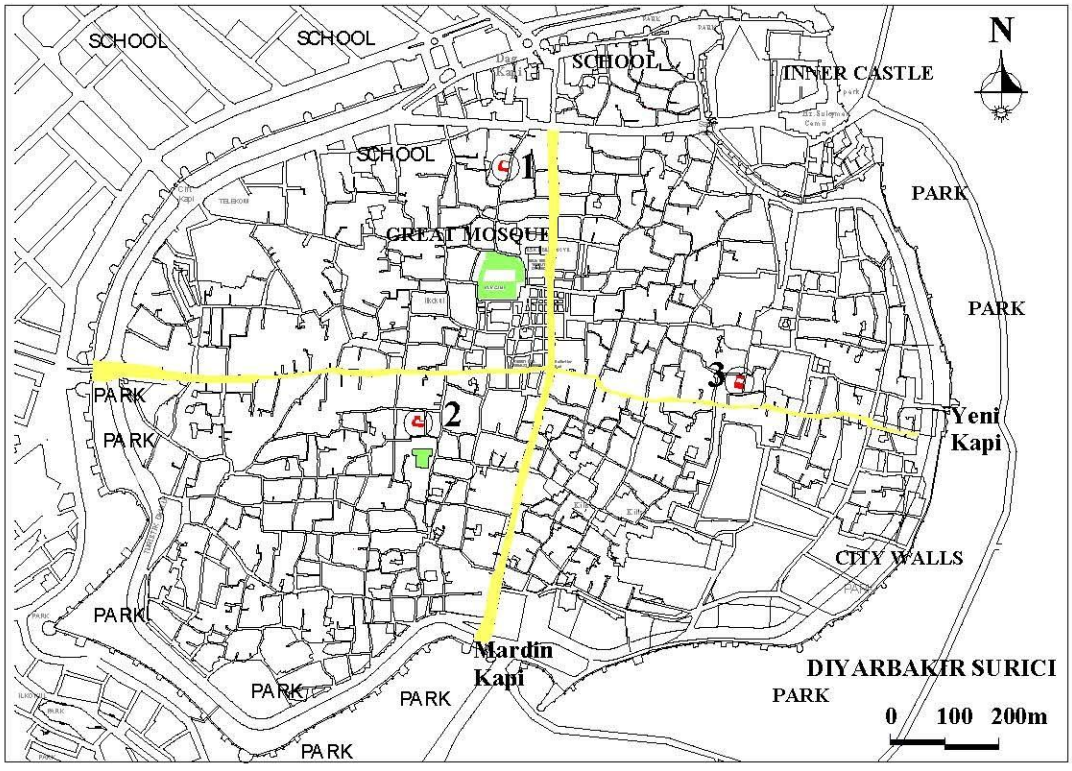

Figure 1. Map Of The Historical Site Of Diyarbakır City

The old town had to develop inside the city walls and because of the climate the streets became narrow, the houses have to be built adjacent. In these narrow streets, there are some under passages, which have a room on it, built to avoid from the heat while walking through and to get a wide projection of the street from the room.

Design Principles For The Traditional Diyarbakır Houses

Turkish Houses are in different shapes in the different regions of Anatolia (Sezgin [4]). In the 12th-13th centuries the architecture of Southeast Anatolia was affected from the Iraq and Syrian architecture due to the political and cultural relationship (Kuban [5]). The region created a stone built architecture beginning in the Hellenistic era and continuing in the Roman, Christian and early Islamic times. The Islamic shapes have been created by Seljuks, Eyyubies and Memluks (Kuban [6]). In the traditional Diyarbakır houses water, shadow, and semi-open areas are the basic principles of the design. The recess with a pool, the water channels, and the semi sunken basement floor are the priorities of the hot climate. The wide stonewalls is the way of protection from the heat of summer and from the wind of the winter. The effects of Islam can be seen in the development of Turkish House. The outside relations restricted with a conservative lifestyle.

The rooms in the Turkish house are the units that respond more than one activity. They are used for eating, studying and sleeping. There are some rooms making a console for a projection to the narrow street. The blocks used during winter are oriented to the south. There is no fireplace inside the room. A died down fire would be taken in by a brazier. The only fireplace is in the kitchen and the winter room of the house is nearby there. There is no any window oriented to the south axis except the winter rooms (Erginbaş [7]). The east and west oriented blocks are used four seasons.

The mostly used space; recess is closed from three edges and opened to the courtyard with an arc or an arcade (Kuban [6]). One of the properties of the recess is being a semi open connection space between the closed spaces; the rooms, and the open space; courtyard. They are covered by wooden beams and rarely vaulted.

In the traditional Diyarbakır houses, with the effect of dry-hot climate, the life would be lived especially in the courtyard that is shaped due to the richness of the family. In the prosperous houses the harem would be a separate part. The blocks are oriented around a courtyard due to the climate and the direction of the sun. The number of the blocks and the greatness of the house are related to the richness of the family. The ground floor is located on a basement floor eighty to eighty-five cm. above the courtyard. The height of the rooms differs from three to four and half m. The wall of the courtyard is built by unhewn stones and the elevations are from well-hewed porous basalt.

Structural Properties Of Traditional Diyarbakır Houses

The recesses are oriented with; semicircular arches, two centered pointed or depressed arches and sometimes by the profiles determined by lines. In the coverings of the top, the wooden beams are located on the short direction of the walls, covered by board as a flat surface and with soil layer on it. The basalt stone used in the structures is a semi crystal, glasslike textured, black colored and homogeneous volcanic stone.

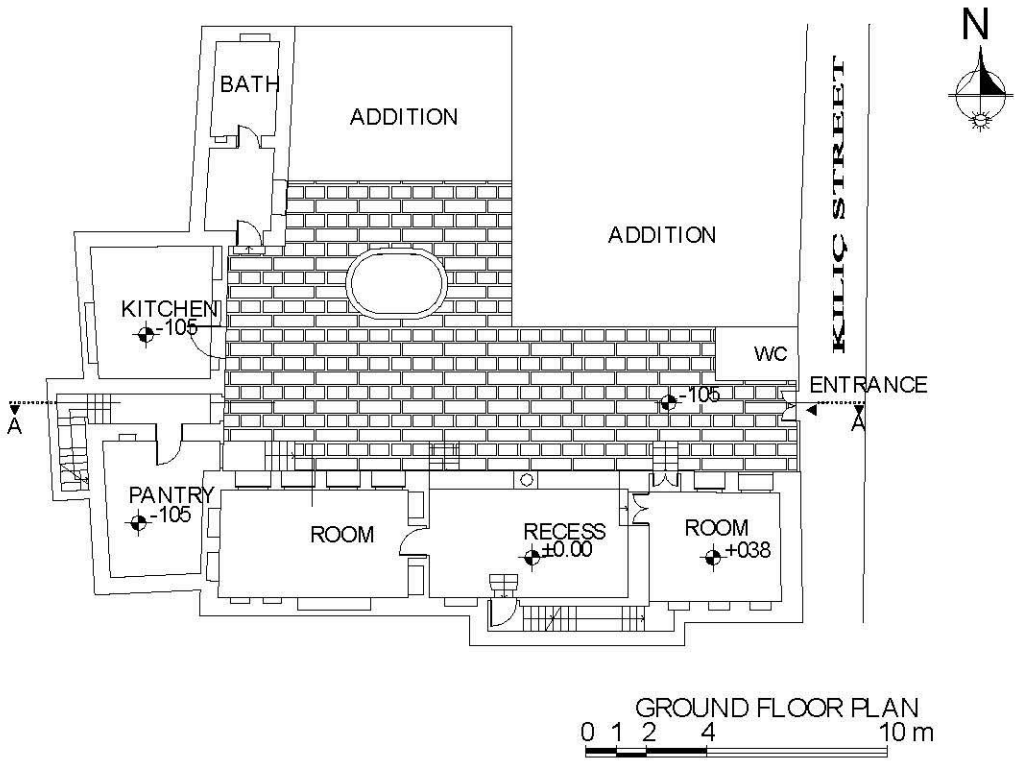

Figure 2. The Plan Of The House In Ziya Gokalp District, Kılıcı Street No:6 (On the map no:2)

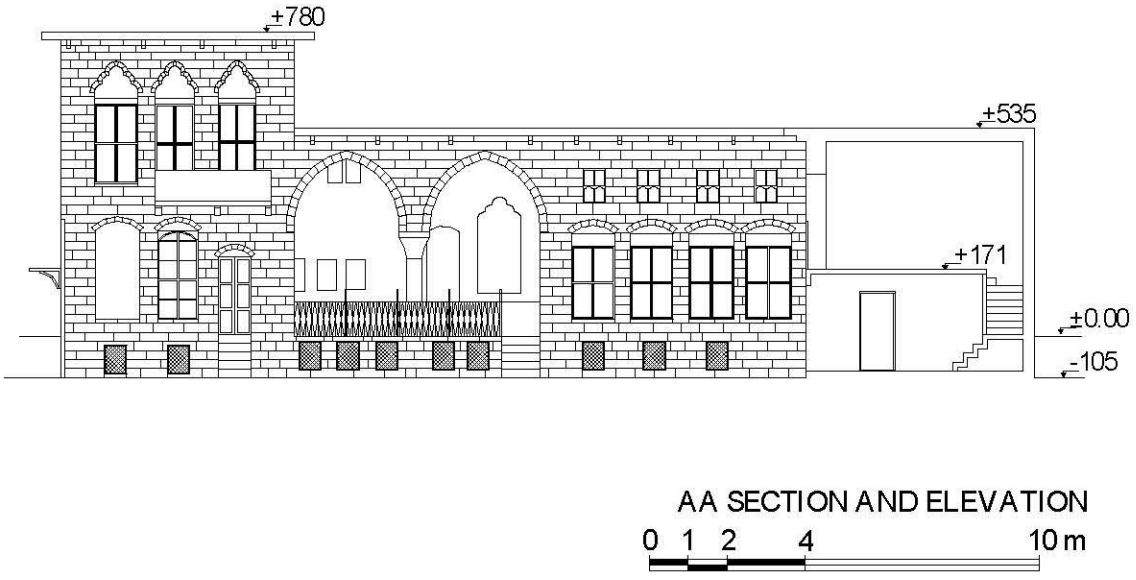

Figure 3. The House In Ziya Gokalp District, Kılıcı Street No:6

Figure 4. A View From The Courtyard OF The House In Ziya Gokalp District, Kılıcı Street No:6.

The Deterioration

The houses, which have preserved and lived for a long period of time, show some deterioration that increase with the technological innovations. It is possible to consider the deterioration in two groups as physical and social parameters. Using some of the spaces out of their functions, brought out decays as well. The carbonic gas from the motorcars and the chimneys cause some decays on the monuments and with deep penetration it would cause harmful damages. The patriarchal family model changed and the real owners of the traditional houses had left them to have much comfort in the new built environment. The unconsciousness of the local management is also being the cause of damage.

Heating of the structural material by the solar radiation causes thermal effects (Feilden [8]). In the hot-dry climate, the structural material basalt stone shows thermal dilatation and it causes cracks on the stone. The most important problem is the rainwater coming from the top cover. Sometimes the original cover would be changed with the reinforced concrete and this would cause a surcharge on the traditional structure.

CONSERVATION PROPOSALS AND RESTORATION PRACTICES

Socio-economic Proposals

One of the most effective ways of the transition of the cultural heritage to the future is the participation of the inhabitants in the conservation. Conserving the historical site without inhabitants would cause the decays happen more rapidly. Arranging the site for the use of rich people also would obstruct a wider use. Some theoretical lessons have to be given to the inhabitants periodically while the restoration is going on. It is important keeping some of the handcrafts alive. Some of the social structures have to be oriented in some of the existing traditional houses.

These structures are; production of handcraft works, selling them, rehabilitation centers for the children and youth centers. For these structures the houses must be renovated and the inhabitants have to be supported by cheap credits. For an adaptive use, the changes must be at minimum level and the offered function have to be searched whether it is needed in the site or not (Murtagh [9]).

Legislative Proposals

In order to make a wise management of the conservation and development of the sustainability of the historical site, a "planning team" must be formed. This team would be effective in providing financial sources, solving the problems in the meantime of planning until the end of the restoration, orienting the credits, making mind of the inhabitants to participate in the conservation and also in the issues of providing materials, technical and educational supports. The local managements also have to be supported by the legislation.

Figure 5. The Recess View Of The House In Kursunlu Cami Street No:10 (On the map no:3)

Cultural And Educational Proposals

A prudery conservation would be developed by the participation of the inhabitants in the restoration practice, taking opinions of them and making their minds up about the conservation of historical town and also the houses by slide film shows, exhibitions and pictured books. In order to make the public conscious about the conservation, in the books the decays of the traditional houses and the restoration practices the inhabitants can do will be shown (Fersan [10]). For an easy understanding, there must be some wise restoration examples in use. By this way it must be explained to the inhabitants that restoring their houses would be cheaper than building a new one.

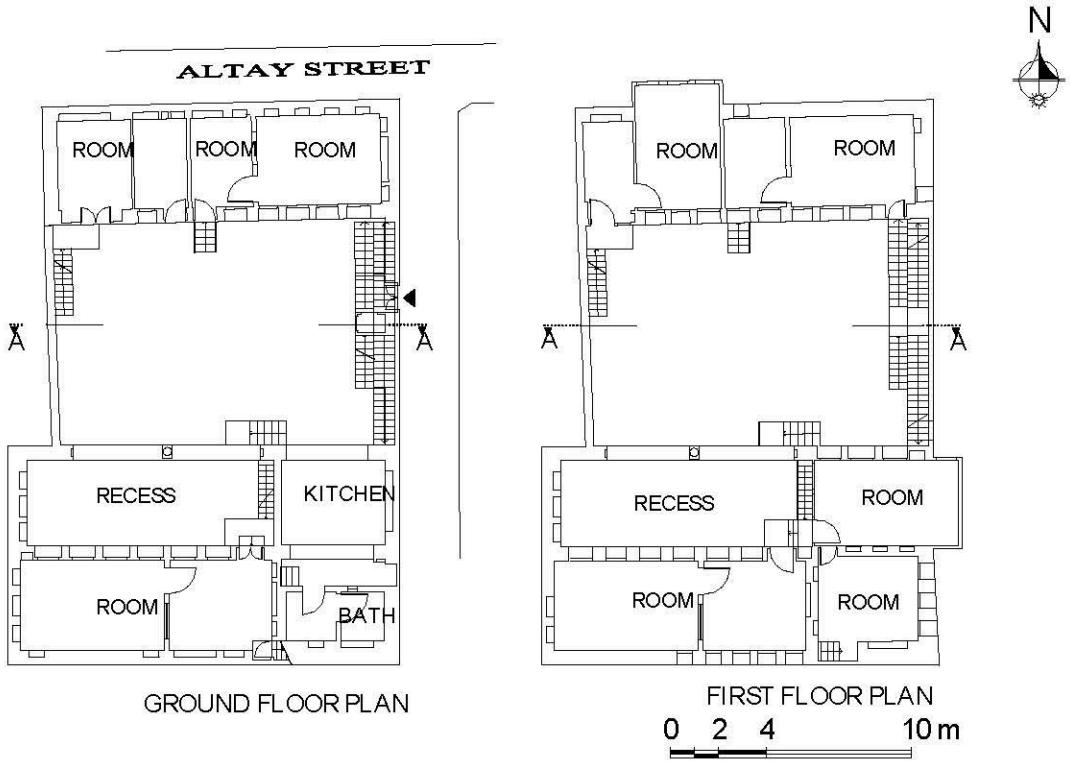

Figure 6. The Plan Of The House In Kursunlu Cami Street No:10 (On the map no:3)

Figure 7.The House In Kursunlu Cami Street No:10

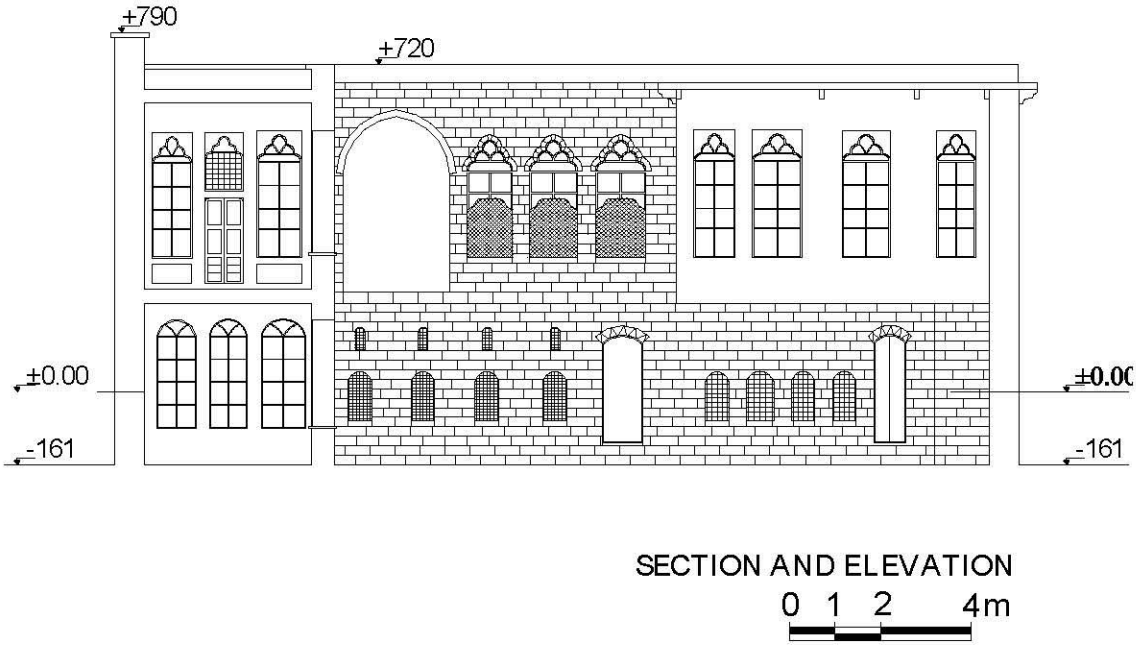

Figure. 8. An Elevation Of A House In Inönü District, Ziya Gökalp Street No:27 (On the map no:1)

RESTORATION PRACTICES

Practices On Urban Scale

The restoration must begin within the urban scale with the restoration of the city walls surrounds the historical city. The rehabilitation is needed for the unlicensed buildings in the historical site by recomposing the structural elements on the elevations. The liberation of the city walls from the adjacent unlicensed buildings and surrounding it with a green band, give hope for the future. Reorganizing the motorways in the historical city would reduce the pressure of the motorcars and would make the historical site a charming place for the pedestrians.

Practices On Planimetric Scale

The main theme of development of the conservation is the maintenance of the traditional structures. Achieving the contemporary user requirements in the traditional houses should provide this maintenance. It is needed to make some reintegration and liberation activities. The courtyard has to be liberated from the additional structures such as new built structures. The wood works must be renewed and open façade of the kitchen would be closed by a transparent closure. The installations of the toilets and baths have to be renewed. Some of the structural elements need consolidation such as the open stairs.

Practices On The Elevation Order

The additional structures' elevation has to be rearranged in order to make an harmony with the existing structure.

The open façade of the recess, called as "eyvan" locally, should not be closed in order to keep the authentic architecture alive but if it is necessary, the closing must be transparent and can be opened in the hot summer.

Figure 9. An Elevation Of A Museum House Of Cahit Sıtkı Tarancı, The Poet.

Practices On The Structural Elements

The rainwater is trickling from the top cover of the traditional Diyarbakır houses from the soil layer on the wood beams and causes decomposition in the mortar. The soil terraces need periodical care after the rains and annually. The inhabitants cannot support to provide these periodical cares. The soil layer has to be removed first. After renewing of the deteriorated wood beams, an isolation to prevent rainwater must be taken place. A soil layer with additives to improve the cohesion, to block the rainwater has to be spread out on the terrace.

CONCLUSIONS

The migration from the countryside to the city causes the traditional houses became a residential area for the marginal groups. The houses cannot be conserved as before because of the user change. The inhabitants are not prosperous because of being mostly unemployed and cannot support a restoration. The limited repairs are made by the contemporary construction methods due to the lack of stone handcraft. The inhabitants should be encouraged on the stone handcraft employee in order to repair their own houses. After the restoration the local government should employ some of the workers for "a sustainable habitation".

The department of culture has restored some of the houses but they are not enough. Two of them have converted to the museums and one of them used as the department of conservation due to the Department of Culture. The examples should be increased and it will inspire the others to conserve their houses. The traditional houses are constructed in the principles of social, urban structure, climatic conditions and spatial planning. It is necessary to reflect those principles to the new built environment.

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Keywords: Sustainable conservation, rehabilitation policies, heritage city

MANAGEMENT OF ARCHAEOLOGICAL SITES, CASE STUDY: AN ARCHAEOLOGICAL SITE IN WESTERN ANATOLIA, MAGNESIA AD MAEANDRUM

B. Nilgun Oz
Nimet Ozgonul

ABSTRACT

The methods for the conservation of archaeological sites are developing to overcome the very complex problems that can be faced in archaeological sites, in the world of today. In Turkey, a country known as the cradle of civilizations, the matter of conservation and sustainability of archaeological sites is especially important. Taking these into consideration "management" is sampled as a system for the conservation of an archaeological site in Turkey, so as to provide the sustainability of the site and enable conservation works to be integrated with the national policies for cultural heritage. In this respect, Magnesia ad Maeandrum is studied and a management mechanism for its conservation is suggested to establish a holistic, systemized means for conservation that prioritizes flexibility, reversibility in its actions and information review. In this context, managing the site is emphasized to be able to render decision makers with the information that will enable them to take precautions against the destructive effects of the modern world, to determine and maintain the values of the site and approach matters in a systematic manner, bringing together professionals of many disciplines and the key interest groups during the decision making process.

Introduction

The world of today presents many threats for archaeological sites and the problems that need to be overcome are getting more complex. Employing newer methods for studying archaeological sites yields even more information for many scientific disciplines, thus necessitating multi disciplinary effort to provide for its conservation. Recent developments in the conservation of archaeological sites demonstrate an approach for having a holistic understanding, emphasizing the need for integration with national policies and developments and prioritizing the conservation of the values of the site. Cooperation and participation have become key issues for conservation of sites. In this context, utilizing management as a system for the conservation of archaeological sites was put forward to enable these objectives.

There are a variety of explanations supplied by the professionals in the field. By definition management means "wise use of means to accomplish an end" (Webster's Dictionary[1]). Similarly management is defined as a process "which must be used in order to bring 'ideas, people and things' together to meet aims and objectives and to analyze the various means of achieving these objectives" offering "means of measuring how well objectives are being met and how best conflicting information can be reconciled" (Bromley[2]).

In other words, management is to approach an aim within a systematic framework, by understanding the resource, analyzing the data achieved from the resource, to foresee the possible changes and reach the aim by skillfully evaluating all of those aspects. It is a process of programming and executing actions to reach a goal and regularly renew program as new information presents itself. Therefore, as Agnew[3] explains, management is about having a holistic perspective.

For archaeological sites, Evans[4] addresses management to be an effective administration and adds "To manage an archaeological site is to approach a defined objective, or objectives, for that site in a disciplined way which, with given constrain and resources, will most easily allow that objective to be realised." This means that for each determined aim to be accomplished, there has to be systematic methods in evaluating the site by gathering information about what the limits and possibilities are.

Management for conservation and sustainability of archaeological sites can be said to be useful in providing the following:

- a holistic approach by integrating and studying all aspects related with the site and allowing sound judgements related to determined priorities
- understanding and determining the values of the site and updating this data
- bringing together all the interest groups and the public to reconcile all stakes to provide conservation
- determining changeable factors affecting the site and devising methods for their control
- making planned decisions as opposed to taking action when a crisis occurs, making use of related policies resulting from comprehensive studies that help to interfere a problem with wider knowledge

Successful management should involve cooperation between the government and its related institutions, academics and professionals from several disciplines, public or private initiatives, the local people and the public in general.

Important within this framework is to be able to understand the conditions of the country in which the archaeological sites are meant to be conserved. Since it is inevitable to come face to face with different legal provisions and circumstances in each country, let alone the characteristics of the archaeological sites themselves, it is essential to analyze the provisions of the country in question.

Archaeological Sites and Conservation Problems in Turkey

Turkey has been one of the main destinations for travelers and researches that wanted to study antiquity for many centuries. Parallel to the global developments in archaeological research and conservation, Turkey also defined its archaeological heritage and methods to provide their conservation. Since the beginning of the 20th century the efforts to investigate and conserve archaeological remains started to gain more importance than ever.

Today, Turkey has a number of 4920 listed archaeological sites and archaeological researches continue in the form of scientific excavations, sondages and surface expeditions. The number of archaeological excavations in Turkey has increased in the last 20 years, from 71 to 282. These excavations are conducted by Turkish and foreign teams and by the museums of related provinces.

Until recently, the activities of conservation in archaeological sites in Turkey were mainly oriented towards consolidations, repairs, restorations of single monuments and other archaeological remains in sites. Within the last 10 years, conservation of sites gained importance and development and conservation plans for many archaeological sites like Hierapolis/Pamukkale and Perge were prepared and implemented. The latest development in site conservation is the preparation of management plans for archaeological sites that mark the beginning of more comprehensive efforts for conservation.

The threats for archaeological sites in Turkey range from conflicts of interest between those who are responsible of the site, to the conflicting land use implementations disregarding conservation of sites. In this respect, the following study investigates the possibility of implementing a management mechanism for an archaeological site through understanding the current conditions and developing a holistic approach for the conservation and sustainable development of the site.

Management Considerations for Magnesia ad Maeandrum

This research can be described as the minimum steps required to accomplish a functional, holistic management planning process for Magnesia, located in the province of Aydın in the Aegean Region of Turkey. In the actual process of management planning, all the fields that were researched should be prepared by relevant professionals who will also determine the values and provide policies and strategies for management with the collaboration and the consultation of all related

interest groups. However, in the actual stages of managing Magnesia, these steps should be the result of collaborative planning and multidisciplinary work.

The aim is to evaluate the current conditions of the site and define the values of Magnesia, determine objectives of the management process in the site and propose a management mechanism working not only for the site but also for other sites in the region.

Description of the Site

The ancient city of Magnesia is located in the Germencik district of Aydın Province, on the western part of the Great Menderes Plain, at the northwest foot of Samsun Mountains, near Gümüşdağ (Mount Thorax). Situated in a rural area surrounded by villages but close to metropolises such as Kuşadası, Aydın and Izmir, archaeological site is cut through by a highway and a railway.

The city, an important religious center in antiquity (accepted as sacred since archaic period and continued its religious facilities until 1300s when the city was abandoned), was especially recognized by other ancient cities in antiquity due to the epiphany (a divine manifestation) of the Goddess Artemis that took place in the city and the Isitheria festivals that started to be held in honour of this event (Bingol[5]).

Magnesia was one of the interesting places for travelers to explore in Asia Minor before the 20th century, especially because Temple of Artemis of Magnesia was referred to in Vitruvius' 'Ten Books on Architecture', where he mentions Hermogenes as its architect. From 1800 onwards, when the site of Magnesia was located, there were many researches on the site, among which the first excavations carried out by C. Humann towards the end of the 19th century are worth mentioning. The site was not excavated again until 1984, when works started on the city, which had gradually been buried below deep silt, under the supervision of Prof. O. Bingol from Ankara University. The excavation periods consist of 2-3 months per year, where in the first years emphasis was given on digs, but in later years consolidation, restoration of architectural fragments, building elements and remains became a major issue. Since the works are carried out on the publicly owned part of the site, the larger section of the site cannot be researched in detail (90% of the lots on the site being privately owned and used for agricultural facilities by the inhabitants of the surrounding villages). The works accomplished during the scientific excavation consist of digs in many locations, environmental investigations, restoration of building remains, material conservation, architectural documentation and environmental organization.

Magnesia is a registered archaeological site since 1990, of whose visible remains can be observed on a small section only. The archaeological remains seen today belong to the Hellenistic, Roman, Byzantine and Principalities Periods. The Theatron, Gymnasium and the Roman Baths/Barracks as well as the Altar and Temple of Artemis, the Market Basilica and the Propylon of the Agora, Mosque and cemetery are some of the major above ground remains. Today, some important fragments and architectural elements belonging to the city, such as the Temple of Zeus, which were transported to Europe prior to the 20th century by various researchers, are in the museums of Louvre and Berlin.

Legal and administrative condition of site

According to the Turkish Law, The Ministry of Culture is the owner and primary responsible organization in the registered archaeological sites, having the duties of providing for its preservation and protection financially through its regional and local units. The organizations responsible from the site are: Izmir Conservation Council (the regional unit of the General Directorate of Cultural and Natural Assets), Aydın Province Culture Directorate, Aydın Museum and Aydın Provincial Special Administration. The duties of the Ministry are implemented by these regional units. Aydın Provincial Special Administration assists in the rehabilitation, maintenance and protection of the sites in the province and provides financial coordination according to the protocol signed with the Ministry of Culture. Izmir Conservation Council controls the conservation procedures implemented by these units. The same law gives the excavation team the right to carry out scientific excavations, conservation and restoration on the site.

In addition to the financial supports from the Ministry of Culture the Provincial Special Administration in Aydın, which collects the income of entrance fees coming from the archaeological sites in the province and then transfers it again to archaeological sites of the province in order to be used where necessary, Magnesia has sponsors from private foundations providing either financial aid or technical service each year.

Evaluation of the Site

Assessing the key features that make up Magnesia, a set of values can be determined. These values represent the information of the site itself and its relationship with its surroundings (Table 1). The key issues that will affect the future of the archaeological site of Magnesia are classified in a Strength-Weakness-Opportunity-Threat Analysis (Table 2).

Table 1. Values of Magnesia

<table>
<tr>
<td>HISTORICAL VALUES:
- PAST ARCHAEOLOGICAL EXCAVATIONS
- CONTINIOUS RELIGIOUS ZONE
- AREA OF REGIONAL DEVELOPMENT</td>
<td>USE VALUES:
- JOB OPPORTUNITIES
- AGRICULTURAL FACILITIES
- ARCHAEOLOGICAL EXCAVATIONS</td>
</tr>
<tr>
<td>RESEARCH VALUES:
- INFORMATION POTENTIAL
- HISTORY OF MODERN MAGNESIA</td>
<td>AGRICULTURAL AND LANDSCAPE VALUES:
- AGRICULTURAL PROCESS
- GÜMÜŞÇAY RIVER</td>
</tr>
<tr>
<td rowspan="2">ARCHAEOLOGICAL VALUES:
(VALUES OF THE WHOLE SITE)
- CONTINUOUS INHABITANCE
- FOUNDATION MYTH
- RENOWNED CITY IN ANTIQUITY
- REFERENCES IN PLATO AND VITRUVIUS
- WORKS OF HERMOGENES
- STRATEGIC LOCATION ON ANCIENT TRADE ROUTES</td>
<td>SOCIAL VALUES:
- CONSCIOUSNESS OF THE VILLAGERS
- COMMUNICATION WITH THE VILLAGERS
- VINEYARD TRADITION</td>
</tr>
<tr>
<td>EDUCATION VALUE:
- CHILDREN'S FESTIVAL</td>
</tr>
</table>

Table 2. SWOT Analysis of Magnesia

STRENGTHS:	WEAKNESSES:
- LEGALLY COMPULSORY PROTECTION - PROCEEDING EXCAVATIONS - COMMUNICATION WITH LOCALS - LESS DISTURBED SITE - HISTORY OF ARCHAEOLOGICAL RESEARCH - TEMPLE OF ARTEMIS - LOCAL SUPPORT - EASY REACH AND TRANSPORTATION	- NO COMPREHENSIVE PROTECTION - LACK OF HOLISTIC INTERPRETATION - UNPREDICTIVE SITE - INSUFFICIENT FINANCIAL SOURCES - LACK OF COMMUNICATION BETWEEN KEY INTEREST GROUPS - DANGEROUS AND UNINVITING ENTRANCE - TRANSPORTATION OF SOME RUINS TO FOREIGN COUNTRIES IN LAST CENTURIES - NOT SUFFICIENT EXPROPRIATION - ARCHAEOLOGICAL SITE BOUNDARIES NOT COVERING WHOLE ANCIENT CITY - NO COMPREHENSIVE INFORMATION DISSEMINATION TO THE LOCALS
OPPORTUNITIES:	**THREATS:**
- NEW INFORMATION TO CONTRIBUTE TO ARCHAEOLOGICAL RESEARCH - EFFORTS TO ORGANIZE ENTRANCE TO THE SITE - EDUCATED VISITORS - SPONSORS AIDING RESEARCH - LOCATION IN WELL KNOWN REGION	- LACK OF PROTECTION - VANDALISM AND ILLEGAL EXCAVATIONS - UNCONTROLLED AGRICULTURAL FACILITIES - LACK OF HOLISTIC DECISIONS - UNGUIDED TOURISM INVESTMENTS - NATURAL DISASTERS

Objectives for the conservation of the site

The results of the analysis show that Magnesia is one of the important cities of Turkey and has many values to be preserved. The strengths and opportunities of the site are mainly based on the city's inherent archaeological value, and its own conditions, whereas the weaknesses and threats that were determined, mostly present problems similar with other archaeological sites in Turkey.

In order to provide the conservation Magnesia, it is necessary to set objectives for the conservation of the site aiming to decrease the threats and weaknesses while promoting and developing the strengths and opportunities. Based on the analysis made, a view on the future of Magnesia, aiming conservation and sustainable development of its values, archaeological entities, landscape, agricultural activities, archaeological researches and continuing inhabitance nearby (which can also be referred to as the overall aims for Magnesia) can be outlined as follows:

- Integration of decisions concerning Magnesia with other regional decisions, development plans and actions by the collaboration of related authorities
- An archaeological site where the maintenance and other daily/periodical activities are performed by specifically established management units that are made up of professionals on site management, conservation of small finds, presentation, public relations etc.
- Sustainability and periodic update of values, by the collaborative work key interest groups with the aid of professionals in related fields
- Presentation of movable remains in addition to the architectural remains that are uncovered, with the establishment of a Museum of Magnesia that gives information on Magnesia's historical development, the first expeditions made to discover Magnesia, the first excavation on the site, together with the pieces and building elements that are exhibited in other museums
- A heritage conscious local public, who view the site as part of their identity and a value to pass on to their next generations

- An archaeological site that is an important part of the process of public education together with other archaeological sites of the region

In Magnesia, considering the current state of the site, long-term, short-term and immediate objectives were determined for the following:

- Archaeological Research-Excavation
- Survey and Documentation
- Conservation
- Maintenance and Monitoring
- Interpretation and Presentation
- Sustainable Landscape and Land Use

Suggestion for a site management mechanism in Magnesia

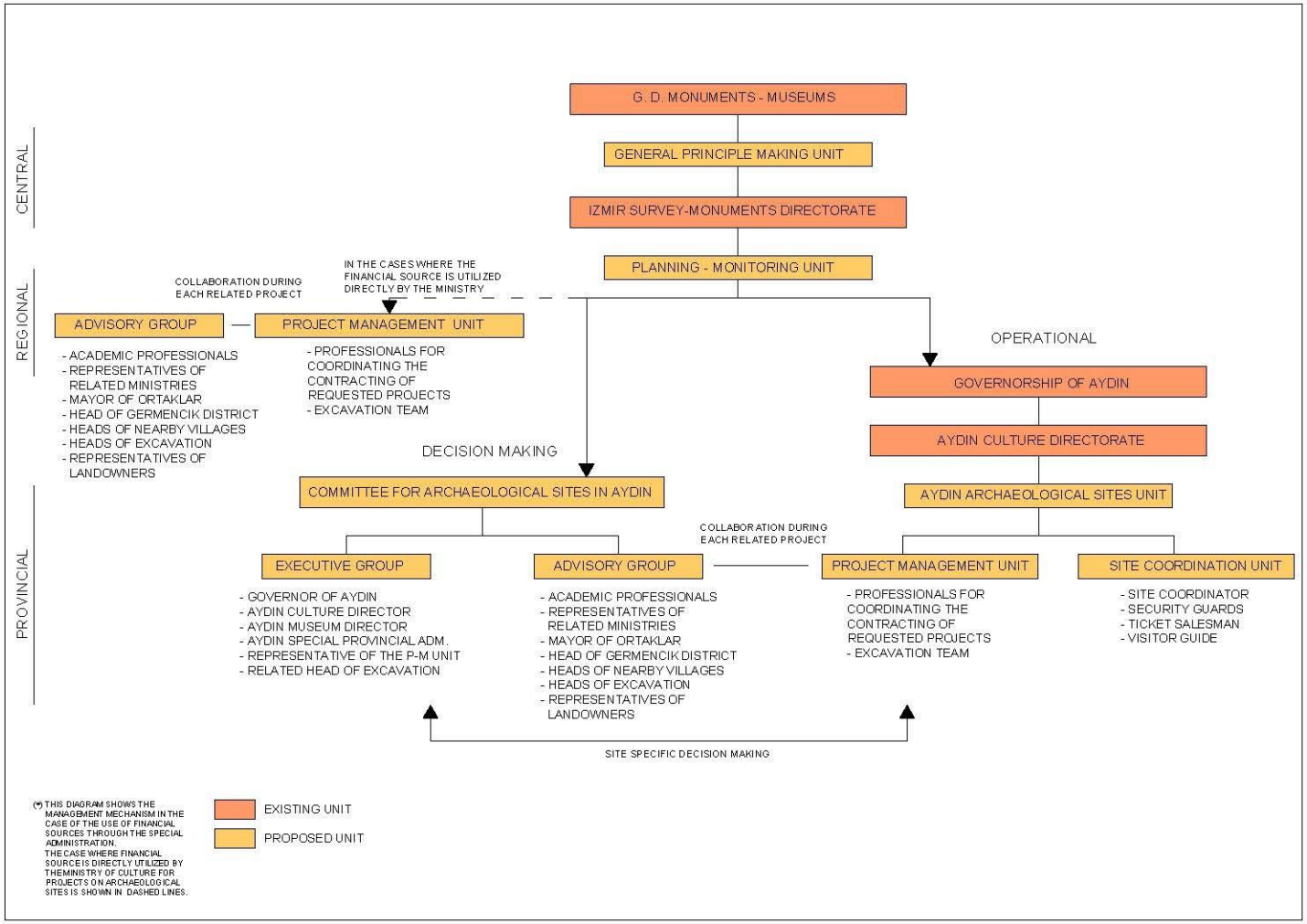
Management applications for Magnesia cannot be thought separately from the cultural heritage policy and the relevant legal framework of Turkey. Also, taking notice of the fact that the weaknesses and threats observed in Magnesia represent common problems in archaeological sites, it would be appropriate to devise a mechanism that enables a holistic approach. Therefore the main criteria while proposing a management mechanism for Magnesia (for short term and long term) was to integrate it with the current legal framework while another important criteria was to set a system that could work for other sites in the region as well as Magnesia. In this respect, rehabilitation was put forward starting from the primary responsible organization, the Ministry of Culture, and importance was given to distribute responsibilities at the regional and provincial levels.

In order to carry out the conservation objectives for Magnesia, there is need for a mechanism that facilitates the assessment of information to evaluate the site in the first place. To obtain this, an organizational structure is needed that enables determination of objectives and guidelines for the management of Magnesia, decision making for actions to be taken based on those guidelines and the regulation of scheduled implementations. This was achieved for Magnesia in the proposed mechanism, where the management procedures for Magnesia involve the cooperation of a central principle making unit and the provincial operational and decision-making units (Table 3). For the short-term period, the daily activities on the site can be regulated by a small number of staff but when the long-term future of Magnesia is considered, there will be need for specialized units for the management of the site. Thus, the proposed Site Coordination Unit can be devised to accommodate further units for enhanced management of the site. In this case the establishment of following units would be of valuable contribution:

- Site Security Unit
- Maintenance Unit
- Public Relations Unit
- Monitoring Unit

The formation of these units may put pressure on the mechanism proposed for the short-term. In other words, the increase in specialized units cannot be supported through the existing organization. In the long-term, however, site management units of archaeological sites can be monitored by a separate organization that should be established working with the General Directorate of Monuments and Museums.

Table 3. Proposed Management Mechanism for Magnesia



In the case of financial sources for conserving archaeological sites and providing their sustainable development, new legal provisions are needed that will give the right of collecting and distributing the income of archaeological sites to the local government. The suggested mechanism can involve two cases of financial source utilization: directly through the Ministry of Culture, or through the Special Provincial Administration, which uses the income of archaeological sites in Aydın and the funds that are appropriated by the Ministry of Culture and other organizations.

Conclusive Remarks on Conservation of Archaeological Sites in Turkey

Turkey is a country of important civilizations and of very valuable archaeological remains, therefore, cultural and natural heritage, especially archaeological sites, which in so many ways were usually neglected, should be approached through a holistic, integrative and multidisciplinary approach. At present, the conservation efforts in Turkey are organized through the Ministry of Culture but it remains insufficient to thoroughly control actions.

It is known that each archaeological site is a case of its own, with its special features, problems, interest groups and provisions for conservation. However, it should be realized that while each case should be treated according to their own data and conditions; it could be advantageous to approach matters regionally, because valuable conservation criteria can be reached for sites of similar character and problems. Also, a system that enables collaborative effort, monitoring and review and long-term framework for conservation is needed that can integrate the future of archaeological heritage into the future of the country.

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(This paper is a revised version of short part of the thesis)

Index

Conservation, management, archaeological sites, integration

PRESERVING AND MANAGING RURAL HERITAGE SITES: THE CASE OF 'THE TRULLI OF ALBEROBELLO' (APULIA, ITALY)

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University of Brighton

Abstract

Over the past fifty years, the relations between the rural environment and free time activities have changed remarkably. Recreation and tourism have become dominant agents in the transformation and control of the landscape and of local communities, bearing strong influences on their cultural, political, economic and natural environment.

Cultural tourism has developed considerably, involving both the booming of European city tourism and the growth of tourism in rural areas. In particular, heritage tourism demand has increased dramatically, stimulating the development of a variety of initiatives in rural areas and encouraging rural communities to look to tourism as a form of diversification for their traditional activities. Farmers find themselves dealing with new customers - tourists, and adapting fairly quickly to a new activity - rural tourism, which has developed into a varied and promising sector.

In the last two decades, the Apulia region of Italy has experienced this trend and although initially several mistakes have been made, recent rural heritage preservation and resources' sustainable management have been identified as examples of good practice.

This paper aims to consider the '*Trulli of Alberobello*' as an example of priceless rural heritage and as a testimonial of a wider regional patrimony, which needs to be preserved by integrated actions by the local authorities and stakeholders. However, strategic plans as well as the creation of partnerships seem to be the best option for the sustainable management of rural heritage attractions, such as '*The Trulli of Alberobello*' – a World Heritage Site (WHS) since 1996.

An Integrated Quality Management approach will be used to identify possible methods of implementing sustainable forms of rural and heritage tourism in the Alberobello area as well as other parts of the Apulia region.

Considerations will be made on the importance of a strategy aiming to develop a rural tourism sector in harmony with the environment, in the interest of local community and adequate to the visitors needs.

Introduction

After the Second Word War, the demand for tourism has grown dramatically. Since 1970, the volume of cultural tourism, in its various forms, has been one of the major new areas of tourism demand. This had been stimulated by various development factors, such as the discussion over preservation, conservation and protection of resources available. The changes in working conditions and remuneration, the desire of achieving a social distinction through travelling and the interest in discovering the past through the visit of heritage sites have also had their influence the demand for European cultural tourism (Bachleitner and Zins[1]). Further to this, since the adoption of the Convention Concerning the Protection of World Natural and Cultural Heritage, in 1972, great interest has started to be shown towards those sites chosen by the World Heritage Commission for their historic, scientific, or aesthetic qualities and many of those became favourite tourist attractions. The 1982 saw the Joint Declaration of the World Tourism Organisation (WTO) and 1987 was characterised by the United Nations Environment Program (UNEP) expressing the goal of sustainable tourism and the action of the World Commission on Environment and Development formulating the concept of 'sustainable development' to the international arena (Drost[2]). The 1980s also saw the considerable growth in the demand for rural tourism, highlighting a strong interest for rural heritage and for the countryside as a key tourism resource and as an alternatives to the common 'three S' package holidays.. In the early 1990s, heritage tourism, as part of the broader category of "cultural tourism", became "a major pillar" of the nascent European Commission's tourism strategy (Richards[3]). The government of many European countries recognised great potential in tourism and consequently acted in this direction including this sector into their regional development policies. On the other hand, the help of some European Union funded programmes such as the Structural Funds, the LEADER project and Agenda 2000, enabled rural tourism to develop fairly quickly into a varied tourism sector.

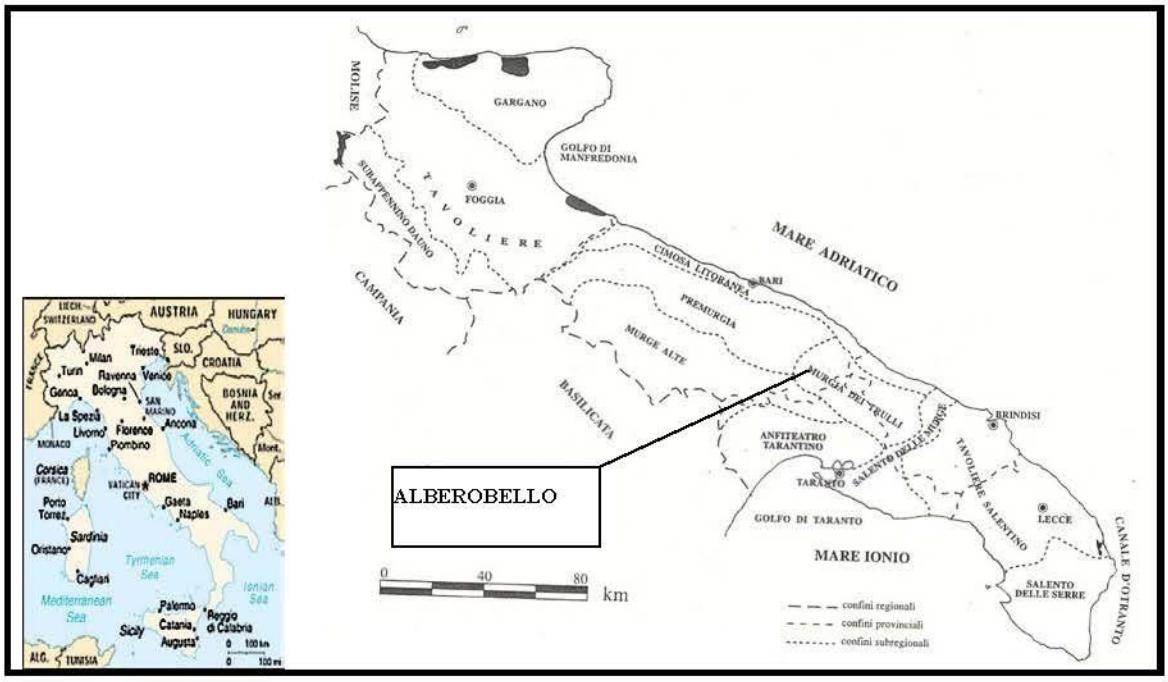
This paper focuses on the Apulia region of Italy due to its extensive rural heritage. This area seems to have experienced an unexplainable 'promotional inactivity', which has kept the region's tourism lagging behind other regions' success. The Trulli of Alberobello, a World Heritage Site (WHS) since 1996, will be considered as an example of a priceless rural heritage and testimonial of a wider regional patrimony. An evaluation of the impact of the World Heritage recognition of Alberobello on tourism and on the local economy will be attempted as a base for the identification of possible actions to be undertaken. The research also aims to the identification of other potential rural tourism attractions of the area and to the recognition of possible ways of preparing the region for and preserving it from a potentially prosperous overseas tourism market.

A selected panel of experts and stakeholders were interviewed. Initial visits to the area took place in the autumn 2000, in the spring of 2001 and 2002, followed by the most recent in early 2003. Due to the limited existence of published reports and documents, difficulties were found in the collection of official data. Strengths and weaknesses of the region's rural tourism will be highlighted as well as the opportunities for the development of regional tourism sector. An integrated quality management approach will be adopted in order to identify possible ways of implementing rural and heritage tourism in the Alberobello area as well as in the rest of the Apulia region.

The Apulia region of Italy

Apulia is one of the most extensive regions of Italy, covering almost 20,000 square kilometres of land with a long coast, which stretches for about 800 kilometres.
The region is varied from a morphological and socio-cultural point of view. It is characterised by a variety of geographical traits: a lack of mountains, a diffusion of plains and hills, a scarcity of surface moisture, extended contacts with the sea and a Mediterranean climate. Within these, there are evident differences between certain zones. In fact, the region is divided into sub-regions: the Subappennino Dauno; the Gargano; the Tavoliere; the Cimosa Litoranea; the Murgia and the Salento (figure 1). The coast and the climate guarantee a long summer season from May till October. The natural and cultural heritage, together with the arts, the craft, the rural traditions and the cuisine make Apulia rich with tourism potential attractions. The particular characteristics of its territory remain the bedrock of Apulia tourism vocation. (Novelli[4])

Figure 1: Apulia sub-regions and provinces (adapted from Bissanti[5])



In the South-East of Bari province, lies one of the most interesting parts of the region, which is characterised by a unique natural and cultural heritage. These include the caves phenomena of the Grotte of Castellana – one of the best known potholing areas in the whole of Italy, and of 'stones' dominating the scenery in various forms, from the dry-stone walls separating fields, to the 'masserie' (farms) and the 'trulli'. These are just a few examples of a rich heritage of the region, open to the public view.

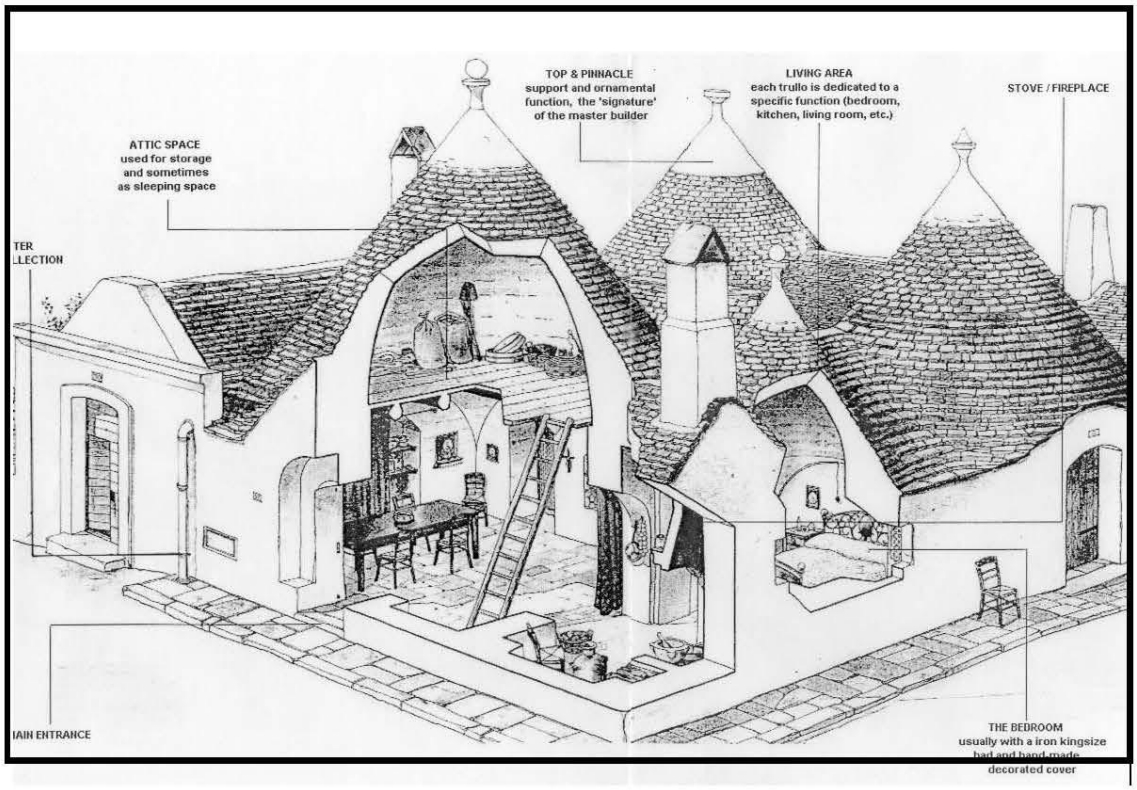
Alberobello is a significant example of Apulian heritage; it is situated on a hill (428m high) and its name derives from Latin *Sylva Arboris Belli* (wood from the tree of war), due to oak woods, which once was nearby. Many legends have been told about its origins and it seems that Alberobello dates back to the XVI century when it was built by the Acquaviva family, Counts of Conversano, who attracted poor farmers to their estates by means of protection and generosity. Southern Italy was at the time under the Spanish occupation and, in order to avoid land taxes imposed by the King Ferdinand IV Borbone of Spain, the Counts obliged the

farmers to build dry-stone houses as they were considered to be precarious, similar to nomadic tents, therefore not taxable. It seems that since the XVII century the town actively began to develop, under the influence of Count Giangirolamo II. It has been said that Alberobello became independent on the 27 May 1797, with the declaration of Royal Town issued by the King Ferdinand IV Borbone of Spain. (Martellotta and Bolognini[6], Carofiglio[7], Mola[8], Patruno[9])

The Trulli of Alberobello

The *trulli* are unusual rural structures built with stones using an ancient method. They consist of squared or circular shaped whitewashed houses, made with dry stonewalls and a dark grey cone shaped roof made by concentric rows of limestones. They were originally built without mortar, while floors, walls and roofs were made of the locally collected limestones. Wooden doors, windows, lintels and the 'tavolato', a wooden floor that formed an attic space reached by a ladder, finished the contruction (figure 2) (Novelli[10])

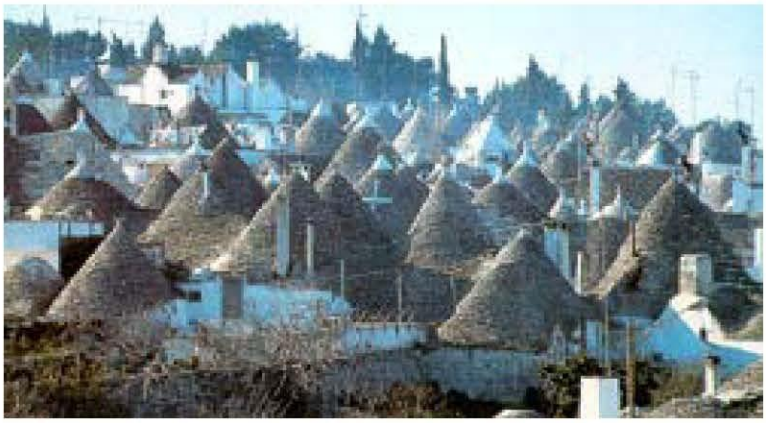
Figure 2: The 'trullo' structure (adapted from Derrien[11])



The *trulli* can be found throughout the entire Apulia region, however, the *Valle d'Itria* has the highest concentration of this traditional construction, with Alberobello being the capital of the 'Trulli country' and having more than 1500 structures in its centre (figure 3). An Italian national monument since 1924, Alberobello was designated as World Heritage Site (WHS) in 1996. The World Heritage Committee decreed it as site "of outstanding universal value being an exceptional example of a form of building construction deriving from prehistoric construction techniques that have survived intact and functioning into the modern world." The reason for designating such an area as a World Heritage Site was its need for protection and

preservation of the cultural heritage and to encourage and motivate the participation of the local population in the safeguard of their valuable resources. (World Heritage Council[12]).

Figure 3: Two views of Alberobello and a shop in the 'Rione Monti' – WHS



The areas and the 'trulli' included in the World Heritage's recognition are: the Rione Aia Piccola, the Rione Monti, the Trullo Sovrano, the Museum of the Territory, the d'Amore House. The 'Rione Aia Piccola' consists in a part of a town, which was used in the past for wheat threshing; it is the most untouched part of the town and counts around 400 trulli, which are mostly inhabited by the local community (Gigante[13]). The 'Rione Monti' (figure 3) is a monumental area best known by the tourists, where it is possible to find around 1000 trulli lined up in seven main streets, all assigned to commercial and tourist activities. The 'Trullo Sovrano' (figure 4) is a unique example of trullo due to its structure, which is on two floors, with a 14 metres highest dome and a cross vault on the ground floor, which hold up to four 'Romanic' arches. It is part of a group of trulli named 'Corte di Papa', which was once inhabited by the cleric Cataldo Perte between 1774 and 1809 (Degano[14]). The 'Museum of the Territory' is one of the oldest trulli constructions, which is formed by several communicating trulli and gives hospitality to various local exhibitions. The 'd'Amore House' was built after the Royal Town status was issued in 1797 as a sign of the victory of the Alberobello

inhabitants against the prohibition on the use of mortar to build the trulli. In fact, it was the first time that a clay mixed soil was used as a building material.

Figure 4: Inside the 'Trullo Sovrano' – WHS

The World Heritage Recognition and Tourism in Alberobello

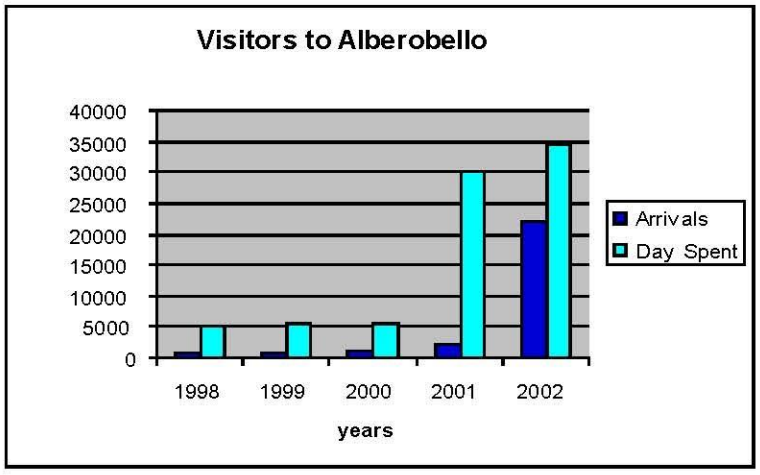
The World Heritage Recognition is the result of the commitment expressed by the citizens of Alberobello to preserve the unique value of their town. In 1994, an association named 'Club UNESCO', started the process of registration in the World Heritage Sites Tentative List. In September 1995 the Nomination Form was drafted and on the 7th December 1996, the town was finally included in the official World Heritage Sites List. (Novelli[15]) An obvious result produced by the inscription of Alberobello in the World Heritage Sites List was the increase in visibility through the promotion produced by the World Heritage Committee. Such recognition is highly regarded by the local community of Alberobello and its main pulling factor in attracting more tourists to the area was envisaged since the very beginning.

In 1996, Alberobello counted an unofficial number of about one thousand regional visitors and only few international tourists spending their holidays in the area (within about 60 km radius) – however, no official data was collected at the time. At the time, the World Heritage recognition seemed to have immediately produced a positive economic impact for the local enterprises as well as for those within the radius area identified (Cisternino[16]). It also stimulated a strong community pride and a deep sense of identity within the locals – "Alberobello is under the international eyes" was the expression of many interviewed locals. The revival of traditional craft (e.g. artefacts and gastronomic products) was implemented by a growing demand for authentic and meaningful souvenirs typical of the town and of the region (e.g. the 'trulli' miniatures and the 'orechiette' pasta), resulting in the opening of numerous commercial activities in the Rione Monti, today entirely dedicated to tourists' shopping. In 1999, during one of the initial visits to the area, sign of an initial commodification process and of a consequent cheapening of culture and traditions were spotted in the various form (e.g. items sold due to the request of the tourist, like football shirts and other Italian destinations images). Open visits to private 'trulli' at a price established by the adventurous owners were another sign of this process. During the most recent visit (April 2002 and January 2003), such trend seemed under control and all the local shops looked as they implemented some forms of connection to the local traditional production. This may relate to the needs of a more sophisticated market, such as the Italian, Japanese and American middle class visitors in

search of a "real experience". In 2002, visitors' numbers have increased dramatically as well as the day visits number (table 1), which involves a significant portion of international tourists, who choose Alberobello mainly as day visit destination from the surrounding provinces of Bari, Brindisi, Lecce and Taranto (Regione Puglia[17]) – detailed statistics were not yet available at the time of submission of this paper.

Table 1: Visitors to Alberobello

Visitors/Years	1998	1999	2000	2001	2002
Arrivals	716	551	1,155	2,302	21,964
Day Spent	5,186	5,373	5,655	30,000	34,600



The presence of ever increasing cars in the parking space between the Rione Monti and the Rione Aia Piccola – World Heritage Sites, initially produced great concern. The impact of the growing number of visitors to the local environment, already used to its limit even before the World Heritage recognition, was the main cause of congestion and air pollution. Two large parking areas outside the town centre were used mainly by coaches and cars, when randomly stopped from accessing the town centre by the local traffic guardians. During an interview conducted with a group of locals the difference of opinion of those benefiting form the tourists' presence and those not involved in the sector at all was clear. Pleased expressions like "we use our 'trullo' as an attraction for the tourists and we go to sleep in the countryside" contrasted by annoyed consideration such as "we cannot park our car and go back home, because of the tourists and the traffic congestion". These were considered as first symptoms of perceived negative impacts of the growing tourist flow to the area and as signs of the pressure placed on local social amenities. Recent interviews have highlighted a more positive attitude towards the presence of tourists by those locals not directly involved in tourism. This was recognised in the growing involvement that the community has had in the past year in the management of the local resources (e.g. dedicated parking to residents, special permits, stronger regulation in the management of the traffic, etc.).

In the last five years, Alberobello is been undergoing a transitory phase where the value of its status is being recognised not only by the numerous visitors, but also by the town community and by those people living in its proximity. Tourism is having an enormous economic impact on the area – detailed statistics were not yet available at the time of submission of this paper. Since 1979, attention was given to the conservation of Alberobello's local heritage, with the 'Legge Regionale n.72/1979', which has been now abrogated, in the vision of an organised tourism sector. During the 1990s, the European Regional Development Fund (ERDF)

provided funding for the preservation and management of the 'trulli', enhancing local and external appreciation and support for its cultural heritage. The "Regolamento Comunale n.46/1999" attempted to encourage with direct financial aid the owners of damaged trulli to preserve their structures. However, the amount of the aid – 10% of the total cost – resulted too little in relation both to the real cost of refurbishing a 'trullo' and the bureaucracy involved. More recently, there is a trend in promoting the purchase of the 'trulli' as a form of conservation and several offers are appearing on the Internet, under slogan such as "Trulli for sale...buy a trullo and save a monument where to spent your holidays!" (Commune di Alberobello[18]). Concern is produced by the value of such trend, its potential result through the sale and restoration of abandoned trulli, and its risk in causing the loss of identity for the area involved. Tourism can be a great tool for local and regional development but it can also be the cause of irreversible damages. The World Heritage Commission has implemented a process of ongoing monitoring of the sites, but the Local Authorities have the obligation to operate in a proactive way to preserve the Alberobello area from becoming a 'spoiled' land.

Before undertaking any implementation or development project, the preliminary stages of a planning strategy should consist of a careful evaluation of the area and its tourists' flow. The need for a 'carrying capacity' assessment is relevant for the understanding of the limits of the heritage site as well as of the areas in its proximity. There is a need for raising public awareness to problems that can be produced by insensitive tourism. This can be achieved with the education of the tourists through codes of 'tourist ethics', but also requires the instruction of local communities and governments (Drost[19]). On the other hand there is a need to promote a rationally developed strategy and professionally manage actions directed to a sustainable outcome. High revenue directly related to high number of visitors does not always mean success and may in fact result in the long term loss of attractiveness of the destination for tourists and the loss of standards for the World Heritage recognition. The need of a clearer position to be played by the local government is envisaged in order to start the process of organisation and management of existing resources.

Alberobello and the Apulia region: delivering a quality experience

Alberobello includes a range of characteristics, which make its area very attractive to tourists. It is the case of a small rural town, with a valuable historic, architectural and cultural heritage, interspersed with a rich agricultural area not far from the Adriatic Sea. The most important actions to be undertaken consists in preserving its landscape, promoting its unique features and offering to visitors its products in an appealing and refined way.

Considering the competitiveness of the European tourism sector, it seems that an essential requirement for success is the improvement of the quality of tourist destinations. It should aim to satisfy the customers' needs and to guarantee a balanced and sustainable tourism development (European Commission[20]). This study has highlighted the strengths of Alberobello, which can be extended to the entire Apulia region. The presence of a unique cultural heritage and the authenticity of traditions are regional characteristics, which needs to be maintained in the long term. The improvement and preservation of rural tourism features, such as historic towns, the 'trulli', the castles, the farms and the dry-stone-walls have been recognised as key priorities for the long term development of the entire Apulian tourism sector. Some significant actions are needed aiming to an Integrated Quality Management (IQM) of tourism in the region. In the Alberobello area, it is possible to recognise some existing broad segments of tourist, which need to be considered in this strategy (table 2)

Table 2: Alberobello area: tourism segmentation (adapted from Novelli[21])

Segment	*Characteristics*	*Action needed*
Day trip visitors	- Up to 2 hours travelling time; - Regional/International tourists	- Infrastructures' amelioration - Attractions' implementation - Accessibility improvement - Traffic management
Short holiday takers & Groups with particular interests	- Over 2 hours travelling time; - Regional/National/International tourists; - Activities: walking/ horse riding, wine/food tasting and cooking; - Week-end to 2 weeks.	- Accessibility improvement - High quality services - Holiday packages (including transports, accommodation and activities)
Educational purposes	- Travelling time not specified; - Main interests: countryside traditions, local history; - School / senior groups & families learning about farming, conservation & heritage.	- Value for money experience - Quality experience - Appropriate facilities - Accessibility improvement - Accessibility of the seaside
Senior tourists & People with disabilities	- target to be addressed	- Accessibility improvement - Tailored activities - Value for money experience - High quality services - Holiday packages

The Integrated Quality Management focuses on the implementation of visitors' satisfaction aiming to improve the local economy, the environment as well as the quality of life of the local community. It seems to be an ideal approach for the planning of the rural and heritage tourism sector in Apulia. "It is about setting objectives, working together, understanding visitors, setting standards, obtaining visitors' reactions, making improvements, and checking impacts." (European Commission[22]) The region has got the potential resources to succeed, but it has to start with an integrated developed approach involving the Local Authorities, which need to carry out surveys and produce reports to support the private sector. The objectives have to be clearly stated and the local communities informed and involved. The typical sun, sea and sand holiday should be offered together with a more diversified set of opportunities, including appealing rural options, like for example itineraries related to festivals and events or the wine and gourmet traditions.

Any tourism strategy undertake today should incorporate a 'sustainability philosophy', which often remains the result of subjective interpretation. In the case of Apulian rural tourism, the preservation of its cultural heritage is as important as much as the conservation of its natural resources. "Tourism is like a fire: you can cook a soup on it, but you can also burn down your house with it", which is the reason why any tourism plan should be carefully planned and 'looked after' in the long term. In the case of rural tourism, this is even more important as the environment involved is generally fragile. Efforts should be made aiming to the realisation of a strategy looking at: the organisation of the local amenities, the preservation of the quality of the landscapes, the amelioration of the hospitality facilities, the promotion of local events and the implementation of typical productions. This should include the enhancement of the entire rural heritage, the monitoring of tourist preferences and the encouragement of quality

standards, in the view of which contribution tourism can make to the rural economy as much as of the impact that it can have on the countryside and its people.

Keywords: rural heritage, Apulia, Trulli

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LA CELEBRACIÓN DEL "DÍA DEL PATRIMONIO" UN INSTRUMENTO EFICAZ PARA LA DIFUSIÓN DE VALORES PATRIMONIALES

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Intendencia Municipal de Colonia

Resumen
Concentrar en un único día varias acciones que antes se realizaban separadamente, ha demostrado ser en el Uruguay un instrumento extraordinariamente eficaz para crear conciencia de valores patrimoniales.

La organización de exposiciones, conciertos, conferencias, espectáculos y visitas a sitios históricos con el objetivo de promover el reconocimiento de la identidad cultural, se complementa con otras actividades como concursos, sesiones de recolección de anécdotas o fotografías de época, dramatizaciones, o visitas a edificios normalmente vedados al público, y constituyen el eje de la estrategia adoptada.

Cada año la participación supera las expectativas, y cada vez son más aquellos vecinos que -orgullosos del valor patrimonial de sus bienes- desean disfrutarlos con sus conciudadanos durante esta gran fiesta cívica colectiva.

Sustentada por la promoción oficial desde todos los niveles de la Administración y con la activa participación de autoridades, asociaciones profesionales, comisiones de vecinos y organizaciones no gubernamentales, despierta el interés de los medios de comunicación de masas y también de algunos sponsors que desean asociar su empresa o su marca a un acontecimiento de carácter nacional con importante participación popular y creciente prestigio.

Reconocemos en esta modalidad un instrumento valioso para la educación en valores patrimoniales. Logra un efecto de volumen que ha permitido trascender al interés de los técnicos y de aquellas personas naturalmente motivadas por el tema, para extenderse a nuevos segmentos de la población del país y a nuevas modalidades de participación.

Nada puede crecer separado de sus raíces. El "Día del Patrimonio" demuestra ser una respuesta exitosa al problema de asegurar una continuidad entre el rescate de los valores del pasado y la realidad aceleradamente cambiante de la vida moderna.

LA CELEBRACIÓN DEL "DÍA DEL PATRIMONIO" UN INSTRUMENTO EFICAZ PARA LA DIFUSIÓN DE VALORES PATRIMONIALES

Voy a referirme al desarrollo y comportamiento que ha tenido en el Uruguay el "Día del Patrimonio", en tanto instrumento de creación de conciencia de la preservación y la gestión patrimonial encuadrado fuera de las esferas académicas.

El Contexto

Uruguay, país joven, cuyas tribus aborígenes de tipo recolectores-cazadores no sobrevivieron como etnia diferenciada a la conquista, fue poblado a partir del siglo XVII por inmigrantes en su mayoría europeos.

Su cultura es producto de la fusión y adaptación al medio americano de tradiciones y costumbres de varios orígenes. De ahí que tengamos un patrimonio de muy diferentes características al del resto de América Latina.

Con un 97% de población alfabetizada, puede parecer un medio en el que nunca hubiera existido la duda sobre el valor del Patrimonio. Sin embargo no ha sido así. Cometimos en ciertos momentos -y aún hoy no estamos libres de ello- el error de creer que ignorando un pasado que considerábamos irrelevante, y aún contribuyendo a borrar sus huellas, nos abríamos paso hacia una supuesta "modernidad".

Felizmente esa tendencia se ha revertido y se percibe un redescubrimiento de nuestras raíces y un nuevo conocimiento e interpretación de las etapas que nos llevaron a constituirnos como nación.

La educación y la difusión

El país ha enfocado el tema de la valorización de su patrimonio desde la educación y la formación, pero también desde la acción.

En tanto conocimiento generado a partir de ciertas elites, la educación relacionada con el patrimonio histórico o cultural fue en principio acotada, y reservada a aquellos grupos cuya formación académica habilita una percepción más aguda.

Desde la educación formal, la escuela primaria ha incorporado en los últimos años los temas patrimoniales, constituyendo el cimiento de un estudio mas detallado que tiene lugar en el nivel secundario, así como de análisis e investigaciones más profundas en las Universidades.

Desde la acción, encarando trabajos como el exitoso rescate de la Antigua Colonia del Sacramento, que ha puesto de manifiesto las posibilidades que el Patrimonio adecuadamente tratado puede ofrecer al conjunto de la población. Y no se trata de adoptar la postura romántica, de nostalgia por un pasado más o menos

lejano, sino de ver las reales ventajas que en el mejor sentido de la palabra pueden obtenerse de acciones de este tipo.

Figura 1- Día del patrimonio en la Colonia del Sacramento.

De barrio deteriorado en su conjunto, degradado en sus condiciones de vida, tugurizado y de escaso prestigio, el casco antiguo de Colonia, se transformó merced a intervenciones continuas y hechas a conciencia, en un sector de gran atractivo local e internacional, verdadero "buque insignia" de actuaciones en otros sitios, donde hoy flamea junto a la bandera nacional, la de la Organización de Ciudades del Patrimonio, y que aporta a la ciudad un perfil diferente y jerarquizado desde el punto de vista cultural y turístico.

Publicaciones a propósito de lo patrimonial han obtenido buena resonancia y se han convertido en tema de conversación corriente, comenzando a entenderse en el medio nacional, que se puede percibir al patrimonio como huella del pasado, pero también como soporte del presente y del futuro.

Pero el tratamiento del tema a nivel de la enseñanza, la tarea de recuperación urbana de Colonia que ya lleva mas de medio siglo, los estudios que sobre el patrimonio se han realizado, no han sido los únicos medios para implementar la educación patrimonial, ni para generar el interés de la colectividad en la orientación de la gestión del patrimonio.

Figura 2- Actividad concentrada en los sectores patrimoniales.

En medio de estas iniciativas y de otras que han tenido diferentes resultados, la que por lejos ha mostrado mayor efectividad ha sido la implementación del "Día del Patrimonio".

Concentrar en un único día, acciones que antes se realizaban separadamente ha demostrado ser en Uruguay un instrumento extraordinariamente eficaz para crear conciencia de valores patrimoniales.

Estamos hablando no de formación académica, sino de una forma de educar en la preservación y la gestión patrimonial a toda la población.

El instrumento en sí

Instaurado a partir de 1995, este año está teniendo lugar su 9ª edición y visto el éxito obtenido en Uruguay, algunos países vecinos, como es el caso de Chile, han adoptado la filosofía y estrategia allí aplicadas, adaptándolas a su realidad.

En una postura que otorga signo positivo a la preocupación por el patrimonio, cada edición ha recordado con su nombre a alguna personalidad desaparecida, cuya destacada actuación en la defensa del patrimonio nacional lo convirtió en un referente obligado, constituyéndose en un homenaje a quienes han abrazado la tarea de defensa de nuestros valores en cualquiera de sus formas.

Al mismo tiempo en esa línea se reconoce en vida a otras personalidades o instituciones que con su trabajo han contribuido al "despegue" habido en estos temas en el país en los últimos cincuenta o sesenta años.

La iniciativa tuvo origen a nivel oficial, y la jornada de 1995 se organizó mediante un convenio entre la Comisión Nacional del Patrimonio y la Embajada de Francia.

Constituyó básicamente una jornada de puertas abiertas de aquellos edificios Monumentos Nacionales inaccesibles a la población en general en un día cualquiera. Al mismo tiempo frente a los edificios que se podían visitar y en algunos sitios destacados de varias ciudades, tuvieron lugar manifestaciones culturales. El rasgo saliente en este caso fue que se puso el aparato del Estado y de varios Municipios al servicio de un día diferente, en lo que constituyó por encima de todo una jornada docente y de toma de conciencia.

Esta concentración de actividades inmediatamente despertó interés y ha generado una sinergia que aumenta año tras año, demostrando ser extraordinariamente eficaz. Desde esta óptica, por la aceptación que ha tenido, por la participación que recoge, por la inserción del tema en la comunidad toda, creemos que se lo puede valorar como un verdadero logro de educación no formal.

Figura 3- Ciudadanos esperando para acceder a un buque escuela.

De unas ciento veinte actividades que tuvieron lugar en 1995, se pasó a casi mil en 2002, en tanto que las visitas aumentaron hasta llegar en este mismo año al millón ciento cincuenta mil.

Figura 4- Las ONGs se pliegan a la actividad.

Sin duda esta evolución es consecuencia de que no se trata solamente de un esfuerzo oficial, sino que es el resultado del trabajo conjunto de los sectores público y privado puestos al servicio de una idea común.

Desde el Gobierno Central a cada uno de los Municipios, desde las escuelas y liceos a las Universidades, desde las organizaciones no gubernamentales a los vecinos actuando en forma independiente, llegan aportes y se sugieren actividades; en tanto surgen inquietudes de colectividades, se elaboran trabajos, se organizan conciertos o recolección de fotografías antiguas. La población participa muy activamente y a todos los niveles se aglutinan grupos en pos del común objetivo de lograr desentrañar, analizar, poner de manifiesto un pasado que aunque reciente ha permanecido en muchos casos oculto, pero también para "ver" con una mirada más aguda cuál es el patrimonio que estamos construyendo.

Figura 5- Las colectividades participan.

Y en este camino se empieza a analizar a nivel de grupos más numerosos qué es el Patrimonio, y se terminan encontrando valores patrimoniales donde mucha gente antes ni siquiera sospechó.

La visión tradicional, hoy superada, solamente consideraba patrimonio a los edificios, o a lugares de interés histórico, pero esta forma de organización comunitaria ha acercado a la gente un concepto más amplio, que incluye el patrimonio natural, al que muchas veces no valoramos por tenerlo presente en forma constante, o el patrimonio intangible, que se trasmite de una a otra generación, a veces sin una representación física.

Figura 6- Concierto en la iglesia.

Anécdotas y leyendas que los viejos del lugar cuentan a los más jóvenes,

Figura 7- Sesión de anécdotas en el palacio Taranco.

rescate de historias de cada "pago", de ejemplos de la cocina criolla, no siempre presente en la mesa de todos los días, tradiciones que mezclan lo americano con lo europeo como el carnaval, o lo americano con lo africano como el candombe, canciones y tonadas rescatadas por memoriosos locales y por estudiosos, pasan vivas de una generación a otra, conjuntamente con las artesanías, mostrando su vigencia.

Pero la característica más singular de este emprendimiento es su evolución, ya que si bien fue originalmente una iniciativa oficial, ha ido cambiando rápidamente de signo hasta llegar en estos ocho años a una participación tan activa de la colectividad que pasa por la organización misma de muchas actividades y que se puede mirar desde varios ángulos.

Figura 8- Exposición de artesanías tradicionales.

Desde el punto de vista conceptual, aquella jornada de puertas abiertas, orientada básicamente a la difusión del patrimonio edilicio fue cambiando hacia una visión más antropológica y totalizadora de lo que es el Patrimonio, que incluye al patrimonio natural y al patrimonio intangible.

Desde el punto de vista de la adhesión, la siembra que implica cada edición, ha hecho pasar a los pobladores de pasivos espectadores a artífices de la organización. La población adoptó esta celebración como una fiesta más, pero como una fiesta propia.

Figura 9- Jóvenes y ancianos comparten un concierto.

Desde el punto de vista académico esta gran fiesta cívica va precedida de un período de preparación en el que las Universidades hacen importantes aportes organizando actividades vinculadas al tema.

Desde el punto de vista de la descentralización en un país de 3,5 millones de habitantes, de los cuales la

Figura 10- Hilado artesanal de lana.

Figura 11- Antiguos automóviles en circulación.

Figura 12- Nuevos hitos en el perfil costero montevideano.

mitad vive en la capital, ha mostrado más efectividad que ningún otro esfuerzo realizado en cualquier aspecto.

Desde el punto de vista social, es muy interesante ver que si hacemos un corte, estarán allí representadas todas las clases sociales, y si hacemos el corte por la edad, veremos que están todas las generaciones. Los uruguayos participamos codo a codo, compartiendo los recorridos por los barrios, los espectáculos, la revalorización de nuestras artesanías, o disfrutando de nuestro patrimonio automotor.

Muchísimas instituciones se pliegan de alguna manera, muchas firmas comerciales asocian su nombre a este acontecimiento de carácter nacional con importante participación popular y creciente prestigio, y la suma de todo ello genera conciencia.

Ahora bien. ¿Cuál es entonces la diferencia entre estos actos en sí mismos y los mismos actos formando parte del Día del Patrimonio?. Creemos que justamente es el enfoque; el hecho de que se establezca un día para que preparándonos de antemano en su organización gocemos de nuestra búsqueda, que no es solamente la del pasado, sino también la de aquellos elementos del presente que por su calidad son nuestro patrimonio, el que nosotros estamos ahora mismo construyendo. Todo esto hecho a lo largo del año resulta bien; sin embargo concentrado en un día, adquiere una resonancia mucho mayor, ya que todas las energías que el país dedica a la cultura puede decirse que están centradas en eso.

El devenir de la fiesta ha generado el reclamo de ampliar el evento a dos días, y esto no es casual. De hecho en varios lugares del interior las visitas y actos superaban la posibilidad de hacerlos en un solo día. Por eso hemos pasado a tener ahora un Día del Patrimonio, que en realidad dura dos. Creemos no obstante que no debería extenderse mas

Figura 13- Fortaleza del cerro de Montevideo.

allá de eso, porque justamente en la concentración radica su fuerza. La gente recorre el país para apreciar las distintas formas del patrimonio nacional, para participar en el mantenimiento de las tradiciones locales, para visitar aquellos sitios y edificios que normalmente le están vedados y a los que virtualmente toma por asalto, o para apreciar no por obligación sino por placer los trozos de historia presentes en los museos, y todo esto no es ni más ni menos que una forma de educación informal que permite una llegada a toda la comunidad.

SAUVEGARDE DE LA VILLE DE SAFRANBOLU

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Résumé

On peut dire que la conservation des monuments historiques en Turquie date du 19e siècle. Mais il s'agissait alors plutôt de sauvegarder des monuments religieux, des sérails, des remparts militaires etc., en somme, tout ce qui symbolise le pouvoir de l'Etat. Par contre, depuis 1975, année de la campagne du Comité des Sites et des Monuments du Conseil de l'Europe, les institutions officielles et universitaires turques se préoccupent de plus en plus de la sauvegarde de l'ensemble du patrimoine architectural urbain et naturel.

Safranbolu a été une des premières villes concernées par cette campagne. Son plan de protection a été achevé en 1989 par nous-même. Les approches proposées dans son plan et son application progressive ont largement influencé les autres plans de protection en Turquie.

En 1994, la ville a été honorée par l'UNESCO et citée dans la liste de l'héritage mondial de l'architecture.

La ville

La petite ville historique de Safranbolu se trouve dans le nord-est de l'Anatolie, à 425 km d'Istanbul et à 250 km d'Ankara (carte 1). Le fait d'être située à 8 km de la ville de Karabük, un centre de l'industrie sidérurgique, lui confère une importance particulière.

Carte 1

Safranbolu est divisée en deux agglomérations: "Çarşı" et "Bağlar" (photo 1).

Photo 1

Photo 2

L'agglomération de Çarşı (bazar, photo 2), située dans une vallée, est plutôt le centre des activités artisanales et commerciales. Tandis que Bağlar est la partie estivale de la ville. L'on notera que Bağlar veut dire "vignobles" en français, ce qui est significatif. On s'y rend pour échapper aux chaleurs de l'été.

Actuellement, l'agglomération de Çarşı comprend 6 000 habitants, tandis que 4 000 personnes habitent à Bağlar; soit un total de 10 000 habitants dans le site urbain et naturel sur un terrain de 150 hectares.

Chronologiquement, la ville a vu les étapes suivantes: A l'ère paléolitique, ces lieux étaient déjà habités. Homère, dans ses écrits, appelle Paphlagonia la région du nord-ouest de la mer Noire dans laquelle se trouve cette ville. A partir du 4e siècle av. J.C. la ville voit se succéder les époques persane, lydienne, romaine, hellénistique et byzantine. Elle se trouve sous la domination des Dénichments jusqu'au 11e siècle ap. J.C., au 12e siècle, elle est dirigée par des peuples turcs comme les Seldjoukides et plus tard par les Djandarogoullari. A partir de 1451, Safranbolu entre sous la domination de l'Empire ottoman.

Tout comme dans les autres villes à structure ancienne, l'architecture traditionnelle est très importante à Safranbolu. Outre cette caractéristique et grâce à la conservation de cette ville, on pourrait résoudre certains problèmes sociaux en Turquie. Les villes qui ont une valeur historique comme Safranbolu ont en effet aussi un potentiel de logements qu'on ne sauvait négliger.

Processus socio-économique et historique déterminant la structure de l'espace

Les petites villes provinciales de l'époque ottomane ont une place spécifique dans la vie économique de l'Asie Mineure. La plupart de ces villes se situent sur les routes commerciales reliant entre eux des centres importants. Ainsi, les marchandises étaient transportées dans des conditions de sécurité et les voyageurs se déplaçant dans de dures conditions étaient hébergés. En outre, parallèlement à ces fonctions, il existait différènts artisanats très développés (comme la soie, le cuivre, le cuir, la métallurgie, la menuiserie et la construction), donc des organisations de guildes.

De ce fait, entre le 13e et le 18e siècle, Safranbolu était une importante ville de passage sur la route commerciale de l'Europe-Asie jusqu'au port de Sinope sur la mer Noire. Par exemple, le caravansérail de Cinci Han, construit au 17e siècle, qui comportait 60 chambres, des dépôts, des écuries et des caisses de trésor, témoigne de l'importance de Safranbolu en tant que ville de passage.

Les différentes fonctions de l'utilisation du sol du centre de la ville gardent jusqu'à nos jours la même structure organique. Les ateliers des diverses branches d'artisanats et les bâtiments de fonction de ces ateliers (mosquées, bâtiments de guildes) sont regroupés dans différentes zones urbaines. Car il était plus facile pour le contrôle opéré par la direction que les membres d'une même guilde se réunissent dans la même rue.

Il faut aussi mentionner qu'à l'époque ottomane, la population grecque vivait en paix avec la communauté musulmane. Vitale Quinet, géographe français, note, dans sa recherche publiée vers la fin du 19e siècle, que 2 700 habitants d'origine grecque de l'Anatolie vivaient à Safranbolu. Ils ont émigré en Grèce selon un accord établi entre la Grèce et la Turquie en 1924.

En général, l'aspect physique urbain et architectural des quartiers de ces deux communautés ne présente pas de différences. Cependant dans le quartier grec de Kiranköy, il existe des ateliers d'artisanat sous chaque maison. Tandis que l'utilisation du sol par l'artisanat musulman est différente: les branches d'artisanat, se regroupant en zones, constituent le centre de la ville. Du point de vue du rapport fonctionnel entre le lieu de travail et l'habitation, l'exemple grec à Safranbolu nous rappelle les villes européennes préindustrielles.

A la fin du 19e siècle, Safranbolu atteint une extraordinaire richesse architecturale. Les raisons essentielles en sont très intéressantes: le 19e siècle est le commencement de l'époque libérale dans l'Empire ottoman (réformes du Tanzimat). Avant le code de 1858 réglant la propriété, il n'était pas question, dans la société ottomane, de propriété privée. Les terrains sont gérés selon le principe du fief et le tout appartient au Sultan au nom de Dieu. Les lois de 1858, et celles, plus élargies de 1869, reconnaissent le droit à la propriété qui existe désormais pour toutes les couches de la société. C'est pour cela que, dans les régions où se trouvent de riches sources de matières premières et où le commerce est développé – comme c'est le cas pour Safranbolu – l'accumulation du capital se reflète dans l'espace physique. De nombreux chefs-d'oeuvre architecturaux qui se trouvent dans cette ville datent de cette période.

Un nouveau processus commence dans l'espace socio-économique traditionnel de Safranbolu à partir de l'époque de la République (1923). L'industrie lourde, installée quelques 10 km plus loin, à Karabük, exerce une très grande influence sur la ville. D'une part, la main d'oeuvre au chômage, due à la diminution de l'artisanat, trouve du travail à Karabük. D'autre

part, le capital commercial accumulé à Safranbolu se déplace verse l'industrie sidérurgique, donc à Karabük.

Safranbolu a par conséquent perdu à la fois sa population et son capital commercial. Parallèlement à cela, la spéculation foncière susceptible de changer la structure physique de la ville, diminue. La ville se trouve ainsi spontanément conservée.

Quelques raisons de la conservation spontanée de Safranbolu

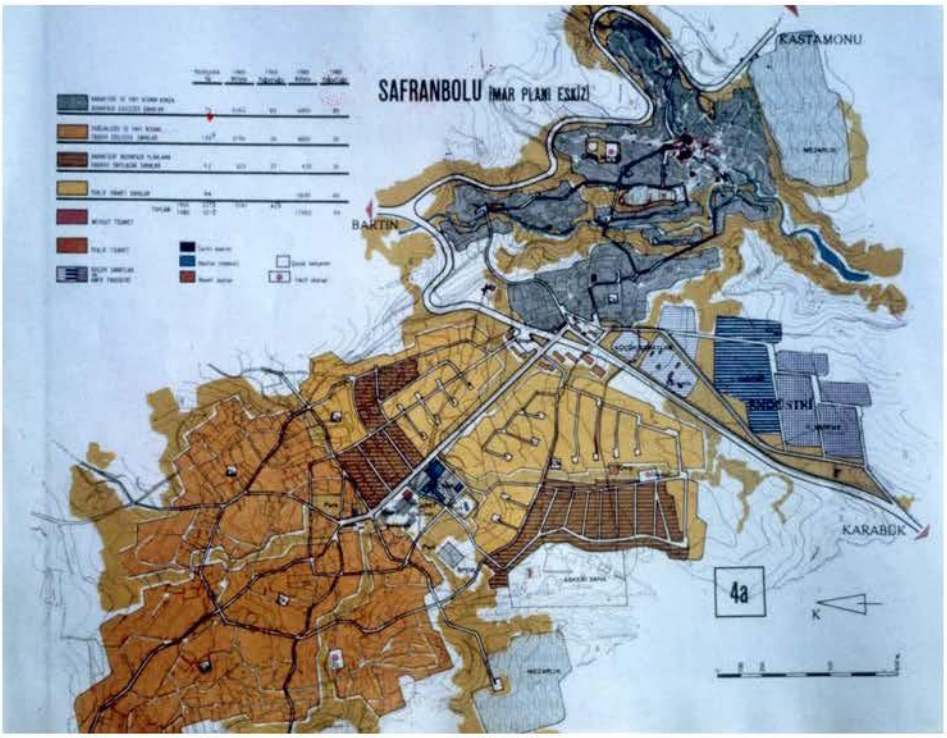

Photo 3

Les raisons de la conservation spontanée de Safranbolu ont été considérées lors du processus de planification de sa protection (1989). Comme nous l'avons mentionné plus haut, la première raison en est l'incidence de l'industrie sidérurgique installée à Karabük. Nous pouvons y ajouter ceci: la demande d'achat de terrains à Safranbolu (qui sert de dortoir à ceux qui travaillent à Karabük) n'augmentera pas, tant qu'il n'y a pas saturation des demandes d'achat de terrains à Karabük même.

La premier plan directeur de Safranbolu a été établi dans cette perspective en 1967, par le Prof. Özdeş (photo 3). Suivant cet ancien plan, la densité de la population dans le site historique était maintenue de façon stable par deux moyens: le plan proposait une zone d'habitation en dehors du site (à Kiranköy) qui canalisait la demande de terrains, de même, ce plan faisait passer les artères principales de transport urbain reliant Safranbolu aux villes voisines, à la périphérie du site historique, afin d'éviter la dégradation de sa texture organique.

Principes essentiels du plan de protection du site

Jusqu'à une date récente, la protection des sites était plutôt considérée à l'échelle des bâtiments individuels en Turquie. Les plans directeurs comprennent des mesures pour la protection de tels sites. En revanche, des plans spécifiques plus détaillés et plus profonds

n'étaient pas établis. Le plan de protection de Safranbolu est le premier grand plan pluridisciplinaire. C'est l'exemple même d'un début dans ce domaine. Ainsi ce plan a montré au fur et à mesure de son application, le bien fondé des décisions prises.

Photo 4

Photo 5

Le site urbain et naturel à protéger est d'environ 150 hectares. Le plan directeur (1:5000) (photos 4 et 5) comprend non seulement des sites historiques, mais des sites naturels formant un ensemble avec les premiers. Dans le site, plus de 1 600 maisons à caractère traditionnel, des rues, des petites places, des murs de jardin, des fontaines, des ponts, des rives de ruisseaux, des rochers, ont été fichés et protégés. Le rues du réseau traditionnel dans le centre de la ville (photos 6 et 7) ont été aménagées de telle sorte que les piétons peuvent y circuler plus aisément qu'avant. Certains passages ont été élargis pour que les pompiers puissent passer plus facilement.

Photo 6

Photo 7

Au cours du processus de planification, la question essentielle sur laquelle nous discutions souvent était de faire un plan propre à cette ville et vraiment réalisable. Pour les habitants de la ville, la nécessité de protection des valeurs architecturales et artistiques et le fait de développer la ville selon ces critères, étaient des concepts encore nouveaux et peu familiers. Des discussions fréquemment organisées et des festivals culturels répétés chaque année ont eu beaucoup d'effet. Mais certains milieux, conscients du fait que la protection limitera à long terme leurs intérêts spéculatifs, réagissent contre le plan. On fait des recherches sur les moyens de susciter la coopération; la chose la plus propice nous semble-t-il, est de préparer un plan souple qui ne soit pas contraire aux intérêts des habitants à moyen et à long terme.

Comme nous l'avons mentionné plus haut, Safranbolu, avant le plan de 1989, a été protégé spontanément. Cela venait du fait que l'évolution économique et démographique d'autrefois, en faveur de la ville voisine industrielle, empêchait la dégénérescence de la texture urbaine de Safranbolu. Mais, un certain changement infrastructurel ne saurait tarder, au cours de l'application du plan de protection. L'important est que le coût de ces changements probables ne soit pas financé par les habitants de la ville, mais par un fonds public ou par l'Etat. C'est une des conditions essentielles pour que le plan se réalise.

Selon nous, une autre condition importante est que la valeur des bâtiments à protéger sous le statut de propriété privée soit toujours plus grande que celle du terrain sur lequel ils sont bâtis. Si, dans l'avenir, la valeur du terrain dépasse celle du bâtiment, leur protection sera difficile. Il faut alors qu'il y ait des mesures augmentant la valeur des bâtiments. C'est à dire que les bâtiments doivent être réparés et rénovés, de façon à rendre la vie de tous les jours agréable. A cet égard aussi, il serait souhaitable que les habitants de la ville puissent avoir des

moyens (crédits à taux peu élevé par exemple) pour faire les dépenses de réparation et de réhabilitation.

Situation actuelle

Le marché en plein air qui se tient actuellement dans le centre de la ville (Çarşı) n'a pas un aspect très engageant. Cet espace est utilisé seulement les samedis. Nous avons proposé que ce marché en plein air soit combiné à un amphithéâtre aux larges gradins (3,5 m de largeur) ce qui permettrait aux petits commerçants et aux paysans de mieux présenter leurs marchandises. Cet amphithéâtre (photos 8, 9 et 10) pourrait d'autre part servir à des activités culturelles. Ainsi, grâce à cet aménagement multifonctionnel, la rue tiendrait lieu de scène dont les coulisses seraient les entrées ou les jardins des maisons. Avant de réaliser cet aménagement en projet, nous avions fait une enquête auprès des habitants du quartier. Tous ont manifesté leur approbation et même leur enthousiasme.

Photo 8

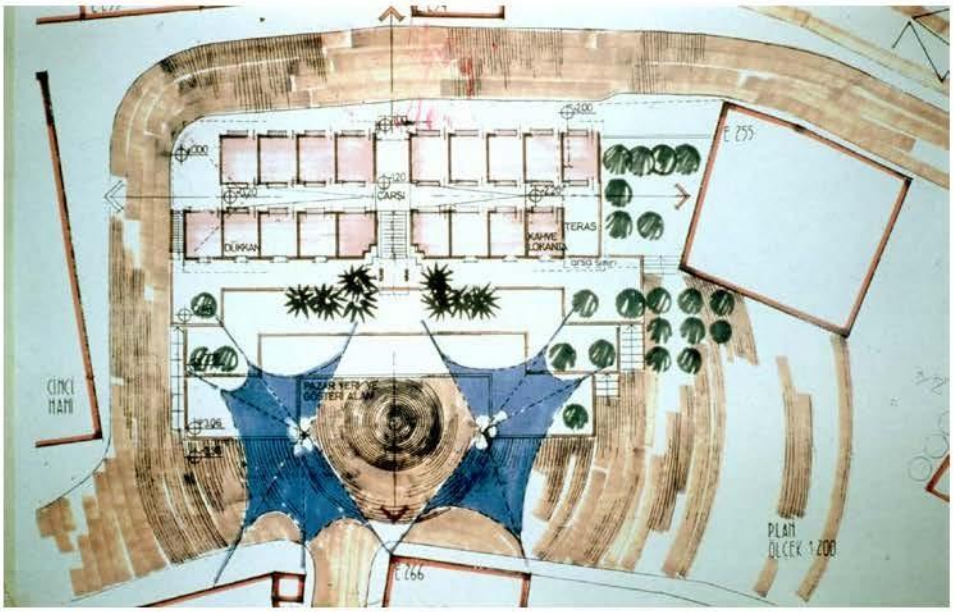

Photo 9

Photo 10

DIVERSITIES OF CULTURES REFLECTING ON CULTURAL HERITAGE

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Abstract

The Mediterranean has been a source of connection between the civilizations and different cultures through centuries. This paper focuses on the two sides of the Aegean, one of the main extensions of this sea, examining the traditional / vernacular architecture and tries to give a brief scope on the resemblances shared. The statements given depend on a personal research done on the southwestern Anatolian shores and on literature study.

The problems of education for the preservation of the traditional architecture, in the above mentioned area are presented in the following paragraphs. With the consciousness of knowing that the survival of the cultural properties depends on public awareness, the educational system in the preservation discipline and public responses are tried to be given.

Diversities of cultures, reflecting themselves on cultural properties compose a rich heritage that must be handed down to the next generations by the help of a well-informed society about the subject.

1. Introduction

One of the most attractive extensions of the Mediterranean Sea towards the inland can be named as the Aegean. For thousands of years, the land at both sides of this sea has been a source of interest, income and invasions. The modern citizens of the two nations sharing the two sides of it, mostly claim with some prejudice that it is only their nation which has been the starting / dynamic source since the Antiquity. Indeed, the idea may be true but it is certain that the eastern and western shores of the Aegean have been inhabited by those who were in close contact sometimes in enmity, but mostly in friendship.

The paper will include the results of a research about a special region named as "Teke Peninsula" today, and will focus on the relations between this zone and the nearest neighboring east Aegean islands, namely the Dodecanese .

1.1 Short History of the Region

Recent archeological researches point to the date of 4000 – 2000 B.C. for the traces of humans in southwestern Asia Minor. Lycians, the first inhabitants of Teke Peninsula, are noticed on the scene of history during the Trojan wars as commemorated on a stele found in an ancient town / Xanthos [1]. Lycians are indicated by Heredotus as a community sharing a matriarchal social organization [2]. Their origins are obscure. Some historians believe that they are the descendants of emigrants from Crete while others lead the hypothesis that Lycians are the natives of southwestern Anatolia [3]. The establishers of the first federative state of the world lived under

Greek, Hellenistic and Roman influence. After the Persian invasion, Lycians accepted Alexander the Great happily in 334 B.C. The Roman influence brought prosperity to the area but the brilliant days ended with two earthquakes in 141 B.C and 240 A.D.

After the partition in 395, Lycia became a part of the East Roman Empire as a matter of fact. The information from the 4th to 6th centuries depends on the church records about the haghiographical life of Nicholas of Sion. The region gained importance in the Christian world [4].

An important event of the medieval era can be mentioned as the war between the Byzantine fleet and the Ummayad Khalif. Muslims could not last long along Teke Peninsula littoral but the Byzantine power decreased by Rhodian, Venetian, Genoese Chevaliers and Cypriot Kings. As a sequence of the raids, by the end of the 7th century Lycian cities were abandoned and turned into the status of villages. During 11th and 12th centuries Seljuk Sultans or Cypriot Kings ruled the region in turn and during the 4th Crusade an Italian Aldobrandini invaded the coast.

The Turcoman Princes named Lycia as "Teke-eli" depending on their branch of tribe and ruled under the suzerainty of Ilhanids, the Mongol invaders [5]. Teke Principality was annexed to the Ottomans during 1425. Another important event of the area took place in 1510 when a Shiite rebellion spread to the area. After the suppression of the rebellion, some of the Turcomans escaped to Iran, others were exiled to the cities of Modon and Koron in Greece [6]. Teke Peninsula settlements survived as remote, desolate villages till the end of the 18th century.

During the occupation of Egypt by Napoleon, in 1788 – 1799 Arabs, in 1822 – 1823 Moreans, in 1897 Cretians and in 1913 the inhabitants of Skopje migrated to the Peninsula. Following the events after the World War I, the peace concluded in 1923; Turks living in Greece especially around Thessaloniki were exchanged with the Greeks living in the province of Teke [7].

1.2 About the 19th Century…

The building stock, mainly the dwellings that is still in use today, is the remnants of the 19th century. They are suggested to be the results of the building activity, approximately constructed during 1850 to 1930's. The travelers of the 19th century, like Choisseul – Gouffier, Davis, Beaufort, Arundell, Fellows, Forbes give a full scope of the Levant and Dodecanese settlements [8, 9, 10,11,12,13]. The Ottoman archive sources of the same period indicate that the inhabitants of Teke Peninsula settlements were composed of Muslims and Greeks mainly, together with Spanish Jews, Armenians, Gypsies from Egypt, conforming the narratives of the travelers. The unchangeable factor was that whatever the religion of the inhabitants was, the residential architecture did not differ much. The Ottoman inheritance lists of the region give clues about the interior spaces, furniture and personal belongings of the communities, indicating to a close resemblance. The only difference can be observed in the economic status of the inhabitants.

2. Cultural Heritage of the 19th Century

In this paper, among the rich cultural heritage of the region, only the traditional dwellings will be mentioned. The architectural characteristics can be summarized in the properties of the townscapes and buildings.

2.1 The Settlement Pattern

The towns of the study area reflect a gridiron plan scheme established along the littoral on which the ports are located, all have a mosque and a church at either ends. The dwellings are so arranged that they face the sea so as to get the maximum benefit from the climatic factors. Thus, the main streets are parallel to the sea and to the topography. The perpendiculars connecting them are either ramps or stairs. Dead ends may occur. The plots of the town centers are rectangular, and attached order houses over them indicate to the most active part of the settlements. Towards the suburbs, detached order houses in inorganic shaped plots can be observed. The town pattern reveals a relatively green zone as all the houses have gardens including those at the centers.

2.2 About the Houses

The houses of the Peninsula littoral can be summarized as two story stone buildings. Single or three storeys are rare although mezzanine is a peculiarity frequently met. Basically, the ground floors are left to shops or storages. It is the first floor that constitute the actual living space, therefore the classification depend on them. The basic element composing the plan is a "hall". Rooms are either aligned along one or two longer sides of the space. Two balconies at both ends terminate the hall. In the first plan type the hall ends with a room, but even in this composition, there is a scenery balcony opening to this space (Fig.1). In the latter case, the hall ends with again a scenery balcony; open, semi-open or closed as a "sahnisin / cumba" (Fig. 2). The other short side of the hall always ends up with a service balcony consisting the wet spaces as small units. This is a specialty unique for Anatolia, as it is customary to locate such spaces at the ground floors.

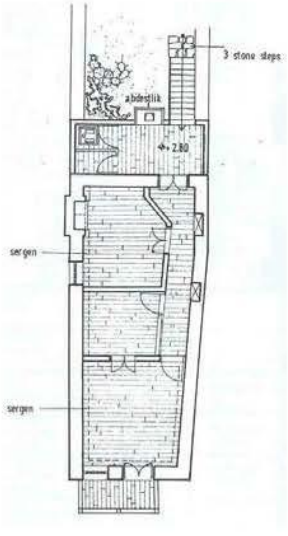

Fig.1 The "hall" with rooms at one side (Source: Ozcan)

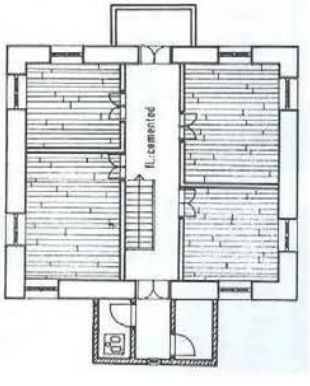

Fig.2 The "hall" with rooms at both sides (Source: Ozcan)

When the elevations of the dwellings are examined, it can be said that attached houses can be accepted as rectangular prisms and the detached look like a cube in general. The attached houses have two main facades at the shorter sides of the prism and end up with triangular pediments.

The superstructure of these buildings is gabled-roofs. The detached can have four equal facades in dimensions but again two of them are important, those carrying the two balconies. Those houses are enclosed with hipped roofs. It is known that it was customary to have flat roofs before the wide-spread use of tiles. Eaves are mostly neglected and it is always the machine tiles used as the finishing. The original machine tiles were imported from Marseilles and only after a factory was established in Rhodes around 1870's these tiles were of preference. The basic construction material is the local stone where the horizontal slabs forming the flats, the service and scenery balconies and all the carpentry are of pine trees brought from the Taurus mountains above the settlements. It is known that metal binding elements like nails, locks, hinges were brought from Cyprus, Beirut, Alexandria as well as Rhodes.

The elevations can be grouped in two basic forms: -the earlier examples, -the neoclassical. Those in the first group are more simplistic as they are composed of exposed stones. The window and door openings are in the form of vertical rectangles with sash or wing system carpentry in the original color of the timber. The most elaborate element on the façade is the scenery balcony. In case they are semi-closed timber lattices or stained glasses are used. The timber pediments over them and the profiled supports underneath carrying the balcony may have carvings of geometric patterns or plant depictions. The neoclassical examples reflect a resemblance with the Levantine buildings of the Aegean shores. Quoins at the corners, triangular pediments before the roofs, eave moldings, blind arches over openings, cantilevers, balustrades are profiled and neatly ornamented. Iron bars are frequent. Color twins like white-yellow, white-green, white-red are applied on facades. The form, ratio and carpentry of the openings are similar to the earlier examples. There is a misbelief that the earlier examples belong to the Muslims and the neoclassicized to the Non-muslims, basically the Greeks. It only depends on the economic status of the owner.

During the research it is determined that the wandering master-builders, some from Rhodes others from Bulgaria have built considerable amount of dwellings in the region.

3. Comparison of the Vernacular Architecture of Southwestern Anatolia and of the Dodecanese

In this paper only the basic settlements of the islands of Kalymnos, Cos, Symi. Rhodes and Castellorizo are chosen for comparison, as being the nearest to the Anatolian shores. The comparison is based on literature study. The aim is not to make a research on the traditional houses of the Dodecanese, but, just to indicate the basic resemblances shared by the settlements at both sides of the current political boundaries. Certainly, the author can never have the aim and right of making statements on Greek traditional architecture and have no tendencies of changing the boundaries.

As in all traditional vernacular settlements the towns of the islands are established conforming the topography. Although roads are perpendicular to an avenue, which is parallel to the coast, there are no dead ends and generally the buildings are, located parallel to the curves of the land. In cases where the contours are dense attached buildings with terraces are seen. When the contours are gradually less detached buildings with courtyards occur. In the first group houses

are directly connected to the streets where in the second group gardens or mostly courtyards exist.

Scholars share the opinion that the "Aegean house" developed from "monochoro"/single space or "monospito"/one room house [14]. It is believed that monospito is the oldest and simplest type of dwelling which is the most prevalent form in the Dodecanese. When the plot permits and depending on the economic status of the owner "archondiko" evolves (Fig.3). It seems that the archondiko, the wealthy two flat house gives way to the "neoclassicized" buildings of the late 19th century. Reminding the Teke Peninsula houses the ground floors consist the store-rooms, the main living spaces raised to the first floors. As it is observed from the studies of Bogdanou-Eliopoulou and Fetokaki- Sarandidi the central corridor divides the plan scheme into two symmetrical parts, like the examples related in southwestern Anatolian examples.

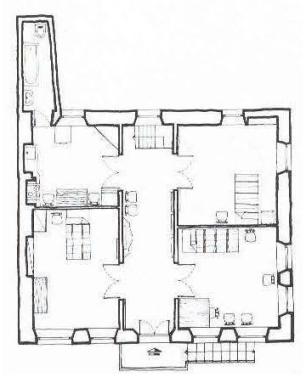

Fig.3 The archondiko house (Source: Bogdanou-Elipoulou,Fetokaki- Sarandidi, Kalymnos,1984)

Details like paved courtyards made by using black and white pebbles are also among the various similarities. On the other hand, the monospito house of Rhodes resembles the "musandirali" house of Bodrum, a neighboring settlement at the north of the case study area. During the literature study it is found out astonishingly that some of the architectural features of traditional houses in the town of Rhodes are accepted as "Turkish" [15]. Although the plan scheme of these houses are not known in detail, the elevations show great similarities with the houses of Kas, Kalkan and Fethiye. It is interesting to note here that such items are supposed to be the characteristics of the "Greek houses" in the case study area. (Fig. 4, 5).

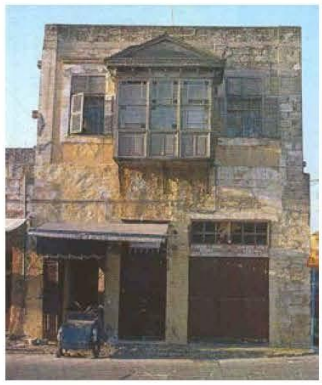

Fig.4 The so-called "Turkish" elements in Rhodes (Source:Moutsopoulou, Rhodes, 1985)

Fig.5 The so-called "Greek" elements in Kas
(Source: Ozcan)

The facades share similar peculiarities as the scenery balconies with stained glass enclosures, profiled decoration of triangular pediments, use of pilasters, quoins, profiled cast-iron cantilever supports of the projections reflect the same aesthetic evaluation and building techniques. In the same way resemblances of the facades are easily recognizable when the traditional dwellings of Castellorizo are compared with the "earlier period examples" of the Teke Peninsula littoral settlements.

4. Problems of Urban Conservation in the Case Study Area

The southwestern settlements of Anatolia including the case study area, the towns Kas, Kalkan and Fethiye, have kept their original characteristics until 1980's due to the poor transportation means. After the construction of the highway, which eased the accessibility to a great extent, tourist attractiveness of Antalya at the east, spread to the area with an accelerating rate. The climatic factors giving way to a long recreational season, natural beauty of the landscape and rich archaeological remains immediately attracted the attention of various professionals in the field of tourism and entertaining. Naturally, they brought the land speculators with them.

At the beginning it has been only the archaeology that carried importance, but soon after the traditional vernacular architecture is investigated. Starting as early as 1980 the buildings began to be used as pansions, small hotels and restaurants. The local peasants, fishers and farmers found themselves in the obligation of an adaptation to the new situation. For a while, they earned relatively well, but in the following ten years they became aware of the fact that institutional management of tourism is out of their limits. Thus, the original owners of the traditional dwellings left their places to the new comers; merchants, tourism agents, professionals of traveling, gastronomy and entertainment. The land speculators easily found place to themselves, to obtain the maximum income from the new constructions. They lead to new Kas, Kalkan and Fethiye, in the form of replicas of the existing cultural properties and unfortunately adjoining to

the traditional urban settlements. Today, for the ordinary man, it is nearly impossible to detect a traditional house from the concrete replicas of it (Fig. 6).

Fig.6 20th century Kalkan houses, faithful replicas of the originals
(Source: Ozcan)

4.1 Responses of the Local Governments

The local municipalities and their governors having no experience on conservation subjects seemed to be content with the situation as more tourists meant more income, at least to solve the infrastructure problems. There was no need to take care of the traditional architecture because they were in the skilful hands, to transform them for new functions. The great mistake of the municipalities can be stated as not occupying the technical staff educated on conservation subjects. The construction activity has been accepted as a conventional building improvement activity.

The traditional dwellings turned out to be mere enclosures as nearly all the interiors began to be changed to serve the new necessities. Although the inventorization of the cultural properties is completed during 1980-1983, the preparation and acceptance of the conservation aiming plans delayed for a considerable time. For example, the inventorization of the traditional dwellings in Kas is completed in 1981 but the conservation aiming plan is approved in January 2003, very recently, after all the illegal and unpleasant new urban fabric became a fact which can not be denied. The urban pattern of the case study area turned into touristic trading centers and is surrounded by concrete blocks of accommodation or secondary housing.

The original owners are obliged to leave their houses and even migrate to cities like Mugla or Antalya, because the settlements are no longer hometowns, except for the short winter seasons.

4.2 The Place of Education in Preservation

Currently, in Turkey, conservation education is given at two different levels; undergraduate and graduate level. The first is given in two-year technical schools where students are expected to learn the subject in application. The latter is given only to architects and they are supposed to develop policies in urban preservation at every level. Apart from these, the technical high

schools of construction at the lycee level, aims to give knowledge on traditional building technology. Some have special courses on restoration.

Although the educational system seems quite mature covering different phases of education, the applications prove the contrary. Technical high school programs aim to graduate students to construct reinforced concrete buildings and the information given on traditional techniques have to stay in the memories of their graduates, as the clients are after the new, not the restored. The two-year technical schools following the high school education are new institutions and insufficient in number, furthermore, their graduates have a tendency of acting like architects though they are not licensed to do so. Finally, the graduate education covers theoretical approaches and physical application methods both but the graduates may not always have the chance of professional applications, as public awareness in the subject is not sufficient at various levels.

4.3 Public Awareness on Preservation of the Cultural Heritage

Public awareness on the preservation of the cultural heritage directly depends on the education of the society at different levels. The education given can be discussed under three basic headings. The first covers the education of the governmental organizations. In the Turkish governmental system towns and cities have two governors: the provincial representative of the central government and the mayor of the settlement. The first is nearly always the graduate of the school of law or political sciences. The latter, as being an elected person, can be of any professional origin. Unless the mayor is an architect or an archaeologist, what they share, is their educational background, in which no information about urban preservation occurs.

The second heading that is supposed to create public awareness can be stated as the education of the officials concerned in the subject. As far as the effort of urban preservation is a relatively new subject, it is a must to give the latest information on techniques and application methods, to the local officials who are supposed to be the appliers.

Lastly, it is directly the society, the inhabitants of the town to be preserved who must be widely educated through conferences, seminars, discussions and even friendly talks at public spaces.

5. Epilogue

The differentiation in the meanings of “Greek” and “Turkish” in the traditional architecture of the region only depend on local descriptions. Most probably local wandering master-builders constructed the building stock of southwestern Anatolia and the Dodecanese. They willingly responded to the needs of their clients. In the local descriptions and documentary work done in Teke Peninsula, it is settled that if a house is known as a “Turkish” one, it can indicate to a dwelling either used by Turks or whose donor has been a Turkish family. It can be estimated that same is valid for the Greek ones.

In other words, it can be said that the architectural features do not have distinct merits pointing to the nationality of the owners. The characteristics of the cultural properties observed in a special zone, do not rely upon the political boundaries of the countries. They seem to be

spread over vast regions. The traditional architecture is mostly created as a reflection of the social phenomena, economic and natural conditions more than religious or nationalistic differences. They reflect the regional specialties of the geography, geology, climate and even history, and are the results of a very long architectural experience evolved through centuries. The common tradition created is an outcome of a, social and economic data shaped depending on the technology, a similar life style and world-view and aesthetic understanding of the period they are created. The reflections of this can be traced on the building terminology shared with directly the same meanings and still active today. Some can be mentioned as such; *paramaklikia* / parmaklik, *sachnisi* / sahnisin, *konaki* / konak, *ambari* / ambar, *damlalik* / damlalik, *marangoz* / marangoz. The list can be elongated if needed. It should not be forgotten that the connecting Mediterranean have carried influences hitherto, from Valetta, Venice, to Izmir and Istanbul. The semi-open balconies of Rhodes have close relatives in Teke peninsula, in Levantine buildings of Izmir-Alsancak or in the 19th century apartment blocks of Istanbul-Beyoglu district [16].

The traditional architecture of the area is highly treated by tourism activities. The newcomers are after the maximum profit. It should be kept in mind that this popular activity of the late 20th century may fade in the future. In this case the buildings will be abandoned and as far as the dwellings are no longer the "homes", a rich cultural heritage will be under the risk of demolishing. It can not be denied that it is the tourism sector that keep them alive today but the equilibrium between the natives and the new-comers should not be spoiled. To create a better friendly world, the last chance to look at the history must not be lost forever.

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Key words: vernacular architecture, preservation, southwestern Anatolia, Dodecanese

ΠΡΟΣΤΑΣΙΑ ΤΗΣ ΑΡΧΑΙΑΣ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ ΤΗΣ ΜΕΣΟΓΕΙΟΥ ΜΕΣΩ ΔΗΜΙΟΥΡΓΙΑΣ ΒΑΣΗΣ ΔΕΔΟΜΕΝΩΝ ΚΑΙ ΟΡΓΑΝΩΣΗΣ ΕΡΓΟΤΑΞΙΩΝ ΔΙΑΚΡΑΤΙΚΗΣ ΣΥΝΕΡΓΑΣΙΑΣ

Βάσος Παπαδημητρίου
Ελένη Ε. Ευθυμίου

ΠΕΡΙΛΗΨΗ

Το πρόγραμμα «Συνεργασία για τη διάσωση, διατήρηση, αναστήλωση και ανάδειξη των κλασικών, ελληνιστικών και ρωμαϊκών μνημείων των χωρών-μελών του Μεσογειακού Forum» εντάσσεται στα πλαίσια του πολιτιστικού-κοινωνικού τομέα του Μεσογειακού Forum και υλοποιείται με πρωτοβουλία και υποστήριξη του Ελληνικού Υπουργείου Πολιτισμού.

Βασικός σκοπός του είναι η προώθηση και προστασία της κοινής πολιτιστικής κληρονομιάς των μεσογειακών χωρών, η οποία απειλείται από φυσικούς και ανθρωπογενείς παράγοντες, με ανάληψη κοινής δράσης. Κύριο όχημα για την επίτευξη του στόχου αυτού είναι, μεταξύ άλλων, η οικοδόμηση τράπεζας δεδομένων σε 3 γλώσσες (Ελληνικά, Αγγλικά, Γαλλικά) προσβάσιμης μέσω του Διαδικτύου (http://anastylosis.culture.gr) με στόχο αφ' ενός την ανταλλαγή τεχνογνωσίας και εμπειρίας και την εκπαίδευση ειδικευμένου προσωπικού και αφ' ετέρου τη συνεργασία για την εκπόνηση κοινών προγραμμάτων και την εξεύρεση πόρων για την υλοποίησή τους.

Η τράπεζα δεδομένων περιλαμβάνει στοιχεία σχετικά με:

α) Νομοθεσία και διοικητική οργάνωση κάθε χώρας.

β) Χαρακτηριστικά και αξιόλογα αρχαία μνημεία όπου έχουν πραγματοποιηθεί ή βρίσκονται σε εξέλιξη έργα συντήρησης και αναστήλωσης. Το πρώτο μνημείο που εισήχθει πιλοτικά είναι η Βιβλιοθήκη Αδριανού στην Αθήνα.

γ) Μνημεία που προτάθηκαν ως εργοτάξια διακρατικής συνεργασίας.

δ) Εκπαίδευση ειδικευμένου προσωπικού, όπου περιλαμβάνονται στοιχεία για διαθέσιμες υποτροφίες και παραδοσιακούς τεχνίτες.

ε) Συναφείς οργανισμούς.

στ) Χρηματοδοτήσεις.

ΕΙΣΗΓΗΣΗ

Α) Παρουσίαση του προγράμματος

Η Ελλάδα είχε και έχει ισχυρότατους πολιτιστικούς δεσμούς με τους λαούς της Μεσογείου, που ανάγονται στα βάθη της ιστορίας μας. Μέχρι τα μέσα του προηγούμενου αιώνα η ελληνική παρουσία ήταν έντονη, ιδιαίτερα στις ακτές της Ανατολικής Μεσογείου. Αυτή η μακροχρόνια αλληλεπίδραση του λαού μας με τους γείτονες μεσογειακούς λαούς οδηγεί σήμερα στην αναζήτηση τρόπων επικοινωνίας μεταξύ τους.

Μόλις εδραιώθηκε το νέο ελληνικό κράτος, θεώρησε σαν άμεσο χρέος και καθήκον του να συντηρήσει και αναστηλώσει τα αρχαία μνημεία που βρίσκονται στην επικράτειά του. Η προσπάθεια αυτή, η οποία συνδέεται άρρηκτα με την ανάγκη αυτογνωσίας του σύγχρονου ελληνικού έθνους, υπήρξε συνεχής επί 170 χρόνια περίπου. Η τεχνογνωσία και θεωρητική κατάρτιση που αποκτήθηκε στο μεταξύ θα μπορούσε να αποτελέσει μέσο επικοινωνίας ανάμεσα στη χώρα μας και σε άλλες μεσογειακές χώρες.

Το Μεσογειακού Forum, δηλαδή η πολιτική πρωτοβουλία των Υπουργείων Εξωτερικών των μεσογειακών χωρών να προωθήσουν την επικοινωνία και συνεργασία των χωρών που εκπροσωπούν, εστίασε το ενδιαφέρον της και σε θέματα πολιτισμού. Το Υπουργείο Πολιτισμού της Ελλάδος, ενισχύοντας αυτή την πρωτοβουλία, προτείνει ένα πρόγραμμα που έχει ως περιεχόμενο την επικοινωνία και συνεργασία των χωρών της Μεσογείου για τη διάσωση, διατήρηση, αναστήλωση και ανάδειξη των κλασικών, ελληνιστικών και ρωμαϊκών μνημείων.

Απεσταλμένοι εμπειρογνώμονες 8 εκ των 11 χωρών-μελών του Μεσογειακού Forum (Αλγερία, Γαλλία, Ελλάδα, Ιταλία, Μάλτα, Μαρόκο, Τουρκία και Τυνησία) συναντήθηκαν στην Αθήνα στις 18-20 Σεπτεμβρίου 1997 και συζήτησαν σχετικά με την υλοποίηση του προγράμματος. Κατά τη διάρκεια της συνάντησης διαπιστώθηκε ότι για τη διατήρηση της κοινής πολιτιστικής κληρονομιάς, η οποία απειλείται από φυσικούς και ανθρωπογενείς παράγοντες, είναι απαραίτητη η συνεργασία στον τομέα της ανταλλαγής τεχνογνωσίας και εμπειριών, της εξειδίκευσης προσωπικού και της δημιουργίας κοινών προγραμμάτων, με την ταυτόχρονη εξασφάλιση των απαραίτητων κονδυλίων. Πιο συγκεκριμένα, αποφασίστηκε:

1. Η οργάνωση γραμματείας υποστήριξης του προγράμματος στην Αθήνα, η καθιέρωση δικτύου επικοινωνίας και η δημιουργία μιας βάσης δεδομένων όπου θα περιλαμβάνονται στοιχεία σχετικά με:
   - Νομοθεσία και διοικητική οργάνωση των χωρών-μελών
   - Μνημεία που προτάθηκαν ως κοινά εργοτάξια
   - Εκπαίδευση ειδικευμένου προσωπικού
   - Συναφείς οργανισμούς
   - Χρηματοδοτικούς φορείς
2. Η δημιουργία εργοταξίων διακρατικής συνεργασίας σε δύο χώρες, το Μαρόκο και την Τυνησία.
3. Η προσπάθεια εξασφάλισης χρηματοδοτήσεων με την προώθηση των επιμέρους προγραμμάτων στην Ευρωπαϊκή Ένωση και άλλους διεθνείς οργανισμούς.

Οι παραπάνω προτάσεις της Α΄ Συνάντησης υιοθετήθηκαν από το ελληνικό Υπουργείο Πολιτισμού, το οποίο προχώρησε στην έγκριση του απαραίτητου προϋπολογισμού κατά το έτος 2000 και τον ορισμό επιτροπής υπεύθυνης για την υλοποίηση του προγράμματος. Η επιτροπή αποτελείται από τους:

α) κ. Βάσο Παπαδημητρίου, Πολιτικό Μηχανικό – Αναστηλωτή της Διεύθυνσης Αναστήλωσης Αρχαίων Μνημείων του ΥΠ.ΠΟ., ο οποίος είναι υπεύθυνος του προγράμματος,

β) κα Νικολέττα Βαλάκου, Αρχαιολόγο, Διευθύντρια Προϊστορικών και Κλασικών Αρχαιοτήτων του ΥΠ.ΠΟ. και

γ) κ. Νίκο Μπελογιάννη, Χημικό Μηχανικό, μέλος της επιτροπής του Κέντρου Λίθου του ΥΠ.ΠΟ.

Η γραμματεία υποστήριξης του προγράμματος συστάθηκε το Φεβρουάριο του 2001 και στεγάζεται στην Πλατεία Καρύτση 10, στην Αθήνα. Στελεχώθηκε από ειδικό προσωπικό ως εξής: κα Μαρίνα – Ζιζέλ Χατζημηνάογλου, αρχιτέκτονα – αρχαιολόγο, κα Ουρανία Φαρασλή, αρχιτέκτονα, κα Φωτεινή Γεωργακοπούλου, αρχιτέκτονα, και κα Ελένη Ευθυμίου, αρχαιολόγο, υπεύθυνη από το 2001 ως σήμερα.

Κατά το έτος **2001** η γραμματεία ασχολήθηκε με την οργάνωση της υποδομής του προγράμματος, μέσω των ακόλουθων δραστηριοτήτων:

- Δημιουργία και ανάλυση του σχεδίου της βάσης δεδομένων.
- Επαφές με τους υπευθύνους όλων των χωρών-μελών του προγράμματος, όπου συμπεριλήφθηκε το προσχέδιο της βάσης δεδομένων.
- Επιλογή εταιρείας για τη δημιουργία και υποστήριξη του προγράμματος της βάσης δεδομένων. Ως το τέλος του 2001 η επιλεγείσα εταιρεία Data & Control Systems ολοκλήρωσε, με τη συνεργασία της γραμματείας, την ανάλυση και ξεκίνησε την εφαρμογή του προγράμματος, που σχεδιάστηκε για να λειτουργεί σε 3 γλώσσες (ελληνικά, αγγλικά, γαλλικά). Σχεδιάστηκαν επίσης οι πρώτες σελίδες στο Διαδίκτυο, που παρουσιάστηκαν ως demo στην συνάντηση των Υψηλών Αξιωματούχων του Μεσογειακού Forum στο Υπουργείο Εξωτερικών (Αθήνα 29/11/2001), με θετική ανταπόκριση.
- Συλλογή στοιχείων για την εισαγωγή πιλοτικού μνημείου (Βιβλιοθήκη Αδριανού, Αθήνα), επεξεργασία, οργάνωση του υλικού (κείμενα, σχέδια, φωτογραφίες) και μετάφραση.

Αξίζει να σημειωθεί ότι κατά την 8η Συνάντηση Υπουργών Εξωτερικών του Μεσογειακού Forum (Ταγγέρη 10-11/5/2001) οι Υπουργοί εξέφρασαν την υποστήριξή τους στο πρόγραμμα, εξουσιοδοτώντας τους Υψηλούς Αξιωματούχους των χωρών-μελών να το εξετάσουν λεπτομερειακά προκειμένου να προχωρήσει η υλοποίησή του, όπως αναφέρεται στο κείμενο των συμπερασμάτων.

Κατά το έτος **2002** η γραμματεία ασχολήθηκε με τις εξής δραστηριότητες:

- Ολοκληρώθηκε η τεκμηριωμένη εισαγωγή και δημοσίευση της Βιβλιοθήκης Αδριανού σε τρεις γλώσσες, ως πρότυπο για τις ακόλουθες εισαγωγές. Επίσης, προχώρησε η συλλογή και παρουσίαση στοιχείων σχετικά με την εκπαίδευση, τους συναφείς οργανισμούς, τους χρηματοδοτικούς φορείς και τις υποτροφίες.

- Το Μάρτιο του 2002 και μετά από πρόσκληση της Διεύθυνσης Πολιτιστικών Σχέσεων του Υπουργείου Πολιτισμού, ο συντονιστής του προγράμματος κ. Παπαδημητρίου επισκέφτηκε τους αρχαιολογικούς χώρους Dougga (Τυνησία) και Lixus (Μαρόκο), που είχαν προταθεί το 1997 ως εργοτάξια διακρατικής συνεργασίας. Κατά την επίσκεψη διαπιστώθηκαν και συζητήθηκαν με τους τοπικούς φορείς τα προβλήματα των δύο αρχαιολογικών χώρων και συντάχθηκε τεχνική έκθεση με προτάσεις για κοινή δράση στις δύο χώρες.
  Για την **Τυνησία** προτάθηκε η συμμετοχή στο αναστηλωτικό έργο τριών πεπειραμένων αναστηλωτών (αρχιτέκτονα, πολιτικού μηχανικού, χημικού) σε περιοδική βάση, για δύο χρόνια.

  Για το **Μαρόκο** προτάθηκε η συμμετοχή πεπειραμένων αναστηλωτών σε πρόγραμμα εκπαίδευσης προσωπικού που θα οργανωθεί από το Εθνικό Ινστιτούτο των Επιστημών της Αρχαιολογίας και της Κληρονομιάς. Μεταξύ άλλων, θα μελετηθούν και τα προβλήματα του αρχαιολογικού χώρου του Lixus.

  Η ελληνική συμμετοχή υπολογίστηκε οτι θα ανέλθει στα 102.714,6 € (35.000.000 δρχ).
- Κατά το β΄εξάμηνο του ίδιου έτους ολοκληρώθηκε από τη συμβεβλημένη εταιρία η δημιουργία του προγράμματος της βάσης δεδομένων καλύπτοντας όλα τα υπόλοιπα κεφάλαια, δηλαδή τις σχολές εκπαίδευσης, τη νομοθεσία και τα κοινά εργοτάξια. Ακολούθησε εισαγωγή στοιχείων στα κεφάλαια αυτά καθώς και μια πρώτη παρουσίαση των κοινών εργοταξίων, με βάση τις διαθέσιμες ως τότε πληροφορίες. Ολοκληρώθηκε επίσης η κατασκευή του δικυακού τόπου, ο οποίος κατέστη προσβάσιμος στο κοινό τον Ιούλιο, στη διεύθυνση http://anastylosis.culture.gr.

Για το έτος **2003** προγραμματίζονται τα εξής:

- Έναρξη και συμμετοχή στα κοινά εργοτάξια (Μαρόκο - Τυνησία), σύμφωνα με το προαναφερθέν σχέδιο.
- Εισαγωγή του αναστηλωτικού έργου που θα συντελείται στα παραπάνω εργοτάξια στις σελίδες του προγράμματος στο διαδίκτυο, υπό μορφή τακτικών αναφορών.
- Εφόσον εδραιωθεί η συνεργασία με το Μαρόκο και την Τυνησία, σε συνεννόηση με δύο τουλάχιστον ενδιαφερόμενες ευρωπαϊκές χώρες-μέλη του Μεσογειακού Forum (Γαλλία, Ισπανία, Ιταλία, Πορτογαλία), θα γίνει προσπάθεια εξασφάλισης χρηματοδότησης από την Ευρωπαϊκή Ένωση (προγράμματα "Euromed Heritage", "Πολιτισμός 2003-2004").
- Εισαγωγή πληροφοριών και από τις υπόλοιπες χώρες του Μεσογειακού Forum, όπως ορίζεται από το συμφωνημένο περιεχόμενο της βάσης δεδομένων.

Β) Παρουσίαση της βάσης δεδομένων

Η βάση δεδομένων και ο δικτυακός τόπος που σας παρουσιάζουμε σήμερα δημιουργήθηκαν ως εργαλείο ανταλλαγής τεχνογνωσίας και γενικότερης πληροφόρησης σχετικά με τη συντήρηση, αναστήλωση και προστασία των αρχαίων μνημείων στη λεκάνη της Μεσογείου. Ο δικτυακός τόπος απευθύνεται τόσο σε ειδικούς (επαγγελματίες αναστηλωτές, οργανισμούς κ.λ.π.) που αναζητούν συγκεκριμένο είδος πληροφόρησης, όσο και στο ευρύτερο κοινό που ενδιαφέρεται για την προστασία της πολιτιστικής κληρονομιάς. Η βάση δεδομένων σχεδιάστηκε σε τρείς γλώσσες (ελληνικά, αγγλικά, γαλλικά) προκειμένου να διευκολυνθεί η εισαγωγή δεδομένων απο όλες τις ενδιαφερόμενες χώρες αλλά και για να καταστήσει το δικτυακό τόπο προσβάσιμο σε όσο το δυνατόν μεγαλύτερο αριθμό επισκεπτών.

Αφού επιλέξει γλώσσα πλοήγησης, ο επισκέπτης οδηγείται στην κεντρική σελίδα, όπου παρουσιάζονται οι νέες καταχωρήσεις μαζί με ένα σύντομο εισαγωγικό κείμενο για το πρόγραμμα και το περιεχόμενο των ακόλουθων σελίδων. Περισσότερα στοιχεία για τις χώρες και τους εμπλεκόμενους φορείς παρέχονται στον ενδιαφερόμενο στη σελίδα των γενικών πληροφοριών. Το άνω μέρος της σελίδας καταλαμβάνει το βασικό μενού πλοήγησης του δικτυακού τόπου, με συνδέσμους (links) που οδηγούν στα επιμέρους κεφάλαια: **γενικές πληροφορίες, μνημεία, εργοτάξια, νομοθεσία, χρηματοδοτήσεις, συναφείς οργανισμοί, εκπαίδευση, σύνδεσμοι**. Περνώντας το ποντίκι πάνω από τους συνδέσμους εμφανίζεται επεξηγηματική φράση για το περιεχόμενο κάθε κεφαλαίου. Το μενού συμπληρώνεται με τους συνδέσμους που οδηγούν στις **αναζητήσεις** και τη **σελίδα επικοινωνίας**. Τέλος, στην οριζόντια μπάρα στο κάτω μέρος της σελίδας εμφανίζονται, υπό μορφή φωτογραφίας, οι πρόσφατες καταχωρήσεις μνημείων, έτσι ώστε ο επισκέπτης να ενημερώνεται αμέσως για τις προσθήκες. Οι φωτογραφίες λειτουργούν ως σύνδεσμος, μεταφέροντας τον επισκέπτη απευθείας στο συγκεκριμένο μνημείο.

Το βασικότερο κεφάλαιο της βάσης δεδομένων, και το πιο πολύπλοκο στο σχεδιασμό του ως πρόγραμμα, είναι αυτό που αναφέρεται στα χαρακτηριστικά αρχαία μνημεία των συμμετεχόντων χωρών όπου έχουν πραγματοποιηθεί αναστηλωτικά προγράμματα. Το κεφάλαιο αναπτύχθηκε με σκοπό να συμπεριλάβει κατ' αρχάς 10 μνημεία από κάθε μια εκ των 11 χωρών. Παρέχει τη δυνατότητα σε κάθε χώρα να καταχωρεί η ίδια, μέσω ειδικού διαχειριστικού προγράμματος προσβάσιμου από το διαδίκτυο, τα στοιχεία του μνημείου στην κύρια γλώσσα την οποία επιλέγει, και κατά προτίμηση σε 1 ακόμη τουλάχιστον. Η Ελλάδα διατηρεί την κεντρική διαχείρηση και το συντονισμό του εγχειρήματος.

Ως πιλοτικό μνημείο από ελληνικής πλευράς επιλέχθηκε η Βιβλιοθήκη Αδριανού στην Αθήνα, μνημείο ιδιαίτερα σημαντικό, τόσο ιστορικά, όσο και αρχιτεκτονικά, το οποίο αποτελεί τις τελευταίες δεκαετίες αντικείμενο εκτεταμένου αναστηλωτικού προγράμματος. Τα κείμενα, που συντάχθηκαν και μεταφράστηκαν από τη γραμματεία, βασίστηκαν σε πρωτότυπες μελέτες του υπεύθυνου για τη Βιβλιοθήκη Αδριανού επιστημονικού προσωπικού, καθώς και εκτενή βιβλιογραφία.

Τα μνημεία κατατάσσονται για λόγους ευκολίας αναζήτησης σε ιστορικές περιόδους: κλασική, ελληνιστική, ρωμαϊκή. Στην εισαγωγική σελίδα παρατίθεται ένα

σύντομο εισαγωγικό κείμενο και, μέσω του μενού στα αριστερά, ο επισκέπτης προσεγγίζει τις πληροφορίες που αφορούν το μνημείο κατηγοριοποιημένες, έτσι ώστε να είναι ευκολότερα προσβάσιμες. Οι κατηγορίες αφορούν δυο ειδών θέματα: γενικές πληροφορίες που οργανώνονται σε σύντομα κείμενα και συνοδεύονται από μια φωτογραφία, όπως η γεωγραφική θέση, η χρήση, ο βαθμός διατήρησης και η επισκεψιμότητα του μνημείου· και ειδικότερα θέματα που αναλύονται διεξοδικά, όπως η ιστορική τεκμηρίωση, η αρχιτεκτονική και δομική περιγραφή του μνημείου, η παθολογία, οι πραγματοποιημένες επεμβάσεις. Τα κείμενα αυτά οργανώνονται σε παραγράφους και εμπλουτίζονται με σχέδια και φωτογραφίες, έτσι ώστε ο επισκέπτης να αποκομίζει μια όσο το δυνατόν πιο ολοκληρωμένη εικόνα.

Ειδικότερα δε όσον αφορά την παθολογία και τις επεμβάσεις, που αποτελούν την ουσία του εγχειρήματος, οι παράγραφοι κατηγοριοποιούνται με βάση το υλικό, την τεχνική δόμησης ή το στατικό πρόβλημα στο οποίο αναφέρονται. Η κατηγοριοποίηση αυτή είναι απαραίτητη προϋπόθεση έτσι ώστε τα κείμενα να είναι εύκολα αναζητήσιμα από χρήστες που ενδιαφέρονται για συνδιασμό στοιχείων, όπως για παράδειγμα τη χρήση ή την παθολογία ενός συγκεκριμένου υλικού (π.χ. μάρμαρου) σε διαφορετικά μνημεία ή χώρες. Το αναστηλωτικό έργο τεκμηριώνεται περαιτέρω με στοιχεία που αφορούν το ειδικευμένο προσωπικό που απασχολείται, τον τεχνολογικό εξοπλισμό και τη βιβλιογραφία.

Με τον ίδιο τρόπο που οργανώνεται το υλικό ενός μνημείου αναπτύχθηκε και το κεφάλαιο των κοινών εργοταξίων, με σκοπό αφ' ενός να τεκμηριώσει τα μνημεία που θα αποτελέσουν αντικείμενο συντήρησης και αφ' ετέρου να παρουσιάσει και να προβάλλει το ίδιο το αναστηλωτικό έργο. Από την εισαγωγική σελίδα με γενικές πληροφορίες επιλέγουμε ένα από τα δύο εργοτάξια, την Thugga ή το Lixus. Οι κατηγορίες είναι ίδιες με αυτές των μνημείων, με τη διαφορά οτι εδώ πρόκειται για δυο μεγάλους αρχαιολογικούς χώρους, οι οποίοι τεκμηριώνονται συνολικά, δίνοντας ωστόσο έμφαση στα συγκεκριμένα μνημεία που αποτελούν αντικείμενο συντήρησης και αναστήλωσης. Έτσι τα κείμενα επιμερίζονται σε μικρότερα, ανάλογα με το μνημείο του χώρου στο οποίο αναφέρονται. Σημαντική προσθήκη αποτελεί το ημερολόγιο του εργοταξίου, που παρέχει τη δυνατότητα στον επισκέπτη να παρακολουθεί το αναστηλωτικό έργο εν εξελίξει, με τη μορφή τακτικών αναφορών που θα δημοσιεύονται από τους υπευθύνους. Προσωρινά έχουν καταχωρηθεί στοιχεία με βάση την τεχνική έκθεση του πολιτικού μηχανικού κ. Παπαδημητρίου μετά την επίσκεψή του στους δυο αρχαιολογικούς χώρους. Οι καταχωρήσεις προβλέπεται να αξιολογηθούν και συμπληρωθούν από τις ενδιαφερόμενες χώρες με την έναρξη των εργοταξίων συνεργασίας.

Ακολούθως, το κεφάλαιο της νομοθεσίας αποσκοπεί στο να παρουσιάσει συνοπτικά το νομοθετικό πλαίσιο που αφορά στην προστασία των μνημείων σε κάθε χώρα. Από ελληνικής πλευράς, η σελίδα περιλαμβάνει επιλεγμένα άρθρα του πρόσφατου αρχαιολογικού νόμου (3028/2002) που σχετίζονται με τα αρχαία μνημεία και τις επεμβάσεις σε αυτά, προς το παρόν διαθέσιμα μόνο στα ελληνικά.

Τα υπόλοιπα κεφάλαια της βάσης δεδομένων συμπληρώνονται από τον κεντρικό διαχειριστή, με τη συνεισφορά στοιχείων από όλες τις συμμετέχουσες χώρες. Περιλαμβάνουν τις χρηματοδοτήσεις και τους συναφείς οργανισμούς, που περιέχουν κωδικοποιημένες πληροφορίες για φορείς και οργανισμούς που είτε δραστηριοποιούνται στον τομέα της πολιτιστικής κληρονομιάς, είτε διαθέτουν

χρηματοδοτικά προγράμματα για ανάλογες δράσεις με το παρόν πρόγραμμα. Στόχος είναι να δημιουργηθεί ένα δίκτυο επαφών και επικοινωνίας και να προωθηθεί η συνεργασία των Μεσογειακών χωρών σε πρακτικό επίπεδο. Παρόμοιος είναι και ο σκοπός της σελίδας των χρήσιμων συνδέσμων, όπου παρατίθενται ενδιαφέρουσες ηλεκτρονικές διευθύνσεις.

Τέλος το κεφάλαιο της εκπαίδευσης απευθύνεται σε όσους ενδιαφέρονται να εξειδικευτούν στον τομέα της συντήρησης και προστασίας μνημείων. Περιέχει πληροφορίες για σχολές και προγράμματα εκπαίδευσης στους σχετικούς τομείς, με σύντομη αναφορά του προγράμματος σπουδών όπου είναι δυνατόν, και στοιχεία για διαθέσιμες υποτροφίες. Στο κεφάλαιο αυτό περιλαμβάνεται και μια υποενότητα που αφορά την απασχόληση παραδοσιακών τεχνιτών σε αναστηλωτικά έργα, με σκοπό κυρίως να τους καταγράψει και να τους φέρει σε επαφή με το ευρύτερο κοινό. Η ενότητα αυτή δεν περιέχει προς το παρόν στοιχεία.

Όπως σε κάθε τράπεζα δεδομένων, ιδιαίτερα σημαντικό είναι το εργαλείο της αναζήτησης. Μέσω αυτού ένας ενημερωμένος χρήστης έχει τη δυνατότητα, με την ευκολία που του παρέχει η μηχανή και οι παράμετροι της αναζήτησης, να βρει γρήγορα την πληροφορία ή το συνδιασμό πληροφοριών που επιθυμεί απο όλα τα κεφάλαια της βάσης δεδομένων.

Το πρόγραμμα σχεδιάστηκε και αναπτύχθηκε την περίοδο 2001-2002 από την εταιρεία Data & Control Systems με την καθοδήγηση της γραμματείας και της αρμόδιας Επιτροπής. Η εισαγωγή στοιχείων από τις υπόλοιπες χώρες, καθώς και ο εμπλουτισμός του υλικού από ελληνικής πλευράς, ελπίζουμε οτι θα καταστήσει στο μέλλον το συγκεκριμένο δικτυακό τόπο ένα χρήσιμο εργαλείο επικοινωνίας και συνεργασίας για τις χώρες της Μεσογείου.

BIOMONITORING AND GEOCHEMICAL STUDIES OF STONE HISTORICAL BUILDINGS DIRECTED TO PROTECTION OF THE RUSSIAN MEDIEVAL CITIES

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Stone historical buildings of the following architectural ensembles inscribed on the World Heritage List are studied: Rostov Kremlin in Rostov the Great, Novodevichyi Convent and Moscow Kremlin in Moscow, and also the Gonzaga Theatre and the Grotto of Arkhangelskoye Estate landscape ensemble near Moscow put by World Monument Foundation on 100 outstanding world architecture monuments extremely required in conservation and restoration List (2000) have been investigated. Microbiological studies within the framework of combined natural-technical system of monitoring the Ryazan Kremlin ensemble also have been carried out. All of the above-mentioned monuments are affected by similar climatic factors but by different environmental conditions. During centuries each of these monuments has undergone changes caused both by natural factors and by human interferences.

The aim of the study was to investigate the interaction of stone erosion caused by microbiota and by water depending on environmental factors. With this purpose we elaborated method of sampling using non-destructive technique of water content determination, mapping of monitoring stone surfaces. We have carried out the isolation, the characterization and the enumeration of microorganisms in stone samples, as well as metal elements and salt content accumulated by stone surfaces and biofilms from acid deposition, atmospheric pollution, and subsoil water. Using the investigation methodology determination and estimation of the biogeochemical composition may be considered as indicator of stone monuments durability and change for diagnostics of stone deterioration required to protect architectural heritage.

This study is a part of integrated program of monitoring historical territories. Further still students of Physiology of microorganisms Department of Biology Faculty at Moscow State University participate in these investigations in frames of science-educational programs of studies and protection of historical and cultural heritage.

1. INTRODUCTION

The historical territories of museums preserves have centuries-old history. These natural-technical complexes were springing up under certain conditions and were adapted to them. However those circumstances are continually changing. Some environmental components have changed to a great extent. Environment in the form physical and chemical parameters, as well as microbial activity can lead to damage objects of historical and cultural importance and at times can break ecological conditions within the preserved territories.

In this connection it is essential to carry out the complex of measures to ensure preservation of historical monuments, which are exposed both to changing natural system and to technogenic effects. In this paper microbiological and geochemical interaction that attack old stone aboveground and underground constructions of historical buildings is considered. Our work is a part of a complex program on monitoring of historical territories of Kremlin ensembles at Rostov the Great, at Ryazan and at Moscow Novodevichyi Convent as well as Arkhangelskoye Estate landscape ensemble near Moscow.

2. METHODS

Microbiological analyses. For all samples, the microbiota was examined quantitatively on chemolithotrophic nitrifying and thionic bacteria, phototrophic cyanobacteria and microalgae, chemoorganotrophic bacteria and fungi. Viable, culturable microorganisms were enumerated by

plate counts. The appropriate selective nutrient media were used to isolate and cultivate the above-mentioned physiological groups of microorganisms. Some samples were studied under scanning-electron microscopy (SEM).

The quantification of airmicrobiota was conducted using air-sampler PU-1B (Russia). The concentrations of viable microorganisms as the number of colony forming units (CFU) per m^3 of air were counted.

Concentrations of metal elements in samples were determined using atomic-absorptional method (Hitachi, Japan).

The determination of moisture-content of building structures was realized by using electronic moisture measuring instrument G 810 by Denzel (Germany). This instrument makes it possible to determine the concentration of water without destruction of material. We measured the concentration of water of plaster, masonry and bricklaying.

For the determination of photosynthetic activity (PA) the pulse amplitude modulation method (PAM) was applied. An instrument PAM-2000 (Germany) was used. We measured a relative variable fluorescence, which reflected the effectiveness of photochemical conversions the energy in the photosystem II. So the relative variable fluorescence is an index of PA.

3. RESULTS AND DISCUSSION

3.1. Rostov Kremlin

Rostov the Great is one of the oldest town of a thousand years history, the center of culture and art of old Russia. In XI century Rostov was a capital of enormous Rostov-Suzdal principality, and was joined to Moscow in 1474. In XVI century Rostov Kremlin was a residence of Rostov-Yaroslavl archbishops, therefore was called the archbishop's yard. During that period there was beginning of intensive stone building and creating of architectural ensemble, which we can observe now.

Microbiological studies of stone samples from aboveground and underground (bore pits) constructions of historical buildings of Rostov Kremlin allowed revealing the peculiarities of distribution of microorganisms in porous stone materials in foundation and in walls. The microbial count and taxonomic essential quality varied considerably with wall height of the sampling site. Chemolithotrophic nitrifying and thionic bacteria producing mineral acids were the main biodestructors of stone in foundations. We found 10^2 to 10^6 cells per gram of rubble masonry in samples isolated from bore pits at foundation of historical buildings of Rostov Kremlin. In contrast, aboveground part of walls was moderately contaminated by chemolithotrophs. Chemoorganotrophic microorganisms were dominated aboveground stone-colonising microbiota in/on walls of both indoor and outdoor environments.

It has been in one of the churches of Rostov Kremlin, which processes of biodegradation of mural paintings were studied in collaboration with Dr. N.N. Lyalikova. Metals are the basic chromophoric substance in many pigments: green ground ochre (Fe); azurite and malachite (Cu); white lead, massicot and minium (Pb); cinnabar (Hg), etc. All metals and their compounds are subjected to corrosion, which can be caused not only chemical and electrochemical processes but by biological ones as well. In the XVII century iron nails were much used to fix the plaster layer on which levcas (chalk-and-glue priming) as a base for mural painting. Great losses of the paint layer in the Church of the John the Divine at Rostov Kremlin were induced and persists to the present by the process of corrosion of iron nails (Figure 1). Thirty nails are placed for every 1 m^2 area. As a result of rusting and transformation of the metal into Fe_2O_3 and other trivalent iron compounds the nails have considerably grown in volume. For the most part the project from the walls, pushing out the levcas layer together with elements of the mural painting.

In laboratory it was possible to reproduce the process of iron corrosion in the following way: a nutrient medium for iron bacteria cultivation containing iron filings was infected microorganisms, isolated from a corrosive nail. As a result a corrosion of iron is has been in progress both in inoculated medium and in sterile control. But in the latter case oxidation of iron

filings was in one month moderately, whereas abundant microbial corrosion was observed in about 10 days. Using special media it was determined that a mycoplasm-like organism, forming hydrogen peroxide, produced the corrosion. Detoxication of peroxide, which is a harmful metabolite, occurs during oxidation. Furthermore, chemoorganotrophic bacteria producing organic acids also were capable to the corrosion. We isolated from the surface of the nails bacteria, which decreased pH to 4.2 in media containing sucrose or casein. The pH of sterile media was kept neutral, about 7.0-7.2. The total number of colony forming units (CFU) per 1 g of the sample from damaged levcas layer exceeded 10^4.

The participation of chemoorganotrophic bacteria, isolated from murals of the Church of the John the Divine, in conversion of mineral pigments was shown. The revealed biotransformation of metals had caused to serious discoloration and damage of painting as follows:

(1) Oxidation of bivalent lead-containing minerals to tetravalent state.
- White lead to dark brown lead dioxide,
- Yellow massicot to dark brown lead dioxide,
- Red minium to dark brown lead dioxide,

(2) Conversion of bivalent lead-containing minerals to black lead sulphide,

(3) Conversion of copper-containing pigments (blue azurite) to black copper sulphide.

Bacteria belonging to the genera *Arthrobacter, Bacillus* and mycoplasm-like microorganisms produced the enumerated processes.

In the mural painting of the Rostov Kremlin churches animal glue was used as a binding material that could provide a growth of chemolithotrophs on the walls of the architectural monuments.

Figure 1. Deterioration of mural paintings of the Church of St. John the Divine in Rostov the Great

3.2. Ryazan Kremlin

In frames of the program of complex studies of historical territories as also in Rostov Kremlin, microbiological analyses of stone samples from aboveground and underground (bore pits) constructions of historical buildings in Ryazan Kremlin were conducted. The results demonstrated the peculiarities of distribution of microorganisms in porous stone materials in foundation and in walls. The microbial count and taxonomic essential quality also varied considerably with wall height of the sampling site. Chemolithotrophic nitrifying and thionic bacteria producing mineral acids were the main biodestructors of stone in foundations. We found more than 10^3 cells per gram of rubble masonry in samples isolated from bore pits at foundation of historical buildings of Ryazan Kremlin. Chemoorganotrophic microorganisms were dominated aboveground stone-colonising microbiota indoor environments (Figure 2).

3.3. Moscow Kremlin

Since 1995 a microbiological monitoring of air and stone surfaces has been carried out inside the Moscow Kremlin Cathedrals. Comparison studies on concentrations and microbial communities structure provided a way of estimating the level of microbial contamination in different indoor environments – climatic conditions, with and without air-conditioning system, with many and without visitors. The highest number of airborne microorganisms was found museum indoors with great public attendance and where no air-conditioning system was available.

Our results on a correlation between the airborne microbiota and that inhabiting the surface of museum works of art and historical objects showed that spectrum of chemoorganotrophic microorganisms found in the air was closely similar to that from stone objects, differing however in proportion. The Gram-positive bacteria of the genera *Micrococcus* and *Rhodococcus* producing pigments were predominant in the airborne microbiota of Cathedrals. In the crypt of the Cathedral of Annunciation these bacteria forming pinkish pigment and producing pink coloured spots on limestone masonry were found both in the air and on the surface of stone. Gram-negative bacteria dominated in microbiota of wet stone masonry (more than 10% moisture content), whereas the air contained 5% of them. In the basement hall of the Cathedral of Archangel Michael gram-negative bacteria were presented on/in stone sarcophages and accounted for more than 70%. Among them chemolithotrophic tionic and nitrifying bacteria, chemoorganotrophic myxobacteria and bacteria of genera *Cytophaga, flavobacterium, Xanthomonas* were isolated. Most of microorganisms isolated from reasonably not wet stone (under 7% moisture content) were halotolerant. High concentration of fungi was found in air of underground pit at foundation of the Assumption Cathedral (Figure 3).

3.4. Novodevichyi (New Maiden's) Convent

Novodevichyi Convent was built in 1524. The present architectural ensemble of Novodevichyi Convent was completed in the late 17th century. Although the convent contains buildings from two different periods it has a very strict layout. The central building of the convent is Smolensk Cathedral, which was constructed in 1525. The two multi-domed gate-churches of Transfiguration and of Intercession were built in 1688 to the north and to the south of the cathedral, for emphasis.

During a period of 1995-2002 biodeterioration of limestone and brick masonry of the Gate-Church of Intercession in Novodevichyi Convent was examined. The Gate-Church was of interest because of a possibility to observe various decay patterns of brick and limestone masonry, including new restoration mounting of stone blocks. The ensemble is located in industrial area of Moscow.

An analysis of the microbial communities growing on the northern side of limestone plinth of the Gate-Church of Intercession has been carried out. Our results showed that colonization of limestone surfaces was affected by environmental conditions including organic and inorganic pollutants, temperature-moisture fluctuations and salt weathering. Various ecophysiology groups of microorganisms are present in the surface causing destruction of stone and chromatic

alterations, mainly green biopatina and dark grey to black crusts of biogenic and industrial origins. The polymicrobial communities were revealed. Among them halotolerant chemoorganotrophic Gram-positive bacteria, fungy and green algae were predominated in all seasons. Although a biospecificity for decay patterns was determined. Aerobic methylotrophic bacteria in dark grey crusts, anaerobic bacteria *Clostridium sp.* in green biofilm and actinomycetes in brick were found (Figure 4). The denitrifying bacteria were also present in green biofilm and chemolithotrophic nitric acid producing nitrifying bacteria were growing in limestone under the green patina.

The structure of microbial communities is controlled by geochemical factors. Heavy metal contamination can have significant impact on stone inhabiting microorganisms, including decreases or increases in microbial biomass and population densities, and changes in physiology microorganisms. The content of 8 metal elements (Cu, Zn, Pb, Ni, Co, Cr, Fe, Mn) in samples from walls of the Gate-Church of Intercession in Novodevichyi Convent was determined. As evident from Figures 5-6, organic component of patina ranged between 23%-37% (Figure 5), metal elements Cu, Ni, Co, Cr, Mn were accumulated mainly in patina (Figure 6). Cu, Cr, Zn and Mn were the main metallic contaminants of the patina samples.

3.5. State Museum Estate "Arkhangelskoye"

Over several years we are engaged in research on historical monuments at Arkhangelskoye Museum Estate landscape ensemble situated about 20 km from Moscow. The microbiota of the Gonzaga Theatre and the Grotto - monuments of architecture, built in XVIII-XIX centuries, was studied. The colonization of algae-cyanobacterial communities on walls of the Grotto at the architectural-park ensemble was studied. Biogeochemical investigations included content determination of 8 metal elements (Cu, Zn, Pb, Ni, Co, Cr, Fe, Mn) in samples from walls in the Grotto (Figure 6). The results of the metal elements content on stone surfaces and the sensitivity of epilithic phototrophic microorganisms (cyanobacteria and microalgae) to metal compounds are compared.

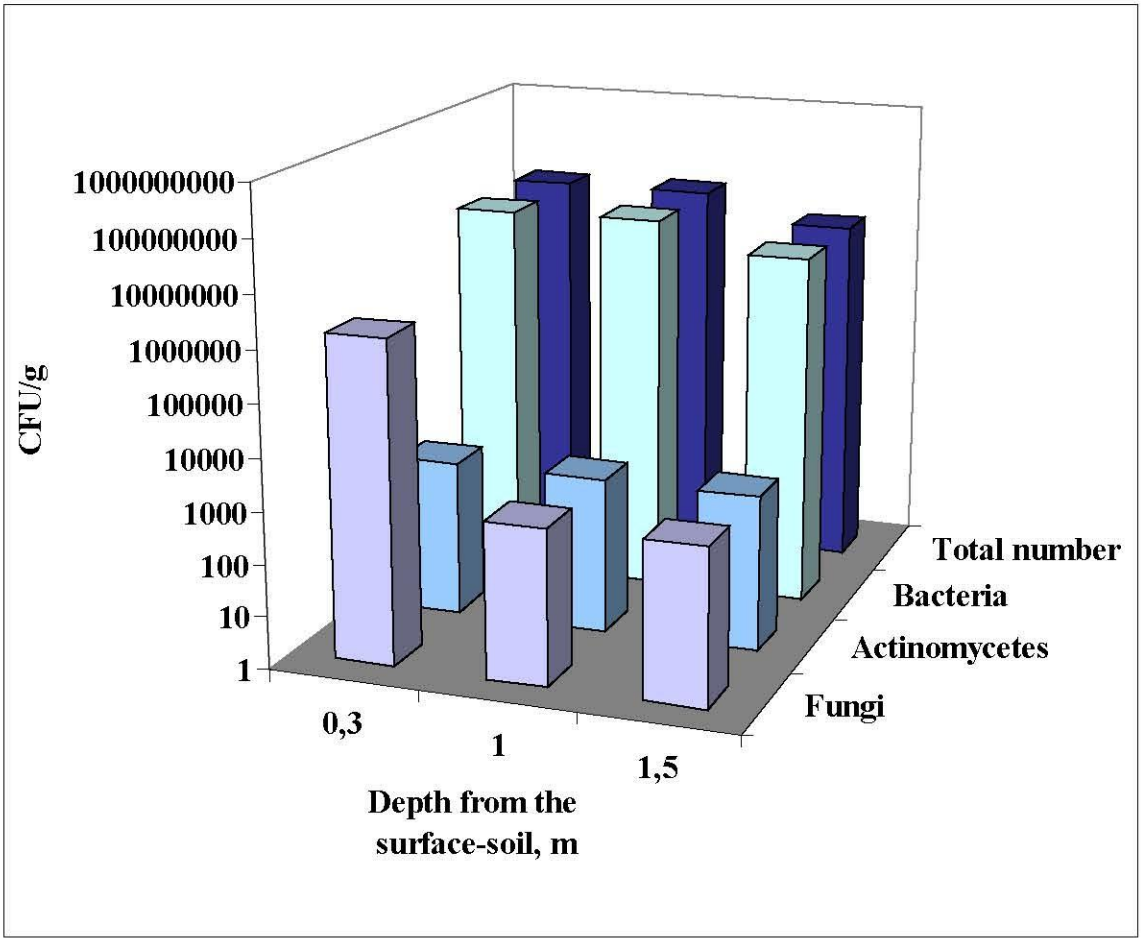
The entrance of the Grotto is closed by wooden gate. So, there is very low lighting indoors, and the rays of light can penetrate the Grotto only through the chinks. The inside walls are made from brick and the separate elements of niches are limestone.

The measurement of moisture-content of inside walls at a depth of 4 centimeters has shown increased proofs and has exceeded 10 %. So it is possible to assume the development of microorganisms not only on the surface but also at a depth. We got the data of measurement at a depth of 1 centimeter and a map of moisture-content was made (Figure 7b).

There was measured the photosynthetic activity (PA) in the points of different moisture-content of bricklaying. We can observe (Figure 7) abundant algae biofilm, which develops on the surface of the west niche. It was necessary to determine, if the algae display a PA or it were in anabiosis. It is important, because the carbohydrates are produced as a result of photosynthesis. The carbohydrates are used by microorganisms in they metabolism. The obtained results were following.

1) It was shown the direct dependence of algae growth from moister-content of stone.
2) There was noticed high PA (as much as 0,54) in the points with a low index of moisture-content (up to 2%). PA was changed from 0,37 to 0,55 in the point of algae's visible over growth.
3) The PA in the blue-green coloring zones of the limestone plinth was about 0-0,1. This coloring was created by the presents of $CuSO_4$, which suppresses an activity of algae development.

These investigations are necessary for preventing the world heritage cities. They allowed working out some methods directed to conservation and protection of the architectural monuments. Moreover these studies have already served as a base for taken actions directed for the above-mentioned monuments restoration.



Depth from the surface-soil, m	Moisture-content, %
0,3	26,42
1	28,45
1,5	66,00

Figure 2. Distribution of chemoorganotrophic microorganisms and moisture-content in stone plinth and foundation masonry in the Church of the Holy Ghost in Ryazan Kremlin

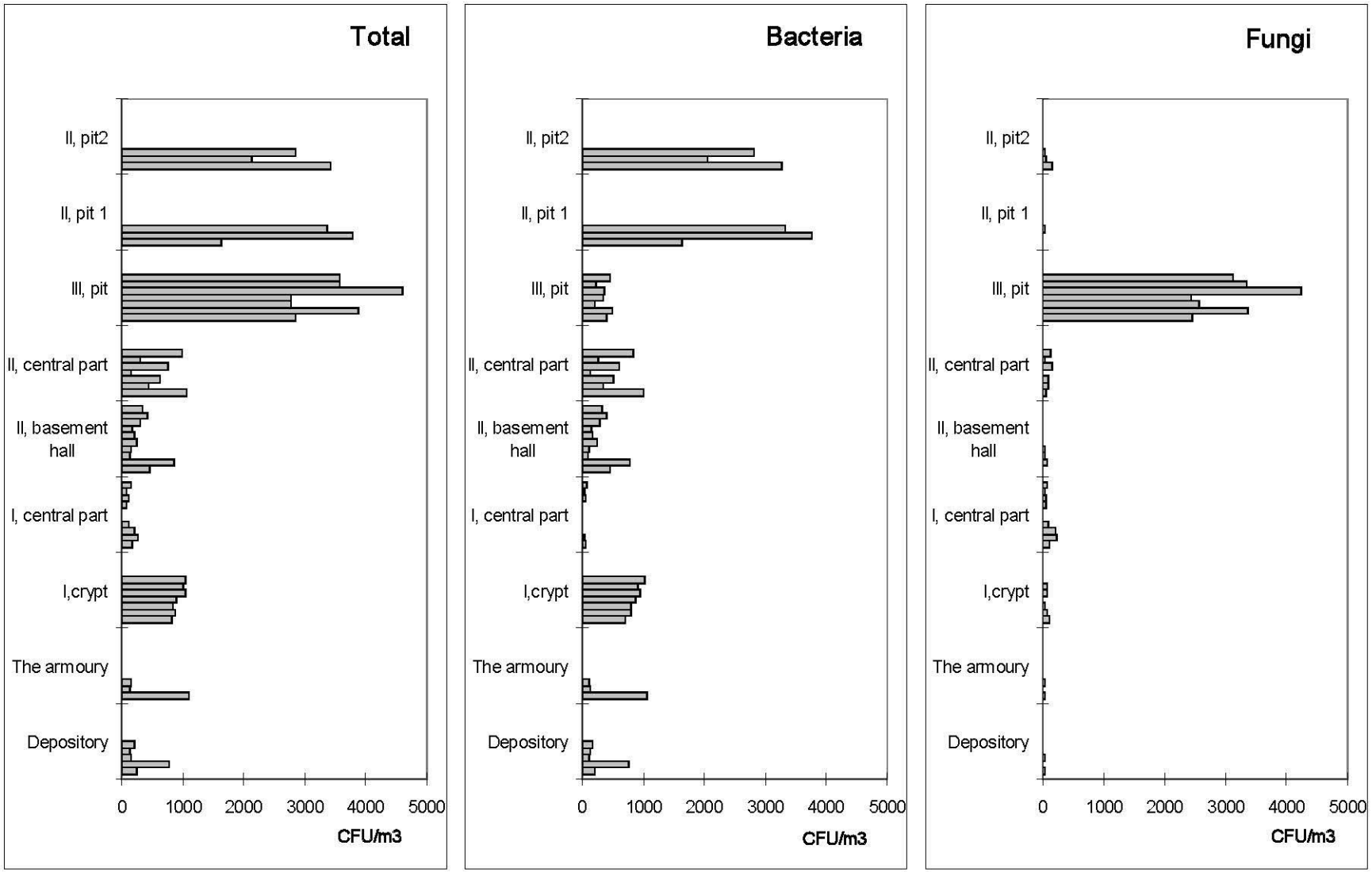


Figure 3. Concentration of airborne microorganisms in the Cathedral and other buildings of the Moscow Kremlin Museum

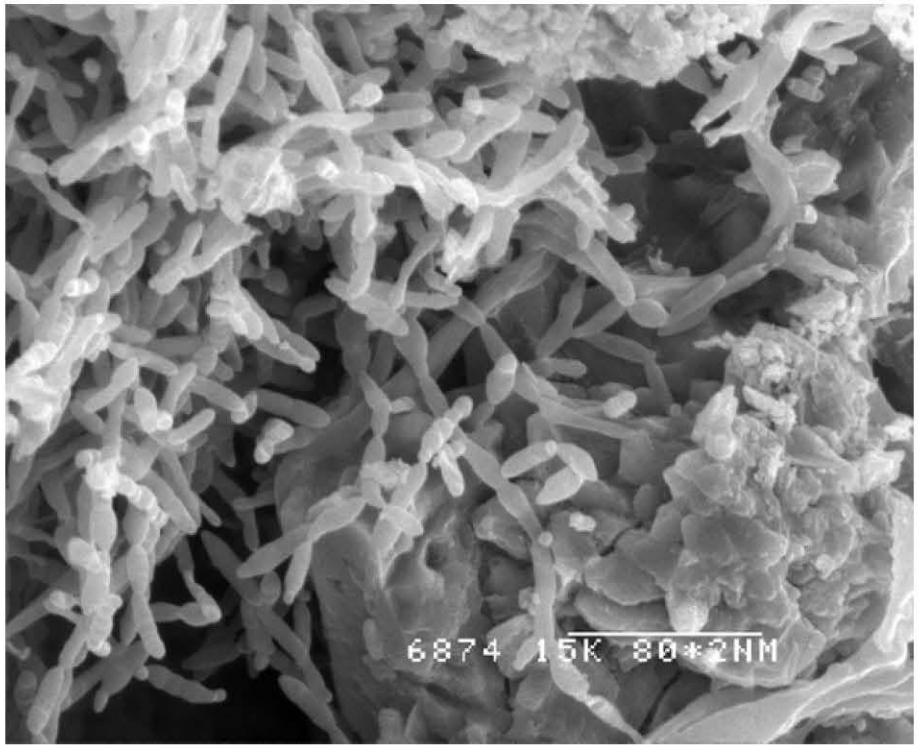


Figure 4. SEM micrographs of microorganisms which interact with mineral compounds of sample from dark-grey biofilm on the surface of a church at the Novodevichy Convent

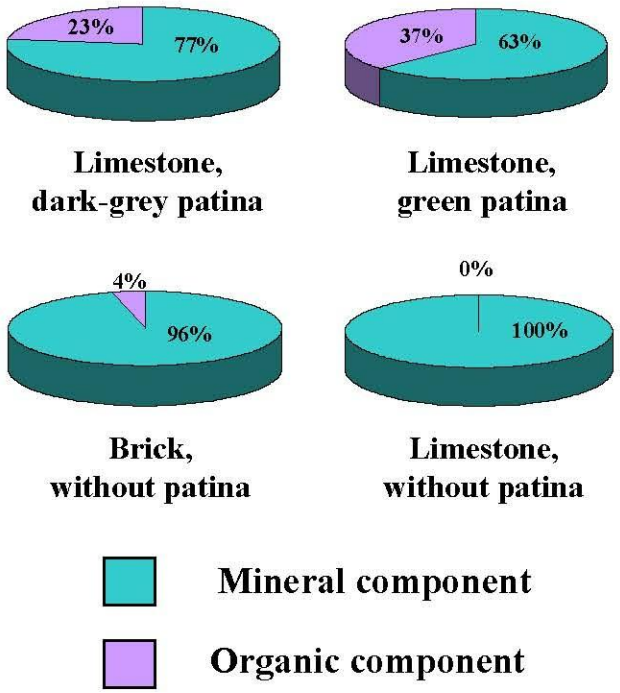


Figure 5. The relationship between mineral and organic components in samples from limestone walls of a gate church at the Novodevichy Convent

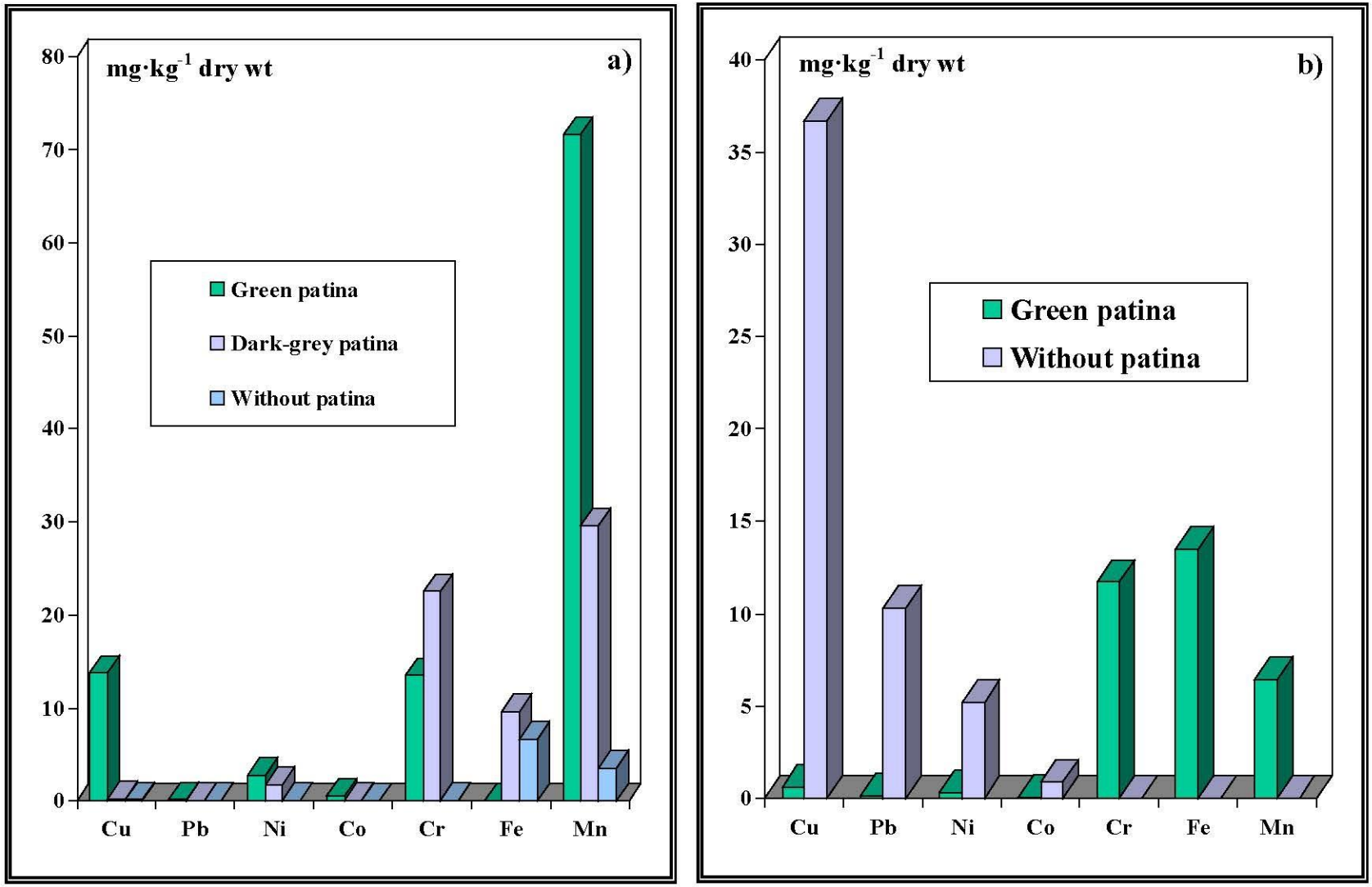


Figure 6. Content of metal elements in samples from stone walls.
a) The gate church at the Novodevichy convent.
b) Grotto at the architectural – park ensemble "Archangelskoye"

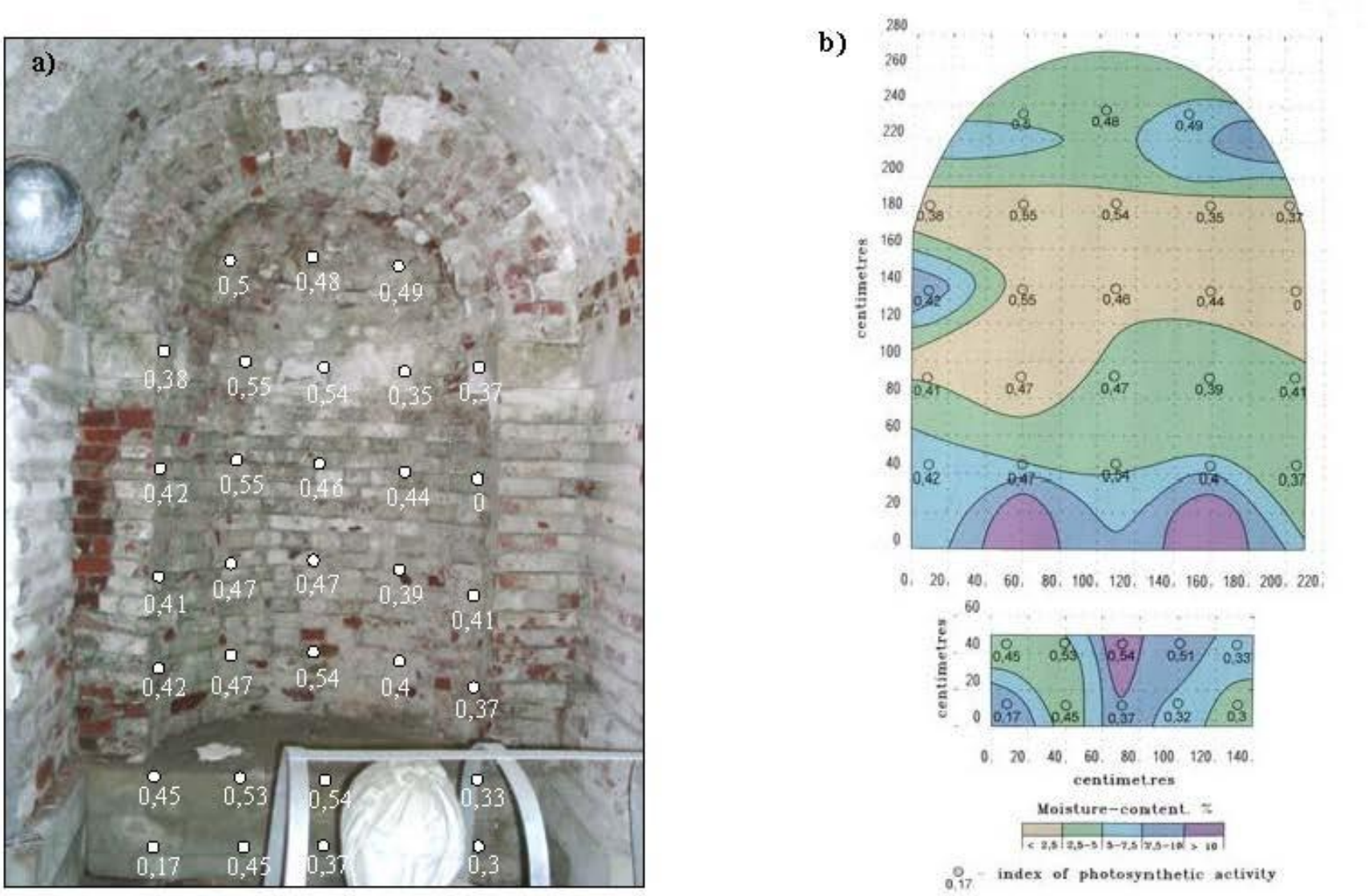


Figure 7. The west niche of the Grotto at the architectural-park ensemble "Archangelskoye".
a) Distribution of photosynthetic activity of algae-cyanobacterial communities on the surface of stone-masonry.
b) Mapping of distribution of moisture-content in the depth of stone-masonry

ΑΝΑΠΑΡΑΓΩΓΗ ΥΔΡΑΥΛΙΚΩΝ ΑΣΒΕΣΤΟΚΟΝΙΑΜΑΤΩΝ ΜΕ ΒΑΣΗ ΤΗΝ ΤΕΧΝΟΛΟΓΙΑ ΠΑΡΑΓΩΓΗΣ ΑΡΧΑΙΩΝ ΚΟΝΙΑΜΑΤΩΝ ΤΗΣ ΚΥΠΡΟΥ ΓΙΑ ΧΡΗΣΗ ΣΤΗ ΣΥΝΤΗΡΗΣΗ

Μαρία Φιλοκύπρου
Κλάδος Διατήρησης - Τμήμα Πολεοδομίας και Οικήσεως
Υπουργείο Εσωτερικών - Κυπριακή Δημοκρατία

Περίληψη

Στη συντήρηση των αρχαιολογικών χώρων και των ιστορικών κτιρίων είναι απαραίτητη η χρήση υλικών συμβατών με τα αυθεντικά για να διασφαλιστεί η διαχρονική τους προστασία. Η ανακοίνωση αυτή στηρίζεται στα πορίσματα της Διδακτορικής Διατριβής της υποφαινομένης με θέμα τα Δομικά Υλικά της Προϊστορικής Κύπρου (Φιλοκύπρου [1], σελ. 256-260), καθώς και στα αποτελέσματα Ερευνητικού Προγράμματος που χρηματοδοτήθηκε από το Ίδρυμα Προώθησης Έρευνας και στο οποίο έλαβαν μέρος ερευνητές διαφόρων ειδικοτήτων (δρ. Ιωάννης Μανιάτης – Διευθυντής του Εργαστηρίου Αρχαιομετρίας του «Δημοκρίτου», δρ. Αντώνης Χαραλαμπίδης – Χημικός, δρ. Κώστας Ξενοφώντος – Γεωλόγος, δρ. Κυριάκος Κυριάκου – Πολιτικός Μηχανικός, δρ. Βασιλική Κασσιανίδου – Αρχαιολόγος, Χημικός και κ. Γλαύκος Παπαδούρης – Αρχιτέκτονας, Συντηρητής) με συντονίστρια και κύρια ερευνήτρια την υποφαινομένη δρ. Μαρία Φιλοκύπρου – Αρχιτέκτονα, Συντηρήτρια, Αρχαιολόγο.

Στα πλαίσια του Ερευνητικού αυτού Προγράμματος έγινε προσπάθεια αναπαραγωγής υδραυλικών ασβεστοκονιάματων. Υιοθετήθηκαν παρόμοιες μέθοδοι με αυτές που χρησιμοποιήθηκαν για την παρασκευή αντίστοιχων αρχαίων κονιαμάτων, τα οποία εμφανίστηκαν για πρώτη φορά στην Κύπρο κατά την Προϊστορική περίοδο (1200 π.Χ) (Φιλοκύπρου [2], σελ. 8-9). Ο αρχικός σκοπός μας, που ήταν η κατανόηση της μεθοδολογίας παρασκευής, επιτεύχθηκε μέσω της μελέτης των αρχαίων υδραυλικών κονιαμάτων. Χρησιμοποιήθηκαν σύγχρονες μέθοδοι ανάλυσης (χημικές, ορυκτολογικές, πετρογραφικές, θερμικές, ηλεκτρονικό μικροσκόπιο σάρωσης) και έγινε μελέτη των φυσικών τους χαρακτηριστικών. Ακολούθησε η εργαστηριακή παρασκευή συμβατών με αυτά κονιαμάτων, τα οποία μπορούν να χρησιμοποιηθούν για σκοπούς συντήρησης – αποκατάστασης ιστορικών και αρχαιολογικών καταλοίπων, καθώς και παραδοσιακών οικοδομών.

Η ανάλυση των υδραυλικών κονιαμάτων έδειξε την παρουσία λεπτόκοκκων αργιλοπυριτικών συστατικών (κεραμιδόσκονης) ομοιόμορφα κατανεμημένων στη μήτρα των δειγμάτων. Η εξέταση των μηχανικών αντοχών και φυσικών ιδιοτήτων των πειραματικών κονιαμάτων, που παρασκευάστηκαν, εντόπισε μερικούς από τους σημαντικούς παράγοντες που επηρεάζουν τις αντοχές και τις ιδιότητές τους. Οι κύριοι παράμετροι είναι: (i) το συνδετικό υλικό και ιδιαίτερα το υδραυλικό πρόσθετο (είδος, σύσταση, θερμοκρασία όπτησης, κοκκομετρία, αναλογία ως προς τον ασβέστη), (ii) η αναλογία νερού (ιδιαίτερα η αναλογία νερού / συνδετικού), (iii) τα αδρανή (είδος, κοκκομετρία, αναλογία ως προς το συνδετικό υλικό) (Moropoulou *et al.* [3], σελ. 214), (iv) ο βαθμός συμπύκνωσης, (v) ο τρόπος ανάδευσης και (vi) οι συνθήκες συντήρησης κατά τη διάρκεια της ξήρανσής τους (Papayianni [4], σελ. 4-5).

Εισαγωγικά στοιχεία

Υδραυλικό κονίαμα ονομάζεται το κονίαμα που στερεοποιείται και σκληραίνει σε υγρό περιβάλλον ακόμα και στην απουσία αέρα. Κατά την αρχαιότητα, τα υδραυλικά κονιάματα παρασκευάζονταν συνήθως με ανάμειξη ασβέστη με κονιορτοποιημένα υλικά πυριτικής ή αργιλοπυριτικής σύστασης (ποζολανικά υλικά). Ποζολάνες είναι είτε φυσικά πυροκλαστικά υλικά από ηφαιστειογενείς πηγές, με μεγάλη περιεκτικότητα σε πυριτικά ορυκτά, είτε τεχνητά υλικά που λαμβάνονται μετά από θερμική κατεργασία αργιλοπυριτικών υλικών. Ποζολάνες θεωρούνται κυρίως η ηφαιστειακή στάκτη (θηραϊκή, μηλαϊκή γη), και πιθανόν η απλή στάκτη (Wright [5], σελ. 373; Domaslowski [6], σελ. 1529; Balfer *et al.* [7], σελ. 191), καθώς επίσης και η ψημένη άργιλος (κεραμίδια, οπτόπλινθοι, όστρακα) σε κονιορτοποιημένη μορφή.

Τα κεραμικά είναι πολύ δραστικά όταν η παρασκευή τους γίνει σε χαμηλές θερμοκρασίες. Αν οι θερμοκρασίες ψησίματός τους είναι υψηλές τότε η άργιλος υφίσταται μια διαδικασία υαλοποίησης, η οποία την καθιστά αδρανή (Παπαδούρης *et al.* [8], σελ. 220). Κατά την αρχαιότητα τα κεραμικά συνήθως δεν υπόκειντο σε ικανοποιητικό ψήσιμο, γι΄ αυτό και ήταν πολύ δραστικά (Frizot [9]; Al Varez *et al.* [10], σελ. 1483-1484; Moropoulou *et al.* [11], σελ. 44).

Από ορυκτολογική άποψη τόσο οι φυσικές όσο και οι τεχνητές ποζολάνες αποτελούνται κυρίως από άμορφο οξείδιο του πυριτίου καθώς επίσης και από κρυστάλλους χαλαζία, καολινίτη, μαγνητίτη, ιλλίτη, πλαγιόκλαστου κ.ά. (Densmore [12], σελ. 199; Νομπιλάκης [13], σελ. 82-83). Τα ενεργά αυτά συστατικά που περιέχονται στις ποζολάνες, τα οποία βρίσκονται σε άμορφη κατάσταση, αντιδρούν με το υδροξείδιο του ασβεστίου στην παρουσία νερού και δημιουργούν σταθερές ένυδρες αργιλικές (CAH) και πυριτικές (CSH) ενώσεις του ασβεστίου (Moropoulou *et al.* [3], σελ. 216; Ashurst *et al.* [14], σελ. 6-8). Ο υδραυλικός χαρακτήρας των κονιαμάτων οφείλεται στις αντιδράσεις προσκόλλησης μεταξύ ποζαλανικού υλικού (κεραμικού κλπ) και μήτρας. Συγκεκριμένα η διείσδυση του ασβεστίου στο κεραμικό επιδρά στη μικροδομή των κονιαμάτων και μειώνει το πορώδες τους (Moropoulou *et al.* [15], σελ. 785).

Στα πλαίσια του ερευνητικού αυτού προγράμματος, καταρχήν μια μεγάλη συλλογή αρχαίων δειγμάτων, που συλλέχτηκαν από αρχαιολογικούς χώρους διαφόρων περιόδων (Προϊστορική, Κλασική, Ελληνιστική και Ρωμαϊκή) καθώς και από ιστορικά και παραδοσιακά κτίρια (νερόμυλοι, εκκλησίες), μελετήθηκε με σύγχρονες μεθόδους ανάλυσης για να αναγνωριστεί η σύσταση (χημική, ορυκτολογική) και η κρυσταλλική τους δομή, και στη συνέχεια έγινε προσπάθεια να παρασκευαστούν παρόμοια πειραματικά κονιάματα και να αξιολογηθούν με βάση κυρίως τις μηχανικές και φυσικές ιδιότητές τους.

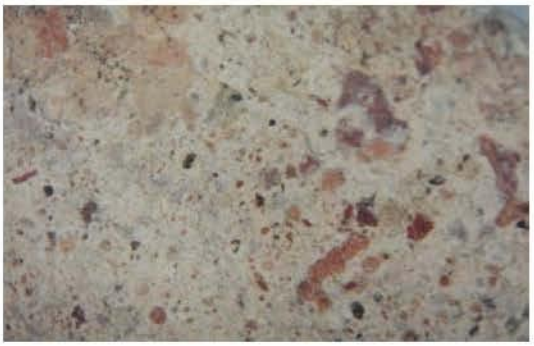
Οι αναλύσεις των αρχαίων υδραυλικών κονιαμάτων διαφορετικών περιόδων και θέσεων έδειξαν μικρές διαφοροποιήσεις στη σύσταση, κυρίως λόγω της χρήσης τοπικών στην κάθε περίπτωση πρώτων υλών, αλλά γενικά έδωσαν παρόμοια αποτελέσματα λόγω της κοινής μεθοδολογίας που φαίνεται πως είχε χρησιμοποιηθεί για την παρασκευή τους (Moropoulou *et al.* [16], σελ. 70). Παρατηρείται πάντως μια διαφοροποίηση ως προς τον τρόπο χρήσης των υδραυλικών κονιαμάτων. Ενώ δηλ. κατά την Προϊστορική περίοδο η χρήση των υδραυλικών κονιαμάτων περιοριζόταν κυρίως στα επιχρίσματα (κανάλια νερού, δάπεδα λουτρών και εργαστηριακών χώρων) (Φιλοκύπρου [1], σελ. 256) αργότερα κατά τη Ρωμαϊκή περίοδο και μετέπειτα τα υδραυλικά κονιάματα

χρησιμοποιήθηκαν τόσο ως επιχρίσματα όσο και ως συνδετικά υλικά κυρίως σε δεξαμενές, νερόμυλους κλπ.

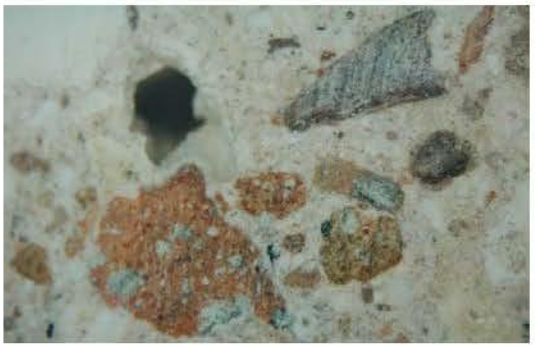
Ανάλυση και μελέτη αρχαίων και πειραματικών υδραυλικών κονιαμάτων της Κύπρου

Παρατήρηση στο στερεοσκόπιο

Η εργαστηριακή εξέταση των αρχαίων υδραυλικών κονιαμάτων, με τη βοήθεια στερεοσκοπίου έδειξε στο εσωτερικό τους ύπαρξη μικρών κοκκινωπών γωνιωδών ή αποστρογγυλεμένων τεμαχίων ή συσσωματωμάτων (μεγίστου συχνά μεγέθους 1-2 χιλιοστών) (Φωτ. 1-2), τα οποία αναγνωρίστηκαν αργότερα στις λεπτές τομές και στο ηλεκτρονικό μικροσκόπιο ως περιοχές αργιλοπυριτικής σύστασης. Στο εσωτερικό μερικών κοκκινωπών εγκλεισμάτων παρατηρήθηκε η ύπαρξη πυριτικών κυρίως ορυκτών.



Φωτ.1. Γενική εικόνα ρωμαϊκού υδραυλικού κονιάματος στο στερεοσκόπιο (5Χ)



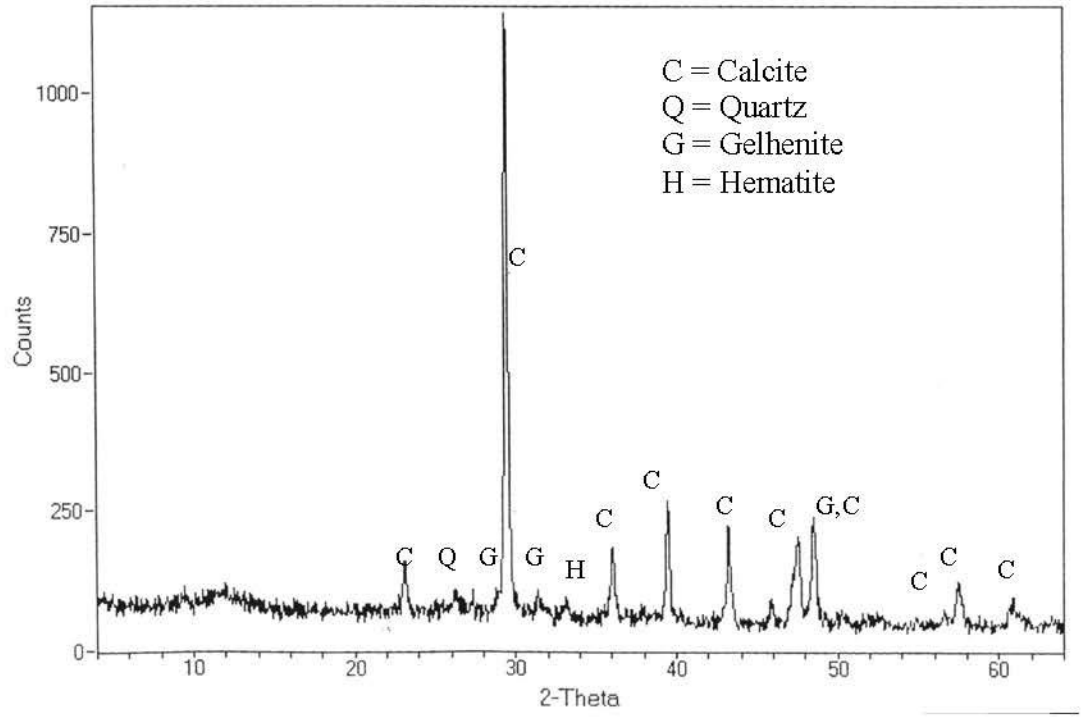
Φωτ.2. Γενική εικόνα υδραυλικού κονιάματος από νερόμυλο στο στερεοσκόπιο (5Χ)

Σύμφωνα με τις παρατηρήσεις που έγιναν στο στερεοσκόπιο από τον ερευνητή δρ. Michele Macchiarola στα υπό εξέταση αρχαία κονιάματα εμφανίζεται άφθονη σκόνη κεραμικού συχνά ομοιόμορφα κατανεμημένη και λίγοι πυριτικοί και ανθρακικοί κόκκοι μέγιστου μεγέθους 1 χιλιοστού καθώς και τεμάχια κεραμικού ποικίλων χρωμάτων (κόκκινο, ροζ και κιτρινοπράσινο) και σχημάτων (στρογγυλεμένα ή ακανόνιστα). Σε μερικές περιπτώσεις, στο εσωτερικό των μεγαλύτερων τεμαχίων κεραμικού προσδιορίστηκε παρουσία σκόνης παλαιότερου κεραμικού που είχε χρησιμοποιηθεί για την παρασκευή του.

Ορυκτολογικές αναλύσεις (Περίθλαση ακτίνων Χ)

Οι ορυκτολογικές - ποσοτικές αναλύσεις με τη βοήθεια ακτίνων Χ (X-RD) που έγιναν στο Ινστιτούτο Γεωλογικών και Μεταλλευτικών Ερευνητών της Ελλάδας υπό την καθοδήγηση του δρα Βασίλη Περδικάτση έδειξαν σε όλα τα αρχαία δείγματα ύπαρξη κυρίως ασβεστίτη με ποσοστά που κυμαίνονται από 50 μέχρι 92%, χαλαζία με ποσοστά 3-10%, γκαιλενίτη με ποσοστά 3-14%, ανορθίτη με ποσοστά 1-9% (Σχήμα 1) καθώς και αργιλικών ορυκτών (μοντμοριλονίτη με ποσοστά 8-10%). Η ύπαρξη γκαιλενίτη είναι ενδεικτική της παρουσίας κεραμικού, το οποίο ψήθηκε σε θερμοκρασία γύρω στους 850^{0}C (Perinet *et al.* [17] σελ. 157). Η χρήση κεραμικού που έχει παραχθεί σε χαμηλή σχετικά θερμοκρασία επιβεβαιώνεται, σύμφωνα με τον Michele Macchiarola, και από την ύπαρξη αιματίτη καθώς και ανορθίτη, ορυκτά που προσδιορίστηκαν σε μερικά δείγματα (Perinet *et al.* [18]). Τα αργιλικά ορυκτά προέρχονται εν μέρει από τους ασβεστόλιθους (αργιλοασβεστιτικής σύστασης) που χρησιμοποιήθηκαν ως πρώτες ύλες για την

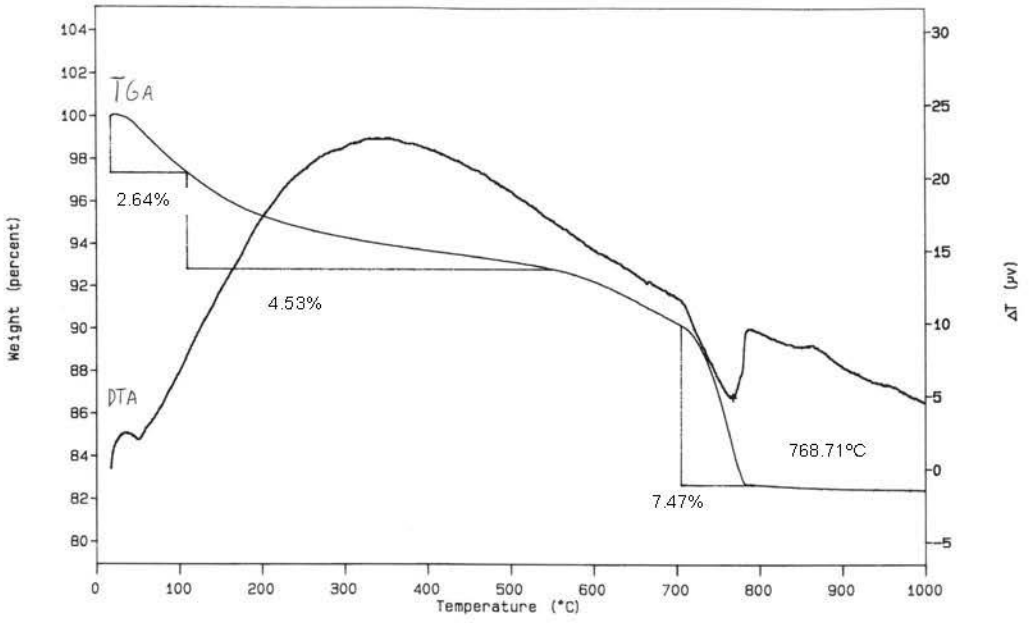
παρασκευή των κονιαμάτων και εν μέρει από τα υδραυλικά πρόσθετα (Moropoulou *et al.* [16], σελ. 65).



Σχήμα 1. Ορυκτολογικός προσδιορισμός προϊστορικού κονιάματος με τη μέθοδο περιθλασιμετρίας ακτίνων Χ

Θερμικές αναλύσεις

Με τις θερμικές αναλύσεις (DTA, TG) που έγιναν στο Εργαστήριο CNR-IRTEC της Ραβέννας υπολογίστηκε ο βαθμός υδραυλικότητας των αρχαίων κονιαμάτων με τη μέτρηση της απώλειας βάρους των δειγμάτων μεταξύ 110^{0}C και 550^{0}C (Σχήμα 2).



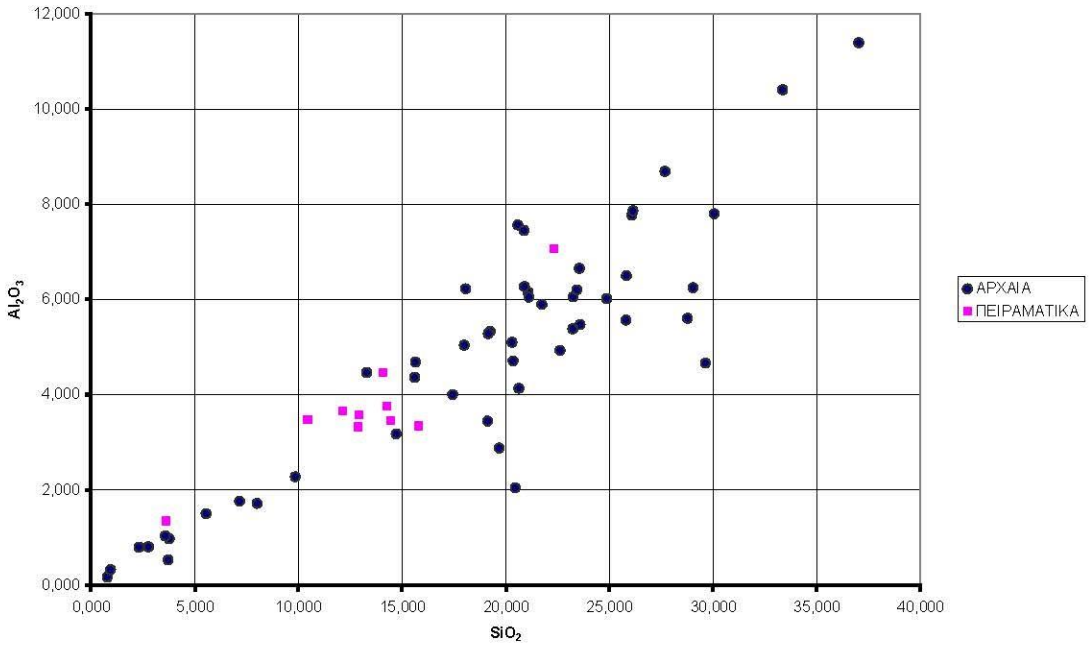
Σχήμα 2. Θερμικές καμπύλες προϊστορικού κονιάματος (DTA, TG)

Η απώλεια βάρους κατά τη θερμοκρασιακή αυτή μεταβολή οφείλεται στο μεγαλύτερό της μέρος στη διάσπαση των ένυδρων πυριτικών και αργιλοπυριτικών ασβεστιτικών ενώσεων των δειγμάτων, δηλ. στην αποβολή του χημικά δεσμευμένου (κρυσταλλικού) νερού. Τα κονιάματα με βάση τα αποτελέσματα των αναλύσεων αυτών χωρίστηκαν σε τρεις κατηγορίες: στα ασθενώς υδραυλικά (απώλεια βάρους γύρω στο 3%), στα υδραυλικά (απώλεια βάρους 3-5%) (Σχήμα 2) και στα ισχυρώς υδραυλικά (απώλεια βάρους 5-10%) (Moropoulou *et al.* [15], σελ. 793). Τα κονιάματα με απώλεια βάρους κάτω από 3% θεωρούνται αερικά κονιάματα εξαιτείας της πολύ μικρής υδραυλικότητάς τους (Moropoulou *et al.* [3], σελ.217).

Η μεγαλύτερη υδραυλικότητα μερικών κονιαμάτων οφείλεται στην παρουσία στο εσωτερικό τους περισσότερης και λεπτότερης σκόνης κεραμικού. Οι υδραυλικές αντιδράσεις μεταξύ κεραμικού και μήτρας είναι συνάρτηση των διαστάσεων, της ποσότητας και της ποιότητας (είδος, σύσταση, θερμοκρασία όπτησης) των κόκκων του κεραμικού (Moropoulou *et al.* [11], σελ. 47). Στα υδραυλικά και πολύ υδραυλικά κονιάματα κατά τη διάρκεια της φάσης της στερεοποίησης πραγματοποιήθηκε μια ολοκληρωμένη αντίδραση μεταξύ ασβέστη και κεραμιδόσκονης με αποτέλεσμα να δημιουργηθεί μεγαλύτερη ποσότητα ένυδρων πυριτικών και αργιλοπυριτικών ασβεστιτικών ενώσεων.

Χημικές αναλύσεις

Οι χημικές αναλύσεις, που διεξήχθησαν με τη μέθοδο φθορισμού ακτίνων Χ (X-RF) στο Εργαστήριο Χημικών Αναλύσεων του Τμήματος Γεωλογικής Επισκόπησης, υπό την καθοδήγηση του δρα Αντώνη Χαραλαμπίδη έδειξαν στα περισσότερα αρχαία και πειραματικά υδραυλικά κονιάματα υψηλό ποσοστό οξειδίων του πυριτίου (13-30%) και σχετικά αυξημένο ποσοστό οξειδίων του αλουμινίου (3-10%) και του σιδήρου. Η παρουσία αυξημένης ποσότητας οξειδίων του πυριτίου και του αλουμινίου στα κονιάματα οφείλεται στην προσθήκη αργιλοπυριτικών συστατικών (κεραμικών) κατά την παρασκευή τους.



Σχήμα 3. Σχέση μεταξύ Al_2O_3 και SiO_2 στα αρχαία και στα πειραματικά κονιάματα

Το υψηλό ποσοστό οξειδίου του πυριτίου συνοδεύεται κατά κανόνα από υψηλό ποσοστό οξειδίου του αλουμινίου και του σιδήρου (Σχήμα 3), ενώ αντίθετα η σχέση της περιεκτικότητας των δειγμάτων σε οξείδια του πυριτίου (και του αλουμινίου) με αυτή του ασβεστίου είναι αντιστρόφως ανάλογη, δηλ. όσο αυξάνεται η περιεκτικότητα ενός δείγματος σε ασβέστιο η περιεκτικότητά του σε οξείδια του πυριτίου και του αλουμινίου μειώνεται, και αντίστροφα (Moropoulou *et al.* [11], σελ. 44).

Ηλεκτρονικό μικροσκόπιο σάρωσης

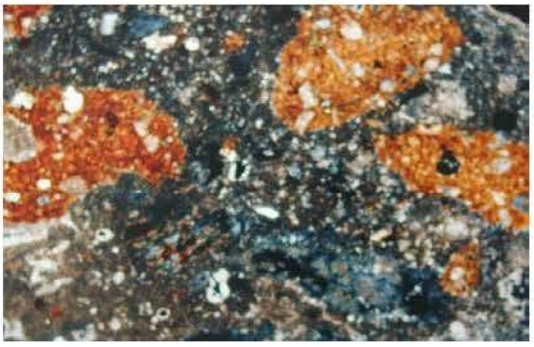
Από την εξέταση των αρχαίων αλλά και των πειραματικών δειγμάτων στο ηλεκτρονικό μικροσκόπιο σάρωσης εφοδιασμένο με μικροαναλυτή, που πραγματοποιήθηκε στο Εργαστήριο Αρχαιομετρίας του Ερευνητικού Κέντρου «Δημόκριτος», υπό την καθοδήγηση του δρα Ιωάννη Μανιάτη, διαφάνηκε μεγάλη συνοχή μεταξύ των επιμέρους συστατικών με ισχυρή μεταξύ τους πρόσφυση. Η σημειακή χημική ανάλυση σε διάφορα μέρη των δειγμάτων έδειξε πως μέσα στη μήτρα τους παρατηρούνται ομοιόμορφα κατανεμημένες λεπτόκοκκες αργιλοπυριτικές ενώσεις (σκόνη κεραμικού) καθώς και αδρανή τοπικής προέλευσης (πυριτικής κυρίως σύστασης).

Οι αναλύσεις με τη βοήθεια του μικροαναλυτή του ηλεκτρονικού μικροσκοπίου έδωσαν γενικά αποτελέσματα παρόμοια με αυτά των γενικών χημικών αναλύσεων με τη μέθοδο φθορισμού (bulk analysis). Οι σχέσεις της περιεκτικότητας των δειγμάτων σε πυρίτιο, αλουμίνιο, ασβέστιο και σίδερο είναι ανάλογες με αυτές που παρατηρήθηκαν στις χημικές αναλύσεις.

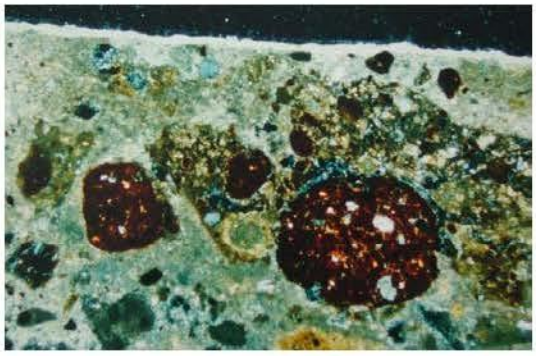
Στις περισσότερες περιοχές των δειγμάτων που εξετάστηκαν παρατηρήθηκε ύπαρξη τόσο ασβεστίου όσο και πυριτίου, με διαφορετική όμως περιεκτικότητα σε κάθε περιοχή. Παρατηρούνται περιοχές με υψηλότερη συγκέντρωση ασβεστίου, που αντιστοιχούν στη μήτρα των δειγμάτων, και περιοχές με υψηλότερη συγκέντρωση πυριτίου και αλουμινίου (περιοχές κόκκων κεραμικού) (Moropoulou *et al.* [11], σελ. 44). Παρατηρούνται όμως και αρκετοί κόκκοι καθαρού ασβεστίτη της τάξης του ενός μικρού του μέτρου.

Πετρογραφική εξέταση

Κατά την πετρογραφική εξέταση των λεπτών τομών των αρχαίων κονιαμάτων, από τον δρα Κώστα Ξενοφώντα προσδιορίστηκαν κοκκινωπά εγκλείσματα διαφόρων μεγεθών και σχημάτων (μέγιστου μεγέθους 1-3 χιλιοστών) αργιλοπυριτικής σύστασης, που συχνά περικλείουν άλλα ορυκτά, μέσα σε μια συνήθως ασβεστιτική μήτρα (Φωτ. 3-4). Ως αδρανή αναγνωρίστηκαν τεμάχια από πυριγενή πετρώματα καθώς και διάφορα πυριτικά και αργιλικά ορυκτά (χαλαζίας, άστριοι, πυρόξενος, μαρμαρυγίες) καθώς και ανθρακικά πετρώματα (ασβεστίτης και δολομίτης).



Φωτ.3. Λεπτή τομή κονιάματος από νερόμυλο με δύο πολωτές σε κάθετη διάταξη (30Χ)



Φωτ.4. Λεπτή τομή προϊστορικού κονιάματος με δύο πολωτές σε κάθετη διάταξη (30Χ)

Σύμφωνα με τις παρατηρήσεις που έγιναν στο πετρογραφικό μικροσκόπιο από τον ερευνητή δρα Michele Macchiarola το κεραμικό στα αρχαία δείγματα εμφανίζεται εξαιρετικά λεπτόκοκκο και ομοιόμορφα κατανεμημένο. Οι μικρές διαστάσεις των κόκκων του κεραμικού αυξάνουν την ειδική επιφάνειά του και μεγαλώνουν σημαντικά την επιφάνεια αλληλεπίδρασής του με το ασβέστιο. Κατά τη διάρκεια της φάσης της στερεοποίησης του κονιάματος, το άμορφο τμήμα του αδρανούς, δηλ. οι κόκκοι του κεραμικού και κυρίως το περιμετρικό τους τμήμα, φαίνεται πως αντέδρασε με το υδροξείδιο του ασβεστίου ($Ca(OH)_2$) το οποίο περιείχετο στο μείγμα, δημιουργώντας πυριτικές (και ίσως αργιλοπυριτικές) ένυδρες ασβεστιτικές ενώσεις στις οποίες οφείλεται η υδραυλικότητα των κονιαμάτων. Οι αντιδράσεις μεταξύ ασβεστίου και κεραμικού επιβεβαιώνονται από το γεγονός πως οι κόκκοι του κεραμικού στις λεπτές τομές εμφανίζονται έντονα αλλοιωμένοι και συχνά στη μετάβαση από τους κόκκους στο συνδετικό υλικό εμφανίζεται μια περιμετρική ζώνη αντίδρασης (ξεθώριασμα) (Moropoulou *et al.* [11], σελ. 43-44).

Η παρατήρηση στο πετρογραφικό μικροσκόπιο των λεπτών τομών των πειραματικών δειγμάτων επιβεβαίωσε την ύπαρξη λεπτόκοκκης κεραμιδόσκονης σε μια ασβεστιτική μήτρα καθώς και την παρουσία άλλων αδρανών όπως βασάλτη, πλαγιόκλαστου, χαλαζία, άστριων, πυρόξενου, κερατόλιθων, μικρίτη καθώς και απολιθωμάτων και κοχυλιών. Η πολύ μικρή κοκκομετρία της κεραμιδοσκόνης κατέστησε δύσκολη την ακριβή αναγνώρισή της.

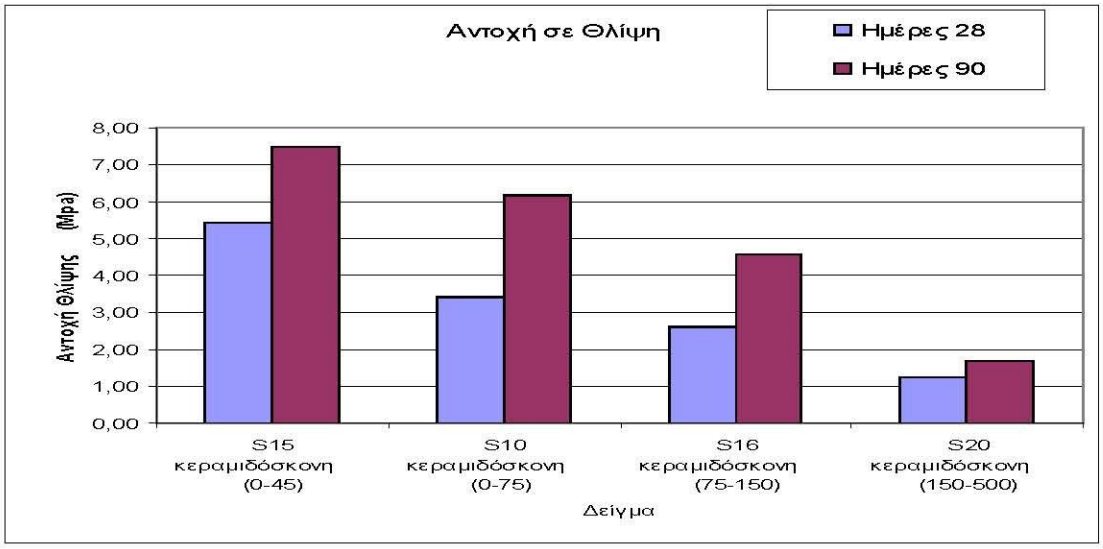
Φυσικές ιδιότητες (υδατοαπορροφητικότητα)

Ο έλεγχος του συντελεστή αρχικής υδατοαπορροφητικότητας των πειραματικών δειγμάτων έδειξε ότι τις μεγαλύτερες σχετικά τιμές εμφανίζουν τα κονιάματα που παρασκευάστηκαν με προσθήκη χοντρόκοκκης σχετικά κεραμιδόσκονης (150-500 μικρά). Αντίθετα μικρές τιμές συντελεστή έδωσαν δείγματα στα οποία είχε χρησιμοποιηθεί κεραμιδόσκονη μικρής κοκκομετρίας (0-45 ή 0-75 μικρά). Από τα ανωτέρω συνάγεται ότι η προσθήκη λεπτόκοκκης κεραμιδόσκονης έχει ως αποτέλεσμα τη μείωση του συντελεστή αρχικής επιφανειακής υδατοαπορροφητικότητας και κατά συνέπεια την αύξηση της υδραυλικότητας των κονιάματων. Αυτό οφείλεται στη διείσδυση του ασβεστίου στο κεραμικό και στις συνεπακόλουθες αντιδράσεις που οδηγούν στη μείωση του μεγέθους των κενών και των ασυνεχειών της δομής των κονιαμάτων και κατά συνέπεια στην αύξηση της φαινόμενης πυκνότητάς τους (Moropoulou *et al.* [11], σελ. 47).

Μηχανικές αντοχές

Κατά τον έλεγχο των μηχανικών αντοχών των πειραματικών υδραυλικών κονιαμάτων (παρασκευή δοκιμίων 4Χ4Χ4εκ.και 4Χ4Χ16εκ.) (Moropoulou *et al.* [19], σελ.88-89) διαφάνηκε ότι η αντοχή σε κάμψη είναι ανάλογη με την αντοχή σε θλίψη τόσο στις 28 όσο και στις 90 ημέρες. Η αντοχή τόσο σε θλίψη όσο και κάμψη αυξάνεται με το χρόνο. Μεγαλύτερος ρυθμός αύξησης της θλιπτικής και καμπτικής αντοχής παρατηρείται στις 90 ημέρες στα υδραυλικά κονιάματα που εμφανίζουν μικρή σχετικά αντοχή στις 28 ημέρες. Αντίθετα τα αερικά κονιάματα ασβέστη εμφανίζουν μικρότερες αντοχές και ελάχιστη αύξηση της αντοχής τους με το χρόνο (Moropoulou *et al.* [19], σελ. 93-95). Μικρή αύξηση της αντοχής με το χρόνο παρατηρείται επίσης στα δείγματα τα οποία παρασκευάστηκαν με προσθήκη κεραμιδόσκονης μεγάλης σχετικά κοκκομετρίας (150-500 μικρά). Κάπως μειωμένος εμφανίζεται και ο ρυθμός αύξησης της αντοχής σε θλίψη όλων των κονιαμάτων από τις 90 στις 180 ημέρες, ιδιαίτερα στα δείγματα με υψηλές αντοχές στις 90 ημέρες (Papayianni [4], σελ. 4, 7-8).

Η κοκκομετρία της κεραμιδόσκονης φαίνεται πως διαδραματίζει σημαντικό ρόλο στον καθορισμό της δραστικότητάς της με το υδροξείδιο του ασβεστίου των κονιαμάτων. Διαπιστώθηκε ότι τις μεγαλύτερες αντοχές (μεγαλύτερες των 5 Mpa) εμφανίζουν τα κονιάματα με χρήση κεραμιδόσκονης με κοκκομετρία μικρότερη των 45 μικρών, ενώ μικρές σχετικά αντοχές έδωσαν τα κονιάματα με κεραμιδόσκονη μεγαλύτερη των 150 μικρών (Σχήμα 4) (Papayianni [4], σελ. 8). Ανάλογες ήταν και οι μεταβολές της αντοχής σε κάμψη. Η ίδια αυτή σχέση της αύξησης της αντοχής με τη μείωση της κοκκομετρίας επιβεβαιώνεται και στα κονιάματα με χρήση φυσικής ποζολάνης (μηλαϊκής γης στη συγκεκριμένη περίπτωση) ως υδραυλικό πρόσθετο.



Σχήμα 4. Επίδραση της κοκκομετρίας της κεραμιδόσκονης στη θλιπτική αντοχή

Καθοριστικό επίσης ρόλο στην ανάπτυξη των μηχανικών αντοχών φαίνεται να διαδραματίζει η σύσταση, το είδος, η προέλευση καθώς και η ποσότητα του υδραυλικού πρόσθετου (κεραμιδόσκονη, άργιλος κλπ) (Moropoulou *et al.* [3], σελ. 219). Η αύξηση της αναλογίας της κεραμιδόσκονης ως προς τον ασβέστη έχει ως αποτέλεσμα αύξηση της αντοχής των κονιαμάτων σε θλίψη και κάμψη.

Τα πειράματα επιβεβαίωσαν πως η ιδανική αναλογία συνδετικού / αδρανούς υλικού κυμαίνεται γύρω στο 1:3 (Moropoulou *et al.* [3], σελ. 219; Bakolas *et al.* [20], σελ. 827). Η αύξηση καθώς και η μείωση της αναλογίας αυτής σε 1:2 και 1:4 οδήγησαν σε μείωση της θλιπτικής και της καμπτικής αντοχής των κονιαμάτων (στις 28 και στις 90 ημέρες). Η προσθήκη επίσης περίσσειας νερού κατά την παρασκευή, καθώς και η έλλειψη σωστής και πλήρους ανάδευσης και συμπύκνωσης έχει ως αποτέλεσμα τη δραστική μείωση των μηχανικών αντοχών των κονιαμάτων. Ο τρόπος συντήρησης των δειγμάτων έχει επίσης επίδραση στην ανάπτυξη των αντοχών τους. Η διατήρηση των υδραυλικών κονιαμάτων κάτω από το νερό βελτιώνει σε μεγάλο βαθμό τις μηχανικές τους αντοχές.

Συμπεράσματα

Από τα ανωτέρω συνάγεται ότι για την εύρεση της σύστασης και της μεθοδολογίας παρασκευής των αρχαίων υδραυλικών κονιαμάτων είναι απαραίτητος ο συνδυασμός διαφόρων αναλυτικών μεθόδων, αφού κάθε μία δίδει συγκεκριμένες, αλλά μη επαρκείς, πληροφορίες για μια ολοκληρωμένη εικόνα τους. Η παρασκευή νέων κονιαμάτων

συμβατών με τα αυθεντικά μπορεί να επιτευχθεί διά μέσου μιας συνολικής και ολοκληρωμένης μελέτης – ανάλυσης των αρχαίων κονιαμάτων (Papayianni [21], σελ. 273; Moropoulou *et al.* [16], σελ. 56) παράλληλα με τον εντοπισμό των παραμέτρων που διαδραματίζουν καθοριστικό ρόλο στη διαμόρφωση των μηχανικών τους αντοχών (Moropoulou *et al.* [22], σελ. 174).

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THE ARCHAEOLOGICAL PROJECT AS ONE OF RESEARCH, EVALUATION AND MANAGEMENT OF TERRITORIAL RESOURCES

Fabiana Pieri, free lancer in architecture

Abstract

By examining the experience derived from the project undertaken at the archaeological site of "Muggia Vecchia" in the province of Trieste (Italy), we underline the importance of cooperative planning between architects and archaeologists on interventions which aim to evaluate monuments and the landscape so as to offer the visitor an overall picture on the history of the territory and on the actions of past cultures that have modified it.
An archaeological site cannot be benefited from until it is not excavated and made legible to the public. Seeing the difficulty of conserving archaeological goods in the open, it is preferable to cover – in order to ensure its preservation – that which is intelligible only to the expert and to concentrate the economic resources on making visible that which is particularly didactic. Particular attention must be paid to didactic panels that transmit technical information to a non-specialised audience, offering simple explanatory schemes and reconstructive plans. The worksite must also become an educational occasion, starting from the "visitable" archaeological excavation, so as to draw scientific research alongside "participated archaeology" on behalf of the citizens, up until the activities of restoration and conservation that may educate public conscience to safeguard cultural goods.

The hill of Muggia Vecchia

In north-eastern Italy, to the south of the centre of Muggia, Municipality in the Province of Trieste, situated between the Adriatic Sea and the Slovenian Republic, rises the hill of Muggia Vecchia (see Fig. 1).

Figure 1 – Between the Adriatic Sea and Slovenian Republic rises the hill of Muggia Vecchia

The hilltop, an ancient village inhabited up until the end of the 1400s, was gradually abandoned for a new settlement next to the sea, Borgo Lauro (Lauro Village), the modern day centre of Muggia enclosed within the city walls and dominated by the castle. The site of Muggia Vecchia is well known for its 13th century sanctuary dedicated to Saint Mary Assumption (see Fig. 2) with a double cycle of 13th and 14th century frescoes. It is also known for the park, with oaks and bay oaks, and for having an admirable panoramic view over the Gulf of Trieste.

One can only glimpse the mutilated remains of the city doors of the medieval *castrum* of Muggia Vecchia, which open towards the East (Door of Saint Odoric) and towards the West (Door of Saint Catherine) as well as a brief section of the city walls connected to the southern door (Door of Saint Margherita).

Figure 2 – The Sanctuary dedicated to Saint Mary Assumption

Evaluation Project for the monument and the landscape

In 1998 I was appointed by the priest of Saint Mary Assumption in Muggia Vecchia, to draw up a project for the retrieval of the area surrounding the basilica.
The retrieval and evaluation project for the hill of Muggia Vecchia and its sanctuary is designed, immediately, as the evaluation of the monument and the landscape so as to offer the visitor a complete picture of the area's history and of the actions of past cultures that have modified it.

The retrieval of a high ground village, in the presence of one of the most precious and important sanctuaries of the region, starts from re-organising the ways of using the area. Intervening on the pathway system that runs across the hill becomes the redefinition of the "functional features of the different parts and their system of relationships" (Secchi[1]). The urban planning project tends thus to underline the historically, most significant, *materials*, defining the relationship between the site and the hierarchy of its routes.

Evaluation of the site on occasion of the Jubilee 2000 foresaw, a part from the enlargement of the parking area, the creation of public services for pilgrims and tourists, along with a system of pathways and stopping points, giving each area its own connotation and characterisation. The northern area, in front of the basilica, is a green lawn with a few sandstone pathways and stopping points that allow a panoramic view over the Gulf of Trieste. The church square was paved so as to create an appropriate

area for the surrounding environment and for the conclusion of pastoral reunions, a sign of availability and welcome for the community that attends the sanctuary. The southern area, behind the parsonage building, was planned as an area for open air celebrations, relocating the 15th century altar table, recovered next to the presbytery of the basilica during restoration works undertaken by the Friuli Venezia Giulia Cultural Heritage Authority (Soprintendenza Archeologica del Friuli Venezia Giulia).
From the southern area, the stone pathway continues towards part of the medieval settlement, which can be visited up to the oak and bay oak wood. A group of residential buildings was chosen to be made visible, situated on both sides of one of the roads that crossed the village, and which, thanks to the abandonment of the latter at the end of the 1400s, are conserved up to the first floor, with no modifications or subsequent superimpositions. The visible archaeological area is marked by an architectural object, which, a part from having a functional use for the site tour (a path suspended above the medieval road axis) is located as a *reference mark*, as a provocative event calling the attention of the visitor (see Fig. 3).

Figure 3 – The visible archaeological area (photo by P. Bonassi)

The archaeological project

The evaluation of such a complicated site is, above all, an archaeological project, in that it is one of research, evaluation and administration of the territorial resources.
Various research methodologies were applied which were made possible by cooperative planning between architects and archaeologists.
The archaeological investigation, undertaken by the Friuli Venezia Giulia Cultural Heritage Authority (Soprintendenza Archeologica del Friuli Venezia Giulia), was carried out with preliminary surveys over "archaeological surfaces" and "surviving archaeology" (Mannoni[2]) on the visible emergencies, with subsequent rescue excavations on occasion of building sites.
Based on the information thus recovered, two areas were chosen where stratigraphical excavation was carried out: the church square and part of the southern settlement. Indications regarding the different stages of the basilica's life were obtained from the former whilst, from the latter, information regarding the medieval settlement's life preceding the destructions of the 14th century.
To evaluate a site such as that of Muggia Vecchia, in fact, the assessment of the archaeological excavation must not be considered solely as a disagreeable fulfilment of the law, but constitutes, a part from a valuable dating instrument, a necessary completion of historical information contained within the standing buildings and in the last visible anthropical layer, becoming thus, part of the intervention for the

conservation itself.
Hand in hand with the archaeological investigations, went historical research, following that which began in the preceding years, along with the analysis of archaeological structures (artefacts, building techniques etc.). Historical research has an active role in the retrieval and conservation of rescue archaeology. It must, in fact, know how to adapt to the results reached by the investigations, understand their significance and avoid making choices which could obstruct future development of knowledge. These choices must aim to conserve significant and characteristic features of the area under examination, attempting thus to integrate the actual situation so as to multiply its meanings.

Conservation of the archaeological structures was preceded by their accurate study. The fundamental and primary choice that the architect must make is to analyse the ruin's level of legibility and to cover up that which is not didactic so as to assure its preservation. The study on the choices of building materials, on their technical use, on the structural solutions, on the disposition of buildings and rooms, on their dimensions and functions, as well as the urban disposition of the settlement, of its internal relations and its connections with the surrounding territory, were undertaken with the final objective of conserving the site and its didactic use.
Conservational techniques were experimented upon the remains of the buildings, verifying the results and the techniques used during the different environmental conditions which the structures endure over the different seasons. The constructions of the medieval village were built with walls made in sandstone, which come from nearby quarries (all the territory of Muggia has also been subject to quarrying activities of this material). These walls are built dryly or connected at some points with mortar. The walls are nearly always constituted by a parameter with regular blocks and by a fill of small and medium roughly worked stones. The archaeological excavation must be followed by the conservation of the structures, for they endure a notable trauma in the passage from the environmental conditions present in the underground to those on the surface.
After cleaning the walls, its cavities and disinfesting the altered surfaces from microbiological materials, limited activities of localised restoration were undertaken by using and wedging analogous material into the walls which came from the ruins of the structures themselves. Each wall top was then protected from atmospheric agents by building a surface consisting in a double line of sandstone hewn ashlars connected by pozzuolana mortar of various thickness so as to make the reconstruction immediately visible. The inhabited floors within the rooms have been covered up and protected with sand and gravel. For the last layer, earth and grass were chosen so as to assure and respect the view and integrity of the natural aspect of the site, which, at the present day, has become a garden. This was done so as to conserve the archaeological structures, being a material witness with values of civilisation, and the natural aspect of the site, being the memory of the last anthropical layer.

The park-garden project

Following the rescue archaeological excavation, undertaken during these first working seasons, the effective consistency of the *potential documentation* of the hill of Muggia Vecchia emerged, indicating the depositional level of conservation and its possible topographic distribution. Seeing the interest which this aroused, not only amongst scholars, but above all amongst the people, the parish of Saint Mary Assumption, owner of the area, along with the Friuli Venezia Giulia Cultural Heritage Authority and the Municipality of Muggia, started looking for funds to make the archaeological site legible to the public. This is currently bringing to the creation of a real *archaeological park* with didactic pathways that run around the basilica, in the area of the so-called

"archaeology of abandoned villages" (Mannoni[3]).

The preliminary project started with a campaign of archaeological excavations along with topographic and stratigraphical planning, as well as that of its deterioration in order to proceed, once sufficiently exhaustive data was obtained, to the definite and executive project.
Having to carry out an adequate restoration of the monumental structures in proximity of the southern door, indicated in primary sources as the *door of "Saint Margherita"*, it was decided to analyse a wide area in proximity of the city walls so as to be able to study the historical and structural evolution of an area within the city walls of the medieval village, from which extremely precious scientific results were obtained.

A second area of investigation began in the eastern area of the site, behind the basilica, aiming thus to continue the visiting itinerary along the whole perimeter of the hill. Here, in fact, in the northeastern area, elements of major interest were missing, an *event*, that is, that could captivate the visitor's attention and curiosity. In order to verify the effective consistency of the archaeological deposit, the excavation foresaw a long explorative trench starting from a few emerging structures that were thought to belong to the constructive system of the medieval city wall. The intention was to bring to light the existing relationships between the inhabited settlement and the city walls.
However, already during the first excavations carried out with machinery, it was possible to establish that, in reality, these structures, at least those taken into consideration, were built in a stage following recent levellings connected to the layout of the area undertaken during the 1950s. Considering these structures were very recent and therefore not datable to the settlement subject to the investigation, it was decided to close the test pit and to move the trench a few metres to the West, where structures had emerged relative to different nearby buildings and to a section of a road.
A vast portion of the settlement belonging to the last stage of the medieval village was brought to light, aiming to show the visitors of the park how the village was structured. After its conservation, a whole building and part of two other buildings, which face three crossing roads, are visible.
Seeing the difficulty of conserving archaeological goods in the open, in fact, it is preferable to cover – so as to assure its preservation – that which is intelligible only to the expert and to concentrate the economical resources in making visible that which is particularly didactic.

Preliminary studies then consisted in analysing the state of structural conservation and the causes of their deterioration, along with a series of investigations regarding the mineral and petrographic studies on fragments of mortar and plaster. Geomagnetic analysis will soon be carried out to investigate the consistency of the room underneath the portico of the basilica, which presumably continues under the right nave, contributing thus to a re-analysis of the architectural system of the sanctuary.

All this knowledge was necessary to the executive project for the restoration of the archaeological structures and for the pathway which would make use of the latter. These will be published in a scientific edition – currently being edited – that reanalyses the site, also in relationship to the dynamics of the surrounding territory.

Visits to the archaeological site

Contemporarily to the preliminary investigations, a series of didactic activities were organised, mainly for schools of the Municipality of Muggia, but also for citizens and tourists.
In collaboration with the Administration of the Municipality, that sponsored the initiative, eight guided tours around the archaeological site were organised for primary

school pupils, as well as four days dedicated to citizens and tourists.
Volunteers of the Fund for the Italian Environment and archaeologists opened the archaeological site to citizens during the spring of 2002 (see Fig. 4).
A direct experience with the archaeological site allows a better comprehension of this discipline and to gain major knowledge on the history and evolution of the life and customs of our ancestors. Visitors thus can visit, not only an abandoned medieval castellum, perfectly intact in its urban conformations, but also comprehend the ways of life of its inhabitants, how they lived, what they ate, how they procured their food, how they dressed and which were their pastimes and hobbies. The site must become, in fact, a didactic experience where research goes hand in hand with "participated archaeology" on behalf of the citizens, moreover to educate public conscience to safegard cultural goods.

Figure 4 – A visit to the archaeological site (photo by G. Crozzoli)

Making use of the archaeological site

An archaeological site cannot be benefited from until it has not been excavated and made legible to the public.
Omitting detailed description of each restoration and conservation, seeing the complexity of the monuments, we would just like to underline our attempt to make the fragmented ruins of the structures recognisable with small jobs of integration, so that the main organisms are legible: the walls, the entrance doors to the village and the inhabited settlement. We would like to dwell upon a study focused on organising visiting pathways and their didactic supports.
Precise stopping points were identified that became areas of perspective, observation points created in order to read the archaeological site located within the territorial context. The archaeological structures next to the southern door are, for example, visible at close hand by following the road that crosses it, and also from a higher level – a belvedere that allows one to place the monument in its context within the territory. Next to the eastern door, what the visitor coming from the centre of the village first sees, is a didactic panel which invites one to observe the surrounding hills, calling their attention to other high ground sites present in the territory, urging them, thus, to visit other sites of historical and archaeological importance. The union between a historical-archaeological visit with that of the environment was attempted, to assure a better understanding of the land's history. The current landscape is a result of the continuous interrelationship between man and the environment, and thus the product of human activity.

Panels have been placed along the pathways that cross the hill which have been conceived as a *guided tour*. These also present new material gathered for the occasion of this interdisciplinary study. The panels placed along the pathway are of two types: didactic, with explanations regarding the site and the results of the archaeological investigations, and informative, with indications of the pathways and services present in the archaeological park (see fig. 5).

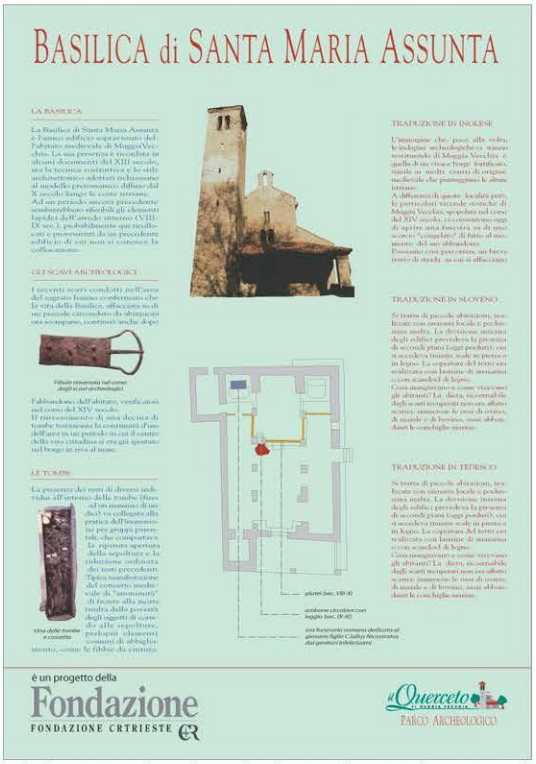


Figure 5 – One of the panels placed along the pathways that cross the hill

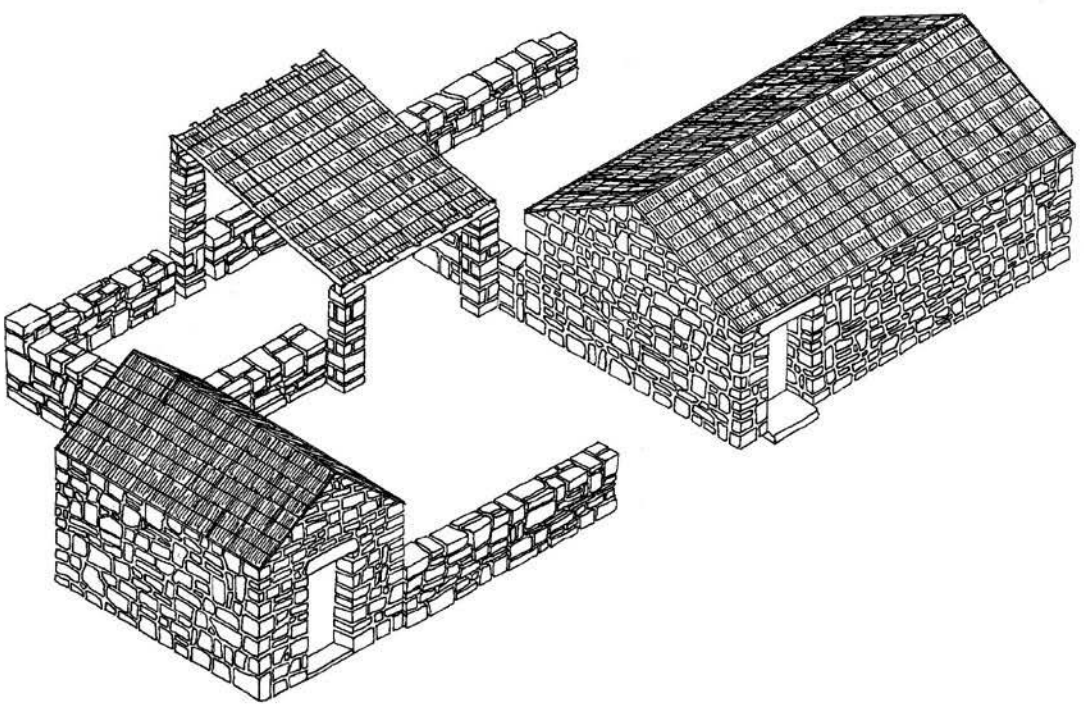
The main role of the visitor-user and of his/her needs was what guided the project concerning the didactic panels. The privileged user for us is not the specialist who will be able to read scientific publications where all the studies and news can be found. The user of this area is the summer tourist, the local Sunday visitor, people who attend the sanctuary, but the main user is the very residential community. The most important user of this community is the child, who goes to the area to play ball on the lawn. His/her time has been enriched by offering new didactic suggestions of the territory where he/she lives.

We began from establishing a unique narrative syntax with rules, recurrences and above all homogeneity in the expository graphics. A recognisable name was given to the park, which could gather the pluralities of the features of the area along with the historical-archaeological and landscape values. Furthermore a captivating logo was designed for the child with the main recognisable element of the site: the basilica. We then chose the fundamental contents destined to divulgation, starting from the receiver's point of view and avoiding giving too much information. The texts written by archaeologists have been simplified and re-elaborated in order to be comprehensible to the widest possible audience, a group identified in the cultural level of compulsory school. The texts are limited to the main information so as not to bore the visitor, favouring graphic and photographic representation.

Photos of everyday objects found during the excavations were used along with

descriptive graphics and, above all, graphic reconstructions of the monuments situated in the landscape as they appeared in various stages of their history. The observer's point of view was the starting point for these reconstructive drawings (see Fig. 6). In every stopping point and areas of perspective, a didactic panel has been placed with a drawing that suggests what the view of the monument and the landscape would have been from that specific point in a precise historical period. A faded photograph is offered to the visitor, as if he/she was in that place a couple of centuries earlier, in order to be able to recompose in his/her mind the monument, now in ruins. Even if the reconstruction is not scientifically perfect, in that the illustrator inserts a few elements using his imagination so as to make the drawing more captivating, it favours the associative and character of the visitor's memory.

We have wanted to promote a type of touristic development that respects the historical value of the area and that allows the visitor to have a pleasant experience but also an instructive one.
The *archaeological project* becomes, therefore, a *cultural project*, in that it attempts to enrich society through the evaluation of its local heritage and the intelligent administration of the *park-garden*, which will be the job of local firms.



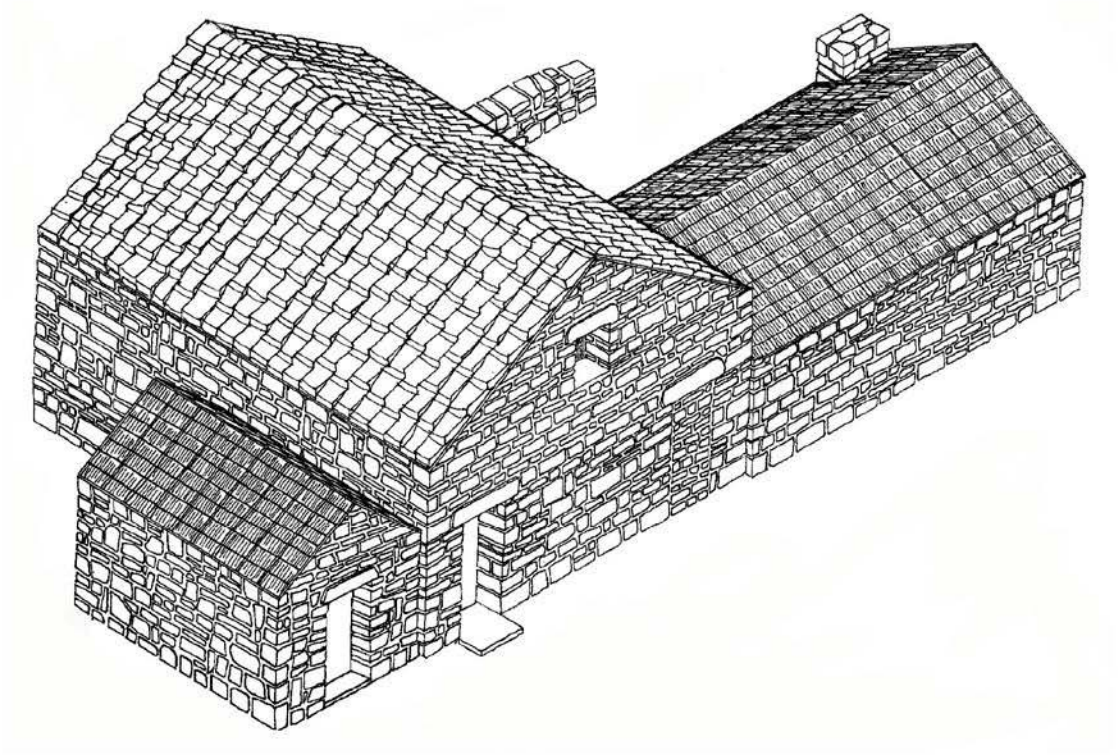


Figure 6 – A reconstructive drawing: it shows the same part of village as it was in13th– 14th century and in 15th century

[1] B. Secchi, 1994, *Tre Piani La Spezia Ascoli Bergamo*, Milano, p. 86
[2] T. Mannoni, 1994, *Archeologia dell'Urbanistica*, Genova
[3] T. Mannoni, 1994

A NEW POSSIBLE STRATEGY FOR THE CONSERVATION AND SAFEGUARD OF PROVINCIAL CULTURAL HERITAGE: THE PROJECT OF THE "FONDAZIONE DELLA CASSA DI RISPARMIO DELLA PROVINCIA DELL'AQUILA"

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Abstract

In this paper the strategies followed in the project entitled "Diagnosis of the state of conservation of the chantry of St. Pellegrino in Bominaco, the church of St. Mary of the Tomb in Sulmona and the Ducal Palace in Tagliacozzo" are presented and the results are discussed.

The research was carried out to establish the main factors of decay and weathering in order to protect these masterpieces. The aim of the project is to carry out a scientific study of the processes of weathering on these pilot monuments with particular reference to the province of L'Aquila. In this area of the Appennines, in central Italy, the combined action of different factors such as severe climate conditions, environmental pollution and seismic events have caused stone decay. The project was cofinanced by "Fondazione della Cassa di Risparmio della Provincia dell'Aquila" and by the Department of Chemistry, Chemical Engineering and Materials of the University of L'Aquila. The activities were performed in collaboration with the "Soprintendenza ai Beni Artistici, Architettonici, Ambientali e Storici per l'Abruzzo" (Regional Monuments and Fine Arts Office) and with several schools of the province of L'Aquila. For this reason about 280 students of local high school played an active role in the research. For each monument the following steps were scheduled: historical research, visual checks, in situ monitoring of outdoor and indoor environmental parameters, study of static and seismic behaviour of the structure, laboratory analyses of samples taken from the monuments.

Introduction

The complexity of the phenomena connected with the conservation and restoration of Cultural Heritage requires specific skills, extremely diversified and able to interact in an interdisciplinary manner. Interdisciplinarity and multiprofessional skills allow to achieve the optimisation of the economic resources and also to produce remarkable increase in the significance of the information. The understanding of the influence of the environmental and social factors and of their interaction with the materials used for the works of art is the core of the *Diagnostic Phase* which is the most important part of the

wider *Conservation Project* in which the interventions to be realize for the conservation, the restoration and the maintenance are defined.

Aim of the research is the study of the influence of the enviromental factors and of their interactions on the state of conservation of three works of art of the province of L'Aquila as well as the determination of the interventions to be realized for their conservation and re-establishment. The works of art selected are continuosly kept under observation because they need restoration works which are carried out according to funds available.

Finally, in Abruzzo the field of the Cultural heritage has great potentialities because it has been possible, in many cases, to preserve the work of arts in consideration of the limited industrial development and the small rate of urbanization.

Historical and artistic profiles of the monuments.

Chantry of St. Pellegrino in Bominaco

The oratory belongs to the Romanesque church of S. Maria Assunta (11-12th century) to a once wider Benedictine complex. The chantry was built in 1263 by abott Teodino (Charlesmagne according to some scholars). The interior is divided in four bays with reinforcing arches and ogival vaults. The architectonic relevance of the monument lies in the structure, typical of the Benedictine churches, and in the number and excellence of the frescoes. The frescoes are attribuited to three artists, of different styles and training, commonly known as the Maetsro dell'Infanzia, Maestro della Passione and Maestro Miniaturista. The second section of the presbytery walls is occupied by the Bominaco calendar. Vaults and frescoes are very well preserved, thus making the chantry a unique example and the most important pictorial cycle of Benedectine art in Abruzzo.

Church of St. Mary of the Tomb in Sulmona

This monument was not involved in the restoration works within the project "Sulmona city of art" in the 80's. The decay of the facade is particullary serious both for aesthetic and structural reasons.

The origins of the monument (settled on the rests of the temple dedicated to Jove and nearby the house of the poet Ovid), date back to the 12th century, but the building was substantially modified during the time. The evaluation of the state of conservation as well as of the nature of the materials would allow to plan and to realize the restoration works.

Ducal Palace in Tagliacozzo

The wide residential structure, which date back to the 11th century, has a remarkable historical and artistic significance thanks to its treasures: frescoes, engraved stone elements (portal and mullioned windows with two lights), caisson ceiling. These elements are particularly considerable because they are representative of the Abruzzo Renaissance art which developed in the first decades of the "Quattrocento".

The project

The project was developed by the Department of Chemistry, Chemical Engineering and Materials of the University of L'Aquila on the occasion of the public competition run by

"Fondazione della Cassa di Risparmio della Provincia dell'Aquila" for the "Call for interventions in the field of art and scientific research". The purose of project entitled "Diagnosis of the state of conservation of the monumental sites of the churches of St. Pellegrino in Bominaco, St. Mary of the Tomb in Sulmona and the Ducal Palace in Tagliacozzo" is to develop conservative and educational objectives. The first and main one can be obtaind by carrying out the "Diagnostic phase"; the second one, not less important, can be achieved involving local high schools students in the different work phases.

The teamwork with the classes of the secondary-schools was realized to allow them to partecipate to the following steps of the project: in situ visual checks (all kind of High Schools), historical analysis (Gynnasium Licei), architectonic & photographic surveys and mapping of the decay forms and materials (Art State High Schools, Tecnical High School for Building Surveyors), evaluation of the seismic vulnerability and of the structural model or chemical-physical-mechanical characterization of the materials (Technical High Schools).

To the schools, in relation to their job and engagement, were given funds varying between 5.000,00 and 10.000,00 euro. The framing of the project within the national activity of the Italian bank Foundations is reported in the book "Scientific research – The interventions of the bank Foundations" (Associazione fra le Casse di Risparmio Italiane[1]).

Responsible of the project was Roberto Volpe, while the coordination of the actvities was left to Raimondo Quaresima. To the project cooperated the Regional Monuments and Fine Arts Office, the Provincial Education Office and several Departments of the Faculty of Engineering of L'Aquila (Energetics, Structure, Water and Soil Engineering). Cost of the two-year projects was 344.980,65 euro cofinaced for about the 55% by the "Fondazione della Cassa di Risparmio della Provincia of L'Aquila ". Table 1 reports aims and benefits of the research. Tables 2 and 3 show the operating units, phases to develop and time duty. Table 4 illustrates the characterization of the materials and of the alterated and decayed forms detected.

Finally, the University for some specific subjects found scholarships and made use of consultants. All the collaboration and cooperation relationships within Institutions were regulated by means of reciprocal agreements. More detalis about the project are reported on the web of the Faculty of Engineering of the University of l'Aquila at the address www.ing.univaq.it/chimica/.

Diagnostic and conservative results

Chantry of St. Pellegrino in Bominaco: the decayed forms observed on the wall paints are related to the plasters (lacks, disintegration, flakes, fissuring and cracks). As for the pictorial film, it is possible to observe change in colours, white and dark stains and patinas, detachment and micro-craters (Quaresima[2], Errico[3]).
The decay of wall paints can be summarized in the following causes and mechanisms: underground rise up through the floor and through the walls; infiltration through the roof (re-roofed some years ago) and through the external face of the walls due to rain washing (cracks and loose of joint and sealing of the external mortars were observed).
The water is also retained by the material located in the extrados of the vaults (materials used to load the vaults) and released slowly in time.

Table 1. Different aims and benefits achievable with the project

Conservative
Creation of a complet and exhaustive dossier on the state of conservation of the works of art (structure, architectonic elements, surfaces, frescoes, roof covering, etc.)
Definition of interventions to realize (conservation, restoration, maintenance)
Study and development of the methodologies to adopt for the diagnosis
Evaluation of the seismic vulnerability of the buildings
Indication and realization of pressing interventions to avoid catastrofic events and to reduce the decay
Production of new and computerize data (photographic, architectonic surveys, etc).
Realization of historical researches
Call for funds and for realization of restoration works.
Safeguard and valorization of the manufacts.
Territorial
Cooperation and collaboration within local Institutions
Creation of a provincial teamwork for the conservation of the local cultural heritage
Promotion of the provincial architectonic and historic heritage
Edicational
Partecipation to the phases of the project of students of different High Schools
Approach of the youngs to the different iusses of the Cultural Heritage
Education and training for experts and professional skills
Vocational guidance of the students toward professional activities or studies link to the conservation
Economic
Call for specialized professional and technical experts
Increase of scientific, touristic and didattic provincial pubblications
Demand for data and information obtained with the project.
Increase of the touristic turnout.

Table 2. Operative units engaged in the projects

Operative Unit 1 - Departement of Chemistry, Chemical Engineering and Materials
Operative Unit 2 - Departement of Structure, Water and Soil Engennering
Operative Unit 3 - Departement of Energetics
Operative Unit 4 - Regional Monuments and Fine Art Office
Operative Unit 5 - Provincial Education Superintendency
05.1 Liceo Ginassio "D. Cotugno" – L'Aquila
05.2 Scuola Statale d'Arte "F. Muzi" - L'Aquila
05.3. Istituto Tecnico Industriale "A. Savoia Duca d'Aosta" - L'Aquila
05.4 Liceo Ginnasio "Ovidio" – Sulmona
05.5 Istituto Statale d'Arte "G. Mazara" - Sulmona
05.6 Liceo Ginnasio "A. Torlonia" – Avezzano
05.7 Istituo Statle d'Arte "V. Bellisario – Avezzano
05.8 Istituo Tecnico Statale per Geometri "L. B. Alberti" – Avezzano
Operative Unit 6 - Day-staff
Operative Unit 7 - Interdepart.al Center for Electron Microscopy-University of L'Aquila.

Table 3. Steps of the project and tasks of the operative units (hours)

	UNIVERSITY STAFF		DAY-STAFF		HOURS
Activity	hrs	*Operative unit*	hrs	*Operative unit*	Total
Historical research	0	-	520	(4)(5.1-2-4-5-6-7) (6)	520
Visual checks	60	(1)	108	(5.1-8) (6)	168
Photographic survey	60	(1)	60	(5.1-8) (6)	120
Architectonical survey	0	-	810	(5.2-3-5-7-8) (6)	810
Thematich mapping	200	(1)(2)(3)	400	(4)(5.2-3-5-7-8) (6)	600
Sampling	60	(1)	60	(5.1-8) (6)	120
Characterization of Materials	2400	(1)(7)	1200	(5.1-8) (6)	3600
Microclimate analysis	450	(2) (7)	0	(5.3-8)	450
Static and dynamic tests	30	(3)	450	(6)	480
Structural analysis	580	(3)	0	(5.3-8)	580
Non destructive analysis	450	(2)	0	-	450
Activity with the Schools	180	(1)(2) (3)	90	(4)(5.1-8) (6)	270
Summer stages	120	(1)(2) (3)	120	(4)(5.2-3-8) (6)	240
Travelling exhibitions	150	(1)(2) (3)	400	(4)(5.1-8) (6)	550
Seminars,lectures, workshops	300	(1)(2) (3)	200	(4)(5.1-8) (6)	500
Final report	800	(1)(2)(3)	800	(4)(5.1-8) (6)	1600
Total hours	5840		5218		1158

Table 4. Characterization of the materials and of the decay forms

Mineralogical-petrografical	**Mechanical**
Light microscopy	Compression test
Scanning electron microscopy	Flexural test
Energy dispersive X-Ray analysis	Tensile test
X-Ray diffraction	Structural dynamic test
X-Ray Fluorescence spectroscopy	Finite elements tests
Differential thermal analysis	
Physico-chemical	**Microbiological**
Evaluation of organic compounds (De Angelis[4])	Quantitative and qualitative evaluation of the species
Intruded Mercury porosimetry	Determination of organic compounds (De Angelis[6.7]
Water absorption	
Index of saturation	
Vapour permeability	
Bulk density	
Calcimetry	
Atomic Absorption Spectroscopy	
Soluble salts (ionic chromatography)	
Colorimetric parameters (Portable Digital Spectrophotometer)	
Determination of calcium oxalate (Quaresima[5])	

Rainfall can also penetrate inside the chantry through cracks produced in the past by seismic events, by the accumulation of the snow along the external northen walls, but also by the streaming of rainwater, from the top of the hill - where is located the Abbazia - down, towards the chantry, produced by a incorrect slight slope of the ground between the lateral side walls and the wall enclosure.
Due to these factors several consequences are produced: a) the indoor relative humidity is generally constantly very high (80-90%); b) the paints are often saturated with water; c) several soluble salts (NaCl and $Ca(NO_3)_2 4H_2O$) are transported and accumulated in the plasters and in the walls. The salts can be attributed to the soil as well as to the presence of several tombs underneath the chantry and in the nearby area. The high level of relative humidity does not allow the formation of efflorescences, but improves the mobility of the salts even in the higher parts of the vaults. Furthermore, the high content of salts creates a high potential risk for the conservation of the whole paints. The availability of so much water and salts produces the detachment of the plasters (dissolution of calcium carbonate and the formation of nitrocalcite subflorescences). The precipitation of the carbonate produces white stains on the surface of the paints (neoformation calcite). Considering that the annual medium rainfalls range around 700mm, the problem of infiltration as well as of rising dump are the most relevant problems to be solved. Moreover, some causes of decay are related to the techniques adopted: first of all the paint technique. Infact, the scenes are painted on large and wide fields (generally 5 square meters) therefore the colours could be applied on parts in which the plaster was still hydratate (fresco technique - main part of the background), or, in others, in which the finishing coat was already carbonatated (dry paint technique - upper part of the background and of the religious characters and scenes).

Generally, the latter scenes thus realized are less durable if compared to those obtained by the "fresco" technique. This use of "dry paint" is also confirmed by the the absence of any organic binder for the pictorial film is also observed and the lay of several layers of colour one upon the other. The clay colour pigments, except for the white color obtained using calcium carbonate, were mixed togheter and in some case with the lime solution to obtain the desidered dye.
The second reason is an improper manufacturing of the lime plaster mix used for the realization of first coat, floating and finishing coat. The latter is too rich in lime, which caused shrinkage and fissures, whereas the first coat and floating are poor in binder and coarse aggregates. Furthermore, in the lime plaster mixtures round reddish particles were detected. The swelling of these particles, made of laterite or cocciopesto, due to water absorption or salt crystallization produces a typical micro-crater decay shape which causes the burst of the plaster and of the pictorial film. At least, the use in the past restoration works of animal glue (as consolidant) and gypsum mortars (adopted to mud up fissures and cracks) produced, respectively, blackening and fissuring of the pictorial film, and white stains and salt enrichment. A maintenance programe was realized and proposed for the conservation of the oratory (Quaresima[8]).

Church of S. Mary of the Tomb (Sulmona)
The historical analysis allowed to understand both the transformations and interventions made in the past. The data on the decay forms and materials were also correlated to those analysis.
Particulary profitable resulted the cooperation with the institutions both with the Regional Monuments and Fine Arts Office, for all the documents concerning the

restoration works of the 70's, and the State Archives of L'Aquila, Sulmona division, for the documents relative to the time period from 1857 to 1916. A new computerized architectonic survey of the whole complex was realized (Donatelli[9]). The study emphasised that the static instability of the facade, manifest both to be out of plumb and in a bending along the median of the stone face between main portal and the two lateral doors, especially near the left angle iron along capitolina street, is due to a sinking of the left wain scot of the church. The presence of the instability is documented till the second half of the 19th century. The first intervention (dissassembly of the element, subsequent reassemble, cut of the lateral wall, along Capitolina street, section damaged and realization of a concrete ground) was realized in 1916 and due to the earthquake of the 1915 that produced the detachment of the left angle iron. The second intervention was realized in 1970 (transformation of the baroque appartatus into the original romanic); the façade was raised (about one meter) and the two lateral windows were closed. This raising produced an increase of the seismic vulnerability; the vulnerability index estimated, equal to 0,33, underline the severe static condition of the wall face (Donatelli[9]).
The stones employed have a carbonatic nature (matrix composed of micritic mud where, in some cases, there are sparitic zones). The decay phenomena are due to the sulphatation, carbonatation and attack of the cement of the matrix (dissolution of the sparitic phase and succesively of the primary micritic cement). The analysis showed the presence of calcium oxalate films (whewellite and weddelite) and an overlapped treatment with fluosilicates. The different nature of the stones used for the construction of the facade of the ex-hospital produces as decay forms alveolization and granular disintegration (dissolution of the carbonatic cement in combination with the presence of chlorides). Different homogeneous groups of stones are located in the areas built in the same period such as the church (wall face and base of the façade, left lateral wall) and the ex-hospital (base and wall face of the facaded, left door jamb).
Finally, particulary interesting are the superficial works (at least 15); their study should help to better understand some historical events as well as the influence of the type of woks (i.e. stone-dressing, stabing, hack hammering) on the extent of the decay. The structural interventions on the façade must investigate the matter of the soil (geotechnical aspects), and the structural and dynamic behaviour of the complex (finite elements modelization, in situ dynamic tests). Only after these studies will be possible define materials and techniques for the intervention.

Ducal Palace of Tagliacozzo

The historical analysis underlined the non specifity of the few documents found and that the main part of them is now property of the University of Los Angeles because sold by the Orsini's successors (Calzetta [10]).
The decay of the complex is due to leave the Palace and to the lack of maintenance. The study of the roof covering (1275 square meters) allows to classify the trusses on the basis of decay, rough-hewns and metallic elements, in four groups (Palladian king post-strut, king, hanging, half and not easy to classify) (Pitassi [11]). All the roof elements are realized using chestnut wood.
The relevant decay of the re-roofed complex is due to the roof covering. The rain seepage on caisson ceiling, frescoes and wall structures is due to the lack, in many areas, of rainproof gaiter, seepage through water sheds, valley gutters, roof ridges, windows and skylights (absence of casing or bad state of conservation). This situation

was produced by scattered past repairing interventions and by the lack of maintenance. All that had led to a non uniform and unsymmetrical distribution of loads, anomalies in the geometry of the trusses and seepage of rainwater (Pitassi [11]).
Another important problem is the underground rise up through walls and grounds along Romana street due to the presence of the water bearing stratum (underground torrent of the ex river Imele) (Calzetta [10]).
With regard to the frescoes, the analysis of the first coats, produced by the detachment of part of the scenes (1983), underlined for their preparation the use of poor materials and an exessive amount of clay. The got in of rainwater and a high rate of relative humidity (due to the closing of the open gallery of the *first floor* with large windows) are the main cause of the decay of the still current frescoes as well as of the first coat (sinopie) (Calzetta [10]).
The local carbonatic stone used for the architectonic elements, have a good workability but low mechanical properties due, respectively to a weak of cementation and a high presence of fossil.On the surfaces there are calcium oxalate films and rare phenomena of sulphatation.
The future of the complex, belong to the Abruzzo Region, depends on the destination of use the Palace (Law n. 80 of 1978) that forsee a training center for the Region and social activities for the Municiaplity of Tagliacozzo.

From an educational point of view, the project, considering tha more than 280 students of different high schools take part to the work, presents remarkable results.
First of all because the students understood the importance and the difficult in the safeguard of their country cultural heritage and had the chance to work for this scope. Many of them partecipated to the *Conservative Project* carrying out a diagnostic as weel as conservative phase (*Figure 1)*. Infact, they visited and attemped several restoration yards. Furthermore, the interdisciplinarity methodology adopted and the task to develop were illustrated and discussed through seminars and lectures in each schools.

After that the students of the same province met each others to coordinate the activities, and, later, to discuss the results. In summer time, for each monuments, the results obtained were discussed during workshops and, for several months, different travelling exhibition, realized by the single schools, showed the data and the activity realized. Always in this period some working groups of students, of the same or different schools, attempted, for several weeks, stages at the laboratories of the University of L'Aquila (Laboratories of Materials Science and Applied Chemistry and Technology of Materials) to study in depth some topics.

The ancient and original pictorial techniques adopted for the Chantry of Bominaco and the frescoes of the Ducal Palace were studied in depth by the students of the Art High Schools who realized more than 30 copies of many scenes and details using the same techniques and materials. Some copies were realized with an educational scope: illustrate the original techniques adopted by the artists for the realization of the opera (*Figure 2*).

Figure 1. **Students at work in the chantry of St. Pellegrino during the photograpich and architectonic surveys.**

Figure 2. **Copy of a frescoe, realized by the students of the Istituto Statle d'Arte F. Muzi of L'Aquila, that shows the technique and the materials used for the realization of the mural paints of the chantry of S. Pellegrino in Bominaco (from the left Annunciation and the visit of Mary to Elisabeth; lower the Last Supper).**

At least, one of the most important results obtained during the project was the co-operation within Institutions and in particular the relationships with the Regional Monuments and Fine Arts Office and the University of L'Aquila. On the base of the agreemet realized the architectonic complex of St. Mary of the Tomb in Sulmona was chosen for the tentative specification for the restoration of architectonic, archeologic, historic and artistic works of art (Activity of Ministero dei Beni e delle Attività Culturali and Consiglio Nazionale delle Ricerche).

Moreover, the close and effective collaboration within the Institutions of Abruzzo allowed to realize a request of funds to the Ministero for the restoration of the façade of the church of Sulmona (Required funds 288.645,66 euro (Relazione tecnica[12]). Moreover, the data collected, and the severe state of decay underlined for the main portal of the church of St. Mary of the Tomb, and its frescoed lunette, allowed to realize their restoration works. This job was financed by the Curia of Sulmona and the "Fondazione della Cassa di Risparmio della Provincia dell'Aquila".

Conclusions

In many regional contexts fair local resources are available for the conservation and restoration of country culturale heritage. It is therefore possible develop projects to understand the main causes of decay and their correlation with the environment, the materials and the techniques adopted for the manufacturing.. In many case the data collected allow to find or to ask for local, governative or european funds for the conservative works. It is possible to realize this target only if the local Institutions co-operate togheter and joint their forces and actions. In this operative context it is possible to obtain other results: the education and the training of the young generations for the preservation of "their and own" local cultural heritage. The enthusiastic and wide partecipation of the youngs to the project illustrated, beyond of the conservative results obtained, is one of the most important and encouraging goals realized. It seems therefore to be possible realize the preservation and safeguard of the local cultural heritage through planned projects, strategic policies and program address to the youngs by means of knwoledge, formation, interdisciplinarity, professionality, research and post graduate education.

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TOOLS AND METHODOLOGIES FOR MANAGING CULTURAL HERITAGE: THE ROLE OF PUBLIC PREFERENCES' ELICITATION

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Abstract

This paper discusses ways of improving the management of cultural heritage sites and cities, focusing on new forms of involvement and public participation based on public preferences' elicitation. The problem of city governance and of the appropriate level of democratic participation needs an *integrated approach*, capable of bridging the practice of urban design, conservation of the built environment and decision-making support system.

All urban policies related to cultural heritage, both mobile and immobile, have crucial impacts on the economic development of most world cities. In Europe *cultural tourism* is one of the most important industries. Some management policies may cause distress to both residents and the cultural heritage itself. Many world heritage cities, to different extents and degrees, suffer because of *congestion* and the negative externalities caused by it. Therefore, it is important to develop new cultural heritage management tools that may account for urban changes and help decision makers to develop appropriate policies, accounting for people's preferences, considering minority and disadvantaged groups and their interests.

This paper reports results from a number of surveys using either *contingent valuation* method or *conjoint choice approach* questions to elicit people's preferences for urban regeneration projects and cultural heritage management strategies for some world heritage sites, such as the Temples of Paestum, the cities of Venice and Naples. The potential of the above-mentioned methodologies' within the current cultural heritage research scenario is also discussed

1. Managing cultural heritage

At the beginning of the third millennium, we can say that the role played by cultural heritage in the development of national identities has been discussed at length. We are now more aware of the economic relevance of this resource, and now the focus is not so much on highlighting the importance of heritage sites, but more on **managing** those sites. But ~~What is~~what is ~~CH~~ cultural heritage management? To what extent can we plan the fruition and exploitation of cultural goods in a way that is compatible with their preservation and with a sustainable development of the rest of the cities to which that heritage belongs? What are the tools and methodologies that we should use and enhance to achieve these objectives?~~??~~

This paper discusses one of the possible approaches to cultural heritage management, based on public preferences' elicitation of the economic values of intangible goods, usually considered unpriced. The methodology here used referrers to the economics of outdoors recreation and emphasis the use of one of the economic valuation techniques developed during the XX century by environmental economists.

Management issues may vary according to the social and cultural context of different parts of the world. Each ~~European~~ city in the world is identified by its

peculiar historic development, testified by its cultural heritage. Though the architectural and historic features ~~are~~ may differ ~~ent~~ at national level, the challenges that historic buildings and sites ~~of Europe~~ are facing ~~is~~ have common features. The rapid development of economies is often a threat to the conservation of historic sites The severe environmental hazards caused by poor air quality, traffic congestion, overexploitation of heritage sites, represents a threat that each European country is currently experiencing at some level. The damage on heritage may be irreversible and cause the destruction of a central part of a social community's cultural identity. An urban development that does not account for the necessity of appropriate management of cultural goods in not sustainable in economic, cultural and social terms. How to assess management strategies for cultural goods conservation is a matter of research and enhancement of current valuation methods and conservation technologies.

Since the Athens Charter (1933), ~~The~~ the role of historic building conservation has been highlighted at international level. ~~since the Athens Charter (1933), followed by a~~A number of other international documents, such as the Charter of Venice in 1964 and the Granada Convention in 1985, ~~who have~~ stress~~ed~~ing both the relevance of the attached economic values, and the importance for the development of the city of entire cultural sites followed. Other International agreements have since then highlighted the need for ~~(Charter of Venice 1964, Granada Convention, 1985); with particular respect to~~ the integrated conservation of cultural heritage both in terms of buildings and of sites (Declaration of Amsterdam 1975, Washington Charter 1987).

The Venice Charter in 1964, for the first time, sees cultural heritage goods also as economic goods, therefore a resource, and an asset. The UNESCO and the World Bank, meeting in Beijing in July 2000 with experts from all over the world, stated the relevance of regulations as prerequisite for the protection of cultural heritage that need to involve both decision makers and local communities. As Luxen (2000) stated in Beijing, the preservation of cultural heritage has been usually perceived as a "public expenditure therefore excluded from const/benefit analysis". A new attitude needs to be developed, where preservation and restoration works may be perceived as real investments.. The acknowledgment of the economic values attached to cultural goods is of strategic importance in order to make a negative attitude change. ~~The severe environmental hazards caused by poor air quality, traffic congestion, overexploitation of heritage sites, represents a threat that each European country is currently experiencing at some level. The damage on heritage may be irreversible and cause the distruction of a central part of a social community's cultural identity. An urban development that does not account for the necessity of appropriate management of cultural goods in not sustainable in economic, cultural and social terms. How to assess management strategies for cultural goods conservation is a matter of research and enhancement of current valuation methods and conservation technologies.~~

1.1 Conservation and sustainable development: The role of public participation

Despite the acknowledgment of the role played by *cultural heritage* in the development of the city, ~~European~~ research efforts have not been sufficiently integrated to tackle the complex issues related to its *conservation* and the need to develop comprehensive approaches and methodologies for its *management*. Planning the *sustainable development* of today's European cities implies accounting for an adequate *conservation of* their *heritage*. It is our duty to enhance awareness for the conservation of our cultural heritage, in order to transmit the heritage we have received to future generations in its integrity, as recommended by the International Charters and agreements.

Cultural heritage goods bear symbolic values that help building common identities. Monuments and historic areas can be regarded as a *stock of social values* that need to be preserved and enhanced in order to increase the social capital of a specific society. Serageldin (1996) states that, in the wealthiest societies, the ratio between social and man-made capital is 2 to 1. This seems to suggest a relationship among the level of economic welfare, *social cohesion* and the presence of cultural heritage. However, different cultural minorities may perceive these symbolic values in diverse ways. The can even perceive them as a threat, as the symbol of their discrimination and cultural diversity. In order to enhance social cohesion in our multicultural cities is therefore crucial to understand public preference and attitudes towards cultural goods and their alternative management options.

Urban regeneration represents one of the spinning forces informing future economic and social developments in most European cities. Planning regeneration is a multidimensional issue aiming to enhance the quality of the *built environment* and create a better quality of life for the population involved. The problem of city governance and of enhancing democratic participation is a very complex one, which needs an *integrated approach*. In particular, there is the need to bridge the practice of urban design, conservation of the built environment and decision-making support systems. ~~A new approach, which takes advantage of modern information technologies and the current knowledge in the fields of urban economics, visual representation, software development, and non-market valuation techniques, is here suggested. There is scope to explore a whole body of research based on the analysis of statistical data gathering information on citizens' preferences for different urban policies that so far seems to have been disregarded.~~

Successful city governance "models", such as the Barcelona case, have accounted for public preferences in their regeneration policies and attempted more comprehensive participation process. However, the level of participation in city governance is still relatively low and fundamentally biased, hardly representative of the majority of the public. ~~. In many cases only those who are vocal may be listened to, and this prevents a realistic and informed knowledge-based approach to the resolution of social conflicts.~~ Eliciting public preferences in the form of economic values that the relevant population attaches to policy alternatives may help composing the arising conflicts.

The paper discusses possible improvements in city governance linked to new forms of involvement and participation of the general public based on elicitation of public preferences. Some urban governance issues, in particular those affecting the integration of cultural heritage in the urban settings, are here explored~~. It is known that~~ . ~~urban~~Urban policies related to cultural heritage, both mobile and immobile, have crucial impacts on the economic development of most European cities. For instance, **tourism** in Europe is one of the most important industries. Some policies may cause distress to both residents and the cultural heritage itself. Many cities of art, to different extents and degrees, suffer because of **congestion** and the negative externalities caused by it, but hardly ever the public is involved in the decision making process that will lead to the way the problems are tackled, since often this is regarded as experts' realm and general public attitudes are tested only *ex post.*

Therefore, it is important to develop new cultural heritage **management tools** that will account for urban changes and help decision makers to develop appropriate policies, accounting for people's preferences, considering minority and disadvantaged groups and their interests.

~~This paper is structured as follows: next section discusses the role of non-market valuation in urban regeneration, then possible tools and methodologies are described, finally some preliminary conclusions are drawn.~~

2. Tools and Methodologies: the use of Contingent Valuation

~~**Urban regeneration and non-market valuation**~~

Architects and planners of the 21st century face problems and challenges that may be compared to those introduced by the Industrial Revolution. *New technologies* implied *new spatial relationships* between the city and its countryside: distances being shortened and communications improved. Historic cities had to compromise with new forms of development, far more hectic and sudden than in the past. Their growth was unexpected and mostly uncontrolled. These circumstances caused the development of the first British planning system, mainly concerned with the city rapid rate of growth and the social issues involved, such as housing, public health and social order (HEALEY, 1998). We are now facing a very similar technological revolution, comporting consequences that are even more complex. We are still partially unaware of the implication of *globalisation* and *information technology* on spatial development. However, a reduction of land space needed for the same social interactions represents an established trend. Many sites have already become redundant in the last decades, having lost their original functions. *Urban regeneration* has taken the place of the more traditional development of the city. Today's European cities, to many extents, do not need to be expanded; they need to be re-developed, regenerated. Therefore, the historic, or *man-made capital* becomes an economic and spatial resource of foremost importance.

Conservation strategies, as any other intervention in the urban tissue, ought to include public participation, and this need has been fully acknowledged by the current "people sensitive" and "collaborative" planning approaches (HEALEY, 1998). The emerging forms to manage conflicts over the use and development of conservation areas presents a challenge to the current conservation and planning practices. Any intervention strategy in conservation areas involves a wide range of those with a 'stake' in culture goods of this area. It is extremely important for different stakeholders to be engaged in the decision-making process. Their conflicting concerns, interests, and strategies may well be shaped through discussion and negotiation, leading to a more sustainable intervention strategy.

This paper's argument is that, in order to improve the negotiation process among conflicting interests, we need to elicit the **economic values** attached to each stakeholder's set of preferences and values, experts as well as residents. Local residents may attach both positive and negative values to the environment (as well as to *changes* in its quality) where they live. In economic terms these values can be

defined as *positive* and *negative externalities*. Residents have a personal perception of what enhance their quality of life *(positive externalities)* and what causes environmental distress *(negative ones)*. They must be regarded as stakeholders in any development strategy of their area. General public's views must be accounted for, in order to achieve a sound development or regeneration program. A way of doing so is to make their perceived values as explicit as possible. To this extent, some economic non-market valuation techniques, such as contingent valuation method (CVM), may represent an important tool.

Non-market valuation techniques have been developed by environmental economists in the last few decades to tackle some market failures. These techniques aim at computing the monetary benefits of environmental policies, important when one wants to compare different categories of benefits, or when one wants to compare the benefits of a policy with its costs. Valuation implies finding how much of one resource (e.g., income) one is willing to give up to obtain an improvement in, or avoid a degradation of, another.

Usually, one can infer how much individuals value a good by observing their market behaviour, e.g. the amount of this good that is exchanged on the market and its price. However, most public goods such as environmental resources or cultural heritage sites are typically *not* exchanged on regular markets, making it impossible to observe prices and quantities. Economists have developed special techniques to estimate the value of environmental quality changes. Among these techniques, the **method of contingent valuation** (MITCHELL, 1989) directly asks individuals how much they are prepared to pay for specified changes in environmental quality. The willingness to pay (WTP) for the proposed change in environmental quality (or for obtaining a public good) is the amount of money that can be subtracted from a person's income at the higher level of environmental quality for him to keep his utility unchanged, and is the theoretically correct measure of the value individuals place on the change. In our discussion, we are resorting to this technique and its latest developments, arguing that this approach can prove useful for conservation purposes. We present a summary of three case studies conducted by the author, where contingent valuation approach is used for cultural heritage management purposes.

~~*Tools and Methodologies to assess urban interventions in conservation areas*~~

~~The design of policies and plans regarding heritage sites and cities needs to involve measurement, analysis, and communication to designers and the wider public using new information and communication technologies (ICTs). Decision support systems, which are frameworks for linking new IT tools together, are being developed in many areas of planning. Geographic information systems (GIS), lie at the heart of such systems, and provide the essential framework for data storage and analysis of urban and spatial data, such as that involved in heritage problems.~~

2. A ~~summary~~ review of ~~Case~~ case ~~Studies~~ studies

In this section we report some of the results from three case studies that have been funded by local governmental agencies or research center to help the decision making process. All of the sites here presented are world heritage sites. The first case is given

by the Temple of Paestum, near Salerno, Italy, the second one is The Bosco of Capodimonte, in Naples, whilst the last one is the case of the Arsenale in Venice.

The common research agenda is given by the use of *different contingent valuation approaches* to explore economic solutions for various management problems of cultural sites. Here our aim is to stress the potential given by this economic valuation technique to tackle different issues, whilst an in depth discussion of the results is object of further specific publications.

When one wishes to place a monetary value on the aesthetic and use services of a cultural site using stated preference techniques, two approaches are possible: Contingent valuation and conjoint choice studies.

In a contingent valuation survey, people are asked directly to report their willingness to pay (WTP) to obtain a specified commodity, such a change in the urban space or the way a conservation site is managed. The change is hypothetical, and no actual transaction takes place. Contingent valuation has been used to place a monetary value on programs for the preservation and restoration of specific urban *buildings* with historical and cultural significance, such as churches, museums, theaters, and marble monuments (Navrud et al, 1992; Grosclaude and Soguel, 1994; Willis, 1994; Riganti and Scarpa, 1998; Scarpa *et al.* 1998; Whitehead *et al.* 1998; Santagata and Signorello, 2000; Pollicino and Maddison, 2001; Morey *et al.* 2001). A more extensive survey can be found in Navrud and Ready (2001).

Conjoint analysis represents a more recent development of the contingent valuation approach, and it seems even more suitable for management purposes. In a typical conjoint choice experiment study, respondents are asked to choose between two or more commodities (or "policy packages") each of which is defined by a set of attributes, one of which is usually the cost to the respondent. Attributes are varied across "packages," and the packages are usually matched in such a way that the choice between them is not straightforward, and the respondents must trade off attributes. Conjoint choice analysis, therefore, lends itself to situations where the investigator wishes to see how support for a policy or program changes as aspects of the program itself are altered.

Table 1 summarizes the study objective, the funding body and the contingent valuation (CV) format used to tackle the problem.

Table 1: Case studies and their Political relevance

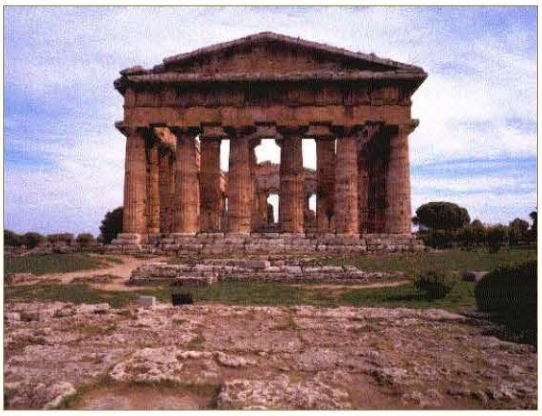
The site	Funding body	Objective	CV format	Main result
The temples of Paestum, Italy	Regione Campania	Management options	Conjoint analysis	Guided tours, labs
The Bosco of Capodimonte, Italy	Ministry of Cultural Heritage	Charging Fee	CVM, double bounded	Mean WTP 14,074 Italian lire
The Arsenale of Venice, Italy	FEEM	urban regeneration alternative	Conjoint analysis	In progress

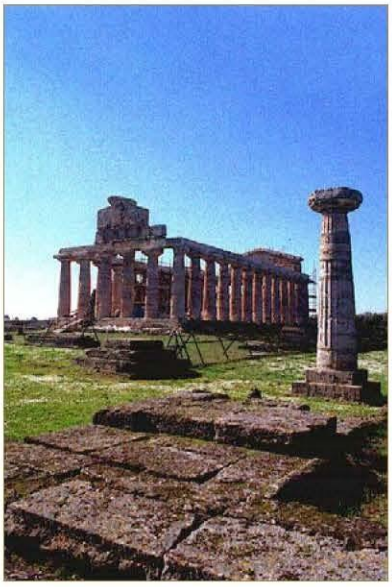
2.1 A world heritage site: The temples of Paestum

The temples of Paestum, namely the Basilica, the Temple of Poseidon, the Temple of Ceres, are one of the most impressive examples of Archaic Doric Architecture

outside Greece. They were built between 530 and 460 BC they were part of the city of Paestum one of the most important Greek colonies of Magna Grecia. They were inscribed in the world heritage list in 1998, within the Cilento and Vallo di Diano National Park, together with the archeological sites of Velia and the Certosa of Padula. They are among the most important archeological remains in Italy and are visited by many tourists. A Museum situated next to the archeological remains contains many roman and Greek works of art.

The study was funded by the Regione Campania, the Local Government, within a research devoted to the study of economic models for the management of cultural heritage goods. A main research objective was to elicit visitors' preferences for a change in services for the fruition of the temples. 732 in person interview were





gathered in situ in July 2002. 96% of the sample was made by tourists, and 76,5% of the respondents was living outside the Campania Region. Each respondent was presented with 4 cards, each containing a pairwise choice of different management packages defined by different levels of 10 attributes. All the attribute were related to improvements in the fruition of the temples. They included new opening hours (indicated in table 2 as HOURS), an audiotape service (AUDIO), guided tours (TOUR), a new coffee shop (BAR), new exhibitions within the museum (EXIB), more cultural events (e.g. theater performances) among the temples (EVENT), the creation of a children lab (LAB), the production of audiovisual (AUDIV), the production of digital documentation (DOCUM). Each of the alternatives had a price to the respondent. Table 2 presents the estimates of the regression analysis conducted on the whole sample. The last column shows the mean willingness to pay (WTP) for each attribute. As one can see, the highest WTP was expressed for guided tour, longer opening hours and the creation of children labs. The research results have already had

Table 1 Coefficient estimates and mean Willingness to Pay

Variables	Coefficient	St. Err	t-stat	β/δ**
HOURS	0.6580	0.0747	8.812	10.107

AUDIO	0.4594	0.0634	7.240	7.057
TOUR	0.8018	0.0675	11.881	12.316
BAR	-0.1937	0.0734	-2.639	-2.975
EXHIB	0.2936	0.0733	4.007	4.510
EVENT	0.4561	0.0764	5.972	7.006
LAB	0.7025	0.0805	8.723	10.791
AUDIV	0.4880	0.0738	6.608	7.4960
DOCUM	0.3979	0.0622	6.401	6.1121
PRICE	-0.0651	0.0069	-9.444	

*all coefficient are significant at the conventional levels
**Marginal mean WTP in Italian lire

~~Tab. 1~~

~~Variabili Coefficienti* St. Err t stat β/δ**~~
~~ORARI 0.6580 0.0747 8.812 10.107~~
~~AUDIO 0.4594 0.0634 7.240 7.057~~
~~VISITE 0.8018 0.0675 11.881 12.316~~
~~CAFFE -0.1937 0.0734 -2.639 -2.975~~
~~MOSTR 0.2936 0.0733 4.007 4.510~~
~~EVENT 0.4561 0.0764 5.972 7.006~~
~~LABOR 0.7025 0.0805 8.723 10.791~~
~~AUDIV 0.4880 0.0738 6.608 7.4960~~
~~DOCUM 0.3979 0.0622 6.401 6.1121~~
~~PREZZO -0.0651 0.0069 -9.444~~
~~*tutti i coefficienti sono significativi ai convenzionali livelli di significatività~~
~~** disponibilità marginale a pagare per le singole caratteristiche in migliaia di vecchie lire~~

some impacts on the management of the site, since some of the most desired attributes are now being implemented.~~3) Come definirebbe la spesa attuale sulla conservazione del patrimonio?~~

~~4) Se il governo centrale decidesse di aumentare la spesa per la conservazione del patrimonio culturale, come vorrebbe che questo denaro venisse raccolto?~~

~~2) Quale di queste ragioni meglio descrive il motivo della sua scelta?~~

~~3) Ritiene che ci sono dei servizi che non citato e che dovrebbero essere introdotti?~~

2.2 Managing the access to historic gardens: the case of the Bosco of Capodimonte

The historic center of the city of Naples was inscribed in the world heritage list in 1995. Neapolis was founded by Greek settlers in 470 B.C. It has retained the imprint of the successive cultures that emerged in Europe and the Mediterranean basin. This makes it a unique site, with a wealth of outstanding monuments such as the Church of Santa Chiara and the Castel Nuovo.

The Bosco of Capodimonte is situated in the Northern part of the city of Naples. It was designed in 1735 by Canevari. It is one of the most interesting European historic gardens. It was the residence of king Charles the III of Bourbons. Under the Bourbons the garden saw a phase of great splendor. After the creation of the Italian Kingdom under the Savoia dynasty not much was changed. The world war periods badly affected the garden that after the Second World War was almost considered vacant land and was badly run down. In the last 20 years the Local agency in charge of its preservation, the Sovrintendenza ai beni artistici and ambientali di Napoli, has restored the Bosco bringing it back to the original beauty.

This study was commissioned by the Sovrintendenza for political reasons. This agency had tried to charge an entry fee to the Bosco, in order to partially meet the maintenance cost of the immense garden. However, this had met the strong opposition of the local environmental groups. The Sovrintendenza wanted us to explore the possibility of finding a charging scheme that at the same time might encounter the public opinion, and be economically feasible.

For this purpose 494 in person interview were conducted in July 1999 at the Bosco of Capodimonte. The sample was composed by 87.5% of people coming from the metropolitan area of Naples. They were regular visitors of the Bosco, with 15.7% of the respondents going to the Bosco on a daily basis, while 20% twice a week and 11.7% once a week. The 67.7% of the respondents belonged to a low income range, with a 18.6% of the sample composed by students, another 18% by self employed and another 19% by clerks. The regression analysis of the sample gave a median WTP equal to 14,074 Italian lire, which means that more than the half of the respondents were willing to pay that amount of money to secure their access to the Bosco. Since this might have represented and overestimation of the public WTP a more detailed analysis was carried out for different income groups. Table 3 shows the final results, with the entry prices maximizing the total revenue.

~~**Tabella 5.3: Modello di scelta discreta a fascia singola per la WTP ad accedere al Bosco**~~

Table 3 Entry price that maximises revenue, with associated demand (visits) at that price, and total revenue.

	Price	*Visits per person*	*Estimated total visits to Bosco*	*Total revenue, million lira*
All visits	7041	7.40	83,900	590.740
Discriminatory price				
By income				
low income	6128	3.00	15,600	95.597
high income	7024	8.10	49,500	347.688
total				*433.285*
By economic activity				

inactive	6988	9.00	89,600	43.710
active	9391	5.62	39,800	373.762
total				*417.472*

~~**Tabella 6.1: Tariffa d'ingresso mssimizzante i ricavi; con associata domanda(visite) a quel prezzo e ricavo totale.**~~

2.3 Managing the future of historic urban sites: the Case of Venice Arsenale

The Venice lagoon has been inscribed in the World heritage list in 1987. The city of Venice was founded in the 5th century and spread over 118 small islands and became a major maritime power in the 10th century. The whole city is an extraordinary architectural masterpiece and is one of the most sought after tourist attractions of the world. For its exceptional beauty the city is regarded as an extraordinary open air museum. Among the world's cities of art is probably the one that most suffers in terms of pedestrian congestion due to the excessive numbers of visitors.

The Venice Arsenale is owned by the Italian government and is currently used by the Italian Navy. According to the tradition, the doge Ordefalo Falier founded the Arsenale—a shipbuilding yard—in 1104. In 1340 the "Darsena Nuova" was created, which marked the birth of the Arsenal Nuovo and of the Corderie building. Further expansion started in 1473, covering an area of 26 hectares. In 1797 the French took control of the complex and made some demolitions and additions. The decline of the Arsenale started after the First World War, and became even more dramatic after World War II, when the buildings were progressively abandoned. In 1983 the Soprintendenza per i Beni Ambientali ed Architettonici of Venice started preservation works.

The Arsenale site accounts for about 15 percent of the area of the city of Venice (about 45 hectares), and is located in the sestiere Castello. It is one of the few areas of Venice where conservation goes together with urban development. A heated debate has accompanied the development of a masterplan for the Arsenale area in the last 20 years.

The Arsenale plays a strong symbolic role; it was the place where the strength and power of the Serenissima was built. The City Council of Venice has recently deliberated that the Arsenale is an inalienable heritage of the city of Venice. In recent years, the importance of the Arsenale has resulted in a heated debate on its possible new uses. Many architectural proposals have been submitted through international competitions. The Proposals—both those submitted in the past and those currently under consideration—have shown that there may be a conflict between different possible land uses and the transformation allowed by the existing architectural structures.

The research is financed by FEEM, an international research centre with one of its headquarters in Venice. The main objective of the research is to assess residents' preferences for alternative land uses and intervention in the Arsenale North. The research is now in progress and 8 Focus groups involving local residents have been carried out in Venice in October and December 2002 as well as in and January 2003. Purpose of the focus groups is to test appropriate ways of developing a questionnaire to be administrated to the Venetian population. One of the purposes of this research is to explore the potential of stated preference methods for eliciting the public's preferences for new land uses, architectural features, aesthetic quality, and for the impact economic activity associated with redevelopment.~~The Venice Arsenale is owned by the Italian government and is currently used by the Italian Navy. The Arsenale site accounts for about 15 percent of the area of the city of Venice (about 45 hectares), and is located in the sestiere Castello.~~

~~According to the tradition, the doge Ordefalo Falier founded the Arsenale – a shipbuilding yard – in 1104. In 1340 the "Darsena Nuova" was created, which marked the birth of the Arsenal Nuovo and of the Corderie building. Further expansion started in 1473, covering an area of 26 hectares. This phase lasted more than 100 years, resulting in the construction of the New Corderie building, among others, in 1591. At its height, the Arsenale employed roughly 20,000 workers in an assembly-line fashion and produced one ship a day.~~

~~In 1797 the French took control of the complex and made some demolitions and additions. After 1814 the Arsenale was again under the Austrians and underwent significant restoration works (1825-1835). After the creation of the Italian kingdom, the Arsenale undertook an important relaunching phase, with more enlargements and enrichments. The decline of the Arsenale started after the First World War, and became even more dramatic after World War II, when the buildings were progressively abandoned. In 1983 the Soprintendenza per i Beni Ambientali ed Architettonici of Venice started preservation works.~~

~~*2.2 Motivation for the Choice of the Arsenale*~~

~~We have chosen to work with reuse projects for the Arsenale for several reasons. First, as previously mentioned, one of the purposes of this research is to explore the potential of stated preference methods for eliciting the public's preferences for new land uses, architectural features, aesthetic quality, and for the impact economic activity associated with redevelopment~~

~~Second, in this research we wish to concentrate on a "city of art," where the relationship between cultural heritage resources and city development is often more at threat. Venice is an obvious choice for the national and international relevance of its heritage. The Arsenale is one of the few places in Venice that has the potential for a real transformation of its uses, with important impacts on both residents and visitors.~~

~~The Arsenale plays a strong symbolic role; it was the place where the strength and power of the Serenissima was built. The City Council of Venice has recently deliberated that the Arsenale is an inalienable heritage of the city of Venice.~~

~~In recent years, the importance of the Arsenale has resulted in a heated debate on its possible new uses. Many architectural proposals have been submitted through international competitions. The Proposals – both those submitted in the past and those currently under consideration – have shown that there may be a conflict between different possible land uses and the transformation allowed by the existing architectural structures.~~ This is a very novel approach, and should push the boundaries of the current use of contingent valuation method. So far the research has encountered the support of both the local population and the local governmental agencies.

~~In sum, the Arsenale responds to our main criteria for the eligibility of a site:~~

1. ~~It has an important urban dimension, both for surface covered and relevance with respect to the city;~~
2. ~~It has a strong symbolic value, for the role played in the historic development of the city since the Middle Ages;~~
3. ~~It represents an important example of industrial archaeology ante-litteram with very distinctive aesthetic features;~~
4. ~~Its regeneration, which has partially already taken place, plays a strategic role for the development of the city of Venice, for its accessibility and its cultural role.~~

Mise en forme : Puces et numéros

43. Conclusions

The role that valuation may play in urban planning is still to be fully explored. The paper aims to shed a light on the need of implementing new consultation processes, new design protocols, where economic valuation may play a substantial role in revealing *ex ante* the strength of preferences of all the relevant actors, the stakeholders, in city development. This paper focuses the attention on a topic, which lies at the frontiers between urban planning and economic valuation. More research is needed in this direction.

The model we suggest to use is in between a *performance criteria* and a *collaborative place making* approach. It is based on the use of economic valuation techniques (CVM) we regard capable to pose a "social weight" to relevant criteria. These criteria may express the quality of places as perceived by different stakeholders and be used when managing conflicting situations. The adoption of CVM for planning purposes is justified by the nature of the valuation technique itself, deeply rooted in social studies literature, being an *interview-based technique*. In fact, CVM is capable of gathering a

great deal of information on attitudes and preferences of the relevant population. Valuing cultural heritage should no represent a purely academic economic activity, but need to be linked with urban planning decisions, in an *ex-ante* framework. In fact, the characteristics of *cultural goods* themselves, the values that people attach to *man-made capital,* opens up a new prospective on the debate about sustainable cities. In this perspective, the costs of implementing studies such as CVMs would be compensated by the social benefits gained, in terms of knowledge of the priorities that the relevant population may express for the development or the management of an important cultural area. This ensures participative grounds upon which to base policy and management decisions.

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THE SICILIAN ARCHAEOLOGICAL ROUTES: MOTYA THE PHOENICIAN CERAMICS: A MULTI-DISCIPLINARY APPROACH TO THEIR CHARACTERIZATION.

Commentaire [PC1]:

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Abstract

Archaeometric studies have been carried out with the aim of characterising ceramic findings coming from the "Zona A" in Motya. The fragments investigated pertain to three types of coarse ware as mortar-tripods, cooking-pots and amphorae. The mortar-tripods and the cooking-pots are earthen wares utilized to cooking and are characterized by a big variety of shapes and typologies. The amphorae belong to typologies used by the native people of the western Sicily and largely influenced by Greek productions.

In the present paper we report the results obtained by scientific investigation as FT-IR, ^{57}Fe Mössbauer spectroscopy and thermogravimetric analysis together with an archaeological characterization of the *impasti* and typologies of the wares. The mortar-tripods present analogies with the cooking-pots, similar behaviour during the heating and similar spectral data in samples collected from bulk and the margins of the wares, emphasizing their mutual utilization as cooking pot. The amphorae show great homogeneity in the samples examined; some characteristics distinguish them from the former objects probably due to a different utilization of these wares.

Introduction

The Motya islet with Solunto and Palermo was one of the most important sites founded by Phoenicians in Sicily. It is placed in a lagoon at the extreme western tip of Sicily and hence had a very important strategic function in the Phoenician trade in the western Mediterranean basin. During the VI – V centuries B.C. the island was a very florid centre, whose wealth is attested by archaeological finds as ceramics, sculptures, glass objects and by coins.

Archaeometric studies have been carried out to characterize some ceramic findings coming from the "Zona A" in Motya. The fragments investigated pertain to three types of common objects as mortar-tripods, cooking-pots and amphorae. The mortar-tripods and the cooking-pots are earthen wares utilized to cooking and are characterized by a big variety of shapes and typologies. The amphorae belong to typologies used by the native people of the western Sicily and largely influenced by Greek productions.

In this paper we present the results obtained by spectroscopic methods, FT-IR and ^{57}Fe Mössbauer at room temperature, and by thermogravimetric analysis in the 25–900 °C temperature range. A study of the *impasti* employed in their manufacturing has been carried out by examination of macroscopic inclusions and descriptive tables have been compiled on the basis of predefinite parameters.

Experimental

Mössbauer spectra were recorded at room temperature by using ≈ 100 mg of ceramics in powder form. A conventional constant acceleration spectrometer, coupled with a multichannel analyser, has been used. Velocity scale was normalised to a metallic iron absorber. The used source was a 10 mCi of ^{57}Co diffused in Rhodium purchased from Ritverc (St Petersburg, Russia). The spectra were fitted by the computer program NORMOS. The results are summarized in Table1.

Thermogravimetric analysis (TGA), in the 25-900 °C temperature range, were obtained by Mettler TA3000 system with a heating rate of 10 °C/min. The results are summarized in Table 2.

The FT-IR spectra were recorded in the 4000-200 cm^{-1} region in nujol or exachlorobutatiene mulls between CsI disks by using the FT-IR Perkin-Elmer Spectrum One spectrometer.

Results and Discussion

Seventeen ceramic fragments have been studied: eight sherds coming from mortar-tripods, six from cooking-pots and three from amphorae; all samples pertain to common, not painted ceramic and the morphological typology has been characterized as concern (Vecchio [1]).

The samples have been examined by ^{57}Fe Mössbauer spectroscopy that yields qualitative and quantitative information about the iron compounds present in the ceramics. In the clays the iron is present as small particles of oxides or hydroxides dispersed in the clay matrix or as substitute of aluminium in silicates (Kostikas, Simopoulos, Gangas [2]). The firing process induces structural and chemical changes that are related to the temperature reached in the process of pottery manufacturing or during their use as cooking pot (Murad and Wagner [3]).

The FT-IR spectra show two absorptions centred at 1420 cm^{-1} (broad, weak)) and at ≈ 890 cm^{-1} (weak or medium) attributable to CO_3^{--} stretching (Branda, Lucani, Costantini [4]).

By means of thermogravimetric analysis the thermal decomposition of the samples has been examined and some aspects of the external and internal zones have been characterized.

A study of the *impasti* has been carried out.

1. The mortar-tripods

This category of objects was used to prepare foods. Their morphological features are typical of pottery production both in the Phoenician area and in the northern

Syria. The samples pertain to different typologies and show a long vitality in the domestic use in Motya, Zona A.

The Mössbauer spectra of six samples, **1**, **3**, **4**, **6**-**8** present three spectral components: a six-line component assigned to the presence of oxides, a quadrupole doublet with parameters typical of structural Fe(III) and a second doublet with typical parameter values of paramagnetic Fe(II) (table 1); the presence of Fe(II) shows that the baking conditions during the manufacturing or during their use where not oxidising enough. The sample MT-72 shows clearly a sandwich structure, the internal layer has a dark grey colour and the external is reddish; the Mössbauer spectra are significantly different (Fig. 1); in the margins of the ware the Fe(II) is absent but an increasing percentage of oxides is observed with parameters of the haematite, in the bulk the presence of Fe(II), 63%, and Fe(III), 26%, can be explained by the low permeability of the ceramic material respect to oxygen, the grey colour can be related to traces of magnetite, Fe_3O_4 (Longworth, Tite, [5]).

The thermogravimetric analysis (Table 2) shows a mass loss, 0.8 – 4.8 %, at a temperature lower than 100 °C produced by water elimination; a following loss at 600 – 700 °C can be ascribed to decomposition of primary calcite; in some cases a gradual loss at a lower temperature, about 400 °C, can be caused from reaction of $CaCO_3$ with silicates to form calcium silicates and CO_2 (Branda, Lucani, Costantini [4]). A typical thermogram is shown in Fig. 2.

The mortars coming from the "A Zone" in Motya have been classified as obtained by *impasti* types **a**, **b** and **d** (Table 3).

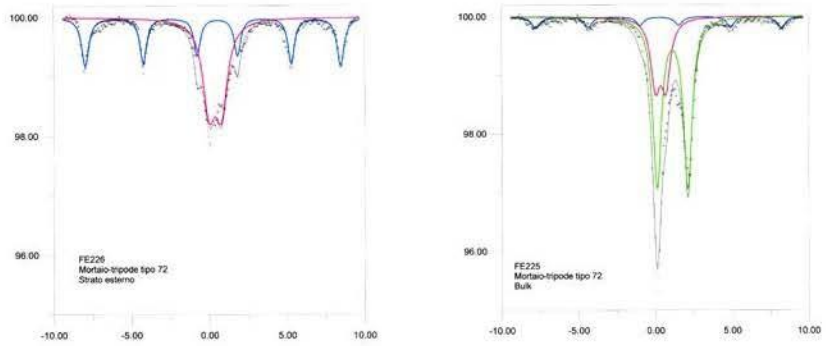

Figure 1. The Mössbauer spectra of MT-72: left: margin, right: bulk.

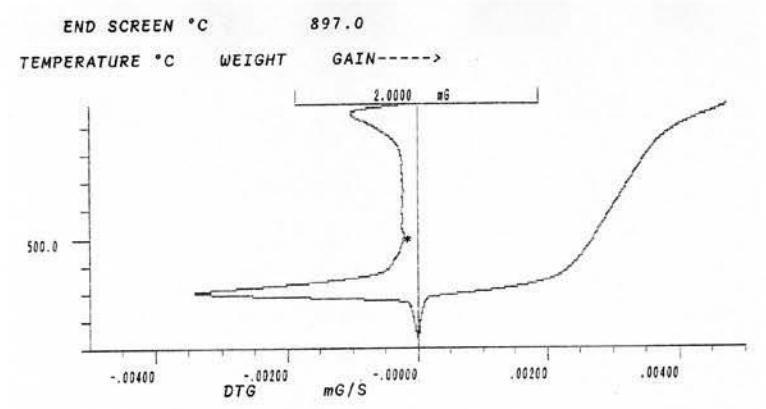

Figure 2 . A typical thermogram of mortar-tripod

2. The cooking-pots

The cooking-pots arose the Eastern Mediterranean basin, and are characterized by a unique handle and a rounded shape that was modified in the Phoenician colonies production of Sicily and Africa.

The Mössbauer spectra of the samples **10 – 13** show three spectral components attributable to structural paramagnetic Fe(III) and Fe(II) and to oxides (Table 1); the samples **9**, **14** and **13 bis**, from margins of OT –18 characterized by reddish colour, present two spectral components due to paramagnetic Fe(III) and haematite. The spectra of OT –18 (from bulk, **13**, and margin, **13 bis**) are reported in Fig. 3.

The thermogravimetric analysis shows analogies between cooking-pots and mortar-tripods (Table 2).

The cooking-pots have been classified as obtained by *impasti* types **a** (samples **11** and **12**), **b** (sample **10**), **d** (samples **13-14**) and **m** (**9**), (Table 3).

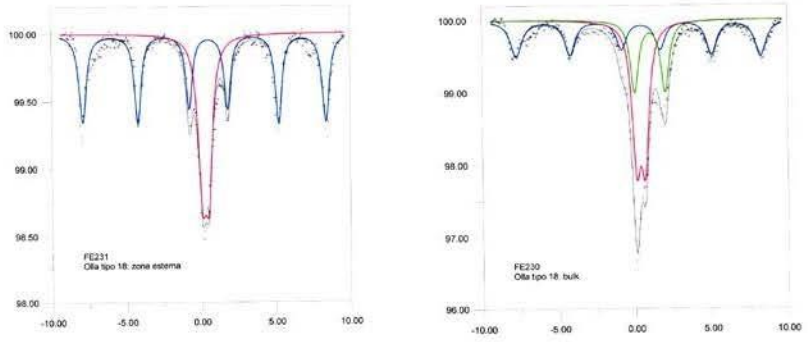

Figure 3. The Mössbauer spectra of OT-18: left: margin, right: bulk.

3. The amphorae

The amphorae pertain to typologies known within the native people of the western Sicily, but their manufacturing was largely influenced by Greek productions.

The Mössbauer spectra show two spectral components: a doublet with parameters typical of paramagnetic Fe(III) and a six-line pattern due to haematite, (Table1); the spectrum of the sample **17**, AT-28, is shown in Fig. 4.

The thermogravimetric analysis shows that two samples have the lower value of residue % at 900 °C owing to a remarkable mass loss, 7 - 9 %, at a temperature below 100 °C attributable to water loss during the first heating phase. The amphorae AT-27 and AT-27.1 have been classified as obtained with *impasti* type **b** and AT-28 with **d** (Table 3).

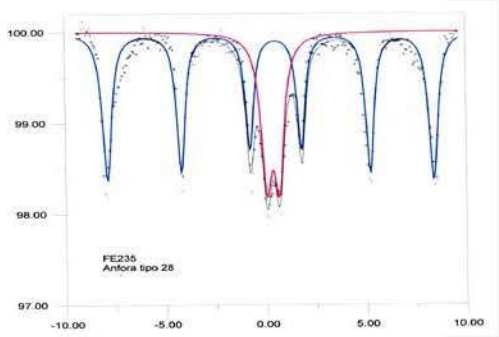

Figure 4. The Mössbauer spectra of AT-28

Conclusions

The mortar-tripods present analogies with the cooking-pots, similar behaviour during the heating and similar spectral data in samples drawn from bulk and margins emphasizing their mutual utilization for preparing and cooking food. The amphorae show great homogeneity in the samples examined; some characteristics distinguish them respect to the former objects supporting a different utilization of these wares.

The presence of carbonates, observed in the *impasti* and confimed by FT-IR and TGA data, shows that the firing temperature reached in the process of pottery manufacturing or during their use as cooking pots was lower than 700-800 °C, because a complete decomposition should happens to higher temperature.

Acknowledgements

Financial support of MIUR, Roma, Italy, is gratefully acknowledged

Table 1. Mössbauer parameters at room temperature.

Samples			Fe(III) doublet			Fe(II) doublet			Sextet			
Number	[a]Typology	Archaeological assigned date Centuries BC	[b]IS mm/s	QS mm/s	[c]A%	[b]IS mm/s	QS mm/s	[c]A%	[b]IS mm/s	QS mm/s	[c]A%	H Tesla
1	MT - 66	VII - VI	0.40 (0.001)	0.84 (0.002)	76 (1)	1.19 (0.007)	[d]2.00	10 (1)	0.44 (0.01)	-0.27 (0.02)	14 (1)	50.4 (0.1)
2	MT – 67.1	VI (end)	0.39 (0.004)	0.88 (0.006)	61 (1)				0.38 (0.005)	-0.25 (0.006)	39 (1)	50.3 (0.04)
3	MT – 67.2	VI (end)	0.37 (0.004)	0.81 (0.006)	64 (1)	1.09 (0.01)	[d]2.00	7 (1)	0.41 (0.01)	-0.18 (0.02)	29 (2)	49.9 (0.08)
4	MT - 68	VII	0.34 (0.004)	0.52 (0.01)	46 (1)	0.96 (0.01)	[d]2.00	8 (1)	0.38 (0.004)	-0.18 (0.01)	46 (2)	49.7 (0.02)
6	MT – 69.1	VII (end)	0.37 (0.003)	0.58 (0.006)	35 (1)	0.94 (0.009)	[d]2.00	9 (1)	0.39 (0.004)	-0.20 (0.007)	56 (1)	49.7 (0.03)
7	MT -70	VI (end)	0.39 (0.003)	0.97 (0.008)	56 (1)	1.13 (0.007)	[d]2.00	15 (1)	0.38 (0.007)	-0.24 (0.01)	29	50.7 (0.05)
8	MT- 72 (bulk)	VII - VI	0.36 (0.004)	0.67 (0.009)	26 (1)	1.12 (0.002)	[d]2.00	63 (1)	0.27 (0.01)	-0.05 (0.03)	11 (1)	49.5 (0.1)
8 bis	MT – 72 (external layer)	VII – VI	0.38 (0.003)	0.80 (0.007)	54 (1)				0.39 (0.003)	-0.28 (0.005)	46 (1)	50.8 (0.02)
9	OT - 9	VIII - VII	0.41 (0.003)	1.03 (0.003)	59 (1)				0.37 (0.003)	-0.26 (0.005)	41 (1)	50.7 (0.003)
10	OT –11 (bulk)	VI	0.27 (0.006)	0.45 (0.02)	36 (1)	1.05 (0.009)	[d]2.0	40 (1)	0.32 (0.01)	-0.07 (0.03)	24 (1)	48.6 (0.1)
11	OT –16.1	VII - VI	0.35 (0.003)	0.55 (0.005)	34 (1)	0.91 (0.01)	[d]2.0	6 (1)	0.39 (0.002)	-0.21 (0.005)	60 (1)	49.6 (0.02)

Table 1. (continued)

12	OT – 16.2	VII -VI	0.35 (0.003)	0.59 (0.004)	35 (0.5)	0.92 (0.02)	[d]2.0	2 (0.5)	0.38 (0.002)	-0.25 (0.006)	63 (1)	50.1 (0.02)
13	OT –18 (bulk)	VI (first middle)	0.38 (0.003)	0.57 (0.007)	40 (1)	0.99 (0.004)	[d]2.0	22 (1)	0.34 (0.006)	-0.16 (0.01)	38 (1)	49.6 (0.06)
13 bis	OT –18 (external layer)	" "	0.28 (0.004)	0.44 (0.01)	38 (1)				0.37 (0.004)	-0.27 (0.007)	62 (1)	50.5 (0.03)
14	OT - 19	VII - VI	0.33 (0.003)	0.56 (0.03)	35 (1)				0.38 (0.002)	-0.26 (0.004)	65 (1)	50.3 (0.02)
15	AT - 27	VII (second middle)	0.41 (0.003)	1.03 (0.003)	59 (1)				0.37 (0.003)	-0.26 (0.005)	41 (1)	50.7 (0.03)
16	AT – 27.1	V - IV	0.39 (0.002)	0.87 (0.004)	58 (1)				0.38 (0.006)	-0.24 (0.008)	42 (1)	50.0 (0.03)
17	AT -28	VII (second middle)	0.36 (0.005)	0.63 (0.007)	29 (1)				0.37 (0.004)	-0.26 (0.003)	71 (1)	50.4 (0.02)

The numbers in parentheses are the standard deviations

[a] M: mortar-tripod; O: cooking pot; A: amphora; T: typology.

[b] Relative to metallic iron at R.T.

[c] Percentage area of the peaks in the Mössbauer spectrum.

[d] Parameter fixed in the fitting program

Table 2. Thermogravimetric data

N°	Sample	ΔT (°C)	T_{max} (°C)	Mass loss %	ΔT (°C)	T_{max} (°C)	Mass loss %	ΔT (°C)	T_{max} (°C)	Mass loss %	Residue % at 900 °C
1	MT - 66	25 - 224	55	1.3	225 - 484		0.8	484 - 760	696	2.8	95.1
2	MT – 67.1	25 - 248	47	4.5	250 - 515	400	1,8	516 - 650		0.6	92.4
3	MT – 67.2	25 - 250	67	4.8	250 - 519	329	1.8	519 - 718	675	1.7	91.6
4	MT - 68	25 - 276	38	0.8	276 - 500	306	0.8	500 - 718	671	1.1	97.4
5	MT – 69	25 - 250		1.4	250 - 500		0.8	500 - 750	570	1.0	96.5
6	MT – 69.1	25 - 250		0.8	250 - 500		0.5	500 - 700	516	0.9	97.6
7	MT- 72	25 - 250	39	3.7	250- 500		2.3	519 - 818	623	2.1	91.1
8	MT- 72 bulk	25 - 250	34	0.8	250 - 411		0.3	415 - 723	675	2.1	96.8
8 bis	MT- 72 ext.	25 - 250	47	2.5	250 - 550	363	2.1	550 - 750	557	1.7	93.1
9	OT – 9	25 - 250	75	5.5	250 - 500	255	2.0	500 - 780		1.1	91.4
10	OT – 11 bulk	25 -270	47	0.8				500 - 700		0.7	98.5
11	OT – 16.1	25 - 246	47	0.9	250 - 500		0.9	500 - 844	671	1.9	96.1
12	OT – 16.2	25 - 190	47	0.3	190 - 510	328	0.5	515 - 757	605	0.3	98.7
13	OT – 18 bulk	30 - 150	37	1.6	150 - 446		2.2	446 - 870	610	2.9	93.0
13 bis	OT – 18 ext.	30 -150	47	1.7	150 - 440		2.8	440 - 650	577	2.1	92.1
14	OT -19	25 - 380	47	1.9				380 - 875	653	2.8	95.1
15	AT - 27	25 -222	67	8.9	222 - 610	450	5.5	610 - 900		0.6	84.0
16	AT – 27.1	27 - 248	49	7.0	250 -494	450	3.0	500 - 688	620	2.8	86.1
17	AT - 28	25 -233	30	2.6	237 - 675	631	2.8	679 - 818	788	0.5	94.1

Table 3. Catalogue of the *impasti*

***Impasto* type "a"**

Provenance	local		
Colour	fracture, 5YR 4/2 dark reddish grey, 2.5YR 4/6 red		
Hardness	hard		
Consistence	schistose/compact		
Type composition	quartz	calcite	vacuoles
Size	large	large	medium
Distribution	regular	irregular	irregular
Aspect	rounded	rounded	lengthended
Frequency	high	low	medium
Colour		white	

***Impasto* type "b"**

Provenance	local		
Colour	fracture, 2.5YR 5/8 red, 5YR reddish brown		
Hardness	hard		
Consistence	compact (depurate)		
Type composition	quartz	calcite	chamotte (rare)
Size	very small	very small	very small
Distribution	regular	irregular	irregular
Aspect	rounded	rounded	irregular
Frequency	medium	low	low
Colour		white	reddish

***Impasto* type "d"**

Provenance	local			
Colour	internal/external, 2.5YR 5/6 red fracture, 5YR 4/1 dark gray, 5YR 4/2 dark reddish gray			
Hardness	hard			
Consistence	compact			
Type composition	quartz	calcite	vacuoles	rare shells
Size	medium	from small to big	medium	medium
Distribution	regular	regular	regular	irregular
Aspect	rounded	rounded	lengthended	lengthended
Frequency	high	high	low	low
Colour		white		

Impasto **type "e"**

Provenance	local		
Colour	Fracture, 5YR 5/6 yellowish red, 7.5YR 7/6 reddish yellow		
Hardness	soft		
Consistence	compact		
Type composition	quartz	micropebbles	vacuoles
Size	from small to big	small	very small
Distribution	uniform	uniform	not uniform
Aspect	rounded	rounded	Circular/lengthended
Frequency	medium	low	rare
Colour		grey	

Impasto **type "m"**

Provenance	No local		
Colour	Fracture, 2. 5YR 6/8 light red		
Hardness	hard		
Consistence	schistose		
Type composition	quartz	limestone ?	volcanic ?
Size	medium	big	big
Distribution	uniform	not uniform	not uniform
Aspect	rounded	rounded	Circular/lengthended
Frequency	rare	low	low
Colour	white	black	

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KEY WORDS: Phoenician pottery, FT-IR and Mössbauer spectroscopy, TGA analysis

DECAY AND PRESERVATION OF BUILDING STONES IN NON POLLUTED ENVIROMENTS (SPAIN)

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Abstract
Preservation of our Historical Cultural Heritage built in stone requires studies on the material itself, on the environment where the monument is located, and even on the microclimate affecting a particular stone in the building. Conservation treatments should be also non-agressive and restoration works should respect the chemical and mineralogical properties and surface characteristics or aesthetic aspect (colour) of the stones already existing in the monument.
We have studied the intrinsic factors of several types of stones and their role in the type of degradation found in each case. Together with air pollution, salt crystallization seems to be one of the most important agents of decay, especially on porous stones and in environments where heating/cooling and wetting/drying cycles exist. Most of the results reported have been obtained on sandstones (arkosic) and granite materials used in building and restoration of monuments in Avila and Salamanca (World Cultural Heritage cities in Spain). The positive effect of several conservation and prevention treatments containing organic silicates and polysiloxane compounds, as well as methods for extracting salts by natural clays, have been studied. The results obtained represent an adequate way to evidence the problems and some of the solutions to solve them.

Introduction

The behaviour of a building stone will depend upon its intrinsic properties (composition, texture, structure, colour, etc.) as well as the environmental conditions to which it is subjected, either inside or outside of the building [1].

The studied areas, Avila and Salamanca, World Cultural Heritage cities, are under the influence of a Mediterranean climate, semiarid, with a continental trend and low atmospheric pollution. Consequently, the main processes involved in the decay of ornamental stones will be thermoclasty, gelifraction and crystallization of salts in the pore network, as well as the flowing through of polluted fluids, mainly water loaded with different ions, in the dry summer season characterized by a very low relative humidity and high temperatures. [1-3].

The three studied types of granites in Avila have been widely used in buildings of cultural interest. At present their original quarries belong to the National Reserve, and are exclusively destined for purposes of restoration and conservation of historical monuments. An emblematic monument where the three varieties of granites were used on is the Cathedral, which construction commenced in the XII century and ended in the

XVI century. The cloister includes a cresting where Gothic pinnacles and Renaissance spirals were combined [4, 5].

On the other side the four varieties of studied sandstones are currently being used as a building stone in the city and the province of Salamanca. Two of the historical monuments where those types of sandstones were utilised are the Old (Romanesque, XII-XV c.) and the New (late Gothic, XVI-XVIII c.) Cathedrals.

This study on such granites and sandstones will analyse the variations on their intrinsic properties when they are subject to consolidation (RC-70) and waterproofing (RC-80) treatments, and how these affect their efficacy and harmfulness. Additionally, a 'non aggressive' methodology based on the use of natural clays poultices to extract salts.

Materials and Methods

Materials

The three types of *granite* often used in construction and successive restorations of the Avila Cathedral were selected. They are:

- M-3: Ochre granite, a naturally weathered facies with 2:1 layered silicates (smectites).
- M-4: Red granite, with a high CT-opal content, 1:1 layered silicates (kaolinites) and iron oxyhydroxides
- M-5: White granite, with a high CT-opal content and 1:1 layered silicates (kaolinites).

Each variety comes from differents levels of a weathering profile appearing over the Hercynian Basement, which was originated by different processes leading to a deep paleoweathering mantle between Upper Cretaceous and very early Tertiary age in the southwestern border of the Duero Basin, Iberian Peninsula [6, 7].

The Villamayor *sandstone* is an arkosic stone of Middle Eocene age [8]. It comes from the Cabrerizos Sandstone Formation, which constitutes an independent unit within the Eocene deposits of the southwest of the Duero Basin, where this joins the Ciudad Rodrigo Depression [9]. The four most representative varieties of this stone were selected:

- DM: Ochre, fine grain, very clayey and with carbonate concretions.
- S-I: Ochre, fine grain, sandier than variety DM (80% fine sand).
- S-II: White, medium grain, the thickest facies.
- S-III: Red medium grain and sandy (30% fine sand, 48% coarse sand).

The mineralogical composition of these varieties are very similar: quartz is the main component, followed by feldspars, 2:1 layered silicates (smectites), palygorskite-type fibrous silicates, and small amounts of micaceous minerals (illite). The DM variety contains in addition carbonates [10, 11].

The products used in the treatments, Rhodorsil 70 consolidant (RC 70) and Rhodorsil 80 consolidant and waterproofer (RC 80), were supplied by Rhône-Poulenc (France). Application of the products was carried out following a modified NORMAL directive.

The clay poultices used for salt extraction from buildings stones were sepiolite (S) and bentonite (B); they are commercial natural clays and were kindly supplied by TOLSA (Madrid, Spain). Their specific surface areas are 240 m^2/g (S) and 120 m^2/g (B).

Methodology

The physical properties (open and total porosity, real and apparent density, and absorption coefficient in water) were determined following standard directives [12, 13], while the L*, a*, b* colour system [14] was selected to determine colour numerically with a MINOLTA (Chroma Meters) colorimeter. The L* value refers to lightness (or darkness), while a* and b* are the chromaticity coordinates. Changes in a* coordinate, ranges between positive values of a*, identified with red, and negative values, associated to green. The negative values of b* coordinate are associated to blue and the positive ones to yellow. Changes in each of the chromatic coordinates for each of the tests corresponds to the difference between the magnitude of such a coordinate for the treated (or aged) sample, with respect to the value for the original sample, thus obtaining parameters ΔL^*, Δa^* and Δb^*. The difference in total colour is given by the equation $\Delta E^*_{ab} = [(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2}$ [15]. Stones blocks (5 x 5 x 5 cm) were cut and the values of the coordinates were averaged from measurements on these five faces. A complete three-way experimental design was implemented: i) type of sample; ii)Treatment; iii) Ageing. The analytical study was complemented with interaction plots, following the ANOVA study, the corresponding contrasts were performed by incorporating a type 1 error-correcting factor.

Consolidation treatments were carried out following slightly modified NORMAL recommendations [16], by immersing the sample in the consolidant fluid (instead of capilar absorption) and using different concentrations (instead of a single one), in order to favour penetration of the product inside the stone sample. Treatment was carried out by immersing the samples in white spirit for 30 min, followed by immersion in white spirit solutions of the reagents at three increasing concentrations: (i) eight hours with a 5% solution, (ii) twenty four hours with a 40% solution and (iii) forty hours with a 75% solution. Cubic (5 x 5 x 5 cm) samples treated as described above were aged through 25 cycles of freezing/thawing and cooling/heating (-20 to 100 °C) in a simulation chamber, following standard recommendations by Tiano and Pecchioni [17].

Samples for salt extraction studies were aged by immersing blocks (5 x 5 x 5 cm) in 0.5 M solutions of NaCl, $NaNO_3$ and Na_2SO_4 for 4 days up to a height of 1cm above the base in order to produce total impregnation via capillary uprising. After removing the blocks from the bath they were dried at room temperature, and a salt extraction process was performed using poultices of bentonite or sepiolite. Two extraction protocols were used [18], under D (dry) and W (wet) conditions:

- D *Protocol*: Poultices were prepared by wetting the clays (B or S) with distilled water, and placing the poultice (4 mm thick) on the top surface of three salt-aged blocks. The blocks were placed on a dry surface and the side faces covered with paraffin to avoid evaporation; the blocks were covered with a plastic film to prevent drying of the poultice (when dried, poultices peel off and lose contact with the stone block easily). The plastic film was removed after 3 days and the blocks were allowed to dry at room temperature. The poultice peeled off spontaneously and was analyzed. The same blocks were treated twice more, following the same method, to assess the efficiency of the method.

- *W Protocol* is identical to protocol D, but the blocks were placed on a humid surface for 4 days and then moved to a dry surface for 3 days. The blocks were submitted to two additional cycles of wetting and drying.

After being removed from the blocks, the poultice was dried to constant weight; then, ions were extracted following the NORMAL [19] procedure. Analysis of the different salt species extracted was acccomplished using a Metrohm ion chromatography System, equipped with a CI 709 pump, a CI 732 conductivity detector, a CI 733 separation chamber, and a Metrohm MSM (CI 753) suppressor module, with a CI 752 peristaltic pump.

Results and Discussion

Main decay pathologies

In low air polluted areas, like those studied here (Avila and Salamanca, Spain), climatic conditions determine the different weathering processes that rule the behaviour of a material.

Avila *granites* are easily weathered. Desaggregation and even arenization is observed in very humid areas of the Avila Cathedral. Weathering has been so severe in some vaults in the cloister and some humid walls that it is difficult even to ascertain which stones are original and which come from restorations. In dry areas, without permanent humidity, but submitted to wind and thermal oscillations, weathering consisting of formation of alveolus, scales and slabs is observed.

Villamayor *sandstones* include swellig-contraction of smectites, precipitation of salts in wet areas, and a lack of mechanical resistance when the material is maintained in wet conditions. However, if the stone is in dry areas, and exposed to sunshine, it develops a nice golden patina. These are usually weathered through complete sanding in humid areas. In carved stones and balaustrades a rounding of the shapes can be seen, and in high locations facing SW the formation of alveolus is observed.

Petrophysical Properties

Petrophysical properties for the granite samples are summarized in Table 1. Densities (δ and δ_{ap}) are nearly constant for both natural and treated granites. Total porosity (P_t) remains almost constant after RC70 treatment, but a slight decrease (10-20%) is observed after RC80 treatment. On the contrary, open porosity (P_o) sharply decreases upon these treatments, reaching values even 25% of the original one. As the water absorption coefficient (W_{ac}) is the ratio between P_o and P_t, and this last one shows only minor changes, those observed for W_{ac} follow the same trends as P_o. Studies reported elsewhere [20] have shown that one of the most informative parameters to discriminate the efficiency of different treatments is open porosity.

Data for sandstone samples are given in Table 2. Real density (δ) slightly decreases upon treatment, while δ_{ap} increases. Changes in total porosity are not regular: important decreases (up to 50%) are observed for samples DM and S-I, but decreases amounting 22-24% are observed for samples S-II and S-III. Open porosity sharply decreases to ca. 13% of the original values, whichever the treatment. Consequently, a rather unregular behaviour is observed for parameter Wac, although its decrease is more evident (ca. 90%) for samples S-II and S-III than for samples DM and S-I (ca. 75%).

Table 1.- Physical Properties in Water of Granites

Sample	Apparent Density δ_{ap},*	Density δ, *	Total Porosity P_t ,**	Open Porosity P_o,**	Water Absorption Coefficient W_{ac} ***
M-3	1.77	2.47	28	21	74
M-3-RC-70	1.79	2.47	27	10	37
M-3-RC-80	1.86	2.46	24	5	22
M-4	1.98	2.48	20	13	67
M-4-RC-70	1.99	2.43	19	4	21
M-4-RC-80	1.96	2.43	18	2	12
M-5	1.87	2.37	22	13	57
M-5-RC-70	1.87	2.40	21	11	52
M-5-RC-80	1.90	2.39	18	3	18

*g/cm^3 ref. [12,13]; **% ref. [12,13]; ***% ref. [12,13]

Table 2.- Physical Properties in Water of Sandstones

Sample	Apparent Density δ_{ap},*	Density δ, *	Total Porosity P_t ,**	Open Porosity P_o,**	Water Absorption Coefficient W_{ac} ***
DM	1.86	2.65	30	26	85
DM-RC-70	1.97	2.46	20	4	22
DM-RC-80	1.99	2.28	13	3	24
S-I	1.80	2.66	32	25	76
S-I-RC-70	1.94	2.50	22	4	17
S-I-RC-80	1.92	2.30	17	3	18
S-II	1.69	2.65	36	24	66
S-II-RC-70	1.78	2.53	29	3	10
S-II-RC-80	1.76	2.46	28	2	7
S-III	1.66	2.66	37	26	70
S-III-RC-70	1.74	2.54	31	3	11
S-III-RC-80	1.76	2.46	28	2	9

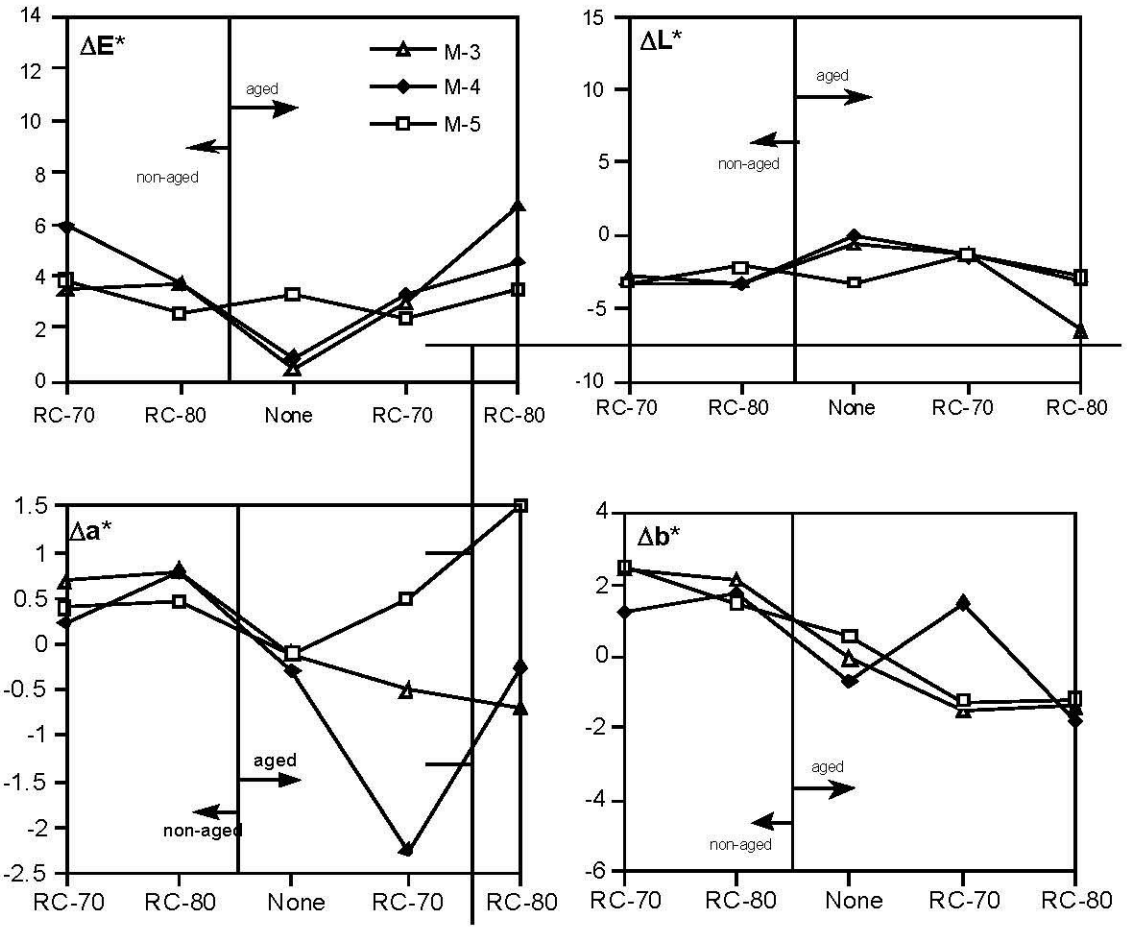
*g/cm^3 ref. [12,13]; **% ref. [12,13]; ***% ref. [12,13]

Colour properties

Colour is one of the parameters currently used to monitore the quality of a conservation treatment of ornamental stones, and its further ageing, well artificially or by decay in the monuments [21].

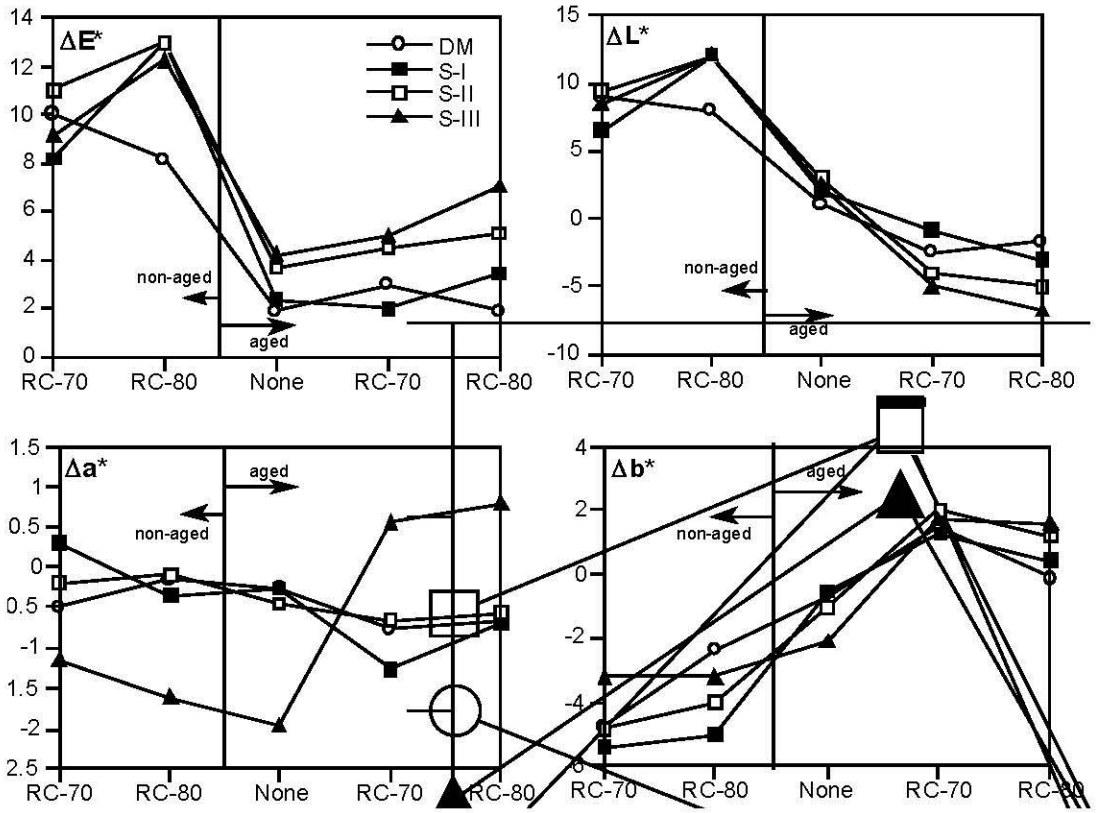
Fig. 1 shows the results of the statistical analysis of changes in colour of the samples upon treatment and ageing. The behaviour observed for the unaged and aged samples seems to be different. Important changes in ΔE* are observed only for sample M-3 and M-4 submitted treatment and ageing. Although darkening (ΔL*<0) is observed in all cases upon treatment and ageing, such an effect is much more pronounced for sample M-3. Chromatric parameters Δa* and Δb* also show minor shifts, but in this case sample M-4 deviates from the other two.

Fig. 1.- Chromatic parameters for granites.
The treatment agent (none, RC-70 and RC-80) is indicated



The results for the ΔE*, ΔL*, Δa*, Δb* parameters corresponding to sandstones are shown in Fig. 2. ΔE* indicates a loss in colour of the treated samples, upon ageing, with respect to the treated ones. Regarding ligthness (through parameter ΔL*), positive values were measured for the unaged samples, but negative values for the aged ones, indicating darkening (ΔL*<0) upon ageing, while unaged samples became lightened upon treatment. The change observed in parameter ΔL* is much larger than that observed in parameters Δa* and Δb*, for which only minor differences are observed upon ageing and/or treatment.

Fig. 2.- Chromatic parameters for sandstones.
The treatment agent (none, RC-70 and RC-80) is indicated



Extraction of salts by poultices

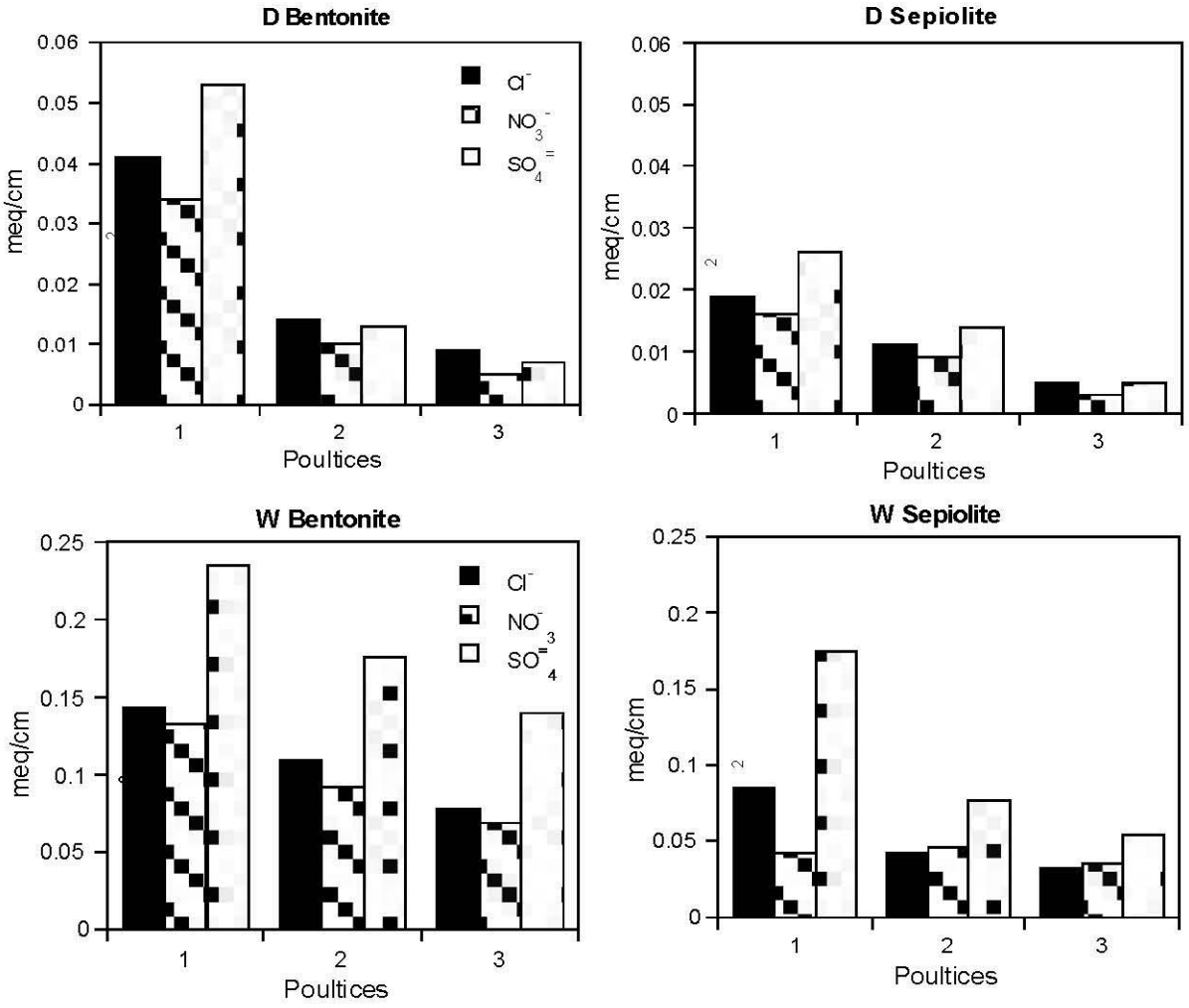
The conditions involved in the use of poultices (e.g. contact time, temperature), the efficiency of the procedure also depends on the nature of the poultices and the type of ions to be removed. No general agreement exists about the beneficial effects of salt removal or the suitability of the use of poultices. [22] addressed the problems arising when the stone is contaminated by mixtures of ions, and they detected an increase in sulfate content and subsequent surface degradation in ornamental stones, following salt extraction by poultices.

Most representative data on salt extraction for ochre granite (sample M-3) are shown in Fig. 3. Obviously, the amount of salts extracted decreases progressively when consecutive extractions are performed on the same sample. However, important differences can be found between the results following both protocols and both extracting clays. Broadly speaking, the amount extracted by the third poultice constitutes only ca. one sixth of the amount extracted by the first one following protocol D, but only one third following protocol W. Under W conditions the ions migrate toward the surface by water flow, while under D conditions, mobilization of ions occurs in the wet part by diffusion from the poultice.

On comparing the extraction ability of bentonite and sepiolite, it seems surprising that bentonite, with a specific surface area ca. one half of that of sepiolite, shows a more powerful extraction ability than this. Such a behaviour can be tentatively related to the different porous system these two clays show: Extremely narrow pores in the sepiolite

network provide a high specific surface area, but their diameter is too small to permit an easy free circulation of solutions; on the contrary, the slit-like pores of bentonite, with a larger average diameter, allows fluids circulate freely.

Fig. 3.- Amount of anions extracted (meq/cm^2) by application of three successive poultices of bentonite and sepiolite under dry (D) and wet (W) conditions.



Conclusions

Treatment agent RC80 seems to be more efficient than RC70, probably because the combination of its consolidation and hidrofugation abilities. Upon treatment the water absorption coefficient decreases, so hindering fluids circulation through the stones.

Changes in colour are more evident for sandstones than for granites, especially coordinate ΔL^*, leading consequently to major changes in ΔE^*, as Δa^* and Δb^* do not change excessively. Treatment lightness the sandstones, but ageing darkens them. However, the granites become darkner in all cases.

Finally, with respect to salt extraction, protocol D seems to be more adequate than protocol W, as in the first case only salts close to the external surface are extracted, avoiding a continuous circulation of fluids, as it occurs following protocol W. The

better behaviour observed for bentonite, despite its lower specific surface area, may be related to the size of the pores existing in these two clays.

Acknowledgments

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THE 7th INTERNATIONAL SYMPOSIUM OF THE OWHC IN RHODES

Theme 1	*Informed communities as a prerequisite of strategic policies for understanding and disseminating cultural heritage values. Assessing and deciding for preservation and management*

Monuments Conservation and Management: ICT Tools for a flexible and scalable solution

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Abstract

The state of art of cultural heritage in Europe is very well known and evident, the wealth of artworks and goods, expression of every kind of art from graffiti to frescos and architecture, issued along the centuries care of different people that inhabited the continent from Greeks to Renaissance and over, characterises uniquely the European cultural heritage. It sounds strange but it is this cultural wealth that causes problems that trouble the European Art.

The contribution is focussed on advanced technologies and ICT tools addressed to monument conservation and management. It will provide a general overview on different approaches world-wide and will consider in detail a set of projects that address these issues such as ICT tools developed by Monumentenwacht, SIRMaP and MIMS projects.

Introducing the general background

G8 has in this decade pointed out the problem related to cultural heritage information services and the European Commission has promoted several actions in the field of

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cultural wealth such as IST, Trans European Network Telecom (sect. Cultural Heritage), Raphael and Culture2000/2001 programmes. The Cultural Heritage Committee of the Council of Europe plays an active role in this scenario with "The European Foundation for Heritage Skills".

The European Foundation for Heritage Skills is a non-profit-making non-governmental organisation, set up in 1996 on the initiative of the Council of Europe. Since 1999 it has run its programmes through an association of partners with a Secretariat in Strasbourg.

The association's ex officio members include representatives of the Council of Europe, UNESCO, the European Parliament and the International Council on Monuments and Sites (ICOMOS).

The Raffaello Rooms in Vatican. courtesy of INFOBYTE

The purpose of the Foundation is "to foster progress in cultural heritage conservation skills and their transmission", in other words to enable European professionals to improve their ways of preserving the existing heritage and therefore handing it down to future generations. "Heritage" is now taken to mean not only prestigious monuments but also major rural or industrial buildings and sites, as well as the less tangible heritage of popular traditions.

In addition there are several initiatives carried out by national institutions and private enterprises. Some European Regions are developing common projects and initiatives to co-ordinate their action all over Europe (both Western and Eastern countries) trying to offer to European "content holders" an open, inter-operable management of cultural wealth.

Thanks to this scenario it seems to be the right moment to collect the efforts and co-ordinate the promotion of cultural heritage using as a leverage information technology and interactivity. Information systems devoted to monument management represent a nice, but relevant, added value market within this sector. HyperMediaGroup at Politecnico di Milano is committed to this goal.

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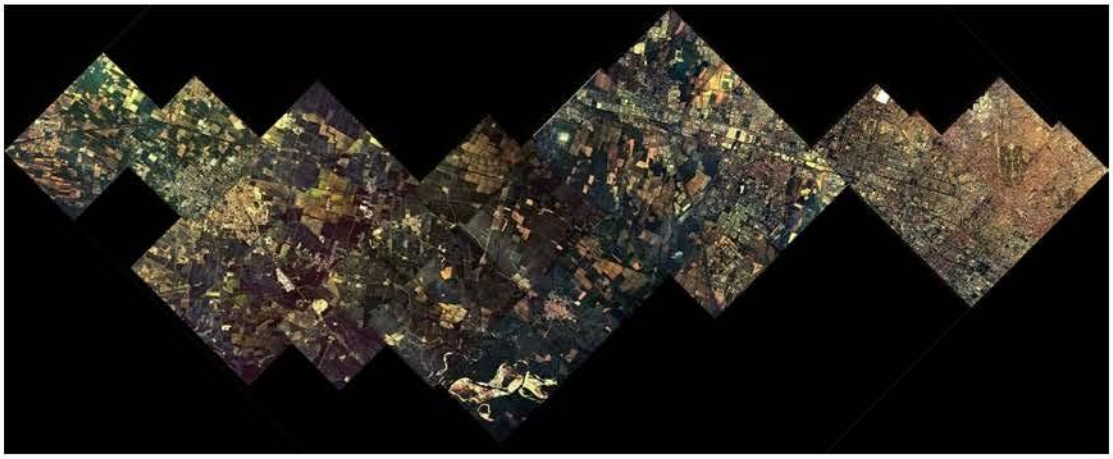
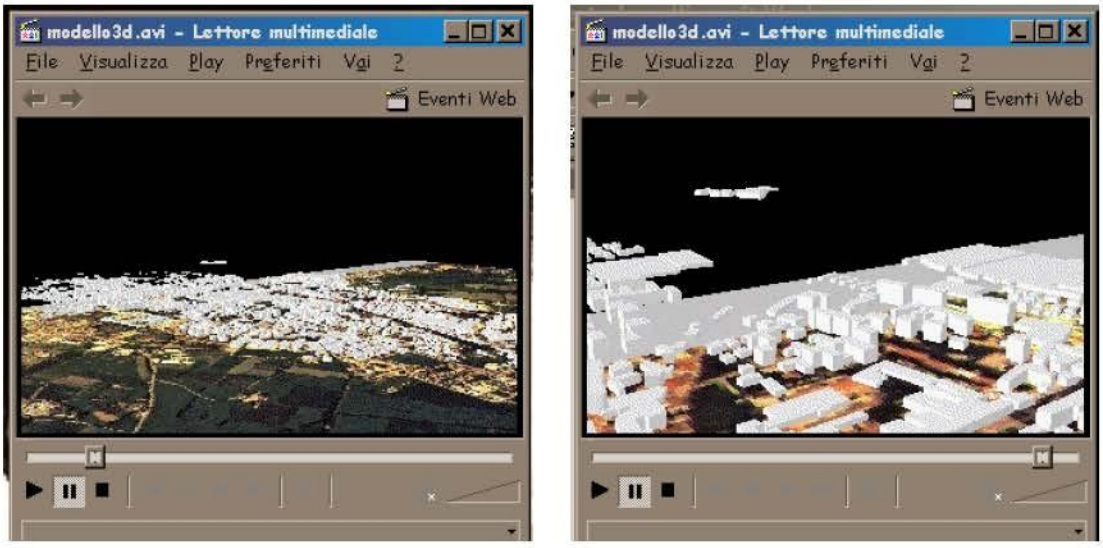
HyperMediaGroup preliminary experiences in ICT for Architectural Heritage

Thanks to the expertise in the field of architecture and building management several early experiences in the field of ICT tools for monuments were carried out early in the nineties. Such experiences ranged between data acquisition and visualization / exploitation both addressed to single monuments or entire portions of landscape.



HyperMediaGroup preliminary experiences in ICT for Architectural Heritage

Early projects were devoted both to monuments digitalisation through photogrammetry, DTM and visualization / exploitation creating video clips or still images (the Tower in Mapello, historical buildings in the centre of Milan, case study named Abbiatense).



Historic City Model: Abbiategrasso

Later on, thanks to the availability of virtual reality technology some experiences both off line and on line were carried out (PAC, Comunità Montana di Sostila, Abbiategrasso and Pestegalla). On the occasion of the TEN Telecom project named MOSAIC a set of methods and tools addressed to the exploitation of monuments was designed and developed.

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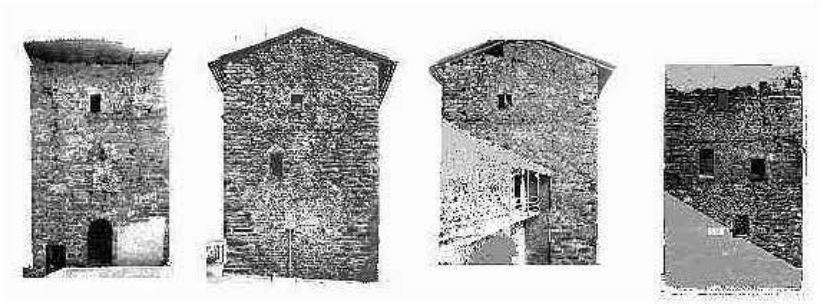
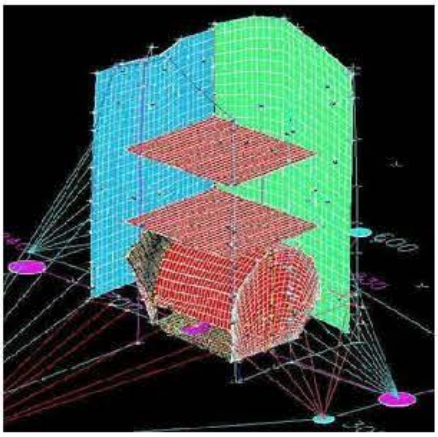


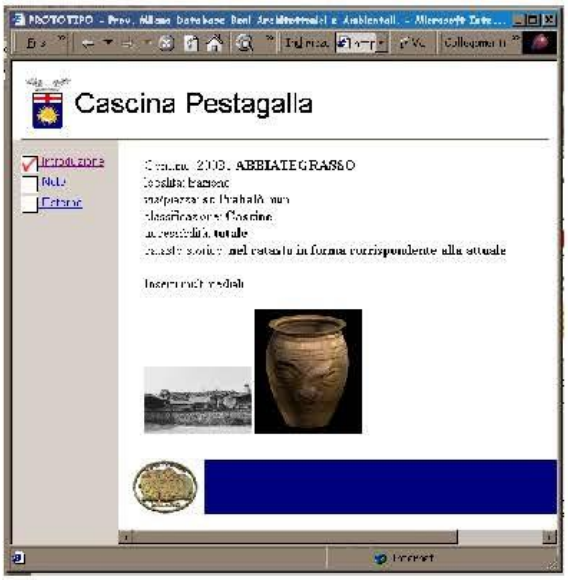
Digital Photogrammetry and 3D Model of Mapello Tower



The BAA project

Almost in the same period the *Provincia di Milano* decided to create a digital archive of all the registered monuments within its own area adopting a proprietary list of data. The amount of monuments to be classified, excluding those within the city of Milan, was about six thousands.

HyperMediaGroup was in charge for the design and development of software solutions. The architecture of the system was based on an on-line Internet application fully operable from remote. This solution takes also into consideration different aspects including the developments and/or enhancements and the real need to provide a scalable solution both on the server side and the front end. One of the main issue concerned a massive and flexible data entry, a Visual Basic based front end for stand alone operators together with an on line multi-user data entry facility enabled a fast start up of the data bank.



BAA Project Web Page

BAA project was launched on 1994 on the basis of multimedia pilot project devoted to a specific landscape called Abbiatense. Early on 1995 a "beta" version of BAA was released. The main aim was to turn the paper based monument and natural assets archive related to "Provincia di Milano[1]" into a digital archive.

[1] Approx. 6.000 items except Milan, separately managed.

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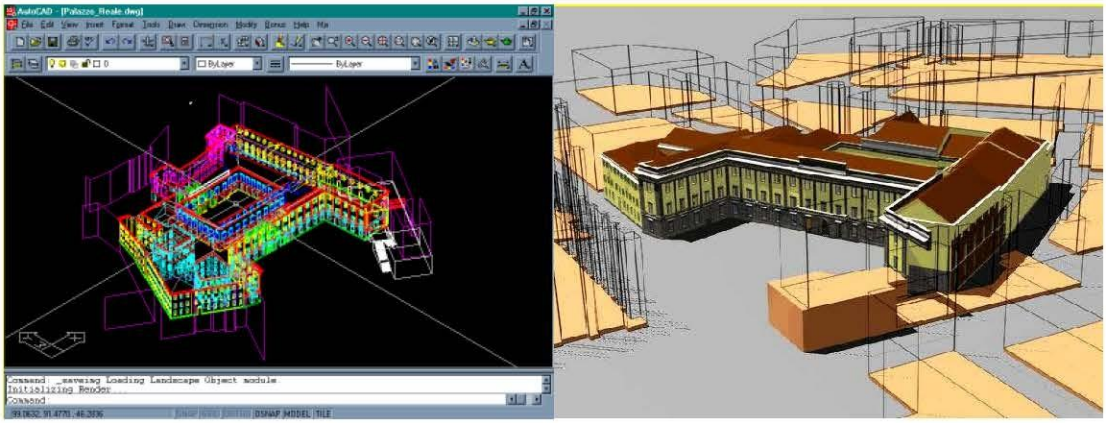
One of the first issue, on the general architecture definition phase, was how to manage different levels of contribution to the archive, even taking into account the usual approach in order to make mass updates to the data bank splitting the job in parallel.

The idea was to define an on line architecture thanks to the emerging Internet technology not yet fully joined with data base management systems. So far a custom implementation of db-connector was developed and a first release of an online immovable-assets archive was activated with different access profiles and outputs. In order to ease the start up phase an additional off-line data entry application was developed care of HMG.



3D Digital Model of Palazzo Reale in Milano

In such a way a full range of organisational model were satisfied, even accomplishing to subsidiary principle. On the occasion of "Virtual Project '95" a demo version of a multimedia extension of BAA was introduced, enjoining VRML 3D reconstruction of the landscape and built heritage enabling hyperlinks on 3d objects.

From BAA to S.I.R.CoP.

Two years later, in 1997, following the successful implementation of BAA and its operational model, the idea to extend the data model to key information related to conservation became reality. The evolution of the data set aimed to provide a basic support to the decision process in order to allocate appropriate budgets in monument conservation taking into account priority, relevance etc (multi-modal DST). In the meantime, developing an European proposal addressed to monument conservation, a group of interested parties was assembled sharing best practice and experiences such as Monumentenwacht experience in the Netherlands.

During the development phase of such a project both at local level and European level Regione Lombardia expressed some interests in the concept foreseeing some synergy with

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the their own "Risk Map". As a result a new project was activated under the acronym SIRCoP.

The S.I.R.Co.P. (Regional Information System for Scheduled Conservation) project was launched together with Regione Lombardia in year 2000 within a research and training framework. The general framework was derived as a follow up of the risk map and implementation of the basic idea of BAA ("Beni Architettonici ed Ambientali" archive) extensions in the field of scheduled maintenance.

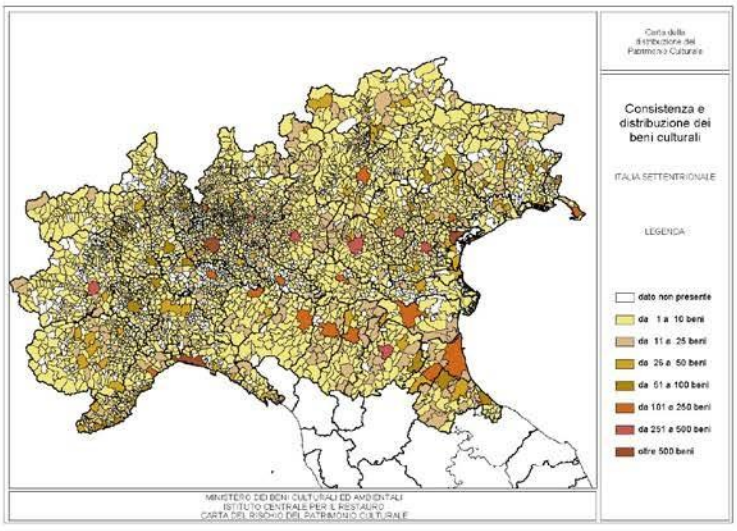
The ICR Project "Risk Map"

"The idea-strength at the base of the Risk Map for cultural heritage is to identify solutions and procedures in order to evaluate risks, potential damages, plan conservation and restoration of cultural heritage. The word "plan" is to be considered in the concrete meaning of gathering the full set of information needed to foreseen and consequently decide in advance which intervention have to be undertaken sorted by priority, schedule/planning and costs to be paid. All this versus the everyday praxis, who led to let decisional processes happen only when damage has already happened."

In this way in 1987 Prof. Pio Baldi from Istituto Centrale per il Restauro (ICR) launched the risk map for Cultural Heritage as a final result of ten years of investigation.

Regione Lombardia took this idea and turned this into a strategic project within the Regional Development Plan 1998 – 2000 aimed to create the Regional Node of Risk Map with the scientific support of Istituto Centrale per il Restauro[2] and the cooperation of Provinces, Superintendents and local bodies.

The Risk Map of cultural heritage is an initiative aimed to provide both the responsible for the protection of territory and the Central Administration with supporting instruments for scientific and administrative activities.



The Map collects the experience and the methodological approach of the 1975 Plan for the Programmed Conservation of Cultural Heritage in Umbria which

Restoration.

was the first experiment of global evaluation of factors of decay extended to a whole territory and the validity of which was dramatically confirmed on the occasion of the earthquakes of Friuli (1976) and Irpinia (1980). This initiative, first outlined in the document "Per una carta del rischio del patrimonio culturale" ("For a Risk Map of Cultural Heritage") drawn up within 'Memorabilia' (1987), was eventually actuated with law 84/90. This law authorised the implementation of the initiative and charged the Istituto Centrale per il Restauro with the scientific responsibility for its conduct.

The initiative consists in two activities:

- Permanents operational structure (the Central Hub, c/o S. Michele, Laboratory of Physics, ICR) for the managing of all information concerning the conservation of cultural heritage on a national scale;
- Survey of monument decay: an activity for an effective and timely evaluation of the condition of archaeological areas, monuments and works of art.

After a pilot implementation of such guidelines the Data Bank centralised in Rome was duplicated at local level.

S.I.R.Co.P. - Regional Information System for Scheduled Conservation

Regione Lombardia launched this project in year 2000 within a research and training framework. The Regional Information System supporting scheduled conservation promoted by Regione Lombardia aims to provide information ranging between pre-catalogue to recovery plans, user manual, technical and best practice handbooks.

The general framework was derived as a follow up of the risk map and implementation of the basic idea of BAA extension in the field of scheduled maintenance or, to be closer to the focus, scheduled conservation. HyperMediaGroup was in charge, together with a team of experts in conservation and art history, for the feasibility study and architecture definition of the information system.

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ICCD forms for historical cities (courtesy of ICCD Rome)

The information system acts as glue amongst different modules and activities foreseen archiving and managing information and data. One of the relevant issues is to revert the "extraordinary maintenance" trend toward "scheduled conservation".

Unfortunately today many aspects are pushing "extraordinary maintenance" including financial aspects, taxes and procedures; such a trend implies the lack authenticity of historical artefacts and major costs.

On the opposite S.I.R.Co.P. promotes "scheduled conservation" and maintenance according to a timetable and "granularity" proposed care of experts and the information system itself.

SIRCoP - Information System

Starting from the upper level the information system will collect and redistribute relevant information and case study. Locally it will offer flexible archiving tools and later on it will operate as historical information source useful in order to evaluate the consistence of historical buildings patrimony and keep track of changes and provide support to managers. In addition the long term data repository provides case study, statistical information and high quality content for educational purposes.

This will specifically support both political and technical decisions providing priorities and possible pathologies on the basis of technical data base.

On running conditions all relevant architectural heritage of Regione Lombardia will be adequately stored within the S.I.R.Co.P. data base.

Monumanager: a significant step toward MIMS

Having tuned some beta versions of S.I.R.Co.P. on the occasion of different surveys on historical buildings the general architecture of the archive and the set of decision support tools was released and the focus of the investigations was on distributed system architecture, user profiling, multimedia data-

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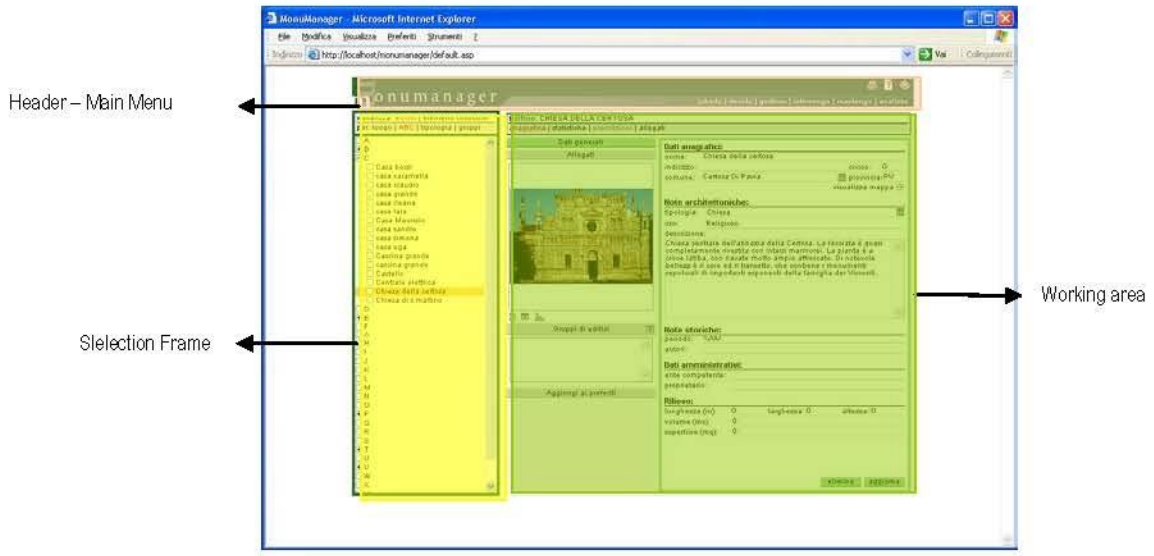
Thanks to an opportunity provided by the Ministry of Research a further step towards MIMS was initiated in 2001 developing a second main release of the information system fully based on network technology and scalable architecture.



Information System Architecture

The project foresees a scalable system, interchanging information bi-directionally both with centralized and distributed databases. The focus of the architecture is on the Regional Information System, starting from this kernel extensions are foreseen both toward national/international information systems and toward local or specific information systems such as those managed by local Authorities, digital maps and any other relevant add-in.

Amongst main extensions at national level we will consider the National Risk Map System managed care of Istituto Centrale del Restauro (ICR) the National Catalogue of Environmental and Architectural Assets managed care of Istituto Centrale del Catalogo e della Documentazione (ICCD). SIRCoP should import data both in structured format (i.e. ICCD, ICR, local authorities, etc) and single data or raw data.

Functional Modules

Monumanager fully implements functional cycles allowing multiple user data entry and simulations. Most relevant cycles are:

- **Political/Decisional Cycle**

Within this phase inspectors evaluate, taking into account information provided by Monumanager (running phase), statistics, priority, etc, possible actions to be performed

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addressing resources toward high priority tasks. Such decisions should be biased by political, social and economic aspects but the information system will keep a drift in order to suggest, without external solicitations, the guidelines foreseen care of objective evaluation parameters adopted.

- **Data Base management and archiving forms**

Once filed as public interest historic building, the first step is to foresee an on site inspection in order both to fill up the general registration form (ICCD A form) and the first level of ICR registration form. In case of need, if the building needs additional analysis, it will be possible to extend the analysis to specific aspects usually included within the second level of ICR registration form, making in advance tasks to be usually performed on the occasion of second level filing contextually with the definition of a conservation project. The maintenance process of the database will be performed in background updating information; such a task should be performed care of local administrations.

- **Restoration/Conservation project management**

On the occasion of the implementation of the conservation plan, involved user profiles should exchange information to/or from the information system. More in detail on the occasion of the execution phase the full information set related with the monument is to be filed even those parts concerning possible modification or deltas compared with scheduled tasks and foreseen activities.

Information is stored:

- In the appropriate section of the database in case of structured data (multimedia contents included)
- Additional information will be filed in either XML (weak structure) or HTML (raw data).

- **Management of focalised Restoration / Conservation projects**

The data structure in the foreseen database allows the management of several levels of detail describing the restoration and conservation tasks even on portions of the monument too.

This facility may be activated in case of need of partial interventions recognised starting from inspections, or to conform the building to law and regulations, or solicited by the information system itself on the basis of scheduled tasks.

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- **Long Term Data Repository**

The data structure relative to each single intervention will be subdivided in two main sections:

- A concise data set relative to the intervention will be always on line, available both to end users and analysing tools;
- The full set of information including detail data relative to the single conservation plan will be referenced by the system but stored off line on external supports intended for long-term data storage.

- **Statistic/Scientific Analysis**

The statistic/scientific analysis module gathers information from different data structures already present in the database, the historical archive and the weak structure data section (XML based). Such data structures will allow, on running phase, several different statistical surveys on relevant data sets.

Such archives will allow:

- to ask information regarding specific interventions, works or technical solutions adopted in order to evaluate the aging behaviour;
- to obtain synthetic economic indexes relative to interventions already carried out;
- to implement the databank supporting the activity of monument managers;
- Technical indicators useful to decision makers on the occasion of maintenance and restoration policy definition;
- Economic indexes in order to assist the budget definition;
- Useful information addressed to tune and refine user and technical handbooks
- Useful feed back on the entire process.

User Profiles and Security

User profiling and security issues are particularly relevant in Monumanager, the system must manage different user profiles both in case of Intranet, Extranet or Internet access. System users should work through local area network from their own office within Regione Lombardia, should connect to Monumanager from external institutions such as Istituto Centrale per il Restauro (ICR) or Provincie, should connect from independent and

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private organisations (professional, building company, consultant, historians, research centres) and lastly interested parties dealing with cultural or tourist issues.

Thanks to the user profiling the system will arrange both information provided and even the user interface.

Referring, for instance, to a user belonging to "Expert in conservation" profile, he will enjoy full access (read & write) to major part of the system. In such a case functional modules will output a full set of available choices including technical tools.

A generic "User" filed as "Basic User" should only give access to system modules addressed to information exploitation with "read only" right limited to public domain data. Data format and options will match with the profile. The system will check access rights for each user or profile validating every single access to data sets. In addition to common user profiles some technical profiles addressed to system management will be added.

ROLE	PROFILE
Table Owner	Data set owner, defines access for user groups (update, input)
Security Administrator	Group and User Manager
Process Administrator	Logical use of information and data flow manager
Server Administrator	Monumanager server administrator
System Administrator	Manage connections between central Monumanager DB and other DB

Access Methods

The Information System will be able to operate principally through the network. The access then will be possible through common connections to the net either at local level through the LAN and at "remote level" through Intranet or Internet connections.

On line access with proper rights will enable data input and update plus a structured set of queries. In addition, in order to ease data input tasks it will be possible to use "stand alone" applications devoted to local data input merging afterwards in the information system the entire external data set.

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Such a method would be particularly useful during the start up phase of the whole system enabling parallel input care of different groups of surveyors both with and without access to the Internet. Later on the stand alone procedure will complement wireless solutions for on site data acquisition operations. Wireless multimedia devices will be helpful specifically on survey phase enabling on line data browsing and updating adding on the fly images and sketches.

Future steps: Monuments Integrated Management System

A truly integrated and modular approach was included in the parallel project called Monuments Information System (MIMS kernel). The idea of MIMS is dated 1997 but after several steps of feasibility study we are now in a position to launch the operational project. MIMS is a comprehensive solution ranging between data acquisition on the field and monument and site exploitation passing through conservation and management. This will conclude the showcase of different approaches, methods and ICT tools.

MIMS will develop and demonstrate innovative methodologies, technologies and products for diagnosis, risk evaluation, protection, conservation, maintenance, restoration, sustainable management, enhancement, accessibility and re-use compatible functions of the European Cultural Heritage.

Monuments Integrated Management System will identify and assess the damage either on movable and immovable cultural heritage implementing methods and tools for its protection, conservation, enhancement and accessibility.

MIMS helps to better predict and prevent environmental damage to cultural heritage and identify best practices for the sustainable protection, conservation and management of movable and immovable cultural heritage.

Socio-economic needs will be fulfilled targeting the benefits that MIMS technologies offers in the field of monuments and immovable heritage management involving both industrial and social activities, from more competitive methods of working and higher-quality lower-cost services.

The system will validate and demonstrate access, delivery and personalisation of heterogeneous assets in large distributed, and multi-owner collections related to historical monuments and sites. This includes the development and integration of automated content packaging and presentation systems, tailoring, Web-based and agent-based

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services (like the maintenance and management tool based on network), unified interfaces and search facilities across different information resources initially located in Italy, Greece, Austria, Norway, Belgium, Germany and Sweden. The work is expected to contribute to open standards for interoperability and access management guidelines, including the definition of a comprehensive data structure for monuments and sites or whether necessary through digital archives integrating library and museum objects.

The technological focus is on rich representations; powerful immerse features such as 3-D visualisation, real-time virtual object manipulation and group interactivity, for multimedia retrieval and virtual galleries too. Work is expected to develop new mixed-economy models for exploitation, repackaging and re-use.

Visual contents will be published using 3D digital reconstruction or virtual reality technologies, managing digital content by supporting distributed and networked content; processing large sets of data in innovative ways such as scenario development or spatial analysis. MIMS will offer an integrated solution in order to have access to heterogeneous distributed collections and repositories in digital format providing high performance visualisation systems combined with risk assessment models. The RTD is expected to contribute in establishing and enhance European standards for generic emergency management tools for monuments and sites.

All this will contribute to the preservation of the originals through valuable multimedia content covering electronic materials and electronic surrogates of fragile objects and monuments that suffer the wear and tear of time.

The development of MIMS is a mid term initiative ranging through different intermediate steps (BAA, SIRCoP, Monumanager ..) throughout the all project skills, competencies, experiences will became a real asset of the group, is consequently logical to establish from the beginning a network of competence centres.

The network of Competence Centres should be both physical and virtual places. Selected universities, museums, companies, laboratories and research centres should be part of this network. The network of competence centres will provide services and solutions in the specific domain of knowledge. The Competence Centre works as a real and virtual interface between potential users, companies and researchers. First enquiries, etc will be handled by a small professional staff with a business and communication orientation.

Main functions and services provided care of CC are:

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- act as a reference point for specific topics;
- provide specific services to museums and other institutions;
- establish basic entities in order to create operational consortia able to participate in projects;
- act as incubator for future SMEs in ICT for Monuments and Sites.
- Centres of Competence should be linked with relevant Centres of Excellence.

Centres of Competence aims to be in the centre between the owner of an historic building, architect and the conservation officer. The most important part is a maintenance contract which guarantees an annual "health – check" of the monument to both the owner and the conservation officer. According to a checklist an expert controls all parts of the structure and their state of preservation is documented and archived in data-structure in order to be analysed and tracked by an intelligent system. Problems and damages are identified and classified and will be communicated to both the owner and the conservation officer. Small repair or maintenance tasks will be done on site by the team of Competence Centre for a small fee.

These updated checklists allow assessing the current state of preservation of a building at any time. In the case of necessary repair works, the owner of a building can prove the regular control towards potential financing sources such as banks or building societies. Larger problems can be avoided since regular maintenance measures can be planned and budgeted in time.

Furthermore, in some European countries the task is to secure endangered monuments and to prevent further deterioration. Establishing Competence Centres will create in a long term permanent qualified jobs for skilled labourers. Furthermore, Competence Centres can ensure the regular control for many ecclesiastical and community owned buildings that are currently not properly maintained.

Typical user profiles are: public institutions, real estate managers, citizens, researchers, tourists, etc. The results of the project will be the conservation and the enhancement of the cultural heritage for a sustainable exploitation of its socio-economic potential for employment and tourism. Target groups of users should be: institutions and private owners of historical buildings; conservation officers/authorities, architects; craft-workers; experts.

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Potential Market: Who might be interested in such an idea? On the one hand there are institutions that own a larger number of historic buildings such as church parishes, village and town councils, banks, insurance companies charities or building trusts that might be interested and on the other hand there are individual owners. Both private owners and institutions are interested in the cost-effective management of their building stock. Hardly any of them are able to professionally maintain their stock on their own.

In addition within the fairly sizeable niche market for sustained use of our cultural heritage, almost the entire spectrum of technological development can be used in a productive manner, whether this relates to information technologies, research and material science, or the new leading trend towards microbiological research in heritage preservation.

This niche market is ideally suited to the development of the interests of small and medium sized companies, which represent a new historical dimension in the European labour market. This applies in terms of a new future for qualified skilled manual professions, as well as with regard to tourism operations or specialised research institutes.

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INFORMATION AND COMMUNICATION TOOLS FOR ASSESSING AND DECIDING HISTORICAL BUILDINGS PRESERVATION AND MANAGEMENT

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Abstract

ARKIS - **A**rchitecture **R**ecovery **K**nowledge **I**nformation **S**ystem - is an Information System, set up as an auxiliary tool for the organisation, representation and utilisation of knowledge of data in the recovery of historical buildings. It regards the architectural item, its immediate context and its territorial location.
ARKIS is user friendly and represents an operative tool for different Organisation, for example monuments offices or agencies.
To this end, mainly important is to create transfer environments and use of knowledge, through a set up of multi-medial data base in remote access, for disseminating heterogeneous information into Internet (alpha-numerical data, geometrical data, images) which are based upon the needs of potential users (researchers, designers, restorers, decision makers).
ARKIS-NET, here presented, provides the foundation for disseminating high-end heterogeneous data, organised and represented in GIS form, and mapping services via Internet. Clients may display, query, and analysis information in an easy-to-use Web browser, and also integrate local data sources with Internet data sources.
Some case history will be presented.

Introduction

As part of architectonic restoration it is necessary to define the different knowledge paths and relative data bases, identify the reciprocal interactions in order to promote a complex interpretative action on the state of conservation of the historic building object. This is done by using different data acquisition and recording procedures consistent with their nature and referring to the geometric, structural and material configuration, to the study of the historical and architectonic features, as well as to the understanding of the training processes and the analysis of the pathologies of degradation as a function of the typologies of the constituent materials. Likewise, as regards the successive phases of the definition of the intervention and its execution, it is necessary to guarantee a rigorous approach to the knowledge and the management of the data.
A fundamental role is played by the dissemination and utilizability of information.
The introduction of Information and Communication Technology (ICT) also in the sector of Cultural Heritage has led, in recent years, to a still limited and self-conscious transformation of the methods of approach to specific issues in the field of both data acquisition and in that of the subsequent data processing and management [1].

In other words, there is still no consistent cultural growth in this direction, particularly in those public and private bodies that play a major role in the process of safeguarding and enhancing these assets.
Conversely a number of investigative and experimental initiatives carried on, in the research field are evidence of a fruitful activity aimed at providing the various stages of the process specific to conservation and protection, also at the operational level, with the innovative tools that modern technology can now offer in a very wide range of disciplinary sectors.
The work presented here in aims at studying the ways in which ICT can be used to disseminate the huge complex of information produced in the course of the process of acquiring knowledge about the building heritage. The growth of the Internet has made available huge quantities of data in all fields of human knowledge, encouraging the sharing of ideas, studies and information, and at the same time making it possible also for non experts to approach and discover fields of learning that would otherwise be very difficult to access.
Over the past few years, the research undertaken has been focused on configuring a system capable of merging complex and heterogeneous data produced by using different acquisition methods specific to each particular phase of the fact-finding approach to the building within a custom-designed ICT environment [2].

An Information System: ARKIS

The product developed consists of a software package called **ARKIS** (**A**rchitecture **R**ecovery **K**nowledge **I**nformation **S**ystem) developed in AVENUE, the ESRI programming language, and based on the ArcView engine, validated for different research cases and presented at several conferences. Its innovative aspect resides in the transfer of functions specific to the Geographical Information System - GIS - [3] [4] to the architectonic scale of individual buildings, which is interpreted in the canonical forms of its graphical representation (plan views, elevations and sections), as a geographic area included inside a map.
ARKIS represents a modular tool consisting of several sub-systems each of which ensures different *levels* of knowledge through different degrees of detail, aimed at guaranteeing the *organization*, *representation* and *utilization* of the knowledge itself.
The basic structure underlying the entire methodological approach is represented by the extension of the georelational model applied to normal procedures typical of CAD and the more commonly used relational data bases. Consequently each data base of CAD objects and graphical entities acquires the *topological/vectorial features* of the GIS. This option made it possible to interrelate the descriptive data with the graphic data, locating the information in a geometrically exact point (or area) using relational spatial positioning functions for the *geometric characterization of the information*, while respecting the reciprocal *topological* relationships among the various parts of the building.
ARKIS is thus structured in such a way as to provide the necessary integration among heterogeneous data (geometric, raster and vectorial, descriptive, alphanumeric organized in RDBMS and as text, images, in various formats). After the specific interrelated files have been configured for each information type, this then allows the

System to be managed, as well as navigation through the various consultation itineraries.
The alphanumeric data are organized and structured into attribute tables, each field of which is flagged with the same identification code as the topological element to which the descriptive data refer. The GIS functions also regulate all the selection and query operations, which are based on geometric or topological criteria, as well as on logico-arithmetic expressions.
Overlay operations (topological cross referencing) allow the intersection between the different databases to be achieved by superimposing the various graphic-rendered topics and the relative tables of attributes, at the same time ensuring functionality of analysis among the different coverages (information layers) by combining together elements having different common attributes (figure 1). For lack of space it is impossible to provide further details on the various functions guaranteed by the system [5].

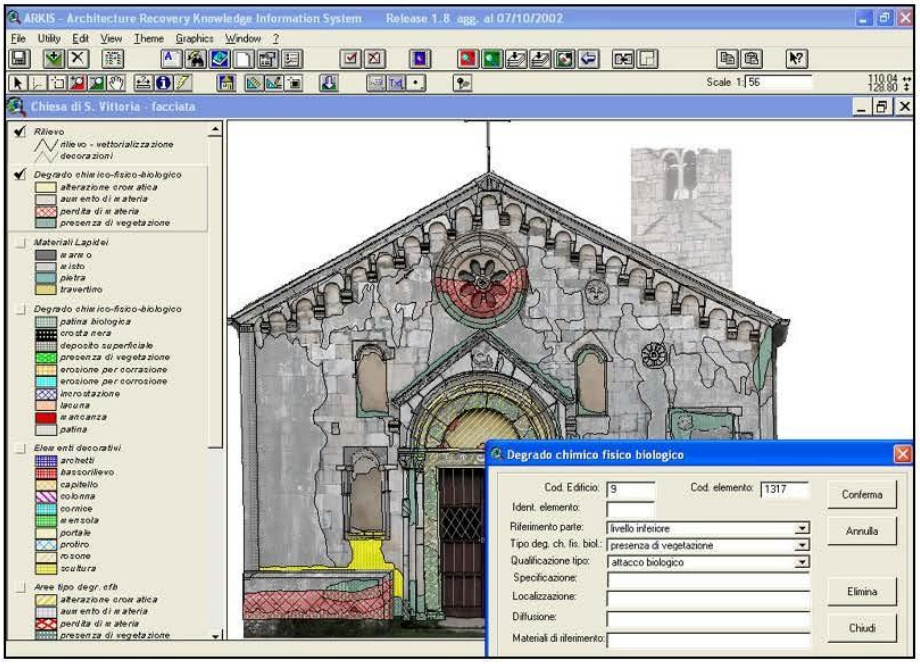

Figure 1 - ARKIS: a consultation data phase on decay situation

To mention only the more significant features [6], the functions may be summed up as follows:

- to guarantee on-screen outlining of areas with which to associate specific themes; these are naturally linked to the records inside which the descriptive information referring to the themes are organized;
- to automatically open the records in which alphanumeric data referring to the acquired entity are to be input, guiding the user by means of drop down menus of pre-established items;
- to automatically code each new entity, ensuring links between the various scales and the automatic updating of the RDBMS;
- to activate one or more themes, with consequent overlay operations;
- to open as many attribute/data tables as there are active themes and defined overlays (this allows the description information referring to each single theme to be merged and cross-referenced in a single display);

- to perform query operations and interactive queries both on the graphic representation and on the specific table record, with reciprocal highlighting of both the geometric element in the graphic representation and of the same record in the table;
- to calculate areas, perimeters and percentages in zones affected by the various pathologies discovered (figure 2);
- to call up the photographic image of the detail investigated and/or the rendering of geometric surveys with the relative lists of coordinate points;
- any other interactive analysis operation.

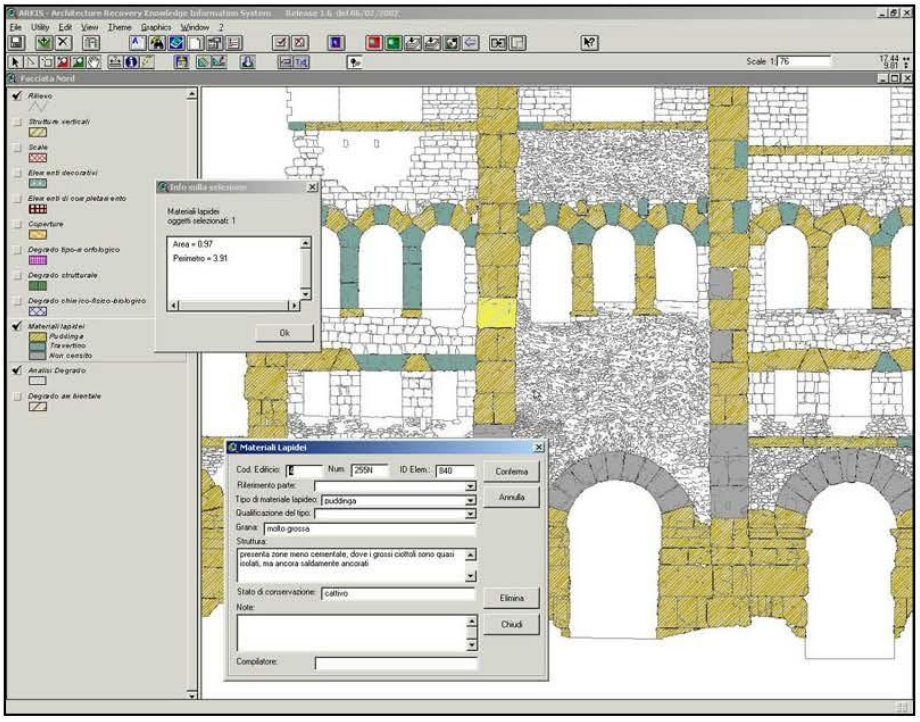

Figure 2 - ARKIS: a consultation data phase on a selected ashlar: information about materials are in the dialog window; in the small box are calculated area and perimeter.

For the purpose of testing the System developed, experiments were conducted using several study cases considered to be sufficiently representative of the object analysed and to be essential examples for validating the theoretical and methodological approach.
The System is user friendly and can be used as a support and guiding operating tool by various different bodies, in particular the Superintendencies. However, it is not enough just to be an operating tool, considering the huge potential possessed by the System.
In this connection it may be said that ARKIS, insofar as it forms the central engine driving a project for knowledge management and for this very reason resident on the desktop of the individual user, must necessarily be addressed to a specific 'nomadic' use (to continue with the metaphor): in other words, it must be able to initiate a process of knowledge navigation.
This entails seeking the added value contained both in the transfer of information organized by the individual user and in its distribution insofar as it is accessible in remote mode, thereby triggering a multiplying effect regarding the intrinsic meaning of

the single information items. It can thus be shared by several users in a network in which planning, comparison, discussion and knowledge are guaranteed.
It was on these conceptual assumptions in the framework of an innovative view of conservation in which the possibility of accessing relevant information plays a fundamental role that the **ARKIS - NET** Project was based.

ARKIS – NET: Methodological and technological aspects

A segment of the research is now focused on the **ARKIS–NET** Project, an evolution of ARKIS. It provides the foundation for disseminating high-end heterogeneous data, organised and represented in **GIS** form, and mapping services via Internet. This project enables users to integrate local data sources with Internet data sources for display, query, and analysis in an *easy-to-use* Web browser.
ARKIS-NET is based on the ArcIMS software package, the latest ESRI product aimed at the exploitation and distribution of GIS environments. It consists of a new generation of Internet Map Server (IMS), with functions orientated above all towards an open scalable architecture [7].
There is a *Client* module and a *Server* module: the Client typically requests information from the Server, which processes the query and then sends the information back to the Client. The Server technology used by this application is part of a multitasking architecture, that is, the management of the flow of queries received from the various Clients and organized according to different, simultaneously active, services (MapServer) monitored in such a way as to route the queries to the appropriate Spatial Server *(Image server, Feature server, Query server and/or Extract server*).
The Spatial Server interacts with the WEB Server through the Application Server and its Connectors and sends the response to its Clients.
Several queries may simultaneously be handled by the same Spatial Server, or else multiple queries of each Spatial Server or again one or more Spatial Servers and queries handled simultaneously on more than one machine. This means that clients that are not only powerful but also "intelligent": the response will be elaborated by the appropriate Server (designed to handle this type of request) and sent back to the Client in real time.
A *MapService* is a process that runs on the Spatial Server. It provides instructions to a Spatial Server on how to draw a map when a request is received. The input to a *MapService* is an ArcXML MapService Configuration File. There are two types of MapServices: *Image* and *Feature*. An *Image MapService* uses the image rendering capabilities of the Spatial Server. When a request is received, a map is generated on the server, and the response is returned as a JPEG, PNG or GIF image. A new map is generated each time a clients requests more information.
A *Feature MapService* uses the Spatial Server's feature streaming capabilities to bundle data and sent the request to the client. Because more processing is performed in the Java Applet, requests are sent only when additional data is needed.
One of the most interesting functions of the Feature MapService is *extracting* or *clipping* data to create a subset that can be sent back in shapefile format.
The Client may have an *HTML Viewer* or a *Java Viewer*: the fundamental difference lies essentially in the fact that HTML technology is very slim, does not require the downloading of addition plug-ins to display the data queries (Java Applet) and does not require computers with powerful CPUs; however, it only allows display and querying

operations. A Java Viewer, although requiring a comparatively powerful machine for processing and additional plug-ins, nevertheless ensures a high degree of interaction with and analysis of the maps.
The communication between clients and servers uses ArcXML. All the ARKIS-NET web pages have been customized with ArcXML, a GIS extension of standard eXtensible Markup Language (XML).
The ArcXML files look similar to HTML pages. The difference is that HTML describes the page structure for display while ArcXML provides the structure for describing the content.
The access to the ARKIS-NET project happens through the pages of the under construction site www.arkis.it (figure 3): there is a special section where you can enter the *online* consultation.

Figure 3 – Home page of the site www.arkis.it

The ARKIS-NET contents are the same as ARKIS, which continues to act as the information "generating" engine [8]. The data types available on the ARKIS-NET pages are essentially of the vectorial (shapefiles) and raster (image) types, as well as alphanumeric (database tables) and refer to the case studies so far investigated in the System. The remote user can access geographical information either directly on the national map and by querying the tables, searching by building type, municipality, etc.
Once the choice of case study has been made, he can call up the page dedicated to it using a set of available tools for:

- pan and zoom the map extent;
- query spatial and attribute data;
- create a buffer around feature;
- measure objects on the map;
- merge remote data with local data and save the work;

If the user is configured as a *privileged* Client, that is, if he can navigate using a *Java Viewer* (fast internet connection and a computer with sufficient processing power), he will be able not only to interact with the map through the tools described above, but also:
add Map Notes, such as text, graphics or images, to your map and submit them for review to the *Expert Team* (that will evaluate the Map Notes received);
make Edit Notes to map spatial and attribute data and submit the edits for review to the *Expert Team* (that will evaluate the Edits received).

Current configuration: the example of the Roman Theatre of Aosta

In the following, in order to complete what has been illustrated so far, it is deemed of interest to provide a brief outline of the present configuration of ARKIS-NET, using as example the data referring to the Roman Theatre of Aosta. It thus becomes possible to examine also the interface used by the client user, making the previously illustrated concepts even more explicit.
The page providing access to the consultation of the data referring to the south facade of the Roman Theatre of Aosta (figure 4), configured with a clientside Java, displays in the centre the *frame* containing the view with the representation of the geometric model of the facade and the various layers containing the polygons relative to the information layers related to materials and degradation of the individual ashlars. In the top right of the frame there is the navigator (in this specific case, the representation of the entire south facade) that is updated dynamically according to the zoom of the central frame. Below the navigator the Table of Contents (TOC) is illustrated, with a legend for each topic (layers of graphic objects belonging to the same class: polygons, lines, points) present in the view. On the left side of the frame there are a series of navigation, query and data analysis tools.

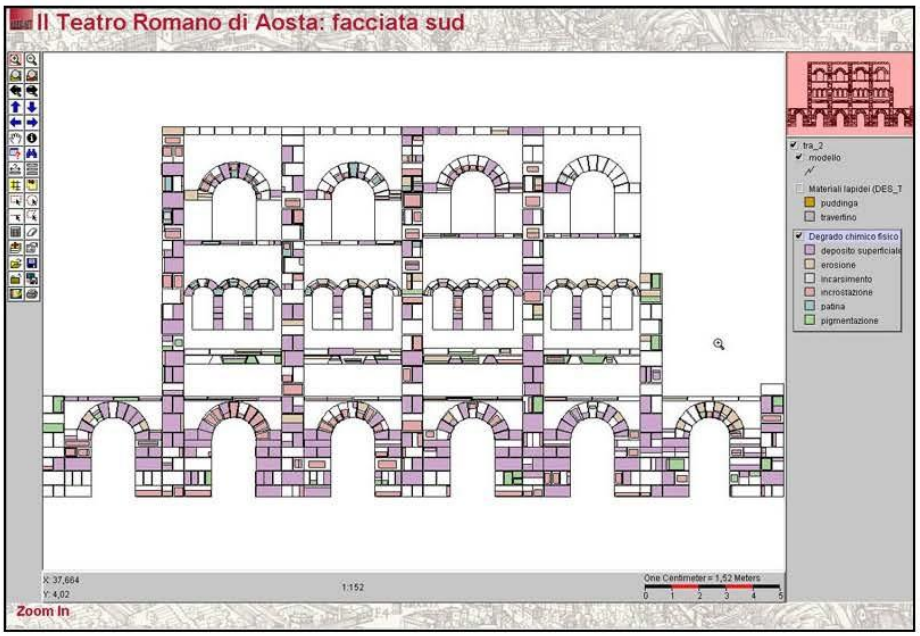

Figure 4 - ARKIS-NET: the access to the consultation of the data.
Roman Theatre in Aosta, south facade

Multiple actions may be performed inside the page, from the various types of zoom and pan to reach the area of interest, to the activation of one or more themes in the TOC, the querying and extraction of information concerning the *table of attributes* of the topics, a feature that is fundamental in a GIS environment, which contains the alphanumeric information related to the graphic objects present in the theme (*features*).

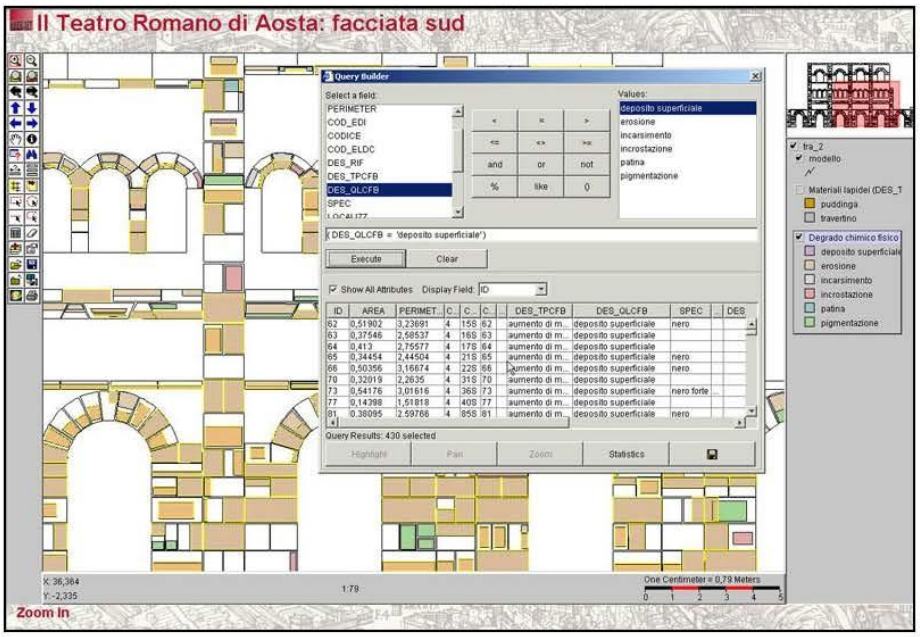

Figure 5 – ARKIS-NET: the *Query Builder* tool

In figure 5 it is shown how to use the *Query Builder* tool to seek graphic objects (*Features*) corresponding to certain selection criteria, inside the active theme. In the window a search string is constructed that is based on the fields in the *table of attributes* of the *Physico-chemical degradation* theme (active theme), requesting all the ashlars displaying an *Increase in material.* By clicking on the *Execute* button in the window a list appears of the ashlars corresponding to the query criteria. It is also possible to save one's search in a text file by clicking on the *Save* button in the *Query Builder* window. The polygons of the ashlars extracted are shown in the view.

Conclusions

In conclusion, ARKIS is user friendly. It represents an operative tool for different organisation, for example monuments offices or agencies. To this end, possible development could be to specialise some of the modules for the management of utilisation of the *topologic* requirement on *raster data* and to extend the system in 3D.
ARKIS-NET can be a valid tool for network information sharing, but not only for this purpose. The system must become a vehicle for the dissemination of a culture of the approach to the topic of the knowledge of historical and architectonic artefacts: there must of course be a data flow from the Server towards the Clients, but also and above all, from the Clients towards the Server; the latter will elaborate and expand knowledge, disseminating it and thus acting as one of the exchange nodes.

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INTERDISCIPLINARY PROCESSING OF THE DEGRADATION AND DETERIORATION CUMULATIVE EFFECTS. I.

by

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1. Introduction

As everyone knows, most of the objects from the national and international cultural heritage, as well as the archaeological pieces, experience complex changes from the moment there are created until they are exhibited in a museum. This route differs depending on the object type: common objects (with domestic or special usage) or artifacts.

Thus, for the former group, between creation and museum exhibition, we deal with two different circuits the object could follow, if it was used as a common object (domestic or special). These circuits could be briefly described as follows [1,2]:

- Creation, usage almost to the point of pre-collapse, maintenance and repairs (early restorations), usage continuance to exhaustion, ***abandon***, pedologic transformation in the context of the abandon, discovery, cleansing, investigation/research, consolidation, restoration, prophylactic conservation (*treatments*) and museum exhibition ***(abandon circuit)***;
- Creation, usage period, ***loss*** in different contexts (real loss, hidden and forgot, abandon following a cataclysm/war, war, diseases etc.), pedologic changes following the loss, discovery (*archaeological context*), cleansing, investigation/research, consolidation, restoration, prophylactic conservation (*treatment*) and museum exhibition ***(loss circuit)***.

The works of art usually follow a different circuit, even when they go through similar periods. In their case we consider the following stages:

- Creation, presentation for sale (auctions/acquisitions), introduction into collections, transfers/routes (or not, depending on each particular case, including thefts), exhibits, protection measures, ***preventive conservation***, ***aging***, this one includes apparition/enhancement of the ***time marks*** of the degradation and deterioration and imposes restoration and prophylactic conservation (*treatment*) operations, continuation of exposure as long as the conservation status allows it, storage retrieval, (***special*** fund, *closed* for the public, sometimes requesting *authorized access* for documentation, depending on the conservation status and on the "patrimonial value" – the latter referring to *inestimable* values and having a *precarious conservation status*, the exhibition continuing through ***replicas*** or ***scientific copies*** and the last phase – *loss of patrimonial*

value, with the insertion in the ***grey fund*** (it must not be destroyed, but preserved for didactic and research activities, continuing its preventive conservation).

During these circuits there are moments when the object presents degradations and/or deteriorations, from light effects to ***collapse*** (when the objects goes to the grey fund). The objects in pre-collapse situation preserve their shape and metallic core, while after collapse they lose these qualities.

The metallic objects from the cultural and historical heritage have a special material resistance (compared to others), thus a longer life. However, they still suffer ***deterioration*** in time, due to the destructive processes of physical-mechanical nature, and ***degradations***, due to the chemical, electrochemical and microbiological processes, both their physical and their chemical nature being affected.

The factors that collaborate in these processes are grouped in the following categories:

- ***Exogenous factors*** (from the environment), including ***environment factors*** *(climatic agents: temperature, humidity, pressure, light and cosmic radiations, air drifts <tourbillions or ascendants> or wind, microbiological agents, pollution <in any form> and, finally, animals and humans or the anthropic factor, through usage - normal usage and vandalism)* and ***risk factors***, which are uncontrollable (random), leading to collapse, denominated ***calamities*** or ***disasters*** (*flooding, hurricanes, hail, storm, draught, frost, thunder, fire, explosions, earth slides, earthquakes or seisms, accidental irradiations or nuclear accidents, wars*, etc.);
- ***Endogenous factors***, related to the ***material*** (quality, warranty period, etc.) and to the manufacture technology (*respecting the execution stages and phases, of the work parameters*, etc.).

The last ones induce, from ***the minimum resistance*** points or *active centers*, where *deterioration* and *degradation* start and finishing with different structural ***defects***.

In the case of easy situations we meet the following ***degradation*** types: *corrosion, segregation, monolithing, re-crystalizing* and *phase modifications*, etc. and ***deteriorations***: *superficial* or *profound erosions*, *fissures, fractures* or *material cuts/tears, unadherent or semi-adherent deposits, plastic deformations (flattening, bending, stretching, compression, folding, twisting, gondolation, alveolation of the plating layer*, etc.).

In extreme situation of ***pre-collapse,*** we encounter: *fragility, monolithing, generalized corrosion,* preserving completely or partially the *shape* and the *core or the metallic core*, and in ***collapse***, the same deteriorations and degradations, differing on the lack of core or metallic core and the complete lack of shape.

We present in this paper the main degradation and deterioration occurring in time, taking into account the stages experienced by a patrimonial metallic object, according to the circuit with abandon and loss circuit for iron objects.

2. Effects of degradation and deterioration in the abandon and loss circuits

Most of the metallic objects removed from the archaeological sites provide often an advanced degradation and deterioration status. They preserve their conservation status

from their abandon or loss period, to which accumulate the ulterior degradations that take place in time, after this stage, under the influence of the environment.

As we know, there are few metals in native form, having a great capacity to preserve their conservation status unaltered in time. Most of them originate in different minerals, from which they are obtained through a series of transformations, implying successive physical and chemical processes, which are at the base of the so-called hydro-metallurgical and/or pyro-metallurgical proceedings.

Corrosion and erosion could be considered "*inverse processes*", which cause the manufactured object to turn back into one or more minerals, respectively to the chemical compound state. This state, for the metals situated before the hydrogen in the electrochemical series Volta-Beketov, is much more stable then the metallic state, considered active state.

A thorough knowledge of the theoretical and practical aspects related to the corrosion processes, assisted or not by erosion and other physical-mechanical processes of deterioration or degradation, allows for a better understanding of the *phenomena of alteration* and *destruction of the metals and their alloys.* Thus, their thorough understanding will allow for the amelioration of the corrosion effects and of the other degradation and deterioration effects during the object's different existence stages.

In the case of the archaeological objects, the problem is a little bit different: first we determine the effects of the progressive degradation for the respective materials, then we interpret the motives, respectively the causes that led to this degradation and we select the optimal restoration and conservation methods. The knowledge about the processes presents a great advantage, because we can avoid the ulterior conservation of the objects in unfavorable conditions or the usage of inadequate materials.

Under the action of infiltration water, respectively of the environmental humidity, oxygen, and different chemical salts, cumulated to the microbiologic effect, the archaeological objects that were abandoned into the soil will corrode in time, forming different chemical compounds, thus returning to the *"mineral state"*

The chemical structure alteration processes of the metallic objects from the soil are present three different aspects: ***corrosion***, which can be: chemical, electrical, or microbiological, having the most important role, thermal and/or chemical ***softening***, which is often met to some metals and their alloys and ***solubility*** or ***dissolution***, which are rarely met and appear only in wet environments. Corrosion includes all forms, from the time marks to adherent deposits with *monolithing effects.* The corrosions that are uniformly extended at the surface in a thin passivant layer form the time mark, which accords noblesse to the object, but those extended into volume could deteriorate the object up to collapse (corrosion without metallic core).

The destructive processes are *erosions, fissures, scratching, bending, flattening,* etc., which modify the *esthetics, structure, functionality* and even the *shape of the object.*

According to this circuit, an abandoned or loosed metallic piece, having a more or less precarious conservation state, will suffer in time different deterioration effects under the influence of some physical-mechanical processes of ***destruction*** (erosion, fissuring, flattening, etc.) and (erosion, fissuring, flattening etc.) ***degradation*** under the influence of chemical and microbiological alteration processes.

3. The corrosion of the ancient metallic pieces in soil

Depending on the aggressiveness of the external factors and on the metal state (pure or alloy), its come back to the mineral state could last a longer or shorter period time. This is the reason why it's absolutely impossible to determine the age of a metallic object through analysis of degradation and deterioration according to the conservation status.

Some metals are more sensible than the others when it comes to humidity, chemical or microbiological agents. For instance:

- Gold can remain for centuries into the ground without suffering any change;
- Silver has the tendency to sulfurate and chlorinate; in some extreme situations it can disappear completely;
- Copper and its alloys tend to transform into oxides, carbonates and chlorites; they preserve themselves better in basic then in acid environment;
- Iron and its alloys are also sensitive to oxidation and to chlorination; they are more stable in mild basic environment, but they tend to preserve themselves better in acid environment, provided that the environment has a great concentration of phosphate ions (which is very rare);
- Tin is to be found rarely in archaeological sites, because it doesn't support well neither basic, nor acid soils. Even more, it degrades in soils subjected to large temperature changes (at 13,2°C begins the famous "*tin plague*").

Temperature and humidity variations predispose all materials to electrochemical corrosions and biologic attack.

Among the main types of corrosion that affect the ancient objects, as they are deposited, after their abandon, in soil, we remind:

Perforated corrosion (punctated), specific to some alloys, which appears as a large number of small areas on the surface of the object, having a punctated, pinched or hunchbacked aspect;

Uniform corrosion, which develops evenly on the entire surface of the object, and is met in all metallic objects with homogenous chemical composition and in those placed into homogenous environment;

Inter-crystallin corrosion, met at the silver and copper alloys, developing inside the metal, which turns it fragile, starting from the crystal limits;

Selective corrosion develops in dinar alloys, for instance brass, in which one of the compounds (zinc in our case) separates on the surface where it is destroyed through oxidation, turning the surface porous;

Galvanic corrosion, affecting all objects containing many metal objects in physical, where the less noble metal shall be destroyed favoring the most noble one.

Spot corrosion, (also known as *cavernous*) which often develops on the metallic objects situated in a conductive environment, close to another more electropositive metal, but without direct contact among them;

Corrosion under tension affects the metals which are subjected to stretching or compression forces and which often takes the shape of inter-crystalline uneven corrosion.

4. The mechanism of the corrosion and erosion processes of iron in the soil

For a better understanding of the mechanisms of the *corrosion and erosion*, we shall explain their action on metals, starting from the main types of action that develop between the two mechanisms. These actions are analyzed according to their *effect* on *the object* and respectively on the *aggressive agents*.

Depending on the nature of the action, we deal with *mechanic, chemical, electrochemical or galvanic and microbiological effects.*

These effects can produce alterations at microstructural level (distructions) or microstructural (defects), growing to develop chemical composition alterations– *degradations* (alterations, corrosion, monolithing, etc.). In time, most of the effects on the archaeological objects are cumulative, because they are the result of the action of many agents such as the environmental and risk factors. If we take into account the usage period for the piece after it has been created and its deterioration degree, which leads to some *conservation state*, its normal usage, we understand that the environment and risk factors from the period while it was "*hidden*" (in the archaeological site), could lead to a *reversible* restoration form or to the "*pre-collapse*" or "collapse" forms (generalized corrosion, the form without metallic core and/or monolith form).

The mechanic effects are determined by the action of the mechanic forces, which act on a structure, respectively material, leading to dimensional and implicitly structural alterations – ***deteriorations***. When cumulative actions with chemical, electrochemical or microbiological forces are involved this could lead to alterations of the chemical composition - ***degradations***. Thus, the force that is applied will generate at the surface or inside the material a certain mechanical or physical-structural effect.

We can provide as example of mechanical or physical-structural effects on archaeological pieces the eolian, maritime or fluvial erosion, the erosion of the infiltration water from the soil or the actions resulting from ploughing or from the dislocation of the structures in the vicinity of the object, the earthquakes, vibrations, ultrasounds etc.

More, the mechanic effect must be thoroughly analyzed, because they could provide the starting point of a certain type of degradation or deterioration or could activate a different action, such as the electrochemical, due to the tensions in the structure of the material.

The chemical effects are based on the interactions between the fundamental particles (atoms, ions and molecules) from a certain material that an object includes and the particles of various chemical agents (atoms, ions and molecules) from the environment such as: pollution, phreatic and meteoric water, etc. In most of the cases, the chemical attack takes place when the object is composed of an active material, which is less resistant to the action of exogenous factors. The action of these factors is thus diminished by the presence of liquid water or water vapors, because the water is the transporting vector or the dissolving material or the dispersion environment, or the processes are often accompanied by absorption or water elimination.

In the case of the chemical attack from the environment, there are two phases that interact: the gaseous phase, leading to the formation of metallic oxides or salts and liquid

phase, leading to the formation of metallic hydroxides, carbonates, etc. (all corrosion products develop from this form).

The chemical attack is related also to the three-dimensional structure of the objects or archaeological pieces. They can present in their structure superficial vacancies of electronic type, which are completed with electric charges from the environment or structural surface or internal defects that allow the insertion of atoms or ions from the environment. This is a chemical absorption process.

We meet another type of interactions as well when the crystalline defects from the surface are saturated. The absorption could be done through van der Waals forces, the phenomenon being denominated as physical absorption.

The chemical attack is related to another characteristic of the environment, the pH. Indeed, some metals are not attacked when situated in basic environment, even if they are attacked in acid environment, for instance, the iron pieces that were preserved in a poor in phosphates environment passivied through phosphatatization.

Thus, when we analyze the chemical effects we should take into account two factors: *the nature of the* material from the composition of the object and the chemical properties of the environment.

The electrochemical effects are based on the principle of the galvanic piles, having as basis the interactions at the surfaces of the two electrode surfaces, oxidation at the anode and reduction at the cathode. Two electrode surfaces are formed in the system. They are separated by an electrolyte (ionic conductor of second degree) and the electrodes are in direct contact (electric contact or through a conductor of the first degree).

In order to analyze the system we shall take into consideration two types of piles, which are used commonly for the electrochemical corrosion:

- *Piles with electrodes of the same nature;*
- *Piles with different electrodes.*

The piles with electrodes of the same nature are used when immersing the iron objects in an aqueous saline solution. Where the oxide layer has a structural defect, an electrochemical effect will take place, based on the following simultaneous processes:

In the electrolyte solution,

$$2H_2O_{(l)} \Leftrightarrow H_3^+O_{(aq)} + HO^-_{(aq)} \text{ and}$$
$$NaCl_{(s)} \rightarrow Na^+_{(aq)} + Cl^-_{(aq)};$$

At the anode,

$$Fe^0_{(s)} \rightarrow Fe^{2+}_{(aq)} + 2e^- \text{ and}$$
$$[Fe^{2+}_{(aq)} + 2HO^-_{(aq)} \Leftrightarrow \underline{Fe(OH)_{2(s)}}\downarrow];$$

At the cathode,

$$O_{2(g)} + 2Fe(OH)_{2(s)} + 2e^- \rightarrow \underline{Fe_2O_{3(s)}}\downarrow + H_2O_{(l)}$$

or

$$\tfrac{1}{2}O_{2(g)} + Fe(OH)_{2(s)} + H_3^+O_{(aq)} + 1e^- \rightarrow \underline{FeO(OH)_{(s)}}\downarrow + 2H_2O_{(l)} \text{ and}$$
$$3FeO(OH)_{(s)} \xrightarrow{\text{in time}} \underline{Fe_3O_{4(s)}}\downarrow + {}^3/_2H_2O_{(l)} + \tfrac{1}{2}O_{2(g)}$$

In this case, in the electrolyte solution exists a complex system of hydrated ions that lead to the formation of the rust layer, according to the reactions:

$$[Fe^{2+} + 2Cl^- + 2Na^+ + 2HO^-]_{(aq)} \Leftrightarrow \underline{Fe(OH)_2}_{(s)}\downarrow + 2[Na^+ + Cl^-]_{(aq)}$$

$$2Fe(OH)_{2(s)} + \tfrac{1}{2}O_{2(g)} \rightarrow \underline{Fe_2O_3}_{(s)}\downarrow + 2H_2O_{(l)}$$ *(formation of rust)*

In the diagram no. 1 we represent the main processes of compounds formation in the rust layer, according to the model proposed by *Hache* [3]:

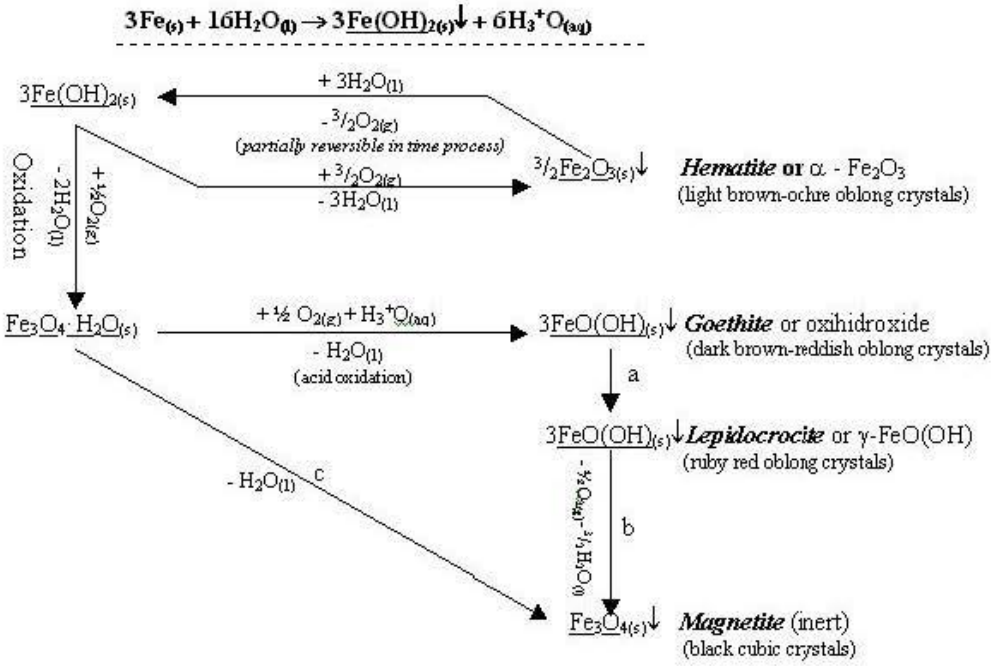

Fig. 1. Formation at the anode of rust compounds (from *Hache* [3]):
a – crystalline reformation process; b – slow process of reduction through aging;
c – very slow process of dehydration through maturation.

At the anode takes place the rusting process. First the metallic iron is dissolved and passes in $Fe^{2+}_{(aq)}$ cation , which transforms further into $Fe(OH)_2$, then, in the presence of O_2 from the air, into hydrated Fe_2O_3, hardly soluble.

At the cathode takes place the process of reduction of the molecular oxygen from the air and the of the FeO(OH) to Fe_3O_4, where the rust layer is formed.

If we insert a voltmeter in the circuit between the electrode of iron-anode type and the electrode of oxide-cathode type that was formed "in situ", we can observe a galvanic current (fig. 2). In this case, the corrosion takes place after the principle of the galvanic pile with electrodes of the same type. This phenomenon can lead to the complete destruction of the object – up to the *collapse state*.

The example from above needs the aqueous solution as a strong electrolyte (e.g., NaCl), assisted by the presence of an oxidizing gas, such as: oxygen, halogens, superior nitrogen or sulfur oxides, etc., which could provoke corrosion, as we simply modify their pressure. Because the oxides are electricity conductors, they present the tendency to move the electrons of the metal from its surface to the external oxide/environment interface.

The electrochemical processes could be influenced by the presence of light sources, other radiant sources and heat, which are developed by the environment.

Thus, because the cations Fe(II) and Fe(III) are photosensitive, the light could stand at the origin of *photoelectrochemical* corrosion, by its differentiated action on the metallic surface. This is why the common practice is to keep corroded objects containing Fe, Mn, Co, Cr, etc. in areas which are not illuminated, not even with artificial light.

As everyone knows the temperature variations could trigger electrochemical phenomena, through the decreasing of the activation energy of the electrodic processes and of those in the electrolyte. It is thus necessary, if possible, to deposit the objects in stable temperature conditions before, during and after the treatment.

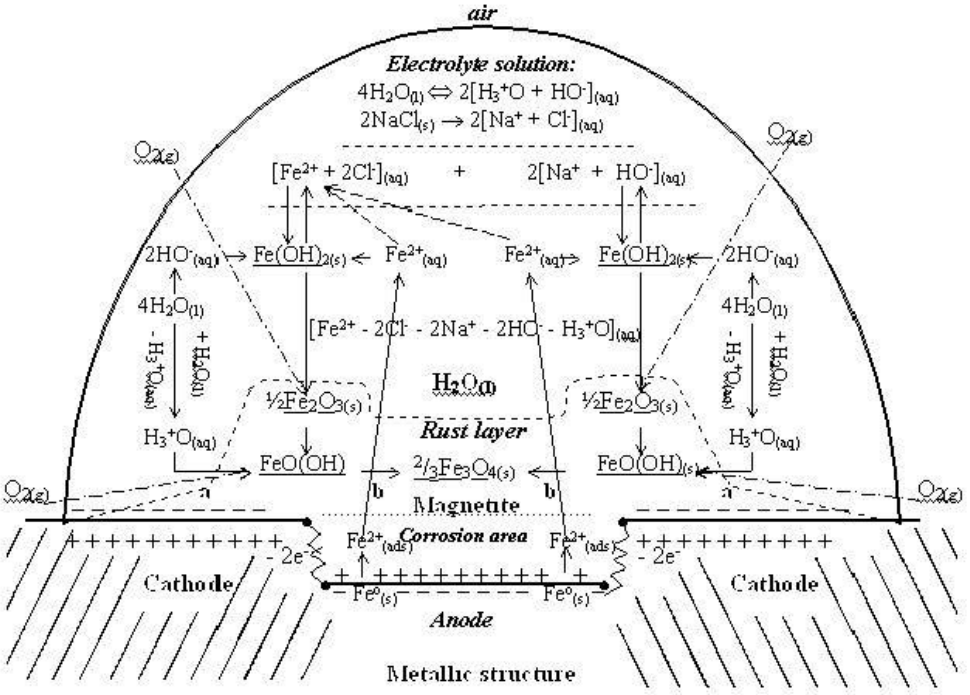

Fig. 2. The mechanism of the process of electrochemical corrosion, with electrodes of the same type, in an aqueous solution that contains NaCl as electrolyte: a – quick process in acid environment; b – slow reduction process through aging

Piles with electrodes of different nature are met in the case of the introduction of two metals in direct contact, which are different from their chemical nature point of view and as far as possible in the electrochemical tension or metal activity series (Volta-Beketow), using the same electrolytic environment, forming a galvanic pile in short-circuit, which will generate an electric current, based on the two electrodical processes.

In reality, the situations are much more complex, metals that are in direct contact, in the presence of humidity and an oxide or salt layer will react when the contact is made after a function of their electrochemical activity. Thus, because of the electrode potential scale, the metal that is more active will be the anode and will dissolve (anodic dissolution) into the chemical compound (electrolyte) to his stable oxidation state, while the less active metal will be the cathode, which will reduce its cations from the chemical compound (electrolyte) he is in contact with, or will reduce the protons contained in the solution releasing hydrogen. According to these reactions, any metal that is more active should replace from its salts a less active metal.

Thus, the more active metal should be the anode, when the dissolving process through anodic oxidation takes place: $Me \rightarrow Me^{z+} + ze^-$, and the metal that is less active should be the cathode. At the cathode takes place, depending on each case, either metallic deposit: $Me^{z+} + ze^- \rightarrow Me^0$, or cathodic hydrogen release:

a) $2H_2O \rightarrow H_2 + 2HO^-$ (*photochemical assisted process*);

b) $2H_3O^+ \rightarrow H_2 + 2H_2O + 2e^-$ (*pure electrochemical process*).

Microbiological effects are much more important than we could imagine. The microbiological activity develops mostly in the soil and is at the base of the transformation of all layers into humus. The action of the microorganisms could be, consequently, the motor factor of many environmental actions where the object lies.

In order to gain a better understanding of its importance, it is enough to know that 1 cm^3 of earth has millions of microorganisms: viruses, bacteria, fungus, algae, etc. These organisms develop their maximum activity al a temperature of 25-30°C and a relative humidity greater than 68%. The microbiological effects create conditions for the corrosion to develop quicker, thanks to the metabolism products (humus, uric acids, etc.)

The microbiological activity can be fatal, even for gold (due to *clostridium regulare* and *irregulare* bateria), and is the only possible attack in the soil.

The microbiological activity can be fought using sterilizing agents, like salted water, basic copper carbonates, antibiotics, phenol and its halogens, etc.

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THERMAL METHODS IMPLICATIONS IN OLD CULTURAL HERITAGE OBJECTS DATING

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1. Introduction

We may talk today of science, technique and art of the conservation as about an interdisciplinary domain, where **scientific investigation** and **materials science** have a special position. This is where from come the role and the implications of chemistry in the understanding of the *nature* and the evaluation of the *compatibility* in the active conservation and restoration interventions (structural, respectively chromatic integration) [1].

Referring to the scientific investigation, we must underline its five purposes respectively areas, *investigations concerning the authentication, the paternity, the determination of its patrimonial value (stock exchange or catalogue quota), the evaluation of its conservation status and the compatibility of the new materials and intervention methods with the ancient traditional techniques.* [1].

Knowing the materials and understanding the traditional techniques, with their specific elements from one period of time to another, from one school to another and from one province or ethnic group to another, represent the main concern of the investigator. In these last analyses he can imply *destructive, paradestructive or nondestructive* methods, the last ones being the most indicated. An analysis must offer *multiple data* about the material and the artistic technique: data related to dating-authentication, paternity establishment, patrimonial evaluation, conservation status and compatibility studies. An analysis would not be done for the only purpose of having a written document or a new topic in the analytic file of support or conservation-restoration. An analysis, event instrumental, providing the maximum of information is very expensive and could damage, when samples are taken, even in microform, the work of art as a whole. Given these facts, depending on the conservation status and the object importance a *protocol* will be established regarding the **scientific investigations proceedings,** respectively the type of the investigations and their objectives and the methods that are to be involved [1-8].

In this idea, we will bring into attention the main groups of thermal methods implied in the didactic and research activities performed in our group and our special accomplishments during the last years. We will insist on the data processing procedures involved in the thermal analysis in dynamic regime that are used in the evaluation of the

conservation status, in the determination of the age and in the harmonization of the conservation-restoration interventions [11].

2. Thermal Methods of Analysis

Because the thermal methods of analysis have many application domains, and their domain is very diverse, we shall underline the way they are involved in the scientific investigation of the cultural heritage goods, reminding, with some details, the main methods that are in the attention of our group [8,9,11].

2.1. Differential thermal analysis (*differential calorimetry*, DSC) relies on the *comparison of the temperature variation* of a sample to a reference object that doesn't present phase transformations in the analyzed temperature interval. The method underlines the phase transformation to solid state having a small thermal effect. Generally, the method allows to obtain a **cooling curve** or a **heating curve**, traced in coordinates ΔT_p - $\Delta T_e = f(T_e)$, where ΔT_p is the temperature variation of the sample, and ΔT_e – the temperature variation of the reference object. The curve is obtained through differential thermal analysis underlines the thermal effect produced by the phase transformations in a specific temperature domain $\Delta T = T_2 - T_1$, where the *critical point* of the phase transformations at the sample heating is clearly emphasized. Thus, the reference temperature is the one of the reference object, because the temperature of the probe modifies through the thermal effect of the phase transformations, of the segregation or micro-crystalline remodeling. As reference object we could use the corindon (Al_2O_3) for materials with congruents, remade steel (with equilibrium structures) for prepared steels (with structure outside equilibrium) etc. In the thermal domain of the phase transformation, using the cooling respectively heating curve, used through differential thermal analysis one could emphasize the nature of the effect: **endothermic** for $\Delta T_p - \Delta T_e < 0$ and exothermic for $\Delta T_p - \Delta T_e > 0$.

2.2. Simple thermal analysis in dynamic regime, follows the variation of the temperature of the researched material, registering or building point by point the curve $T = f(t)$. For easy fusible materials under 270 °C, one could use mercury thermometers and for melting temperatures over 300 °C, one could use thermocouples and a milli-voltmeter, whose gradation is in temperature degrees (usually °C), because the force of the thermocouple is directly proportional with the temperature (*Seebeck effect*).

After the material is heated at temperatures larger then melting temperatures, they are slowly cooled down, at rates smaller than 4°C/min. and the cooling curve is traced.

The material has on its cooling curve a stair specific to the solidification temperature (the pure material solidifies at constant temperatures, in a time interval dependant on the sample mass), while the additive compounds, for a certain concentration of their components, has the same cooling speeds for the liquid phases and for the solid phases, which are imposed by the method, but instead of the corresponding stair for the *solidification point* we will have an inflection with slope change (constant or variable, depending on the phase complexity in the mixture), corresponding to a temperature interval $\Delta T = T_L - T_S$, where T_L is the start crystallization temperature

(solidification), which is the **„lichidus" point**, which is specific to the analyzed mixing ratio, and T_S is the final solidification temperature, which is the **„solidus" point,** which is specific to the same mixing ratio. Thus, a material would solidify in a temperature interval (ΔT) and time interval (Δt) specific to the studied mixture type (homogenous or heterogeneous, additive or non-additive). The cooling speed in this interval is modified with respect to the normal regime imposed by the method, due to the thermal effect, which accompanies the crystallization (solidification) processes. If one would trace the heating curve (a method that is rarely used), the crystallization processes would be replaced by the melting and/or solving processes.

The curve between *„lichidus"* and *„solidus"* has many forms, depending on the complexity of the possible phases that exist in a mineral, as integral or summative system.

With the cooling curves, one could elaborate for the mixtures **the solidification diagrams or of thermal equilibrium**, which are very important in the determination of the nature and composition of the phases in a material. Excepting the homogenous materials, which present continuous variations of the *„lichidus"* and *„solidus"* curves, the heterogeneous could form **eutectics** or **congruents** in various mixing ratios.

By *eutectic* we understand the intersection point of the two *„lichidus"* points with the straight line part of the *„solidus"* curve from the thermal equilibrium diagram and it represents the mixing ratio with the minimum melting point. For binary mixtures whose components have limited mutual solubility in solid state, the *eutectic* has the concentration corresponding to the E point in the thermal equilibrium diagram and the minimum melting temperature. The eutectic point can be found both in **binary mixtures**, whose components have limited mutual solubility in solid phase and that have three phases in this point (at eutectic temperature), two solid and one liquid, according to the phase rule, and in **ternary mixtures** (which have four phases at eutectic temperature) and **quaternary mixtures** (which have five phases at eutectic temperature). Under this point the systems solidify completely. At binary systems we talk about the llimits of the eutectic line, and at ternary mixtures about the limits of the eutectic surfaces. The eutectic as crystallographic, respectively metallographic compound has always the sameconstant composition corresponding to the eutectic concentration, also called eutectic composition.

Compared to the eutectic, **the congruent** has a melting temperature higher than one of the components and much higher than the eutectic, corresponding to a stoechiometric mixture ratio capable to form a compound.

2.3. The thermal analysis in static regime is very much used in the composite study, as matrix systems or hetero-joining structures, when are studied phase modifications for certain temperatures or mass losses function of temperature. The technique that is used is the microscopic method on thermal oven with monocular lens and photographic or video recording system (Böetzius micromass).

This analysis allows the determination of the mass loss at a certain temperature, according to the following relation:

$$\Delta m_t, \% = 100(m_I - m_f)/m_I,$$

where m_i is the mass of the initial mass and m_f, the mass of the probe that remained after its heating at t temperatura.

The technique with Böetzius micromass allows the determination of the melting point, of the phase modifications, of the boiling point, of the molar mass through the crioscopic or ebulioscopic method, etc.

2.4. The differential thermogravimetric analysis, in dynamic regime, is the most complex thermal analysis method, with special implications in the **study of all the materials**, both organic and inorganic, but mostly of the **composite hetero-joining systems** with complex structures: electric or/and ionic conductive, semi-conductive and dielectric. The used device is the **derivatographs** with thermal rooms and thermogravimetric weighing devices (with light spots on photosensitive support) or with electronic registration of **the termogram**, with the **four curves**: ΔT – temperature variation of the thermal room from 20 to 600°C, with a speed between 1 and 12°C/min., depending on the chemical nature of the a material; TG – the thermogravimetric variation or Δm – mass loss; DTA – thermodifferential variation (the derivative of the thermal variation – thermal effect) and DTG – the differential thermogravimetric variation (the derivative of the termogravimetric variation – the nature of the thermal process: elimination, decomposition, oxidation etc.).

Correlating the four curves, apart from the percentile evaluation of a structural composition, based on the volatile components or those resulting from thermal decompositions, which are eliminated at certain temperatures (or in temperature domains), the establishment of the nature of the thermal effects (endothermic or exothermic) and their complexity (simple processes of elimination through evaporation or sublimation and the complex segregation processes of micro-crystalline reformation or decomposition) for characteristic domains, can be experimentally determined the **activation energy (E_a)** and **the reaction order (n),** relying on the **Freeman – Carrol equation:**

$$-[\Delta \lg (dW/dt)] / \Delta \lg W_r = - n + [(E_a / 2{,}303\ R)\ \Delta (1/T) \cdot 10^3 / \Delta \lg W_r,$$

where dW/dt is the derivative of the weight loss which is read on the DTG curves, W_r – reactive mass that is in turn equal with $W_\infty - W_t$, where W_∞ is the total loss in wight and W_t the loss at the t moment, determined from the TG curves or Δm, n – the reaction order, E_a – activation energy of the process in the analyzed temperature domain, in kj/mol, R – universal constant of the gases, 1/T the inverse of the process temperatures, in ^0K.

For the calculus of the activation energy and of the reaction order for a certain process, we select the characteristic domain of temperatures, fitting in this domain the areas (sectors) on the four curves. The reading is done in this domain point by point for all discrete values corresponding to the four curves: ΔT, TG, DTA and DTG.

Using an **Excel computer program,** based on the **Coats – Rethford method**, we can represent graphically the variation of the activation energy E_a, and of the reaction order, n, function of the transformation degree x or α, respectively the function of the thermal gradient T, involving only three curves: DTA, ΔT şi TG or Δm.

3. Analytic description of the DTA and implying it in the authentication investigation (dating)

It was remarked that the DTA and DTG curves have a specific shape for a certain material. The organic materials, which suffer from the aging phenomenon in time, present readable modifications of the DTA curves DTA in time. This affords their use in the dating process. This effect is also present at some inorganic materials, which age through structural or compositional allotropy modifications. To be able to use the DTA or DTG curves, in such investigations, we must build a mathematical model of intrinsic description of the curves.

There are many large difficulties when comes to the exact mathematical descriptions of the DTA curves. From what I know, there is no complete satisfactory description. Until now, the best known are the *Hodany* [12] , *Barral, Porter and Johnson* [13,14] tries, for very simple systems. It is true that there is no theoretical or experimental ground for the empirical formulas that describe the DTA curves. According to these, such a formula is derived from a very simple DTA curve (fig. 1.), with only one endothermic peak, specific to a enthalpy change, corresponding to an allotropic transition and yto simple structural changes (segregation, osmoses, diffusions, etc.).

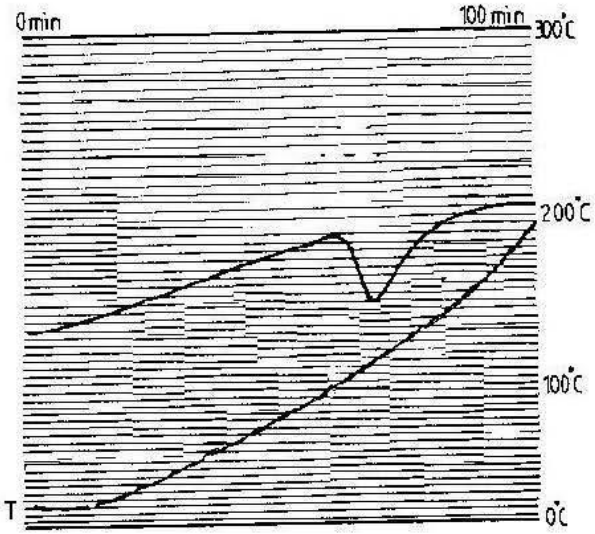

Fig.1. The shape of a simple DTA curve simple and the temperature variation Δt, For a mineral pigment;

The empiric description of the DTA curve DTA can be done through a quadratic expression, having the formula:

$$h = h_0 - at + bt^2, \qquad (1)$$

where, h – is the distance in mm between the baseline (level 0° C), h_0 is the height in mm at the 0 moment 0, t – the time in minutes, and a and b represent constants evaluated from experimental data, **a** being expressed in mm/min and **b** in mm/min^2.

According to such an expression the t_m moment, in minutes, belonging to the peak would be:

$$t_m = \frac{a}{2b} \qquad (2)$$

and would correspond to a minimum point.

Because:

$$\frac{d^2t}{dt^2} = 2b \qquad (3)$$

it would have positive values.

To decide if a DTA curve can be analyzed, respectively described through such an expression, the differentials, meaning that the equidistant derivatives in a direction should vary constantly [15,16]. From table 1, where the first, the second and the third differential are represented, one can observe that only the first differential can be used, and the 2 and 3 degree not. Thus, an expression of superior degree would make the calculation very complicated, where from resulting that the possibility of an intrinsic description of a DTA curve through an expression of the type above described cannot be easily done.

Table 1. The variation of h function of t and its partial derivatives.

t (min)	H (mm)	Δ^1h (mm)	Δ^2h (mm^2)	Δ^3h (mm^3)
0	91,5			
		1,9		
6,66	93,4		1,9	
		3,8		1,9
13,33	97,2		3,8	
		7,6		-5,2
20,00	104,8		-1,4	
		6,2		-1,0
26,66	111,0		-2,4	
		3,8		2,8
33,33	114,8		0,4	
		4,2		0,4
40,00	119,0		0,8	
		5,0		-1,8
46,66	124,0		-1,0	
		4,0		-1,0
53,33	128,0		-2,0	
		2,0		-31,3
60,00	130,0		-33,3	
		-31,3		87,4
66,66	98,7		54,1	
		22,8		-65,4
73,33	121,5		-11,3	
		11,5		2,6
80,00	133,0		-8,7	
		2,8		9,9
86,66	135,8		1,2	
		4,0		-3,8
93,33	139,8		-2,6	
		1,4		
100,00	141,2			

Because of this *Hodany* describes a DTA curve with the formula:

$$\ln\frac{h}{h_m}=\frac{\left(t_m^2\frac{t}{t_m}-1\right)^2}{f\left(\frac{t}{t_m}\right)} \qquad (4)$$

where h_m is the height in mm above the de 0° C level belonging to the peak, thus to the t_m moment.

The $f(t/t_m)$ function at the denominator is a function that could be determined from the experimental data.

From ecuation (4) results:

$$f\left(\frac{t}{t_m}\right)=\frac{t_m^2\left(\frac{t}{t_m}-1\right)^2}{2{,}3\lg\frac{h}{h_m}} \qquad (5)$$

Thus, the value of the $f(t/t_m)$ function could be calculated for each given time moment. Similarly, the relative errors of h can be determined for the calculated values from equation (5), using the equation:

$$\frac{df\left(\frac{t}{t_m}\right)}{f\left(\frac{t}{t_m}\right)}=\pm\left|\frac{5\cdot10^{-2}}{\frac{h}{h_m}\lg\frac{h}{h_m}}\right| \qquad (6)$$

According to equation (6), the results are acceptable, if $dh/h_m = 5\cdot10^{-2}$ [17,18].

Tracing the values that are calculated with equation (5) for the error limit from equation (6) as a t/t_m function, we allow for the graphical determination of the $f(t/t_m)$ function . The graphic is illustrated in fig. 2, where the dotted curves represent the limit of the average, and the continuous curves the $f(t/t_m)$ function, according to the experimental data. Formula (5) is undetermined in the $t/t_m = 1$ point; nevertheless, this aspect is not taken into consideration in the graphical procedure for which the discontinuities of the small values of t/t_m are also omitted.

One can easy realize that the continuous shape of the curve is described by the function:

$$f\left(\frac{t}{t_m}\right)=33\cdot10^3\left(\frac{t}{t_m}\right)^{0.296}-31.10^3 \qquad (7)$$

Replacing in equation (7) the measured value of t_m from equation (4) we obtain a theoretical formula for the DTA curve, which allows a correct investigation for it. Equation (4) will be described as follows:

$$\lg\frac{h}{h_m}=\frac{t_m^2\left(\frac{t}{t_m}-1\right)^2}{2{,}3f\left(\frac{t}{t_m}\right)} \qquad (8)$$

for which the limit condition:

$$\lg \frac{h}{h_m} \rightarrow \frac{\left(\frac{t}{t_m}-1\right)^2}{f\left(\frac{t}{t_m}\right)} \qquad (9)$$

is done on a straight line, specified for the DTA curve of a material with a certain age.

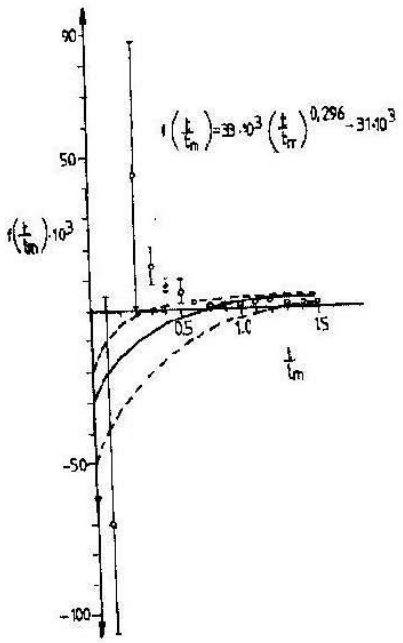

Fig. 2. The graphical determination of the $f(t/t_m)$ function for the simple DTA curve of a mineral pigment

4. The graphical determination of the $f(t/t_m)$ function for the DTA curve.

The problem that arises from now on is to establish an easy to solve equation, allowing for the graphical representation of a *"specific straight line"* for a certain curve, corresponding to a given age for a studied material.

After solving equation (7), for different values of the t/t_m ratio, with t_m experimentally measured, one can calculate relation (8). Using these values and tracing them according to equation (9), we obtain the so-called **theoretical line** (fig.3.). The graphical representations using experimental data matching the theoretical line (the points are on the line on one side or another, at small distance from it), equation (8) will describe very well the DTA curve. Figure no. 3 proves this, meaning that both equation (4) and (8) – using relation (7) – give a correct description of the investigated DTA curves.

As well, it was remarked that equation (4) could be used for the description of some other DTA curve types. In this case, the data given by the DTA curves must be taken into consideration when the $f(t/t_m)$ function is determined. For the complex DTA curves is proposed the utilization of the equation:

$$f\left(\frac{t}{t_m}\right) = 26 \cdot 10^3 \left(\frac{t}{t_m}\right)^{0.71} - 24.10^3 \qquad (10)$$

In fig. 4 are presented the DTA curves for a natural shadow type pigment, subjected to artificial aging through thermal degradation, equivalent to an age between 0 and 400 years (from 100 in 100 years).

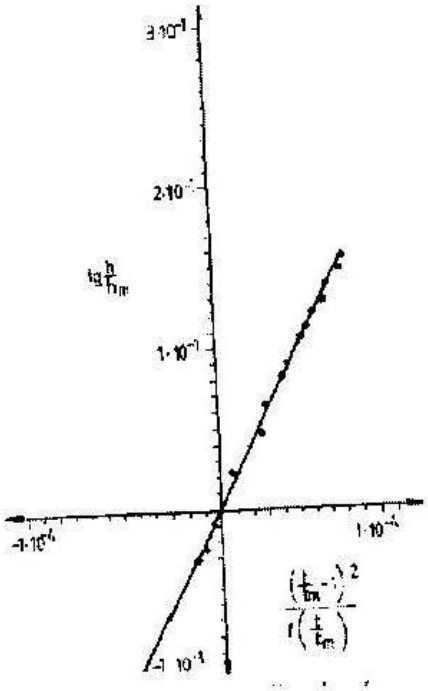

Fig. 3. The theoretical line of the experimental data for a simple DTA curve, corresponding to a mineral pigment, of natural shadow type (MnO_2), recently prepared

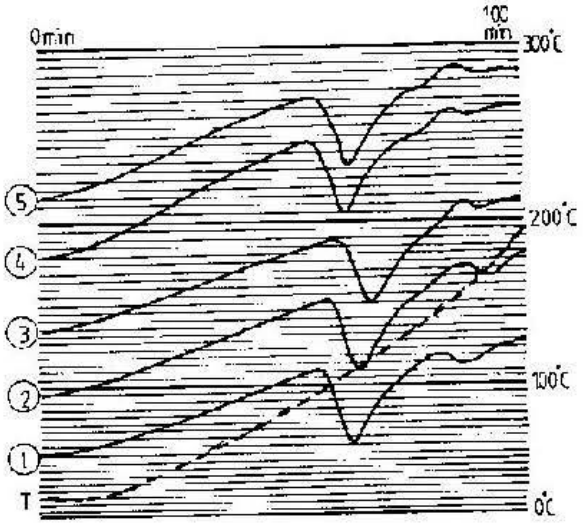

Fig.4. Simple DTA curves for the natural shadow type pigment, which was artificially aged through equivalent thermal degradation, corresponding to an age between 0 and 400 years (from 100 to 100 years);

Replacing equation (10) in equation (4) and taking into consideration the t_m and h_m values that were experimentally determined (see table 2), could be evaluated the theoretical lines for the 5 DTA curves and could be calculated the specific individual slopes, corresponding to their age. In the logarithmic representation of the theoretical curve, it is enough to use equation (10) and the t_m value.

Table no. 2. The t_m and h_m values that were experimentally determined

	Curve				
No.	1	2	3	4	5
t_m, (min)	66,10	66,67	69,92	63,95	65,72
h_m, (mm)	30,40	62,00	90,00	129,50	150,00

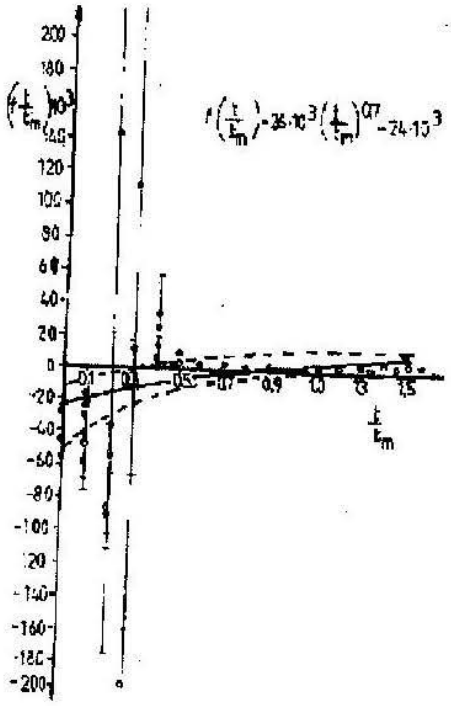

Fig. 5. Graphic determination of the $f(t/t_m)$ function for the complex DTA curve of a mineral pigment;

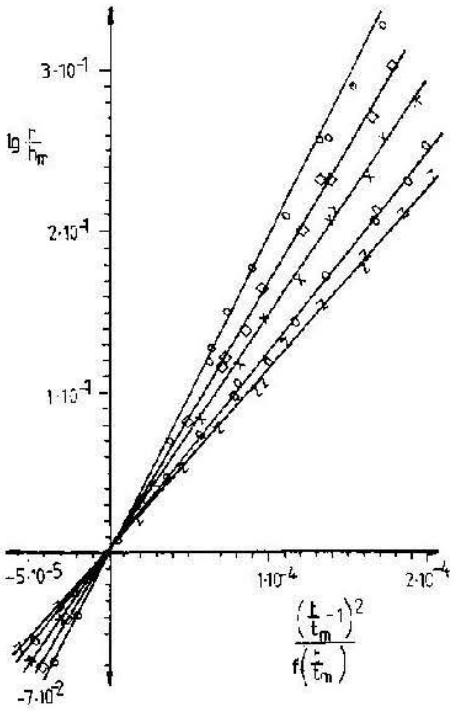

Fig. 6. Theoretical curves of the experimental data for the five DTA curves

Using the theoretical lines slope one could approximated the aging rate for some materials, such as: proteic, glucosic and lipidic adhesives, vernis and diverse organic supports, and some inorganic materials, such as metals, ceramics, varnishes, glasses, some pigments, etc. Our group evaluates this research.

5. Conclusions

Processing the shapes of the DTA and DTG curves, function of Δt one can make graphic representation, which allow to measure the conservation status, respectively the aging rate of some mineral or organic materials from the structure of the cultural heritage objects. Even more, involving the already classic, Freeman-Carrol method, or using an Excel computer program, relying on the Coats – Rethford method, one can graphically represent the variation of the activation energy, E_a, and of the reaction order, n, function of the transformation degree x or α, respectively function of the thermal gradient Δt, data that allow for the intrinsic characterization of a certain material, concerning the influence of the diverse factors on its conservation status, thus obtaining very important data about the evolution of the degradation and deterioration in time.

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"Mantener el Patrimonio Vivo. Educar y formar a favor de la preservación y la gestión del Patrimonio Cultural"

"EL PROYECTO INTEGRAL DE RESCATE DE CENTROS HISTÓRICOS, UNA PROPUESTA PARA EL CONOCIMIENTO Y PRESERVACIÓN DEL PATRIMONIO CULTURAL EN EL CONTEXTO DE LAS CIUDADES PATRIMONIO MUNDIAL"[1]

▪ Introducción

En las narraciones que hace la historia, la convivencia e influencia mutua entre las ciudades principales y los núcleos de población aledaños, ha tenido una presencia singular, al matizar en el tiempo una cultura o bien manifestaciones de la misma. Esta dinámica imposible de obviar en las reflexiones y propuestas a cerca de *"la sensibilización y preservación"* en el contexto de la red de Ciudades Patrimonio Mundial, se convierte en el hilo conductor de variables imprescindibles para la protección del Patrimonio Cultural.

Así,*"ciudad principal – núcleos de población"* aplicado a la ciudad de Puebla (México) y otros polos de su Estado, es donde se centra la experiencia del Instituto del Patrimonio Artístico, Antropológico, Histórico y Arquitectónico del Estado de Puebla (IPAAHA) desde una perspectiva de reconocimiento y cuidado, identificando entre otros aspectos, las diferentes redes de poblaciones – *a partir de sus tradiciones y costumbres, características tipológicas, así como de los valores cualitativos y cuantitativos de su patrimonio, etc. -.*

Entre dichas redes y las distintas vertientes de conservación del Patrimonio, se encuentran las premisas que dan sentido a esta exposición dividida en

[1] **Tema I:** *"Comunidades bien informadas constituyen una condición esencial que permite elaborar políticas para comprender y difundir los valores del patrimonio cultural. Evaluar y decidir a favor de la preservación y la gestión.*

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tres momentos: Un primer recorrido por Puebla y sus redes vitales de centros de población, aciertos y vicisitudes en términos de preservación del patrimonio; la propuesta "Proyecto Integral de Rescate de Centros Históricos en el Estado de Puebla", sus instrumentos operativos y los vínculos que establece con cada comunidad; y finalmente, la aplicación del Proyecto Integral en el caso específico de la Ciudad de Zacatlán Puebla, así como algunos casos comparativos y sus respectivas reconsideraciones.

En este contexto de ideas, es como dedicamos un espacio a la ciudad y al poblado, al núcleo político y a los núcleos ideológicos y sociales, a lo sublime y a lo singular.

I. Puebla, Ciudad Patrimonio Mundial y los contextos de su Estado como parte de una red Cultural

Con título de "Ciudad de los Angeles" desde 1530, una Zona de Monumentos declarada en 1977, un total 2619 inmuebles histórico artísticos registrados en mas de 400 manzanas "trazadas a cordel", bordes naturales hoy convertidos en importantes arterias viales y un promedio de 10 barrios tradicionales cuyos orígenes se remontan a los siglos XVI a XVIII; la Ciudad de Puebla en1987 es declarada Patrimonio Cultural de la Humanidad, y halla su complemento en los distintos centros de población que conforman la totalidad del territorio poblano.

El estado de Puebla es uno de los más vastos en testimonios culturales, dicha cualidad de abundancia, inicia con la misma variedad del paisaje y de su topografía marcando de un modo claro e indeleble cada una de las particularidades que encauzaran la producción cultural de cada región. A estas características primeras de identidad, se ha sumado la impronta temporal a través de una materialización de ingenio,

experiencia, ideología e ímpetu colectivo; teniendo como resultante una gama de legados producto de la fusión de costumbres mutuas y configuración de nuevas identidades.

Es en la dinámica que guardan dichas constantes aplicables a toda cultura, a partir de las cuales en este Estado surgen contextos como: las Sierras Norte y Nororiental con sus variantes totonacas, nahuas y otomíes; los valles, con su base nahoa y sus señoríos independientes o aliados con Tlaxcala; el sur con su carga mixteca y popoloca; el valle de Puebla y Atlixco con sus "sueños bíblicos" y de buen gobierno por parte de la Corona Española, y la Sierra Negra con sus influencias olmecas xicalancas y nahuas matizada por las culturas del Istmo.

En este contexto, 217 municipios con sus respectivas cabeceras y las mas de 3,054 localidades registradas[2], con sus permanencias urbano – arquitectónicas: *llámense conventos, templos, ranchos, trapiches, haciendas, estaciones de ferrocarril, mercados, cementerios, plazas y los bienes inmuebles implícitos*; así como elementos que complementan y ligan cada una de estas comunidades entre si: *Caminos de herradura, puentes, acueductos, fuentes, garitas, postas, humilladeros, ventas, etc.*; o bien manifestaciones como: *fiestas patronales, producciones artesanales, leyendas etc.;* representan el universo de este acervo cultural y por tanto el reto de la conservación del Patrimonio Cultural en el siglo XXI, ante el deterioro "natural" que confiere el paso del tiempo y la transformación inducida en las estructuras históricas dada su respuesta a nuevas necesidades.

En este panorama es preciso reconsiderar que la lejanía y marginación de una comunidad no implica la carencia de acervo cultural

[2] *Instituto Nacional de Estadística, Geografía e Informática, México 2000*

o el desconocimiento del mismo, al contrario, tiene una valoración particular que es necesario analizar, comprender y aceptar para poder dar respuestas reales a las problemáticas existentes en respeto a su identidad.

Además del reconocimiento a la Ciudad de Puebla; en 1994 ante la declaratoria de los Primeros Monasterios del siglo XVI ubicados en las laderas del Popocatéptl se incluyen tres monumentos ubicados en territorio poblano, rebasando en materia de Patrimonio los límites de la ciudad.

Esto muestra la importancia del sistema de ciudades que reafirman a Puebla en el renglón de patrimonio, a partir de una red conformada por un promedio de 30 localidades, integrando distintas regiones caracterizadas por la abundancia y calidad de patrimonio urbano, arquitectónico, natural, socio cultural y productivo; ante condiciones geográficas diversas.

- **La difusión del Patrimonio y su conocimiento**

Bien es sabido que en las ciudades capitales la información circula a mayor velocidad en términos de protección y educación del patrimonio, por tanto adquieren una mayor atención y cuidado de los valores que encierra un centro histórico de esta naturaleza. En contraste los sistemas de ciudades secundarios, captan esta información generalmente de manera espontánea o en términos de lo estrictamente necesario (ya sea por la urgencia de intervenir un inmueble, frente a riesgos de demolición o ante algún desastre causado por agentes naturales o humanos). Pero, ¿En que consiste una adecuada información en las comunidades?.

En una situación ideal, el tener al alcance un aprendizaje sistematizado, derogaría en una cadena de acciones a favor de la

preservación de cualquier manifestación cultural; sin embargo sería interesante equiparar las condiciones particulares en las comunidades del Estado de Puebla en términos de accesibilidad física o niveles de información con relación a la situación de conservación del legado histórico.

Por citar un ejemplo, al sur del Estado de Puebla, en la Región Mixteca; se encuentra una fundación del siglo XVI denominada Santa María de los Reyes Huatlatlauca. Dotada de una belleza singular por su ubicación geográfica (entre la sierra del Tentzo y los márgenes del río Atoyac), paisaje, costumbres, estructura urbana y características arquitectónicas tradicionales; esta población permaneció al margen de la dinámica del Estado de Puebla hasta hace cerca de treinta años, conservando así sus ricas fuentes de identidad. Al cambiar estas condiciones, con la construcción de vías de comunicación, la emigración de sus habitantes y por tanto el abandono de los sistemas tradicionales de producción, se vio alterada la concepción espacial y la fisonomía urbana aun ante el conocimiento, la permanencia y apropiación de los hechos que la generaron entre sus pobladores, lo cual no ha impedido la pérdida paulatina de su acervo cultural.

Desde otra perspectiva y en un juicio laxo sobre la divulgación de los valores del patrimonio, el conocimiento sedimentado o interindividual vigente en muchas comunidades, es el otro polo que da sentido a un intercambio o diálogo en términos de difusión; ya que considerar el criterio unívoco de la difusión que comúnmente empleamos (llámese para sectores reducidos o especializados), no constituye el puente legítimo en la preservación del Patrimonio Cultural de comunidades alejadas.

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En este sentido, la comunión entre institución y población, implicará un buen cauce en el "extender, propagar y divulgar" que connota el término *difusión*, dirigido a sectores amplios, asumiendo la diversidad de los habitantes y con el diseño de los medios pertinentes para un trabajo *in situ*. Así la difusión basado en estos factores y el intercambio se reduce a una vertiente en proceso de exploración.

Ante esta circunstancia, el IPAAHA ha emprendido campañas de difusión permanentes tanto a solicitud de las comunidades como a través de visitas de prospección o durante la elaboración de los diferentes inventarios catálogos de bienes inmuebles; estos últimos como instrumentos de reconocimiento y conservación.

· Del respeto y la preservación del patrimonio

En el recorrido por el interior del Estado se han detectado, algunos aspectos que requieren mayor atención siendo estos: el respeto, la preservación y la apreciación del Patrimonio Cultural como un recurso no renovable y válido satisfactor que fundamenta el desarrollo real de una comunidad.

Como una cuestión cultural, la conservación de las estructuras históricas se hace evidente desde el México Antiguo, en donde por ejemplo las superposiciones piramidales representan diferentes momentos históricos y el hecho de que "nada esta terminado" no como un concepto reduccionista, sino en un sentido de continuidad, tal vez partiendo de conceptos diferentes pero equiparables a los que ahora empleamos.

Sin lugar a duda, un recorrido por la connotación del término "*conservación*" en diferentes momentos históricos en México, sería muy

extenso, solo bastaría recordar como primer registro el siglo XVIII como un hito conservacionista ante los hallazgos arqueológicos y el movimiento positivista a finales del XIX y principios del XX; circunstancias que fundamentan la creación de instituciones avocadas a la educación, investigación y difusión en pro de la preservación del legado histórico.

Lo cierto es que actualmente, dadas las condiciones y disertaciones bajo las que se encuentra la dinámica social, la arquitectura contemporánea y las lecciones que aporta el patrimonio edificado no resta mas que aprender de éste último lejos de ignorarlo o incluso falsificarlo. Ello viene a propósito de lo vago que en ocasiones resulta para muchos el concepto de "Conservación del Patrimonio" aún entre profesionistas, generando con ello una versión distorsionada o bien libremente interpretada.

Frente a ello queda la convicción de que la educación, conocimiento y por tanto, valoración como principal instrumento para la preservación del patrimonio cultural, cobra fuerza al encontrar por ejemplo en nuestros días, sitios que presentan una clara organización y apropiación del mismo, al conservar sus estructuras primigenias de organización. Citemos por ejemplo el caso del modelo de trabajo comunitario frente a la reconstrucción de los daños ocasionados por los sismos de 1999 en el estado de Puebla y frente a la sorpresa de encontrarse con el funcionamiento de estos sistemas surgidos desde la época prehispánica.

Tal es el caso de la Capilla Real, en el conjunto del ex convento franciscano de San Gabriel Cholula, monumento del siglo XVI, en donde los barrios asumieron la responsabilidad de la reconstrucción y mantenimiento, antes de cualquier instrucción o apoyo institucional; observándose además la distribución de tareas por barrios, tal como lo han hecho desde la construcción de este inmueble .

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· **Como recurso no renovable y válido satisfactor de necesidades**

En este contexto de manifestaciones socio culturales, el Patrimonio Edificado también experimenta sus contrastes, al encontrar como punto neurálgico en términos de su conservación, la escasa concepción del mismo como un recurso renovable, es decir, como un bien perecedero, con posibilidades de recuperación y con una oferta importante ante las necesidades y recursos de cada comunidad.

Así, el dejar de lado las propuestas del Patrimonio Edificado dentro de los programas de desarrollo urbano, por las mismas autoridades municipales, es un aspecto que permanece aún como una constante al no considerar esta fuente como un sector redituable.

Una labor de enlace institucional que ejemplifica el esfuerzo por revitalizar los elementos que conforman un centro de población, ha sido GENPROTUR (Generación de Proyectos Turísticos en el Estado de Puebla), cuyo objetivo es que sociedad y autoridades participen conjuntamente en el desarrollo de proyectos tanto en diseño, desarrollo como administración y en donde el Patrimonio Cultural se convierte en el eje rector de toda acción emprendida.

▪ **El reconocimiento y análisis de opciones**

Hasta aquí se han referido algunos puntos neurálgicos respecto a ese ciclo que es la "comunicación y difusión del Patrimonio para su conocimiento, apropiación y aprovechamiento en términos de ciudad patrimonio mundial – sistema de ciudades secundarias", sin embargo para emitir

conclusiones y propuestas, es imprescindible retomar y evaluar lo hecho por aquellos grupos interesados en la revitalización del patrimonio, como una fuente de ideas, inquietudes e iniciativas dignas de reconsiderar:

A propósito de la Difusión del Patrimonio y sus formas de conservación, conclusiones en distintos foros a cerca de el tema que aquí nos ocupa, han sido seriamente discutidas en nuestro país. En un recuento, es preciso destacar como criterios reiterativos:

· **Institucional**

Que en los programas y planes de desarrollo urbano en el estado, se integren en forma prioritaria los aspectos relacionados con la conservación de sitios, monumentos y su medio ambiente de manera inmediata, dados los graves riesgos que actualmente enfrentan.

La conservación y rehabilitación de los pequeños poblados es una obligación moral y una responsabilidad del gobierno de cada estado y de las autoridades locales y es un derecho de las comunidades participar en la toma de decisiones sobre la conservación de sus pueblos. El patrimonio ambiental y arquitectónico de los pequeños poblados es un recurso no renovable y su conservación debe recurrir a cuidadosos procedimientos para evitar los riesgos de su alteración o falsificación por razones de oportunismo político.

Que en condiciones de creciente despersonalización y masificación, este patrimonio explicita las posibilidades de definir nuestra personalidad, atesorar la memoria históricos y recuperar la adecuada calidad de vida, incorporando la tecnología y los avances científicos a un sistema humanizado.

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La recuperación de monumentos y zonas monumentales debe tener en cuenta los usos originales a los que históricamente se han ido incorporando.

Se recomienda que el desarrollo turístico sea considerado como complemento importante de las actividades en las ciudades y sitios históricos, pero sin que su presencia constituya un factor de transformación.

· Difusión

En los programas de conservación del patrimonio cultural, es necesario incluir aspectos educacionales didácticos y de difusión masiva.

·Marco Legal

Es necesario actualizar, complementar y agilizar las leyes, reglamentos e instrumentos para garantizar la permanencia del patrimonio cultural y natural[3]

· Acciones

La metodología en los programas de conservación deberá adaptarse a las particularidades de cada región.

Es de vital importancia la preservación de los pequeños poblados semirurales que mantienen características homogéneas en la arquitectura popular. Estudios especializados para la conservación de sistemas constructivos y conceptos formales característicos.

[3] Conclusiones extraídas de: "Conservación del patrimonio monumental. Quince años de experiencias" Comité Nacional Mexicano del ICOMOS 1978 – 1994. INAH , México 1996

Es necesario estimular y colaborar en la organización de unidades regionales de inventario y catalogación, organizando programas de inventario básico motivando la participación de la sociedad.

En los proyectos de revitalización urbana de los centros históricos se debe buscar la convivencia de las diferentes actividades que dan vida a la ciudad, tanto como a la recuperación de su imagen. El desplazamiento de una o varias de las actividades positivas del centro histórico debe ser evitado a riesgo de propiciar la degradación definitiva y falsificación del mismo.

Se ha dicho tanto sobre la conservación del Patrimonio Edificado, que es tarde para inventar el hilo negro, simple y sencillamente las aseveraciones anteriores resultan ser algunas de las propuestas bajo las cuales se apoyan acciones analizadas y emprendidas.

2. El Proyecto Integral de rescate de Centros Históricos

Ante el panorama esbozado con anterioridad en el territorio poblano, las estrategias adoptadas por el IPAAHA (algunas de ellas ya mencionadas) para los 217 municipios que conforman el Estado incluyendo el Centro Histórico de la Ciudad de Puebla, son: Identificar, clasificar, registrar, evaluar y catalogar el Patrimonio Antropológico, Artístico, Histórico y Arquitectónico; promover la formación de la conciencia colectiva en los diferentes niveles de participación de cada grupo social sobre los valores que encierra el Patrimonio a través de actividades y programas de difusión; elaborar proyectos de conservación

dirigidos a los centros de población o bienes inmuebles así como los programas que se deriven de estos; ejecutar obras de restauración y regeneración de Centros Históricos, otorgando apoyo técnico, control y seguimiento de las obras; prestar asesoría técnica a los particulares y autoridades en general, en obras de rescate y conservación; evaluar, proponer y promover la expedición de los instrumentos jurídicos que se requieran y permitan dar eficacia a las acciones que beneficien al Patrimonio; así como celebrar convenios de colaboración con autoridades municipales, estatales y federales a fin de conjuntar esfuerzos en la realización de investigaciones, proyectos, obras, gestión y difusión.

En este marco de opciones y posibilidades, consciente de las exigencias que hoy en día presenta el patrimonio edificado y su contexto cultural, frente a la demanda de fuentes de identidad en la sociedad contemporánea, pero sobre todo de la urgencia por vigorizar la calidad de vida en centros de población con valor histórico en beneficio de quienes los habitan; surge el planteamiento de este Instituto para la conservación del patrimonio con el *"Proyecto Integral de rescate de Centros Históricos"*, cuya perspectiva reconoce mas allá de un concepto "aparente", hacia una visión integral de las propuestas en una tarea paulatina y por etapas.

▪ Directrices

El esquema general del proyecto consiste en una red de actividades interdependientes que plantean al Patrimonio Edificado como un recurso y satisfactor de necesidades colectivas que van desde las meramente funcionales hasta las económico – turísticas, e ideológico – culturales.

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Cuatro son los ámbitos que surgen como instrumentos vitales de esta red:
1. Elaboración de un *catálogo de bienes inmuebles* con valor histórico y artístico en la población
2. Definición de la *zona de protección* y elaboración del proyecto de *"Declaratoria de Zona Típica y Bellezas Naturales" con su Reglamento*
3. *Análisis integral y nivel de propuestas*: anteproyecto y proyecto de imagen urbana: las propuestas o acciones en el proyecto de imagen urbana, están dirigidas a satisfacer cuatro programas: *Integración Arquitectónica, Integración Urbana, Mobiliario Urbano e Infraestructura;* de acuerdo con la competencia institucional
4. *Ejecución de las obras correspondientes* por etapas

En términos de las variables expuestas y bajo un esquema metodológico más específico, es preciso referir que éste es perfectible en la medida que lo dicte la experiencia puesto que cada caso debe atenderse como único, ya que está diseñado para una participación interdisciplinaria y social; que permita integrar mano de obra, artesanos y profesionistas de cada localidad.

Así mismo y en la medida de las necesidades de cada sitio, a este Proyecto se pueden integrar tantos subsistemas o programas como se requieran, pensando en el fomento al trabajo interinstitucional de acuerdo con los distintos ámbitos de competencia (llámense programas de vivienda, desarrollo turístico, fomento cultural, espacios para el desarrollo económico etc.)

▪ La propuesta y el Patrimonio Cultural en la Ciudad de Zacatlán

En la trascendencia cultural que enlaza vigorosamente centros de población con la Ciudad de Puebla, Zacatlán es un referente

característico tanto por la singularidad de su entorno como por la forma de integración de sus ejemplos arquitectónicos al clima, topografía y forma de vida de la población. Una de las tres ciudades mas importantes de la Sierra Norte del Estado y la mas representativa por la conservación de la fisonomía urbana que acentúa el carácter típico de la región, además de ser enclave en el núcleo de la Sierra y enlace de poblaciones intermedias.

Desde el punto de vista institucional, el Plan de Desarrollo del Estado de Puebla (1999 – 2005), contempla líneas de acción que involucran a dichas ciudades y en particular a la ciudad de Zacatlán como una zona de reactivación permanente.

En este abanico de posibilidades, la Ciudad de Zacatlán reunió las condiciones propicias para la elaboración y ejecución de las diferentes etapas consideradas para este proyecto piloto, a saber: Pujanza económica y productiva, alta concentración de patrimonio cultural edificado, ubicación estratégica para lograr un mayor impacto regional, actividad turística así como activa participación de autoridades municipales y de la sociedad en general.

- **Delimitación de acciones**

En cada uno de los rubros del proyecto, se integraron investigación y propuestas a fin de retroalimentarse mutuamente para lograr el mayor respeto a la autenticidad, en una conciencia respetuosa de su momento histórico.

Cuatro fueron las áreas adoptadas para el desarrollo del proyecto:

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· Investigación.
Se desarrollaron los conocimientos generales y específicos en cuanto a la identificación del patrimonio, su ubicación dentro de la historia y su fundamento de valoración cultural. Se conformó el inventario – catálogo , integrando información recabada por este Instituto y por el Instituto Nacional de Antropología e Historia (INAH) a través de la Subdirección de Catalogación[4] de bienes inmuebles, que arrojó como resultado un total de **151** edificios con valor histórico y artístico así como la delimitación de zona a proteger, con una síntesis histórica de los principales monumentos.

· Jurídicos.
Al mismo tiempo que se efectúan estos trabajos de inventario - catalogación, se delimita la zona mediante una poligonal coordenada, definiendo con ello la zona de protección para la cual se procuran los instrumentos jurídicos con el seguimiento de la "Declaratoria de Zonas Típicas y Bellezas Naturales" y el " Reglamento de construcción y preservación de la imagen urbana de la zona típica monumental"[5].

· Proyectos y Obras
El proyecto de Imagen Urbana coyuntura de este tema, se dividió en tres ámbitos para su diseño y ejecución:

[4] El trabajo de inventario consiste en el levantamiento gráfico - croquis - y fotográfico asi como de descripción de inmuebles, vaciando toda la información requerida en una ficha elaborada por la Subdirección de Catálogos del INAH con la cual se trabaja coordinadamente pues, después de efectuado el levantamiento del inventario, el Instituto de Antropología e Historia le da el carácter de Catálogo de Monumentos; con base en un convenio establecido entre ambas instituciones el día 12 de noviembre de 1999.

[5] Cabe señalar que tanto la Declaratoria de Zona Típica de la Ciudad de Zacatlán como su reglamento, se encuentra en diferentes etapas de revisión y gestión, por la Secretaría de Cultura del Estado de Puebla.

a) Integración Urbana

Análisis de espacios públicos y vías de comunicación - sentidos de calles, flujos vehiculares, flujos peatonales, estacionamiento y servicios – proponiendo según las necesidades, el mejoramiento físico y la optimización en función de la sociedad. Llámese el arreglo o cambio de banquetas y creación de andadores o bien la disminución de la afluencia del automóvil y el incremento de áreas peatonales, etc.

b) Integración Arquitectónica

Refiere aspectos como forma, textura y color; aplicado a las edificaciones que conforman los espacios públicos, solo como alzado frontal y con el consenso de propietarios durante la etapa de ejecución en campo, normando también los anuncios de publicidad y comercialización en fachadas.

c) Infraestructura

Incluye factores como: las condiciones en que se encuentran los servicios de la zona - agua potable, alcantarillado, drenaje, electrificación, alumbrado y telefonía -; la señalética - de la zona para el uso vehicular y peatonal turístico -, y el beneficio de equipamiento urbano en el sector de espacios abiertos, mediante el diseño de jardinería, arbotantes y luminarias, concluyendo con el diseño del mobiliario urbano como son bancas, basureros y sombrillas para uso comercial.

1. **Análisis urbano – arquitectónico, ejemplificación de resultantes y acciones**

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En la poligonal definida como zona de protección para la Declaratoria de Zonas Típicas y Bellezas Naturales, conformada por un total de 48 Manzanas, fue posible identificar seis zonas cuyas características tipológicas de usos y costumbres, entre otras condiciones, las hacen distintas entre sí pero no menos importantes unas de otras, teniendo así:

Zona 1. Definida como primer cuadro, núcleo de fundación de la localidad
Zona 2. Primer perímetro de crecimiento, con elementos comerciales y habitacionales preponderantes.

Zona 3. Área comercial principal, en la línea de la antigua calle Real.
Zona 4. Área de Abastos, caracterizada por el mercado y su radio de influencia.
Zona 5. Área habitacional, con variantes por barrio.
Zona 6. Perímetro general externo, con características modernas y suburbanas.

Frente a ello, la dinámica funcional en cada uno de los contextos detectados con relación al primer cuadro de la ciudad, promueven una suerte de "reconfiguración" de la imagen, que como se verá, establece de facto necesidades inmanentes, para una mayor armonía, equidad y fortalecimiento de los aspectos que hacen singulares a este sitio. El área de estudio corresponde a 16 manzanas que incluyen parte importante del asentamiento primigenio de la población, conservando la mayor cantidad de inmuebles con valor y concentrándose en esta área las actividades socio culturales de la población. De este universo, y por razones administrativas, la delimitación final se circunscribió a 6 manzanas, generando con ello dos etapas de trabajo.

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A continuación se ilustra, a partir de una somera ejemplificación algunas de las aplicaciones de los conceptos, análisis, diagnóstico y programas llevados a cabo en la fase del proyecto de intervención (regeneración de imagen urbana):

RESULTANTES DE ANALISIS	PROGRAMAS Y PROPUESTAS
	2. PROGRAMA DE INTEGRACIÓN URBANA
Traza Urbana Estableciendo una retrospectiva, ésta se conserva en su mayor parte, pero en las inmediaciones del primer cuadro se afectó en el siglo XVIII. Podemos deducir que la población fundacional se componía por 9 manzanas y que se amplió rápidamente a 17, lo que se denota por la unidad de las mismas y por los solares cuadrados que aún se infieren en la subdivisión actual. El valor de esta estructura urbana y la intensidad de uso, refiere una urgencia por vigorizar el sitio en términos del disfrute del espacio y las manifestaciones socioculturales .	Respetar la traza actual, motivando la restricción de vehículos en algunas calles para promover el tránsito peatonal, disminuir las vibraciones, circulación vehicular restringido, peatonización e integración de espacios abiertos existentes y énfasis en circuitos turísticos mediante andadores, plazas y jardines; además de los inmuebles de los siglos XVI al XIX que conforman el recorrido. Respecto al uso de suelo fue necesario reordenar el comercio informal ambulante.
	3. PROGRAMA DE INTEGRACIÓN ARQUITECTÓNICA
Edificación e imagen Entre los inmuebles conservados, aquellos que presentan niveles de intervención pero	La asesoría de detalle (trabajos de mantenimiento), la promoción con los

susceptibles de recuperación hacia el original y los inmuebles modernos que rompen con el contexto de la población. Elementos primordiales a tomar en cuenta en términos de este deterioro son sin lugar a dudas elementos agregados sobre las fachadas, tales como: marquesinas, anuncios y letreros; luminarias, acometidas y medidores aparentes; cableados sobrepuestos al azar y sin orden; señalización con diseños arbitrarios y desiguales.	propietarios para la recuperación hacia sus características originales (restringido a los niveles de posibilidad e interés del propietario) y la posibilidad de integrar el inmueble a su contexto inmediato fueron opciones prioritarias. Así mismo, la intervención de fachadas mediante su restauración y pintura y la motivación hacia una recuperación al interior de los inmuebles por parte del propietario fueron un segundo aspecto. El respeto a los anuncios ya existentes (en bandera e integrados a las características de la imagen del sitio).
	4. PROGRAMA DE INFRAESTRUCTURA
Servicios y pavimentos Evidente el desorden en postes travesaños, accesorios y cableados así como de los servicios subterráneos como abasto de agua y drenaje. Destaca la ausencia de banquetas y la necesidad en términos de ancho y altura; sin embargo se tiene referencia de pavimentos existentes que datan de fines del siglo XIX y principios del XX, que nos permiten ver empedrados y algunos adoquinados de piedra laja. Deficiencia en la información para el habitante o visitante.	A partir de un convenio interinstitucional, se doto de instalaciones subterráneas: electricidad, telefonía y televisión por cable. Rescate y adecuación de guarniciones, banquetas y espacios urbanos de acuerdo con las características originales. Elaboración de estelas informativas, informadores e indicadores de sitio así como señalética vial y de servicios.

Tanto el financiamiento, como la coordinación con instancias federales, estatales y municipales así como los convenios de participación interinstitucional a nivel público y privado; constituyeron una labor de gestión importante; ante lo cual basta referir que el monto de la obra de

aproximadamente 950,000 USD; fue cubierto al 50% por el gobierno estatal y el 50% restante con recurso aportado por el municipio de la Ciudad de Zacatlán.

A manera de corolario y en el tema que aquí no ocupa: "Mantener el Patrimonio Vivo. Educar y formar a favor de la preservación y la gestión del Patrimonio Cultural", encuentra sentido la experiencia del "Proyecto Integral de Rescate de Centro Histórico" que se sintetiza en la labor de concientización inicial dirigida a las autoridades, representantes de la comunidad y habitantes en general sobre la valía del Patrimonio Cultural en Zacatlán; en el consenso con la población para la aprobación y ejecución del proyecto, así como en la visita puntual de cada predio para las exigencias particulares de mejoramiento. Ya que lo anterior con todos y cada uno de los programas emprendidos y culminados en este centro de población, generó un recorrer y reconocer nuevamente esta ciudad, tanto por propios como extraños y sobre todo una sensibilización sobre la importancia de sitios como este; evidente en la solicitud de la aplicación de este proyecto en distintos puntos del Estado de Puebla, específicamente en aquella red de ciudades significativamente sobresalientes a la que ya hemos hecho referencia.

3. Conclusiones a partir del Proyecto Integral y sus casos de aplicación

Es así como se lleva por primera ocasión el Proyecto Integral de Rescate de Centro Histórico en la Ciudad de Zacatlán concluido en el año 2002 . Con este afortunado antecedente se generaron nuevas expectativas en otros puntos de nuestro Estado considerados dentro de la red estatal de sitios patrimoniales: Acatzingo, Atlixco, Ciudad Serdán, Tlatlauquitepec, Zacapoaxtla y actualmente en una labor interinstitucional

algunas zonas del Centro Histórico de la Ciudad de Puebla. Como proyectos en proceso durante el presente año, se están desarrollando: Chignahuapan, Pahuatlán, Tehuacan, Teziutlan y Tlatlauquitepec. En el año 2004, como conclusión del período actual de gobierno, se tienen programados Huauchinango, Huejotzingo, Tetela de Ocampo, San Martín Texmelucan y Oriental.

En la inclusión de la colectividad de cada uno de estos sitios, surge del diálogo y concientización desde las primeras etapas de reconocimiento, durante la elaboración del catálogo, el desarrollo del proyecto y obras correspondientes, así como la elaboración de los instrumentos jurídicos de protección. A este respecto, aún cuando los proyectos de imagen urbana alcanzaron un auge relevante en la década de los ochenta, y con ello niveles de crítica importantes respecto a sus métodos y alcances, estos han sido enriquecidos con el tiempo en distintos puntos de nuestro país, representando hoy en día una alternativa en pro de un engranaje real y equilibrado entre el "Patrimonio Cultural y el Desarrollo", quedando implícitos aspectos como el arraigo, la calidad de vida y atracción turística de acuerdo con las variantes de creatividad y talento de las comunidades

Bajo el esquema esbozado a lo largo de este texto, la atención a los municipios del Estado de Puebla en el rubro de la conservación integral del patrimonio urbano – arquitectónico, que hasta hace algunos años había sido obviada, ha presentado diversos matices de complejidad y ha permitido apreciar una fisonomía dinámica distinta en cada caso, haciéndose patente la importancia que han guardado muchas de nuestras poblaciones en el tiempo.

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A un año de distancia de la culminación del Proyecto en Zacatlán, se hace patente el rescate del espacio central y su entorno, para el disfrute de la población, denotando una mayor intensidad de uso, la cual se intensifica durante la feria y fiestas patronales. La imagen del sitio ha experimentado una mayor organización y apropiación desde el punto de vista del respeto hacia la integridad del patrimonio edificado y su contexto así como del cuidado de inmuebles civiles y religiosos. Finalmente una reactivación económica y afluencia de visitantes a esta ciudad han sido testimonios significativos.

Establecer puntos de comparación con relación a los Proyectos Integrales de Rescate de Centros Históricos, llevados a cabo en otros puntos del Estado, implica una actividad de retroalimentación que tiene como parámetros de revisión: Los recursos disponibles para cada proyecto, las características urbano arquitectónicas tradicionales de cada zona, así como las costumbres, participación e identificación de la comunidad con el proyecto.

Lo anterior estableció un dimensionamiento y niveles de trabajo. Así, mientras en Atlixco la zona de estudio se circunscribió al entorno de la plaza principal y parroquia, en Zacatlán y Ciudad Serdán además de estas zonas se atendieron las calles principales y en Zacapoaxtla se añadió el estudio del mercado; de ahí que los programas y propuestas en cuanto a configuración espacial y peatonización, color en paramentos, e incluso el mejoramiento de infraestructura fueran diferentes, teniendo en algunos casos la implementación de instalaciones subterráneas y en otros el solo ordenamiento de la red eléctrica y telefónica.

Las resultantes de los proyectos recién concluidos, comienzan a evidenciarse y suelen ser semejantes a los obtenidos en Zacatlán, teniendo

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como fin último el objetivo del proyecto que en su inicio fue planteado como: *"Promover la concientización, protección jurídica y rescate del Patrimonio Cultural, tanto urbano como arquitectónico de la Ciudad de Zacatlán, mediante un programa de acciones consolidadas en proyectos y etapas sucesivas que culminen en la conservación, mantenimiento y desarrollo de la localidad en cuanto a sus valores de patrimonio cultural, contexto y sociedad".*

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INTEGRAL PROTECTION OF THE URBAN AND ARCHITECTURE HERITAGE - NEW STRATEGIES

Mihail Tokarev

Abstract

The framework of this paper comprises experiences of former theory and practical knowledge regarding protection of urban and architecture heritage, and it recommends system measures for its integral protection. Accordingly, concrete contemporary strategies and measures for heritage management is recommended:
- Elaboration of a Sector Heritage Study on all planning levels, as one of the basis for elaboration of urban and space planning,
- Substitution of usual urban planning with plans or revitalization projects regarding areas or parts of certain sites that posses monumental character,
- Utilization of models for conveyance of the restoration and revitalization process of certain objects in order to establish their optimal shape.

Introduction

In order to start the integral protection, on the basis of present experience, it is necessary to determine directions in order to strengthen the connections vertically and horizontally within the desired system for protection of the urban and architecture heritage. The methodology displayed in this paper should represent an important part in reference to the basis for implementation and monitoring of the integral heritage protection. It should result in introduction of contemporary methods for protection management, through:
- rational connection of participants (subjects) within the protection process,
- opening of a long-term rational protection process, and
- establishment of a contemporary legal system in that area.

It is well known that besides the possession of grand culture and history attributes, the urban and architecture heritage has also a great material value. Accordingly, its restoration represents an expensive and long-term process. The basic slogan during the process of protection is "Restore to revitalize by protecting and saving". This active approach is the unique right basis for integral protection that will enable heritage implementation within the contemporary life parallel to its maximum protection.

It is necessary to examine the problem of studying, programming and planning of the integral protection on several levels, as within the frames of: space, general and detail urban planning; as well as in the frames of urban and architecture projects. The integral protection required expanded interpretation on the evidence of former practice in reference to the contents of the *Amsterdam declaration* from 1975. The declaration comprises protection of architecture integrities within the widest sense of global development, and encircles with it all objects of culture significance (from the most important to the ones less important) never forgetting the ones from the contemporary era and their environment. The declaration rightfully pledges that such global protection will be supplemented by individual protection of isolated monuments and objects.

Further development of the integral protection significance completely leaves the narrow minded professional-scientific approach and transforms into a more complex social-economic and urban-planning approach in reference to heritage protection.

Experience and morals of previous protection and revitalization

Before commencement of building operational methodology for integral protection, and because of the reason for real implementation of problems, solid acquaintance with the present conditions is necessary regarding the protection and revitalization area. Previous experience shows that in order to improve the protection and revitalization of urban and architecture heritage it is necessary to:

- Establish direct cooperation and coordination among the Protection Organizations of culture monuments, urban services and authorized administration institutions;
- Bring into accord existing space and urban plans in reference to the protection of building heritage;
- Synchronize coordination of all state institutions and services in application of legislative regulations regarding the protection of culture monuments;
- Intensify the procedure for complete valuation of monumental integrities and objects, as well as the procedure for revaluation of former protected objects;
- Protect urban and rural integrities and not only individual objects, as well as integration of these integrities within the contemporary life and the tourist economy;
- Strengthen protection service cooperation with the object owners, as well as
- Establish new material sources for protection and revitalization.

Urban and architecture heritage represents a unique and functional integrity that's why it should be treated and respected integrally while elaborating space and urban plans. *These plans enable correct treatment of the heritage and it requires a shape of primary, legal and physical protection.* For that purpose:

- The Protection Organizations should participate in all phases regarding elaboration and completion of space and urban plans, as well as prepare urban and architecture conditions for areas that are not yet included in these plans;
- In order to define the above mentioned conditions, the most practical way is to process them within the frames of a separate *Sector study for building heritage,* that would represent one of the basis for elaboration of urban plans and projects;
- It is necessary to elaborate special long-term programs for revitalization of heritage types, with determined priorities and realization dynamics that provides synthesis of different interests and concentration of assets and professional team in the realization phase;
- The objects and the integrities comprised by the revitalization programs should take prior places in the annual working plans of the authorized state institutions and professional organizations;
- In accordance with the determined priorities it is necessary to elaborate special revitalization program (concept) for each integrity and object;
- Authorized institutions should bring into accordance the protection plans for those integrities and objects comprised in the revitalization programs that have different treatment in the moment regarding space and urban planning, or if they are totally omitted;

- All planned protection and revitalization enterprises should be confirmed through public debate in order to implement wider citizenship.

It is important to emphasize that all previously stated directions comprise many confirmed attitudes regarding the integral heritage protection. These directions mostly coincide with the contents of the *Convention for protection of the building heritage in Europe* (Granada 1985).

Methodology procedure for implementation of the integral protection

The methodology procedure for implementation and monitoring of the integral protection represents a complex social-economic and urban planning process that requires wide and profound elaboration by an interdisciplinary professional team regarding various scientific areas. We must agree upon the fact that the solution of urban and architecture problems in reference to revitalization of history objects represents the most important segment in the system of the integral protection.

This segment has an integrative character by itself. In order to solve architecture-urban problems it unites in itself the research of the rest of the participants within the complex process regarding archeology conservation, society-economy and the urban planning. In order to achieve expected results this whole complex and long-term process of integral protection must be supplemented by adequate standard-legal documents and regulations. According its professional-scientific orientation, the author chooses precise display of a part of the methodology procedure regarding architecture-urban problems, as well as a display of a part of the complementary research that are directly connected to it.

Existing state study of the building heritage

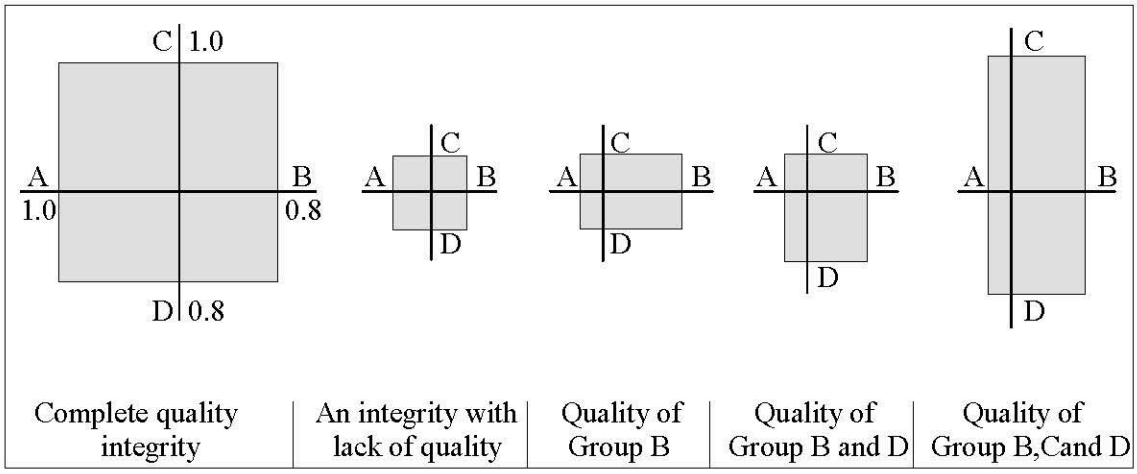
The existing state study of the building heritage represents a basis of all further studies and programs. That is the reason for its thorough elaboration by all possible aspects emphasizing interdisciplinary aspects in its production. The quality of an elaborated study of the existing state facilitates further on research and decision making in the protection process. A well-elaborated study comprises almost all necessary elements for heritage valuation and categorization, as well as basic elements for creation of program directions and elaboration of a revitalization draft-plan.

Inventorisation of the building heritage, as a professional-scientific procedure, in fact represents a basic research that records in its frames the heritage and also determines the basis for its valuation. The above stated complex procedure can be implemented in a simpler way by the use of a so-called system of connected documentation for valuable integrities. The system has been elaborated and tested within the frames of space and detail revitalization plans regarding the protected area of the Kotor Bay. (Fister[1]) This system is also in accordance with the ICOMOS' recommendations for application of a unique inventorization system for the European culture heritage *(I.P.C.E, Palma, 1965).*

The system of connected documentation is comprised of a series of equal topographic cardboards that show separate valuable building integrities. Each topographic cardboard is comprised of five sheets (form A4):

- *Comprising sheet,* representing the general valuation of data comprised in the remaining four sheets, that enables starting the heritage analysis as a need to the integral protection of the integrity;
- *Sheet "A",* comprises the geographic-ecology characteristics of a wider and specific areas;
- *Sheet, "B"* , comprises anthropogenic characteristics, or values created by men within the frames of the integrity;
- *Sheet, "C",* includes society-economy conditions, and
- *Sheet, "D",* records and evaluates society-economy conditions.

The total value (geometry) picture has a crucial part in establishing correct relation (regime) towards the integrity, and it is made of the basic parameters (A,B,C,D). In that manner, by a simple mathematical calculation we come to the value category of the integrity and we bring preliminary decisions about it: what should be protected, what should stay the same, and what should be improved. (Figure 1)



The analysis of the existing state of the integrity represents a professional-scientific procedure that can not be regulated by a standard. Nevertheless, its content should be determined within certain frames. If the problem is viewed upon the society-economic aspect then other integral types of analysis have an important role in the implementation of the integral protection, such as: proprietorship, society-demographic and society-economic. In a state of economic transition, the proprietorship of the building integrity demands adequate solution; otherwise they could become a burden in the integral protection implementation.

After elaborating the study of the existing state, the methodology procedure for integral heritage protection continues through two parallel professional-scientific research, such as:
- study of the development and the reasons for the integrity decline, and
- complex valuation by establishing a regime for their protection.

Valuation and protection regime

We are familiar with the fact that without clear criteria the value category can not be verified nor can we determine our attitude towards the heritage, neither establish a

regime for its protection. Consequently, establishment of a legal regime represents an obligation that comes from Article 3 of the *Convention for protection of building heritage in Europe.*

The valuation of building heritage in fact starts with inventorisation and existing state analysis. This kind of contemporaneous activity represents a relief enabled by the use of topographic cardboards in the system of connected documentation. This system, in the sense of "opened planning" enables in the simplest way a *participation of citizens in making decisions for the future of a space unit.* That is enabled within the frames of a democratic procedure and on the basis of objective data evaluation.

Criteria for heritage evaluation are mainly divided in three groups, comprising: property, meaning, function and the rest of the criteria, such as: age, preservation and endangered stage. Specific definition for certain value heritage categories can be used for history cores, integrities and for certain objects.

Evaluation of certain objects is a separate profound research from different aspects. For example, Article 1 of the *Convention for protection of building heritage in Europe,* declares that while evaluating objects their age is not regarded as the most important issue. There are a series of other criteria that make a distinction of the object within the frames of the integrity and their location. According the Convention, an element of building heritage is an object that *has only one, several or all the above stated criteria,* such as: history, architecture, artistic, scientific, social and technical importance.

The author has made a more complex research in order to achieve more detailed elaboration and definition of the above stated directions. Their results can be used in creation of criteria and standards for valuation and restoration of certain objects regarding building heritage. (Tokarev[2])

Within the frames of that research, mathematical models are established in order to determine *priority social values of monuments*. The main purpose is to choose the most adequate of them in the complex process of restoration and revitalization (Figures1+2). Establishing a mathematical equation has finished the research. That equation determines the optimal architecture-artistic and historical shape of the restored and adjusted architecture monument as a part of the building heritage. (Eqn 1) (Lesik[3])

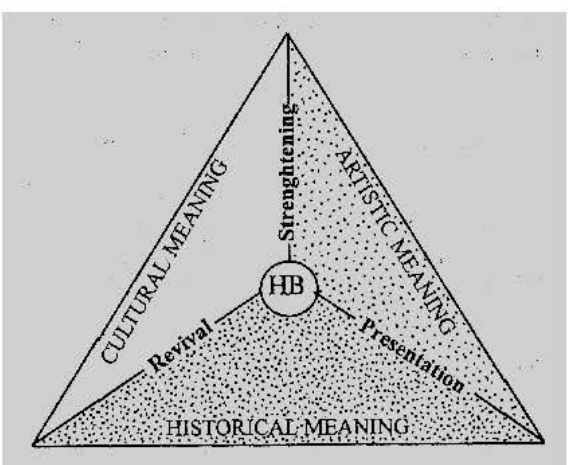


Figure 2. Pyramid model of the process of restoration of the historic building (HB)

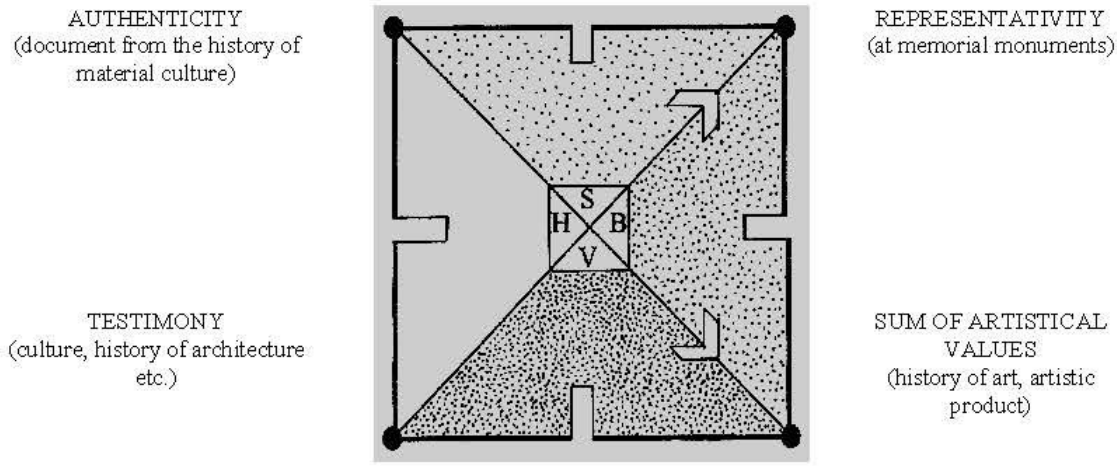


Figure 3. Pyramid model for establishing the social value of historic building (SVHB)

Eqn 1 **Ora = Pf + Ol - Sl + Nl + Sad**

Ora - Optimal architecture- artistic and historic form of restored and adapted monument of architecture for new purpose
Pf - Primal form of the architectural monument, as a result of historical-architectural analysis
Ol - Organic layers which supplement the architectural monument in the process of its exploitation
Sl - Strange layers which are not supplemented with the architectural-artistic integrity
Nl - Neutral layers without influence on the form of the monument, but can be opposite to its new functional content
Sad - Suplementation connected with adaptation of the monument to the new functional purpose (constructive-designer-engineering, urbanistic)

A regime for heritage protection, especially the building one, represents an act of outmost significance submitted to social verification that makes it a legal document used to regulate the relationship towards it on all programming and planning levels. The protection regime of integrities is most operational in practice in order to become a constituent part of the urban documentation. The signatory parties oblige themselves towards establishing the regime for protection according the *Convention for protection of the building heritage in Europe*. Article 3 of the Convention declares that depending on the specific modalities of each state or religion, protection of monuments, buildings and localities should be ensured.

After defining the role and types of protection regime, their further operational elaboration is enabled through various levels of planning and project creation within specific area or object. This should be done in accordance with the needs and abilities of the society and environment. Confirmed attitudes are primarily implemented in the program and then materialized by the assistance of the plan or project for arranging the

space or objects. Topographic cardboards value the integrity or its elements in four categories previously prepared by a proposition for protection.

Their basic designations are:

I category is submitted to absolute protection,
II category allows small internal changes,
III category allows bigger internal and smaller external changes,
IV category allows even larger external changes.

The measures (suggestions) for protection should be in the function of integrity value, as well as in the function of its implementation within the contemporary life of the settlement. The achievement of balance between these two functions represents one of the hardest tasks in the process of integral protection.

Integral protection programming

The basic directions and priorities for protection are already settled within the frames of the confirmed valuation according the system of connected documentation, as well as in the suggested system for their protection. In favor of a complete protection, it would be useful to create legal assumptions *in order to make the protection regime a constituent part of the program for elaboration of a space and urban planning documentation.* In that manner, the protection regime would represent an immediate and constant relation between the public and the creators of space and urban planning.

The above mentioned designations should be placed within the context of strategic and program tasks of urban planning. Accordingly, the place and role of heritage should also be designated as a permanent part of an already built space surrounding and life environment in general. *The program framework* should also comprise several important designations regarding heritage, such as:

- integrity and object destination,
- an outline for traffic relations and arrangement of open space,
- an outline for gradual realization, and
- directions and recommendations for building new objects.

Legal, economic and social designation of the program

Conditions should be created within the program frames for integral protection for its legal designation. An analysis should be made regarding the existing laws, regulations, contracts and arrangements in order to discover the necessity for creation of new, special regulations. If the historic integrity possesses wider significance, than it would be best to place all regulations, decisions and agreements within a separate LEX SPECIALIS that will regulate relations during the process of integral protection.

The economic designation of the integral protection is most often the crucial factor for its realization that is why the document for revitalization should *define asset sources for that purpose.* Acceptance of certain documents by the involved parties means that they have also accepted the revitalization as their own need and task which guarantees the desired success.

During revitalization of historic cores, the initial material assets could be obtained according the example of certain European cities. In that sense the *Convention for protection of building heritage in Europe* declares in Article 6: The signatory parties are obligated to provide assets on a state level, on the level of religious and local communities. If necessary, they will introduce special tax measures, and support private initiative regarding preservation and heritage restoration. The provided assets *should bring about initial results* in inciting object proprietors of their own larger material participation.

The integral heritage protection represents a procedure of a wider interest and it should get solid society confirmation. *The system of public planning and programming* should be present in all phases of that long-term process. The citizens, government organizations and NGO's should contribute in further understanding of the integral protection as a necessary need and cause by using the contemporary information system and direct engagement. This designation is comprised in Article 15 of the *Convention for protection of building heritage in Europe.*

NGO's are the true promoters of the necessity for heritage protection. Their activity requires *creation of legal and material conditions* that will enable their transformation into constructive partners of the government organizations. The integral protection could get the most crucial society confirmation if the cooperation of government organizations and NGO's produce a Social agreement for protection of specific integrity and if that agreement is supported by adequate state funds and foundations on native and foreign level.

The necessity of mutual accordance regarding various level plans should be emphasized, consequently by the principle of simultaneous actions and planning. Provision of the local self-management influence is also important upon the decisions made for space organization. For that purpose, I suggest elaboration of the above-mentioned *Sector study for building heritage* according a *Fluent scheme.* It regulates necessary contacts and consultations between the project team and the citizens through special society matters council regarding space organization. (Figure 4)

Conclusions

One of the main tasks of the *Convention for protection of the building heritage in Europe*, represents a complete (integral) heritage preservation as an important factor for environment promotion. For that purpose, the Convention insists on the necessity of complete cooperation between the authorized institutions and the experts regarding the area of space planning with those of the area for protection. Consequently, the signatory parties are obligated to accept the politics for integral protection that gives protection, revitalization and functional use of building heritage the main role in politics connected to: culture, environment and space planning.

The experience shows that the state management institution authorized for city planning should clearly prescribe a unique methodology and contents for elaboration of space and city planning. This methodology would provide integral heritage protection. According contemporary culture benefits and professional-scientific knowledge it

would be useful if the methodology comprises the categories: *Revitalization plan* and *Revitalization Project.*

If the city plans and projects are made for inhabited locations or parts of inhabited locations with important building heritage presence, than they should be obligatory replaced by revitalization plans or projects. The plan or project for a special area, building integrity, i.e., as well as the program for their arrangement possess in general contents similar to the city plans which emphasizes the revitalization protection.

In general, according former research it can be concluded that *for areas or parts of inhabited locations that represent a historic building integrity it is necessary to create a revitalization city project.* The revitalization project would replace the city project as a document of public importance. The revitalization project enables adequate heritage treatment and its implementation in the contemporary settlement life. Insufficient respect of the above stated obligations and recommendations would bring about gradual discordance of the historic sites as the example of Ohrid - the city of UNESCO.

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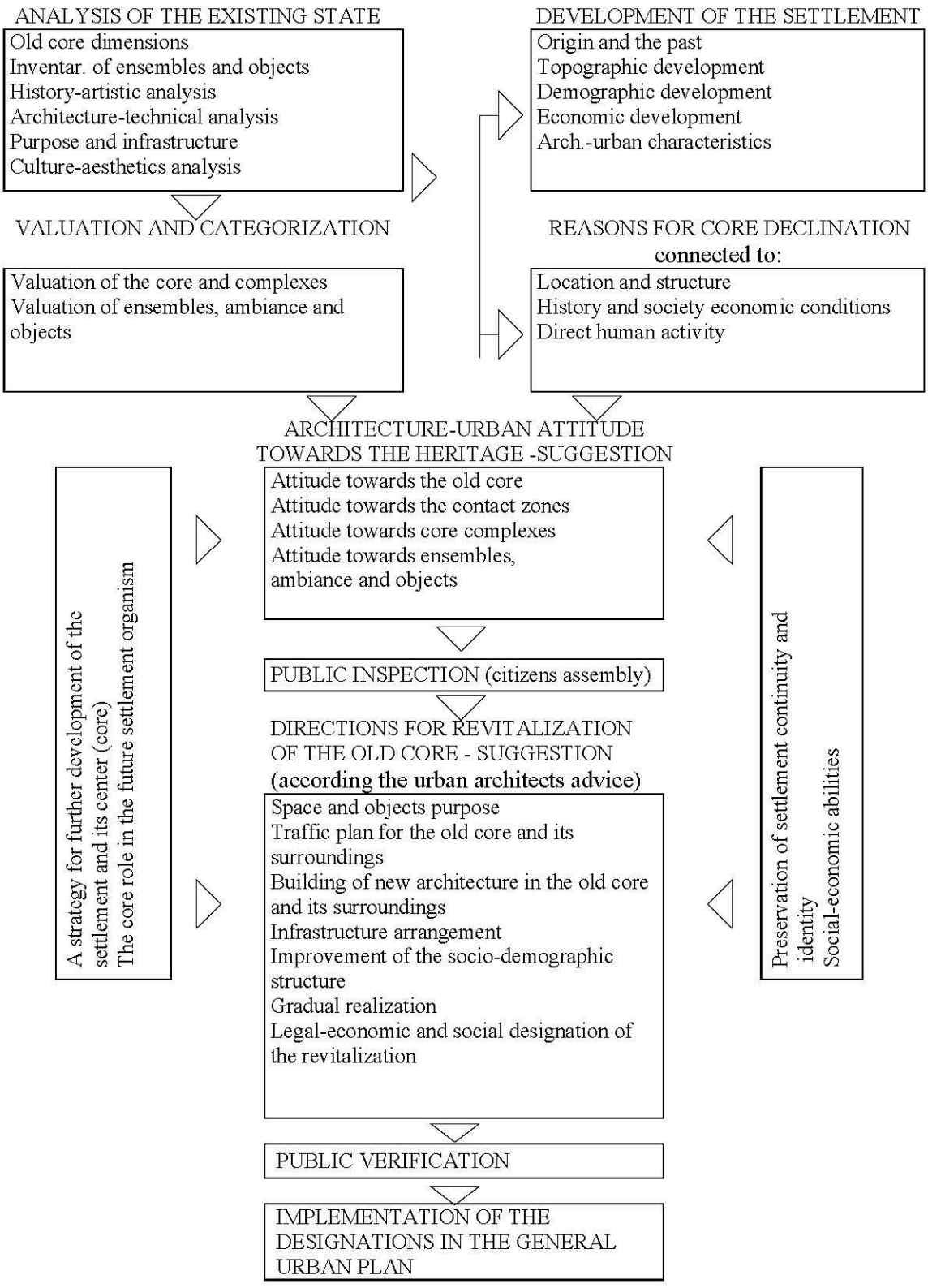
Figure 4. SECTOR STUDY OF BUILDING HERITAGE FOR THE NEEDS OF THE GENERAL URBAN PLAN



LA UTILIZACIÓN DE LA CAL COMO "*NUEVO*" MATERIAL EN LA RESTAURACIÓN DE MONUMENTOS HISTÓRICOS.

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Abstract

La repercusión que desde la antigüedad ha tenido la utilización de la cal como material de construcción, no puede compararse con la aparición de los nuevos materiales que hoy en día utilizamos para usos semejantes. En un primer momento, se puede pensar que el uso del cemento ha generado un importante auge de un tipo de arquitectura y de una forma de construcción que la cal no podría nunca alcanzar. Es cierto, pero si nos centramos en la intervención del patrimonio arquitectónico este razonamiento cambia y aparecen otros factores como son la compatibilidad, comportamientos físicos determinados antes factores ambientales, trabajabilidad etc, que la cal se encarga de solucionar de una forma mas solidaria y menos traumática con el monumento.

La utilización que se ha realizado desde este punto de vista en restauraciones recientes en la ciudad de Valencia y entorno, nos constata los usos tan distintos que se pueden realizar con la Cal. Trabajos estructurales, de revestimiento, de protección e incluso estéticos componen la amplia gama que puede realizarse desde un punto de vista compatible y fiel con el monumento, sin llegar a soluciones que provoquen en un corto periodo de tiempo futuras patologías no consideradas desde la intervención.

1. Introducción

El desarrollo durante el siglo XIX de nuevos conglomerantes hidráulicos obtenidos mediante procesos industrializados y su expansión posterior, durante los inicios del siglo XX supuso la relegación de aquellos conglomerantes como la cal, cuyas virtudes como material y su posterior puesta en obra no eran comparables, por aquel entonces, con las nuevas técnicas.

La necesidad de construir un nuevo parque de viviendas, así como el proceso expansivo de las grandes ciudades favoreció el uso indiscriminado del cemento como aglomerante de los diferentes materiales que componían el edificio, que por otro lado daba sobrada respuesta a los requisitos técnicos necesarios durante el desarrollismo que demandaba una construcción rápida y en altura. Así pues, se creó alrededor de este conglomerante una forma de construir y un tipo de arquitectura que con la cal no podría haberse alcanzado.

Resultado de esta transformación en la forma de construir fue la pérdida y posterior olvido de un material y de sus procesos técnicos de puesta en obra, como la cal, tan extendida en otros tiempos y que ahora quedaba, sobre todo a partir de la segunda mitad del siglo XX, fuera de dichos procesos y, lo más grave, sin transmisión a las nuevas generaciones incorporadas a las profesiones que desde los distintos ámbitos participan en el proceso constructivo (figura 1).

Fue a raíz de la intervención en el patrimonio arquitectónico cuando se empezó a constatar como aquellos conglomerantes que con tanta fuerza habían irrumpido en todas las facetas de la arquitectura y con tan buen resultado en muchas de ellas, en el caso de la restauración no había propiciado avances. Más bien su uso estaba generando una serie de patologías que afectaba directa o indirectamente al monumento. Su carácter hidráulico, su alta resistencia y su aporte de sales, características que en otras circunstancias son beneficiosas o al menos no suponen un detrimento en la calidad de las fábricas, aquí ocasionaban serios problemas de compatibilidad, estéticos o constructivos.

Con este panorama, los profesionales que van incorporándose durante las últimas décadas del siglo XX al proceso restaurador y rehabilitador de los edificios y especialmente de los monumentos, deberán realizar un gran esfuerzo para intentar superar el uso generalizado del cemento en todos los procedimientos, introduciendo otros materiales que siendo compatibles con los preexistentes pudieran solventar aquellos problemas que el cemento de por sí no podía en estos casos. El reencuentro con la cal iba a ser inevitable, surgiendo del mismo muchas respuestas a las cuestiones planteadas, si se lograba superar el gran obstáculo que suponía recuperar técnicas tradicionales.

Figura 1. Horno de cal en Godella, abandonado

Figura 2. Preparación de un mortero de cal

El empleo de la cal se había perdido hasta tal punto que para las nuevas generaciones se presentaba como un nuevo material, explorando, de nuevo, sus prestaciones, aplicaciones, sistemas de utilización, condiciones de empleo, dosificaciones y otra serie de características propias que iban incorporándose en muchos casos gracias a las escasas referencias documentales.

Los trabajos realizados en los casos que se van a exponer no dejan de confirmar más que el esfuerzo de recuperación de estas técnicas tradicionales, relacionadas con el uso de la cal, que se están desarrollando en un ámbito geográfico concreto situado alrededor de la ciudad de Valencia y su área de influencia. Trabajos estructurales, de revestimiento, de protección e incluso estéticos componen la amplia gama que puede realizarse desde un punto de vista compatible y fiel con el momento, sin llegar a soluciones que provoquen en un corto periodo de tiempo futuras patologías no consideradas desde la intervención (figura 2).

2. Pintura a la cal

La arquitectura fingida es una constante en el siglo XVIII que caracterizará a muchas edificaciones de esta época. Los maestros Felipe Rubio y Antonio Gilabert, parientes políticos, con una importante presencia en la segunda mitad de ese siglo, dejaron un amplio legado de esta tipología de revestimiento basadas en la protección del paramento exterior con una pintura a la cal sobre la que se recortará y pintará el aparejo de una fábrica de ladrillo visto o de sillería (Figura 3). Las fachadas de tres de sus obras: la iglesia de las Escuelas Pías[1] y el Palacio de Justicia[2] en la ciudad de Valencia y la iglesia de la Natividad[3] en la población de Turís, han sido objeto de reciente restauración.

La restauración pictórica de las fachadas se abordó bajo las premisas iniciales de las técnicas de restauración empleadas en pinturas murales, aunque manteniendo un cierto distanciamiento impuesto por la extensión de las fachadas, el conocimiento de la técnica de ejecución y su fácil reproducción, o la diferencia de calidad frente a otros tipos de pintura mural.

Así, se opta por la eliminación de todos aquellos substratos que no estuvieran adheridos al soporte, frente a soluciones más propias de la pintura mural que contemplarían su consolidación mediante inyección de caseinatos cálcicos o acetatos de polivinilo, por ejemplo.

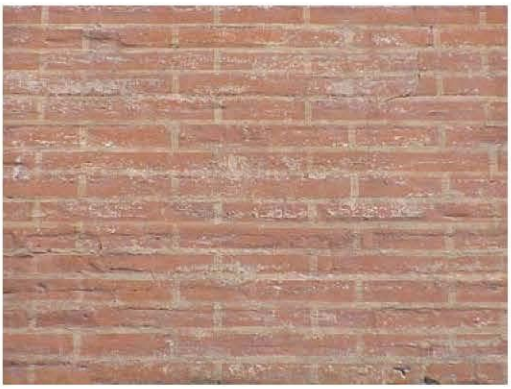

Figura. 3. Detalle *fingido* histórico

Figura 4. Iglesia de la Natividad tras su restauración

Limpia la fachada y eliminados todos los elementos sueltos se recomponían las lagunas con una pintura a la cal pigmentada con tierras naturales, micronizadas y estables a la acción de la cal. Los fingidos de los aparejos de las fábricas también se realizaron con la misma técnica Los colores

elegidos se situaban dentro de la gama del original pero bajando el tono, obteniendo así una imagen global integrada pero diferenciadora de la intervención actual. Esta técnica empleada también permite realizar degradaciones de color, trasparencias sobre superficies con pequeños restos de pintura e incluso generar sombras.

La pintura utilizada variará en cada caso pero se basa en una disolución de agua con cal apagada (en proporción de 5 Kg de cal por 10 litros de agua), mejorándose mediante la adición en pequeñas proporciones de resina acrílica termoplástica, (en proporción de 0,5 lt. que supone aproximadamente un 5%); caseina (en proporción de 40 gr. por 5 Kg de cal), y tierras naturales, micronizadas y estables a la alcalinidad de la cal, como pigmentos, sin llegar a superar el 5% del peso de la cal (Figura 4).

La resina facilita la fijación de las diferentes capas de pintura entre sí y sobre el soporte original, a la vez que consolida los restos de pintura en superficie, confiriendo trabazón a la pintura. La caseína que también realiza alguna de estas funciones, permite que se rebaje la proporción de la resina acrílica al mínimo.

La aplicación en varias capas y con bajas concentraciones de cal permite no sólo el control del color y su saturación, sino que evita que se produzcan los temidos craquelados, sin necesidad de añadir otro tipo de aditivo. La utilización de pigmentos estables a la cal determina que no sea necesario la utilización de la piedra de alumbre, cuya incorporación contrarresta el efecto alcalino de la cal y consolida la pintura.

Por otro lado la resina acrílica crea una película que, permitiendo la transpiración del soporte, le da un grado de impermeabilidad, sustituyendo así a aditivos tradicionales como la ceresita cuyo fin también era conseguir la impermeabilización del material. Sin embargo, si nos excedemos en la proporción de ella podemos producir daños irreversibles sobre la pintura. Además de los brillos, podemos variar la permeabilidad al vapor de agua hasta tal punto que creemos una barrera que impida la transpiración, con lo que en poco tiempo quedará poco del enjalbegado aplicado. Por eso es conveniente rebajar al mínimo la concentración de la resina, y controlar la cantidad aplicada en función de las manos de pintura que se realicen.

3. Revestimientos exteriores

Gracias al primer tratado de arquitectura de Vitruvio, tenemos constancia del uso y proceso de la utilización de la cal en los revestimientos exteriores. Su admiración por los enlucidos griegos que intentan imitar las piedras de mármol, realizados con cal, es una clara muestra del uso extensivo y generalizado de este producto en las regiones del ámbito mediterráneo.

En cualquier caso, sin entrar a pormenorizar en su historia, la utilización del mortero de cal en revestimientos exteriores experimenta en Roma su gran evolución, gracias a la incorporación de arcillas denominadas puzolánicas que le conferían un carácter hidráulico y, por tanto, más resistente a las condiciones climáticas y ambientales.

La adecuada selección de los materiales componentes del revestimiento (áridos, buena selección y cocción de la cal, las adiciones de arcillas, etc…) ha permitido gozar de restos de edificaciones datadas incluso 1000 años atrás. Estas construcciones llegadas hasta nuestros días nos trasladan un reto de permanencia que los materiales y normativas actuales difícilmente se marcan. A todo esto se le añade el proceso de envejecimiento acelerado que el mal o nulo mantenimiento les ha propiciado.

La utilización de estos morteros en edificios históricos de reciente restauración, plantea incógnitas sobre cual ha sido su composición y de cómo se debería intervenir sobre ellos.

En la intervención realizada sobre los muros y tapiales de los baños del Almirante[4], fábricas datadas entre los siglos XIII-XIV, se propuso la realización de una capa superficial a modo de piel, que actuará de protección frente a los agentes atmosféricos, fundamentalmente la lluvia. Esta piel debería de adherirse y ser solidaria con la fábrica donde se apoya, transfiriéndole las propiedades de transpiración que deberían de tener esta clase de edificios y sin crear capas impermeables capaces de agravar las patologías existentes.

Las numerosas pruebas realizadas con diversos tipos de árido y sus variantes mediante la agregación de consolidantes, hidrofugantes, resinas acrílicas, etc, nos determinaban soluciones que deformaban o reconstruían en gran medida las aristas e intersecciones creadas hace 600 años. La incorporación de una capa de cierto espesor (5 cm.), modificaba la imagen exterior de las bóvedas trasmitidas hasta nuestros días. Por el contrario, la solución adoptada ha preferido conservar las técnicas tradicionales, con la incorporación de un revestimiento de poco espesor (0,5 cm.), al que se le exigía mantener la configuración externa de las bóvedas al mismo tiempo que protegerlas (Figura 5).

Sobre el revestimiento existente, previa limpieza intensa del soporte, se ha dispuesto un enlucido de mortero de cal compuesto de 2 partes de cal por una de árido, con granulometrías de 0,8 y 0,35 mm. En las grandes oquedades y en las grietas, que se habían sellado, se utilizaron tres capas de mortero de granulometrías descendentes como si se tratara de la aplicación de un estuco. En una primera capa se utilizó árido de 2,5 y 1,25 mm. En la segunda de 1,25 y de 0,8 y en la tercera el tratamiento general. Se probaron tres tipos distintos de cales, decantándose por la cal en pasta por su resultado más homogéneo y trabajable, ya que se aplicaba con espátulas de unos 2 cm de anchura para permitir llegar a todas las zonas (Figura 6).

Figura 5. Muestras de tratamientos y aplicación

Figura 6. Aspecto final del mortero previsto

4. Tratamiento de juntas exteriores

En las intervenciones de saneado de juntas de fábricas con mortero de cemento, tan extendidas en otros tiempos, se pretendía tanto el sellado como la impermeabilización de las mismas, pero con graves consecuencias. Entre ellas la modificación de la transpirabilidad o la alteración de la imagen de las fachadas, tanto por los cambios cromáticos que se producían como por la tan frecuente aparición de eflorescencias de sales. Frente a este modelo caduco, las últimas intervenciones

tienden a sustituir o reponer las juntas en mal estado con morteros similares a los preexistentes, habitualmente de cal.

Muestra de esta metodología es el trabajo desarrollado durante la reciente intervención en la Torre de la iglesia de Santa Catalina[5] de Valencia, donde se ha actuado sobre una superficie desarrollada de 1500 m2, distribuida según la traza de un hexágono de 4 metros de lado y 54 mts de altura.

Tras la eliminación de la suciedad y polvo que envolvía la torre se comprobó una evidente pérdida de la calidad de la fábrica de sillería con disgregación del mortero de rejuntado, que obligó al picado casi por completo de las juntas, hasta alcanzar la superficie sana situada entre 5 y 10 cm. de profundidad (figura 7).

Los análisis previos[6] determinaron, entre otros, la ausencia de pátinas históricas polícromas en el mortero de juntas, y la tipología de morteros utilizados, constituidos por calcita y áridos de cuarzo, de canto rodado y tamaño variado. La caracterización de los materiales que componen el mortero de junta, determinando sus características físicas y químicas, composición y dosificación adquieren gran importancia pues serán los que fijaran las características del mortero a utilizar

Para la ejecución del mortero de cal a emplear en el nuevo rejuntado se barajaron dos posibilidades, su realización a pie de obra o la utilización de un mortero predosificado, para lo cual se realizaron diversas muestras de ambos tipos para aproximarse al mortero original. Se diseñó un programa de ensayos[7] en los que además de determinar los parámetros habituales tales como resistencia, porosidad, consistencia, curva granulométrica, etc., se tuvo especial interés por resolver la coloración final, a ser posible, sin añadir pigmentos o retocar las juntas a posteriori, pues no hay que olvidar que el rejuntado no sólo tiene que resolver los problemas constructivos funcionales, sino que también debe solventar los estéticos (figura 8).

Figura 7. Juntas tras eliminación de morteros

Figura 8. Ejecución de rejuntado

Por las características de la obra, desarrollada en altura, sin espacios para acopios de material y la considerable cantidad de mortero a emplear, junto a la necesidad de fabricar un mortero homogéneo tanto en su composición como en su tonalidad, fueron condicionantes suficientes para decantarse por un mortero predosificado, que cumpliese las características técnicas que se habían considerado previamente. El conglomerante, de cal aérea, tenia que quedar garantizado en más de tres meses su tiempo de apagado. Las arenas de origen calcáreo y siliceo presentaban una granulometría compensada, aunque requerían de la aportación de árido más grueso en los supuestos de relleno de grande lagunas. La relación entre conglomerante y árido se calculo en 1:5, cuya

disposición en obra si se realizaba con la correcta relación en agua proporcionaban una morteros de 25% de porosidad y una resistencia a compresión de 5.32 N/mm2 Sus características físicas y químicas lo hacían compatible tanto con el mortero de cal preexistente, como con la piedra de composición calcárea y origen sedimentario tan utilizada históricamente en las construcciones de la ciudad de Valencia.

Las juntas, siempre que no superaran los 5 cm. eran rellenadas en una única puesta. Sin embargo, si la profundidad era mayor se haría en sucesivas fases, de tal forma que cada una no superara los 5 cm., dejando entre ellas tiempo suficiente para que se produjera el fraguado y un cierto periodo de carbonatación, en el que colaboraba tanto la porosidad del producto como la gran extensión de superficie a tratar que permitía mantener cierto periodo de tiempo entre las distintas aplicaciones.

5. Consolidación estructural mediante inyecciones de cal

En la torre de Santa Catalina también fue necesario plantearse el colmatado de todas las juntas y oquedades internas que se manifestaban según se iba avanzando el proceso de limpieza, especialmente en el cuerpo de campanas y el inmediatamente inferior, marcando una diferenciación en su calidad constructiva que bien podría coincidir con el cambio del maestro cantero que realizó las obras.

En reiteradas ocasiones se pudo comprobar como tras el rejuntado superficial aparecían sillares que apoyándose únicamente en ripios de piedra, presentaban importantes oquedades que llegaban a alcanzar el metro de profundidad (figura 9).

No hubo duda de la necesidad de rellenar aquellos grandes huecos pero se planteó la cuestión de determinar el producto más idóneo. Podrían introducirse resinas pero existía la incertidumbre de su respuesta a medio y largo plazo junto con el alto coste económico que podía alcanzar dado que se intuía la gran cantidad de oquedades de la torre. Por otro lado, la cal aérea utilizada habitualmente en la construcción de estos edificios, ofrecía la dificultad de reaccionar en ambientes que no sean exteriores, surgiendo dudas sobre la imposibilidad de que este mortero recién elaborado endureciese a corto plazo en el interior del muro y recuperara su capacidad portante.

La eventualidad de añadir cemento al mortero de cal aérea o realizar inyecciones de cemento tampoco se consideró adecuado pues podía suponer la aparición incontrolada de sales a corto plazo.

Finalmente, la propuesta por la que se optó para colmatar estas oquedades paso por una solución mixta en la que el aspecto externo de las juntas era resuelto con un sellado superficial del mismo mortero de cal aérea utilizado para el resto del rejuntado de la fachada de la torre, con el fin de evitar diferencias en el tratamiento cromático y estético. Sin embargo a este mortero se le iba a exigir que una vez endurecido hiciera las veces de encofrado perdido del relleno interior de la torre.

Para ello, en el sellado de juntas se disponían una serie de inyectores en las zonas bajas de la superficie tratada, para la inyección posterior, mientras que otra serie era dispuesta en las zonas más altas, como indicadores de llenado y salida de aire interior. La inyección se llevo a cabo mediante un calderín de aire comprimido que permitía controlar la presión. La distribución de cánulas quedaba por encima de las llagas, de tal forma que aun sufriendo cambio de volumen por retracciones durante la fase de fraguado, no se perdiera el contacto entre las piedras y el relleno de juntas.

Como material de inyección se empleó una lechada de cal hidráulica en proporción 1:1 que facilita la inyección, permite el fraguado en el interior de la fábrica y el alcance de cierta resistencia a corto plazo. En este caso se realizaron ensayos del material seleccionado para confirmar su composición, heladicidad de la pasta que iba a inyectarse y sobre todo el tiempo de fraguado en condiciones adversas, sin entrar en contacto con el ambiente exterior, así como su índice hidráulico, factor indicativo del tipo de cal hidráulica a emplear y por tanto de su dureza, aporte de sales al sistema, etc. El material elegido presentaba un bajo índice, lo que le aproximaba a las cales aéreas con las que se construyó el edificio (figura 10).

Figura 9. Oquedad de las fábricas

Figura 10. Proceso de inyección

Durante la ejecución se llevó un estricto control del material aportando en cada nivel, obteniendo resultados significativos: mientras que en los niveles inferiores la incidencia era menor, en los superiores y cuerpo de campanas los espacios rellenados oscilaban entre el 10 y el 20% del volumen total.

6. Consolidación de tapial

Los esfuerzos de recuperación de patrimonio edificado, centrados en la utilización de las técnicas con cal, tienden a incorporar soluciones de reintegración de faltantes de gran volumen mediante el uso de hormigones y morteros de cal. El tapial, una de las técnicas constructivas más extendidas para realizar muros en el mediterráneo, muestra su versatilidad mediante una amplia gama de variantes y diversos materiales entre los que se incluye el conocido como tapia valenciana. La recuperación de estos muros en avanzado estado de deterioro, constituye sin lugar a dudas su refuerzo estructural, mediante el empleo de masas cuyo conglomerante vuelve a ser la cal.

Las murallas del castillo de Xàtiva, en su vertiente Este presentan uno de los ejemplos más antiguos de utilización del tapial, expresado en la torre almohade del siglo XI denominada del Sol (figura 11). Esta torre de forma semicircular de mas de 20 metros de altura y cuya base define un rectángulo de 13 x 9 m. se construyó mediante la técnica del tapial, con muros que oscilan entre los dos metros en la base hasta los 40 cm. en la coronación. El estado de deterioro se centraba principalmente en la coronación de la torre, los tramos de la muralla defensiva anexa (35 metros de longitud en ambos sentidos) y el alarmante estado de pérdida de masa que presentaba el paramento orientado al Este. El proyecto de intervención[8] pretendía congelar el deterioro de la masa existente y recuperar la consistencia de la tapia, reconstruyendo la coronación de la torre según las huellas existente en los tramos laterales.

El refuerzo de la tapia se planteó bajo la óptica de la utilización de materiales y técnicas constructivas desarrolladas para acercarse lo máximo posible a la original (figura 12). Los análisis determinaron la dosificación, composición y tipos de los áridos y la cal empleada. La decisión más costosa correspondió con la adopción de la solución más adecuada para unir la fábrica existente y la nueva, en aquellos tramos en los que la falta del tapial constituía más de 50 cm. de espesor. Se decidió que la cal aportada a obra pasará el control de apagado en obra, siendo el origen de esta cal el óxido de cal en polvo para producir una mayor dureza de la mezcla, ya que con la humedad se produce un mejor fraguado y compactado. La presencia de numerosos restos de caliches en la tapia antigua testimoniaba esta manera de actuar.

En las coronaciones de los muros y en las zonas de la muralla que presentaban cambios de sección se resolvía mediante un compactado con una granulometría más fina y un enlucido fino con pasta de cal para crear una capa más impermeable.

Figura 11. Torre del Sol

Figura 12. Montaje de la tapiera

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[4] Intervención dirigida por Julián Esteban Chapapría Dr. Arquitecto, Ricardo Sicluna, José Luís Robles, Liliana Palaia y José Monfort, arquitectos, Marisol Martí, Javier Blanquer, Santiago Tormo, arquitectos técnicos y Concha Camps arqueóloga.

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Palabras Clave

Cal
Conglomerante.
Mortero

STRATÉGIES POUR LA PRÉSERVATION ET LA PROMOTION TOURISTIQUE DU CENTRE HISTORIQUE DE LA VILLE DE PUEBLA AU MEXIQUE

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Résumé

Le tourisme peut être considéré comme un outil très puissant pour préserver et pour promouvoir les valeurs culturelles des villes patrimoniales et, de cette manière, contribuer positivement au développement économique et social de la population résidente. Le centre historique de la ville de Puebla, au Mexique constitue un espace urbain très riche du point de vue culturelle, qui possède l'un des patrimoines édifiées parmi les plus importants de l'Amérique Latine.
Le but de ce travail est celui d'identifier les stratégies d'intervention à suivre, les organisations publiques et privées qui devraient participer dans la définition de ces stratégies et les actions concrètes à réaliser, afin de préserver le patrimoine urbain et d'augmenter les flux touristiques au centre historique de Puebla.
L'étude constitue une recherche empirique à caractère descriptif dont l'information analysée a été obtenue à partir de l'opinion qualifiée des experts ayant participé dans des projets de préservation et de gestion du patrimoine culturel des villes historiques dans plusieurs pays dont l'Espagne, le Cuba, la Norvège, l'Équateur, le Pérou, la France, le Laos et le Mexique.
Les résultas de l'étude démontrent que:
a) la création d'un comité municipal tripartite ainsi que d'organisations à caractère mixte (étant composées des représentants du gouvernement, des entreprises et des citoyens) sont les stratégies les plus appropriées pour le design et la mise en œuvre des actions de préservation du centre historique des villes patrimoniales,
b) les gouvernements municipal et régional sont les organismes les plus conseillables pour participer activement dans les travaux de préservation des villes patrimoniales
c) les travaux de restauration des bâtiments anciens, des monuments et d'infrastructure urbaine doivent être considérées comme des actions prioritaires pour la préservation du patrimoine des villes historiques et,
d) étant donné qu'il s'agit d'un *produit touristique complexe,* il est nécessaire d'élaborer et d'utiliser un plan stratégique de marketing pour gérer les activités promotionnelles du centre historique de Puebla.

Les villes patrimoniales et le tourisme culturel

La culture et le tourisme culturel

Selon Haulot[1], la culture est l'ensemble des conditions évolutionnaires de l'environnement matériel, physique, moral, intellectuel et spirituel de l'homme. Pour Maciel[2], la culture est l'ensemble des connaissances, des croyances, de l'art, de la morale, des droites, des coutumes et même d'autres aptitudes et habitudes que l'homme acquiert en tant que membre d'une société.

Ce même auteur considère que le mot «culture», dans le sens du développement des individus, exprime l'idée du développement intellectuel et de réussite de la personne humaine qui s'enrichit par elle-même, au moyen du raffinement de ses préférences, de son sens critique et de

ses jugements. Cette définition diffère de la signification du terme civilisation, lequel, s'exprime par l'ensemble de phénomènes collectifs communs à toute une société ou groupe de sociétés.

Dans le champ de la culture, le tourisme a connu un développement remarquable depuis plusieurs années. Dès différents perspectives d'analyse, beaucoup d'auteurs considèrent que le tourisme peut contribuer de façon importante à la préservation du patrimoine naturel et culturel (Grahn[3]). À ce sujet, Myers[4] opine que le tourisme a la capacité de créer des motifs très puissants vers la préservation des régions et de aires naturelles protégées. Budowsky[5] considère que le tourisme orienté vers la visite aux parcs nationaux joue un rôle important dans la préservation des espèces en voie d'extinction.

Pour sa part, Ceballos-Lascurain[6] établit que le tourisme est un facteur importante pour la protection des aires naturelles et, en même temps, il contribue de façon significative à la préservation du patrimoine culturel des sites, des régions et des pays. Finalement, en interprétant l'opinion de McNeely[7] et de Ziffer[8], le tourisme peut aussi préserver et renforcer les valeurs culturelles des sites visités contribuant positivement à leur développement économique.

Le patrimoine culturel comme facteur de motivation touristique

En tant que sujet de motivation touristique, le patrimoine peut être défini comme tout ce qui nous vient du passé, transmis d'une génération à l'autre, et qui est suffisamment valorisé pour le préserver à jamais. Dans ce sens, et à dire de Prentice[9], le patrimoine comprend le paysage, l'histoire, les bâtiments, les traditions et toutes sortes de manifestations culturelles qui peuvent être considérées comme des objets de promotion touristique.

L'intérêt pour le tourisme culturel ayant pour destination les villes historiques, et surtout, les villes patrimoniales a connu une tendance croissante dès l'époque du *Grand Tour* (Blank et Petkovich[10]). La ville est, partout dans le monde, une partie essentielle de l'histoire de l'humanité et, pour cette raison, un objet *per se* d'attraction touristique. De nos jours, il existe un vif intérêt pour visiter les espaces urbains représentatifs des différentes périodes historiques et culturelles. Cette tendance a donné lieu à ce qu'on connaît comme le «tourisme urbain», connu aussi sous des autres dénominations dont «tourisme culturel» Torres[11].

Une bonne approche pour essayer de comprendre le phénomène touristique qui visite les villes historiques est l'emploi de la théorie de systèmes. De ce point de vu, le tourisme peut être considéré comme un ensemble d'activités socioéconomiques et d'organisations agissant autour de ces activités qui peuvent être classés dans trois groupes principaux à savoir:

Le premier groupe comprend les logements, les restaurants et les moyens de transport que les touristes utilisent pour se rendre à la ville. Le deuxième groupe comprend le patrimoine culturel de la ville, ses produits touristiques complémentaires et d'autres satisfacteurs qui répondent aux besoins du touriste urbain, comme les magasins, les agences de voyages, les agences de tourisme, les spectacles, etc. et, finalement, dans le troisième groupe se sont classés les services publiques et d'infrastructure urbaine que le touriste emploie lors de son séjour, comme le transport, la sécurité, les banques, les bureaux gouvernementaux, les services de santé, etc.

De cette classification on peut déduire que les activités touristiques ont une caractère clairement transversale selon laquelle, elles agissent, de façon simultanée, dans différents secteurs de l'économie urbaine. Alors, selon Torres[12], sa grande capacité d'influencer sur la structure socioéconomique et territoriale de la ville, est l'attribut qui accorde au tourisme son importance capitale dans le contexte de la planification stratégique urbaine, de sorte que le développement urbain des villes monumentales ne puisse pas être compris sans la planification et la gestion des activités touristiques.

La ville de Puebla comme destination culturel axée sur son caractère patrimoniale

Considérée parmi les quatre villes principales du Mexique, la ville de Puebla a subit des grandes transformations pendant ses plus de quatre siècles d'histoire depuis sa fondation par les espagnols le 16 avril 1531.

Même si ces transformations ont touché presque tous les aspects de l'activité humaine, la physionomie architectonique du centre historique de la ville a conservé ses attributs distinctifs essentiels depuis ses premiers temps. Étant donné que *sa structure urbaine fait partie de l'architecture caractéristique de la renaissance, la ville* a été déclarée par l'UNESCO patrimoine de l'humanité le 11 décembre 1987.

Presque depuis sa fondation, la ville de Puebla est devenue l'un des principaux centres industriels et commerciales de l'époque coloniale mexicaine. Les industries de verre, textile et agricole connurent un essor au niveau du pays et même international entre les XVIe et XVIIe siècles (Clavijero[13]). Son dynamisme urbaine a connu aussi une croissance parallèle à celle de sa production industrielle, artisanale et commerciale, de façon que, au début du XIXe siècle sa population urbaine avait atteint déjà 100,000 habitants. Après, le long des dernières décennies, des différents facteurs économiques ainsi que sociaux tels que la révolution mexicaine et l'établissement du régime constitutionnel ont influencé les différents aspects du développement de la ville de manière que, de nos jours, Puebla est le quatrième centre industriel et commercial du Mexique ayant une population métropolitaine qui dépasse les 2 millions d´habitants.

En ce qui concerne sa richesse patrimoniale en tant que destination touristique, la ville de Puebla possède trois grandes types d'attraits: a) son architecture urbaine et monumentale, b) son histoire et traditions culturales et, c) sa gastronomie.

L'architecture urbaine de Puebla possède, comme principal attrait touristique, l'ensemble monumental représenté par son centre historique, lequel, constitue un espace urbaine intégré par plus de 2100 bâtiments construits entre le XVe et XVIIe siècles, selon différents styles architectoniques parmi lesquels le style renaissant, le style *herreriano*, le baroque et le plateresque son les plus représentatifs. Dans cet ensemble de rues et bâtiments civils et religieux ressortent la cathédrale (la plus imposante et décorée du style *Herreriano*), la bibliothèque Palafoxiana, la chapelle de *Nuestra Señora del Rosario* (l'expression la plus raffinée du plateresque mexicain, aussi dénommé *Churrigueresco*), le Teatro Principal, et d'autres bâtiments et églises de grande beauté décorées en utilisant une combinaison de bric et de faïence dénommée *talavera*, ce qui les a apportés leur sceau distinctif et unique parmi tous les villes de Mexique. De plus, et complétant le paysage urbain du centre historique, il existe 27 places et jardins, 11 musées ainsi que des écoles, couvents et bâtiments publiques de dimensions et d'importances diverses.

Quant à son histoire et traditions, la ville de Puebla constitue l'un des cas les plus représentatifs d e l'évolution sociale, culturale et économique du Mexique. Étant la première ville intentionnellement fondée par les espagnols après la conquête, son développement et évolution politique, sociale, et économique reflète de façon très claire l'histoire et l'évolution de l'empire espagnol en Amérique dès son essor à son déclin sous le règne du Roy Fernando VII au début du XIXe siècle.

Finalement, la gastronomie de Puebla représente pour le Mexique, l'une des cuisines les plus appréciées tant pour les mexicains que pour les étrangers, grâce à la variété et à la sophistication de ses spécialités culinaires dont le *mole poblano* (une sauce épicée contenant du cacao, chile et des arachides parmi d'autres ingrédients) et les *chiles en nogada* (des piments verts finement préparés et décorés avec de la sauce de noix et des grains de grenade).

Sur la base de ces attributs, le ville de Puebla offre aux touristes cherchant des expériences de loisir une très large gamme de possibilités d'ordre culturel leur permettant de connaître une facette différente du Mexique, qui est considéré, par beaucoup de voyageurs, comme une destination propre du relax.

Néanmoins, la richesse culturelle du centre historique de Puebla n'est pas capable, par elle-même, de générer des flux touristiques suffisants pour convertir le tourisme en un important facteur de développement social et économique. D'autre part, dans le cas où le patrimoine culturel de Puebla deviendrait un facteur substantiel du développement touristique de la ville, la question qui se pose maintenant est celle de savoir si ce développement pourrait être géré de facon que les flux touristiques ne représentaient pas de dangers graves à la préservation des monuments et des bâtiments historiques.

À ce sujet, Law[14] opine que le tourisme ne peut pas être considéré tout simplement comme l'un des filières économiques du développement intégral des villes. Par contre, l'investissement en tourisme involucre la création d'infrastructure, d'ambiances physiques et d'activités promotionnelles qui apportent des bénéfices économiques et sociaux à la population résidente. Tout cela, signifie que la ville doit concevoir et implanter une stratégie intégrale de marketing dans le but d'identifier des marchés cibles auxquels vendre son image, mais surtout, son «produit culturel de loisir».

Dans ce contexte, ce même auteur suggère que l'argent que les touristes dépensent en utilisant les services de logement, de restauration, de transport publique, ainsi qu'en assistant aux concerts, aux musées et à d'autres attraits et spectacles lors de leur séjour dans les villes historiques représentent des retombées économiques très importantes dans la création d'emplois et du développement économique.

En dépit des bénéfices qui découlent de l'exploitation du tourisme comme source d'obtention de revenues, une autre approche critique établit que le tourisme provoque des effets adverses aux villes patrimoniales. Selon ce point de vue, l'affluence de grandes masses de touristes demande beaucoup plus de services additionnels à ceux qui sont demandés par la population résidente et, par conséquence, ce phénomène cause, à son tour, l'augmentation des coûts d'approvisionnement et de gestion des ressources nécessaires pour faire face aux besoins tant des résidents que des visiteurs.

Cet argumentation rendre évident la nécessité des efforts de planification conjointe dûment concertées, permettant la participation coordonnée de représentants citoyens, de fonctionnaires gouvernementaux, ainsi que de cadres d'entreprises privées et publiques appartenant à tous les domaines de l'activité touristique.

Objectif principal de l'étude

Le but principal de l'étude est celui de reconnaître une stratégie globale d'analyse et d'actions concrètes d'intervention pour la préservation du patrimoine culturel et la promotion touristique du centre historique de la ville de Puebla.

Méthode

La nature exploratoire de l'étude suggère, par elle-même, la réalisation d'une enquête pour l'obtention des données d'analyse. À cet effet, l'instrument utilisé pour la collecte des données a été un questionnaire dessiné spécifiquement à propos de l'étude. Le questionnaire employé a été

intégré par 5 sections. Les quatre premières sections servent à obtenir des opinions qualifiées reliées au propos central de l étude, tandis que la dernière section a été utilisée pour obtenir le profil démographique des individus intégrant l'échantillon d'analyse.

La première section sert à identifier les types générales de stratégies d'intervention qui peuvent être utilisées pour la préservation des centres historiques des villes patrimoniales. La deuxième section sert a identifier le type d'organismes publiques et/ou privés devant intervenir dans les actions de préservation des centres historiques. La troisième section est utilisée pour reconnaître les actions ponctuelles à réaliser pour la préservation des monuments et du paysage urbaine et, finalement, la quatrième section a été utilisée pour identifier les activités de promotion touristique considérées comme les plus appropriées à réaliser selon l'opinion des enquêtés.

Les quatre premières sections comprennent, à leur tour, deux parties. Dans la première partie, les répondants expriment leur opinion en choisissant une o plus options de réponse à partir d'une liste donnée. Dans la deuxième partie, les répondants ordonnent les options choisies selon leur degré d'importance qu'elles pourraient avoir si elles seraient appliquées pour le cas spécifique du centre historique de Puebla.

La fiabilité de l'instrument de mesure a été testée selon l'indice Alpha de Cronbach (α), lequel, est un indice qui mesure le degré de consistance interne du questionnaire au moyen du calcul du degré de corrélation existante entre les énoncés de l'instrument. Ainsi, étant donné que toute corrélation peut prendre des valeurs allant du 0 jusqu'à 1, lorsque l'indice Alpha de Cronbach montre des valeurs égales ou supérieures à 0.60, on peut considérer que l'instrument testé est fiable (Carmines et Zeller[15]).

Chaque section du questionnaire a été testée séparément afin d'obtenir des indices Alpha les plus fiables. Les résultats du test pour chaque section ont été positifs. Par conséquence, le questionnaire, au complet, montre un indice Alpha $\alpha = 0.707$, ce qui signifie que le questionnaire est un instrument de mesure fiable.

Afin de faciliter le remplissage du questionnaire, celui-ci a été rédigé en espagnol et en anglais. L'instrument comportait des questions fermées, dont la réponse était à choix multiple et aussi des questionnes ouvertes dans lesquelles, les enquêtés devaient exprimer leur opinion sans aucune réponse suggérée.

Echantillonnage

Dans le but d'utiliser un échantillon d'analyse approprié aux propos de l'étude, on a employé un échantillon de convenance intégré par des experts en matière de gestion de projets de préservation de villes patrimoniales (Wiers[16]). Comme des conditions de sélection, les participants choisis devraient avoir travaillé ou avoir participé dans des projets de préservation et/ou de reconstruction de zones touristiques urbaines de villes patrimoniales dans des différents pays du monde.

Quant à la nature du travail des membres de l'échantillon, ils pourraient occuper des postes administratives (fonctionnaires des organismes publiques ou privées), être cadres d'entreprises publiques ou privées, être professeurs universitaires et même chercheurs indépendants ou affiliés à des organisations culturelles ou gouvernementales.

L'échantillon a été intégré à partir des listes d'individus ayant participé à trois événements spécialisés dans le tourisme urbain. Le premier événement était le *6e Colloque International Puebla 2001* qui a eu lieu à la ville de Puebla du 3 au 7 octobre 2001 organisé par l'OVPM (Organisations des Villes du Patrimoine Mondial). Le deuxième événement était le *XII Congreso Panamericano de Escuelas de Hotelería, Gastronomía y Turismo*, réalisé à L' Havane, Cuba, du

10 au 13 octobre 2002 et organisé par la CONPEHT (Confederación Panamericana de Escuelas de Hotelería, Gastronomía y Turismo). Le troisième événement était le *Foro de Exploración Estratégica de Turismo*, réalisé à la ville de Puebla le 9 novembre 2002 et organisé par la Mairie de cette même ville.

Collecte des données

Le remplissage des questionnaires pour la collecte des données a été effectué pendant les événements mentionnés ci-haut ainsi qu'en utilisant le courrier électronique. La collecte des donnés, la sélection des questionnaires viables et l'analyse de l'information obtenue ont été réalisés pendant la période comprise entre novembre 2001 et décembre 2002. D'un cadre d'échantillonnage de 200 participants environ (tenant compte les trois événements), on a retenu 42 questionnaires dûment complétés, desquels, 34 ont été finalement utilisés pour l'analyse.

Analyse des données

Tenant compte de la nature des donnés découlant du remplissage des questionnaires, leur analyse a suivi deux méthodes principales. La première méthode, de nature descriptive, consistait à calculer les fréquences de réponses aux questions fermées dont les réponses, pour des fins de calcul, ont été exprimées en termes numériques. La deuxième méthode utilisée était l'analyse de contenu, laquelle, consiste à interpréter la significations des réponses données aux questionnes ouvertes qui demandaient l'opinion des répondants.

Résultats

En termes généraux, les résultats de l'étude décrivent les opinions des individus enquêtés concernant les organismes participants, les stratégies adoptées et les actions implantées qui, selon leur expérience, ont été utilisées ou devraient être utilisées par les autorités et organismes chargés de la préservation et promotion touristique des villes historiques déclarées patrimoine de humanité par l'UNESCO.

Évidemment, il s'agit d'opinions strictement personnelles qui découlent d'individus dont les expériences de travail, la formation professionnelle et la culture sont extrêmement variées. Alors, de ce point de vue, l'interprétation des résultats tirés de l'analyse et, surtout, la transformation de ces mêmes résultats dans des plans stratégiques d'intervention pour la préservation des centres historiques des villes patrimoniales deviennent un défi.

Cependant, en essayant de faire un résumé, le plus complet possible des principales idées et notions exprimées par les répondants concernant le but central de cette étude, on présent ci-dessous les résultats suivants:

a) Concernant les stratégies d'intervention pour la préservation des centres historiques des villes patrimoniales

Les résultats de l'étude démontrent que la *création d'un comité municipal tripartite* intégré par des représentants citoyens, par des cadres d'entreprises et par des autorités du gouvernement municipal est la meilleure stratégie à suivre pour la gestion et l'implantation d'actions de préservation des centres historiques (65% des réponses).

En occupant le deuxième rang d'importance (56% des réponses), les répondants suggèrent aussi la *création d'un organisme local à caractère mixte* comme une alternative de gestion des projets pour la préservation des villes historiques. On entend par organismes à caractère mixte,

les groupes d'individus intégrés par des citoyens et par des fonctionnaires gouvernementaux au niveau municipal ayant l'expertise et l'expérience nécessaires pour faire des apports substantiels aux objectifs des programmes de préservation du patrimoine des villes historiques.

Par contre, les répondants considèrent que, pour la préservation des centres historiques des villes patrimoniales, la stratégie la moins appropriée serait l'engagement d'entreprises de consultation provenant de l'étranger.

b) Concernant les organismes chargés de réaliser les actions pertinentes pour préserver les centres historiques des villes patrimoniales

Dans ce domaine, les résultas sont beaucoup plus variés. Les organismes les plus recommandés pour participer activement dans les travaux de préservation des villes patrimoniales sont le *gouvernement municipal* et le *gouvernement régional* comme les deux plus importants (82% et 79% des réponses respectivement). En troisième lieu, se trouvent les organismes intégrés par des représentants citoyens (68% des réponses) et, finalement, le gouvernement fédéral (59% des réponses).

De façon surprenante, le *ministère régional de tourisme* (20% des réponses) et les *centres de recherche touristique* (12% des réponses) sont considérés par les enquêtés comme des organismes qui ne doivent pas participer dans les actions de préservation des centres historiques.

c) Concernant les actions à réaliser pour la préservation des monuments et du paysage urbain

À ce sujet, l'opinion des répondants se centre sur quatre types d'actions considérées comme des activités préalables aux actions de préservation proprement dites. Ces actions sont, à savoir: la *réalisation d'études hautement spécialisées en histoire, en architecture* (civile et religieuse) ainsi qu'en *styles et matériaux de construction* utilisés par les constructeurs des différentes époques du passé (79% des réponses).

En deuxième rang, *la réalisation d'études approfondies d'urbanisme* pour la mise en état de rues, des systèmes d'approvisionnement de l'eau potable, des systèmes de drainage ainsi que pour les éléments du mobilier urbain, des parcs et des jardins publiques (74% des réponses).

En troisième rang d'importance, les enquêtés recommandent *d'implanter des nouveaux systèmes de circulation piétonnière et véhiculaire* permettant, tant aux résidents habituels, qu'aux touristes de se déplacer plus aisément par les rues et avenues du centre historique de la ville (59% des réponses). Finalement, les enquêtés suggèrent aussi la réalisation des études nécessaires pour *identifier et réordonner l'utilisation du sol* à l'intérieur de l'espace urbain délimité par la zone monumentale du centre historique de Puebla (56% des réponses).

Évidemment, ces activités, en tant que préalables, conduisent nécessairement à la réalisation de travaux de reconstruction ou de reconstitution de bâtiments, monuments rues, ponts, parcs, etc. qui représentent les actions concrètes et proprement dites de préservation du patrimoine édifié du centre historique de Puebla.

d) Concernant les activités de communication pour promouvoir le tourisme dans les centres historiques des villes patrimoniales

Quant aux activités de communication orientées vers la promotion touristique du centre historique de Puebla, les résultats de la recherche démontrent que *l'implantation d'une stratégie de marketing touristique* spécifiquement dessinée pour promouvoir les attraits culturels de la ville est considérée comme l'action prioritaire à réaliser (56% des réponses). Cette opinion est forte-

ment renforcée par la recommandation de *créer et de distribuer plus efficacement des matériaux promotionnels appropriés* dans tous les endroits visités par les touristes (58 % des réponses).

Néanmoins, d'autres activités d'appui promotionnel telles que *l'identification des attributs distinctifs de la ville de Puebla comme destination touristique* (47% des réponses); la *signalisation des monuments et de sites d'intérêt culturel* (47% des réponses) et la *mise en place de systèmes fonctionnels de transport* (38% des réponses).

Par ailleurs, en analysant le contenu des commentaires additionnels au moyen desquels les enquêtés supportaient et/ou justifiaient leurs réponses, il est possible de distinguer trois groupes d'opinions différentes. Le premier groupe d'opinions fait référence à l'importance qui doit être accordée à la participation active des citoyens dans les projets qui influent de manière directe leur environnement social et de travail. Cette opinion renforce la suggestion de créer un comité municipal tripartite pour la gestion et l'implantation d'actions de préservation des centres historiques.

Dans le deuxième groupe d'opinions les répondants mettent l'accent sur le caractère local des organismes qui doivent participer aux activités de préservation tant du patrimoine tangible qu'intangible des villes historiques. Autrement dit, les répondants accordent aux participants locaux une avantage substantielle sur les étrangers, en termes d'une vision générale des facteurs particulières qui doivent être considérés lors de la formulation des plans stratégiques.

Finalement, un troisième groupe d'opinions réfère à la nécessité incontournable d'axer toute action de préservation patrimoniale sur des études préalables approfondies, afin d'assurer le succès des plans, des programmes et des stratégies visées. Ce qui peut être interprété comme la négation à toute action menée par l'improvisation, laquelle, malheureusement, prédomine dans beaucoup de projets importants.

Quant au profil démographique des répondants, l'échantillon a été composé par 22 mexicains (65%) et 12 étrangers (35%) dont 3 espagnols et 3 cubains, 2 norvégiens, et un représentant chaque de l'Équateur, du Pérou, de la France, et du Laos. Par sexe, l'échantillon comportait 23 hommes, dont 14 mexicains et 9 étrangers (68%) et 11 femmes, dont 8 mexicaines et 3 étrangères (32%).

En matière d'occupation professionnelle, l'échantillon comporte 13 chercheurs, 8 fonctionnaires gouvernementaux, 7 cadres travaillant dans des organismes publiques et 6 cadres des organisations privées.

Conclusions

En termes généraux, le résultats de cette recherche empirique démontrent que les organisations de participation citoyenne (groupes mixtes ou comités) sont considérés les organismes responsables de réaliser les actions pertinentes pour préserver les centres historiques des villes patrimoniales. Aussi, on peut établir que, parmi les composants de ces organismes, les gouvernements municipal et régional jouent des rôles significatifs tant dans la mise en état de tous les éléments du patrimoine édifié, que dans l'implantation d'une stratégie de marketing touristique spécifiquement dessinée pour promouvoir les attraits culturels des villes patrimoniales.

Alors, étant donné que les stratégies, les programmes d'activités, et les actions concrètes préalablement mentionnées gardent une relation séquentielle qui va du conceptuel au pragmatique, il devient possible de visualiser la construction d'un modèle de décisions et d'actions qui pourrait être adopté par les organismes responsables de la préservation du centre historique de Puebla et

que, éventuellement, pourrait être utilisé pour autres villes patrimoniales pour des propos semblables. Le schéma conceptuel du modèle proposé est montré dans la figure 1.

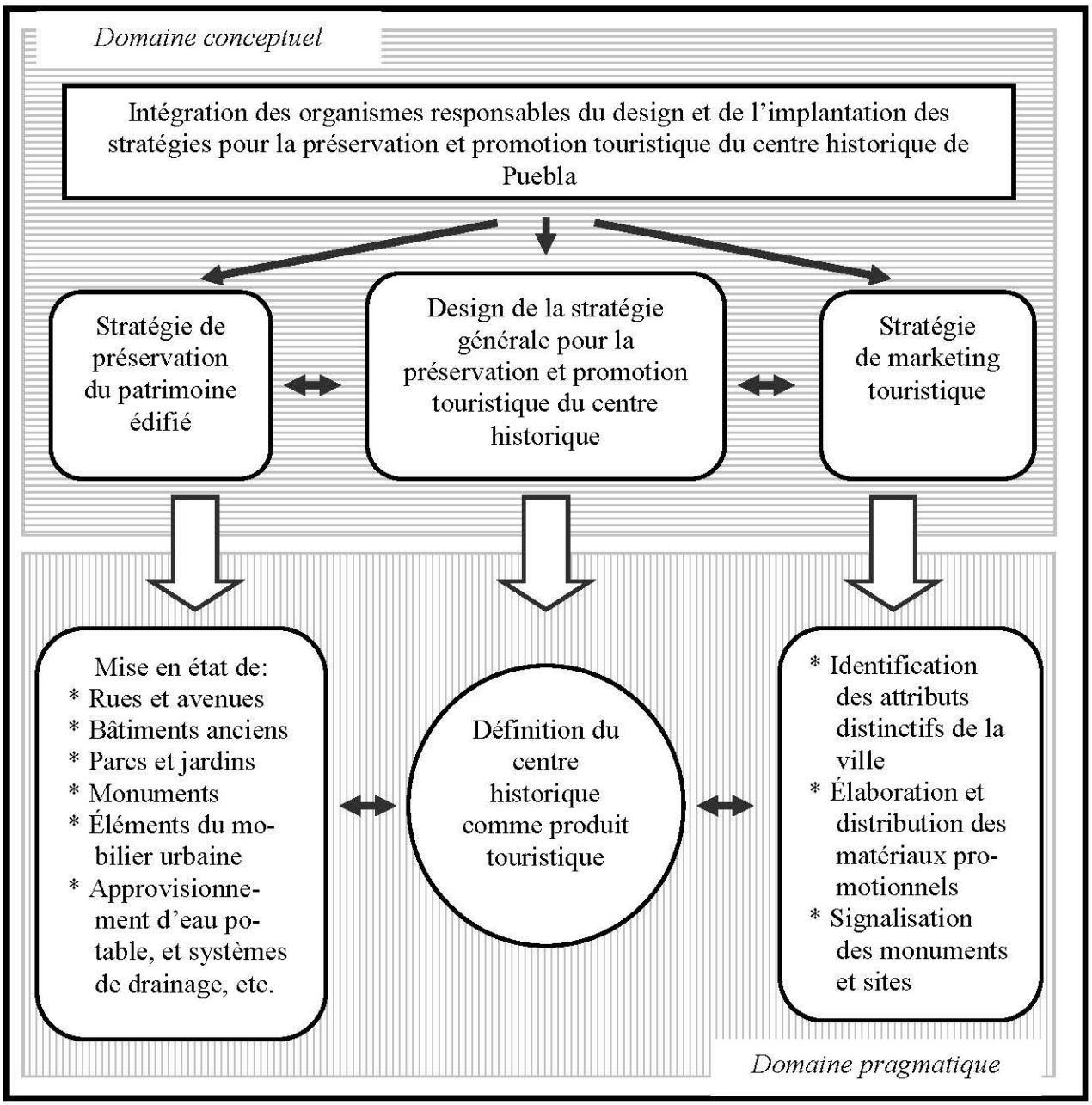

Figure 1
Modèle stratégique pour la préservation et la promotion touristique du centre historique de Puebla

Ainsi, en suivant la logique du modèle proposé, le design et l'implantation des stratégies tant de préservation que de promotion du centre historique de la ville de Puebla doit être toujours la responsabilité prioritaire d'un ensemble d'organisations composé par des fonctionnaires du gouvernement local, par des organismes spécialisés d'experts (scientifiques, artistes et académiciens) et par des groupes représentatifs des intérêts citoyens.

Quant à la réalisation des travaux nécessaires pour la mise en état de rues et avenues, de bâtiments, de parcs, de monuments, ainsi que des systèmes d'approvisionnement d'eau potable et de drainage, l'interprétation aux réponses des individus enquêtés suggère l'utilisation de licitations ouvertes permettant l'accord des contrats aux entreprises spécialisées les plus compétentes. La même approche doit être utilisée pour la définition du centre historique de Puebla comme produit touristique ainsi que pour sa promotion et commercialisation. Néanmoins, il faut faire la distinction entre la partie conceptuelle et la partie opérative du processus au complet. Or, on suggère que des véritables experts en marketing de la culture et des arts soient chargés de la définition des attributs distinctifs du centre historique de Puebla et, de façon parallèle, d'autres experts, cette fois-ci en matière de promotion commerciale, soient chargés de l'implantation des stratégies de marketing pouvant assurer le succès global du projet.

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Salt weathering research: present state and future directions

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1. Introduction

An increased attention has been paid to safeguarding of the built heritage and its integration into the life of contemporary society. Urban sustainability should be improved through delivering real, noticeable benefits to citizens. Action is therefore required in the areas of cultural heritage and the built environment where there is untapped technological potential and strong demand for new solutions from cities themselves.

The complexity of problems of cultural heritage calls for a modern interdisciplinary and holistic approach of international dimension. Future research projects should have significant regional and international impacts and should be managed and clustered with a view to practical implementation and the transferability of their results.

Salt weathering of building stones is recognised as one of the primary agents in the loss of historic architecture all over the world. Salt weathering can therefore be considered as an important hazard with significant cultural and economic implications. The growth of salt crystals within the pores of a stone can generate stresses that are sufficient to overcome the stone's compressive strength and disintegrate the stone into a powder or flakes. Natural and artificial porous media become contaminated with salts in different ways. Salt accumulations found in historic buildings can be attributed to a variety of sources, e.g., air pollution, rising saline groundwater, marine spray, unsuitable cleaning material, incompatible building materials, microbiological activity and de-icing salts. Advances in our understanding of salt decay mechanisms would significantly reduce maintenance and restoration costs.

2. Salt weathering: where do we stand?

2.1. Salt input/transport

Along with air pollution, soluble salts represent one of the most important causes of stone decay. The growth of salt crystals within the pores of a stone can generate stresses that are sufficient to overcome the stone's compressive strength and turn the stone to a powder. The deterioration of many of the world's greatest monuments can be attributed to salts. The most frequently encountered salts in and on building stones

and stone sculptures are carbonates, sulphates, chlorides, nitrates and oxalates of sodium, potassium, calcium, magnesium and ammonia [Arnold and Zehnder, 1990].

Salts on and inside building stones originate from ions that have been leached from mortars, other stone types used in the same monument or products used in conservation treatments. Salts may also be transported to the stones by deposition from the atmosphere, from groundwater by capillary rise or being generated by organic metabolism. The ions are carried in diluted aqueous solutions that can penetrate into porous materials and circulate within or percolate through their cavities and pores. Salt solutions become more concentrated whenever the water (as solvent) evaporates. Lewin [1982] proposed a model to predict the site of crystal deposition by applying the physical-chemical laws governing capillarity, viscous flow and diffusion. The site of this crystallisation is determined by the dynamic balance between the rate of escape of water from the surface (by evaporation) and the rate of resupply of solution to that site (by capillary rise). The former is a function of temperature, air humidity, and local air currents. The latter is controlled by surface tension, pore radii, viscosity and the path length from the source of the solution to the site of the evaporation. When both are constant, a steady state may develop and be maintained, so that crystallisation is balanced in a distinct zone on or below (usually a fraction of a millimetre to a few millimetres) the surface where the salts accumulate. Near the bottom of the wall (i.e., closest to the groundwater supply) the capillary flow through the pores is likely to be able to keep up with the rate of evaporation, so the liquid/vapour interface remains at the exterior surface (*Figure 1*).

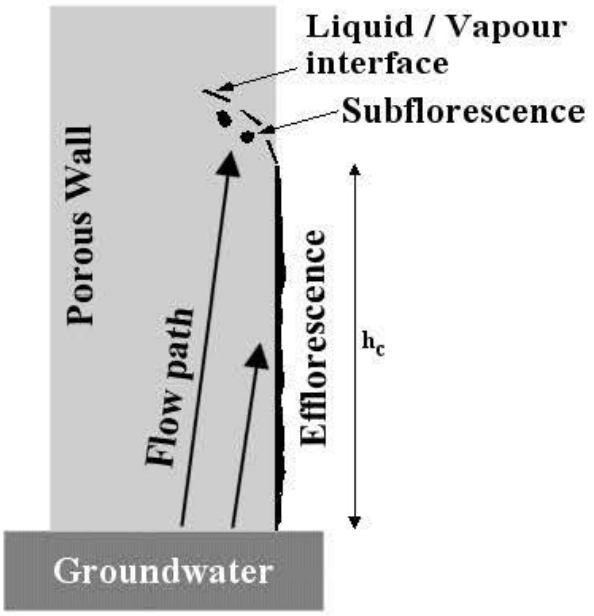

Figure 1. Schematic representation of capillary rise of groundwater into a porous wall, with simultaneous evaporation from the surface. Near the ground the flow path is short, so the rate of rise more than matches the rate of evaporation and the liquid-vapour interface is at the surface of the wall. The rate of rise decreases as the flow path becomes longer, and becomes slower than the rate of evaporation beyond a certain height, $\mathbf{h_c}$. If evaporation causes the solution to become

supersaturated, crystals precipitate at the exterior surface below $\mathbf{h_c}$ (efflorescence), but they precipitate within the wall above $\mathbf{h_c}$ (subflorescence).

In that region, if the solution becomes supersaturated with salts, crystals will precipitate at the surface; this is called *efflorescence* (outward flowering), and is responsible for the whitish stains often seen on new brick walls. Higher up the wall, the rate of capillary rise is slower, so that evaporation may dry out the surface and drive the liquid/vapour interface into the body. In that case, super saturation leads to precipitation inside the pores, *subflorescence*.

According to Snethlage and Wendler [1997], at least in the case of sandstone, in addition to a steady vertical moisture flow from the ground (proposed by Lewin), periodically active moisture sources are needed to produce salt efflorescences / subflorescences and damage.

There is a significant difference between the process of salt crystallisation on the surface of a porous material (efflorescence) and the crystallisation within the porous system (subflorescence). The former, while appearing impressive, typically results in little damage to the stone (e.g. sanding, surface disaggregation), whereas, by contrast, the latter typically creates extensive damage (e.g. flaking, spalling). Certain salts are prone to effloresce, while others crystallise more readily inside a pore [Rodriguez-Navarro and Doehne, 1999]. When salts precipitate, the growing crystals exhibit different forms and habits depending on the local external conditions.

Behlen et al. [1997] have shown that the contributions of wet and dry deposition to the total deposition of salts on a vertical wall in a coastal, rural area with low pollution levels, are 59 % and 41 % respectively. The dry deposition consists of gases (85 %) and particulate (15 %). The relative importance of each of the salt input pathways (e.g. wet deposition, dry deposition and capillary rise) largely depends on the very particular situation at each individual monument, including the environmental and climatological conditions, the geometry of the building, the local airflow characteristics and constructional details ([Moropoulou et al., 1995] and [Steiger et al., 1997]).

The presence of deliquescent salts on and inside building stones significantly increases the 'time of wetness' (fraction of the exposure time when a stone surface is wet) of the stone, which indirectly increases the weathering rate of the stone, by increasing the absorption rate of gaseous pollutants and the deposition velocity of particulate pollutants and by promoting the transport of soluble salts inside the stone. The presence of sodium chloride alone was found to increase water pick-up in an overnight dew event by up to a factor of 100 (relative to a salt-free control specimen) [Cooke and Gibbs, 1993]. Auger [1988] has shown an increase in drying time by a factor of 10 for stone samples containing high degrees of crystallised sea salt, relative to salt-free control specimen.

2.2. Theoretical Crystallisation Pressures

The deleterious power of salts in porous substrates is generally attributed to three different mechanisms: linear crystal growth pressure, hydration pressure and hydrostatic crystallisation pressure.

Linear Crystal Growth Pressure

Linear crystal growth against an opposing pressure is possible provided that the salt solution is supersaturated. The exerted pressure is strongly dependent on the degree of super saturation (C/C_0) and the molar volume of the crystalline compound and can be expressed, based on the Riecke principle, as [Correns, 1949]:

$$P_C = \frac{RT}{V_C} \cdot \ln\left(\frac{C}{C_0}\right) \qquad \textit{Equation1}$$

With: P_C = linear growth pressure (N/cm^2); R = universal gas constant (8.31 J/K.mol); T = absolute temperature (K); V_C = molar volume of the crystalline compound (cm^3/mol); C = concentration of the salt in solution (mol/L) and C_0 = solubility of the salt (mol/L).

If super saturation develops in an unconstrained situation, crystallisation occurs but there is no pressure exerted. P_C is the theoretical maximum hydrostatic pressure that crystallisation could oppose, e.g. in the case of a sodium chloride crystal (V_C = 24.55 cm^3/g) growing from a 100 % supersaturated ($C/C_0 = 2$) solution at 20 °C, a pressure of ca. 30 MPa would be required to prevent further crystal growth. The validity of this approach has been criticised, however, raising the objection that it is unlikely that sufficiently high, if any, super saturation is reached inside irregularly shaped capillaries (which provide plenty of nucleation sites) [Snethlage et al., 1986]. According to Rodriguez-Navarro and Doehne [2000], however, high super saturation ratios may be sustained within small pores due to the effect of pressure build-up into capillaries (due to the Laplace effect of curvature of a solution). The smaller the pore, the higher the super saturation at which crystallisation occurs, when the molar volume of the condensed phase (V_c) is larger than the molar volume of the solute (V_s). In the case of NaCl $V_c > V_s$ therefore, NaCl in solution will be more stable than in a condensed phase at high pressures.

According to Scherer et al. [Scherer, 1999] the destructive tensile stress exerted on the pore wall by a crystal growing in the pore (circumferential or hoop stress exerted on the pore wall), σ_θ can be approximated by [Scherer, 2000] :

$$\sigma_\theta = \frac{1}{2}\frac{RT}{V_C} \cdot \ln\left(\frac{C}{C_0}\right) - \frac{\gamma_{WL}}{r_p} + P_e \qquad \textit{Equation 2}$$

With: γ_{WL} = tension of the pore wall-liquid interface; r_p = radius of the capillary pore where the crystallisation takes place; P_e = atmospheric pressure and assuming that: the growing crystal has a spheroidal form, the pore has a cylindrical form, salt solutions are ideal solutions, the substrate has a low porosity and the porous system is completely saturated with solution.

When the surface of a crystal touches the pore wall, a new crystal/wall interface is created with energy γ_{CW}; at the same time, the crystal/liquid and wall/liquid interfaces are eliminated, whose energies are γ_{CL} and γ_{LW}, respectively. As Correns [1949] pointed out, pressure must be applied to force the crystal and wall into contact if $\Delta\gamma = \gamma_{CW} - \gamma_{CL} - \gamma_{LW} > 0$. That is, if a crystal is growing in a pore in a saturated solution, and the materials are such that $\Delta\gamma > 0$, then the crystal will resist touching the wall

and will exert pressure against it. On the other hand, if $\Delta\gamma < 0$, then the crystal will be able to reduce the energy of the system by touching the wall, so it will grow into contact without generating any crystallisation pressure [Scherer, 2000].

Hydration pressure

Salts that can exist in more than one hydrated form, expand when changing to a higher hydrated form, under the influence of a rise in the relative humidity or a drop in temperature. The pressure exerted by the crystal onto the substrate can be expressed as [Winkler and Singer, 1972]:

$$P_H = \frac{nRT}{V_H} \cdot \ln\left(\frac{p_a}{p_h}\right) \qquad \textit{Equation 3}$$

With: P_H = hydration pressure (N/mm^2); n = number of moles of H_2O molecules incorporated in the crystalline phase during hydration; V_H = (molar volume (mm^3) of the hydrated salt - molar volume (mm^3) of the original salt); p_a = partial pressure (atm) of water in the atmosphere at temperature T; p_h = partial pressure (atm) of water over the hydrated salt at temperature T.

In general, P_H is not the stress actually exerted; cracking occurs before it is reached. Therefore the relative magnitude of the values of P_H for different salts (as for the linear crystallisation pressure) does not indicate their relative efficacy at producing damage, providing that these pressures are large enough for cracking to occur. The tendency for damage will depend on the volume change, V_H, associated with hydration and on how often this volume change occurs [Cooke and Gibbs, 1993] and kinetic aspects of hydration of the respective salts [Winkler and Singer, 1972].

The approach proposed by Winkler and Singer [1972] to calculate the hydration pressure has been criticised, however. The transformation of a salt to a higher hydration state has been shown to take place by dissolution and repricipitation, rather than by incorporation of water molecules in the crystal lattice, in solid state [Rodriguez-Navarro and Doehne,1999], so that the hydration pressure again would be a crystallisation pressure of the precipitating hydrated salt. However, according to Cooke and Gibbs [1993], salt crystallisation within pores is potentially more damaging to stone than hydration of crystals already formed. The actual damage mechanism is still not clear.

Hydrostatic crystallisation pressure

This pressure is a direct consequence of the fact that the one phase system: supersaturated solution, occupies a different volume than its two phase counterpart: saturated solution + crystalline phase. The exerted pressure can be calculated, using the expression of the compressibility coefficient (κ_t) of the crystalline compound:

$$\kappa_t = \frac{1}{V_l} \cdot \frac{(V_l - V)}{(P_e - P_v)} \qquad \textit{Equation 4}$$

With: κ_t = coefficient of compressibility at temperature t (mm^2/N); V_1 = volume of the saturated solution + volume of the crystalline compound at pressure p_1 (mm^3); V

= volume of the supersaturated solution at pressure p (mm^3); P_e = atmospheric pressure (N/mm^2); P_V = exerted pressure (N/mm^2).

In the case of weathering of building stone, the hydrostatic crystallisation pressure is of minor importance, compared to the two previous mechanisms.

2.3. Limitations of the Theory

Although, by now, the thermodynamic basis of crystallisation stress caused by a single salt is quite well established (under idealised conditions), the theory still seems to be unable to unambiguously predict the differences in weathering rates caused by different salts and salt mixtures in practice. The actual salt systems that are found on building stones differ widely in terms of their physical and chemical characteristics and the concept of the saturation humidities of the individual salts does no longer apply to the mixtures, and may thus alter their potential for causing damage [Steiger and Zeunert, 1996]. Salt efflorescences on walls containing complex salt mixtures have been observed at considerably lower relative humidities than would have been expected from the saturation humidities of the pure salts [Steiger and Zeunert, 1996].

Based on the basic assumption that the driving force for the generation of crystallisation stress is the free energy which is released upon crystallisation from a supersaturated solution, Lewin [1990] concluded that among the salts that are most frequently encountered on and in building stones, NaCl, $NaNO_3$ and $MgCl_2.6H_2O$ are the most disruptive because they exhibit the greatest tendency to form supersaturated solutions. Following Lewin's approach $MgSO_4$ (solubility: 200 $g.L^{-1}$) would be more disruptive than Na_2SO_4 (solubility: 48 $g.L^{-1}$). Binda et al. [Binda et al., 1985] have shown, however, that the weathering of brick due to Na_2SO_4 is more severe than the weathering due to $MgSO_4$, under the same conditions. The reason for this discrepancy could be found in the high deliquescence of $MgSO_4$, which could prevent a complete crystallisation of all the salt absorbed by the brick. The difference in disruptive potential of both salts can also be explained by the fact that the theoretical crystallisation pressures (P_C) are very large and are probably not attained before the critical stress for internal cracking of porous stones is reached. The internal stresses actually developed at the onset of cracking will then be directly proportional to the amount of crystallisation that has taken place, the crystal molar volume V_C and the elastic moduli of the stone. It follows that the theoretical crystallisation pressures P_C for various salts do not necessarily rank them in order of propensity to cause damage. So long as they all exceed the stresses required to cause internal cracking, the crystal characteristic that should be an indicator of damage propensity is the crystalline volume, V_C [Cooke and Gibbs, 1993]. The latter explanation seems no longer sufficient when comparing different hydration states of the same salt. It has been shown that, despite its much lower crystalline volume, thenardite (Na_2SO_4) has a higher disruptive potential than mirabilite ($Na_2SO_4.10H_2O$) for equal super saturation [Rodriguez-Navarro and Doehne, 1999]. The difference in disruptive potential of these two hydration states can in its turn be explained by the inevitable difference in relative humidities at which the respective crystallisation experiments were executed. Higher relative humidities (in the case of mirabilite) lead to slower evaporation and lower degrees of super saturation, thus leading to a lower crystallisation pressure and the precipitation of the salt will take place closer to the surface.

These examples indicate the need to extend the merely thermodynamic model with factors such as: kinetics of crystal nucleation, crystal growth and solution flow

inside the porous substrate, as well as differences in crystallisation habits and deliquescence of the salts.

3. A reference research project

The theory underlying salt weathering needs more systematic and fundamental (laboratory) research, however, without loosing the link to its raison d'être, i.e. in-situ weathering. Case studies are essential prerequisites for experimental work, since they alone are able to consider the full damage spectrum of the various materials, climates, anthropogenic environmental 'load' factors, and age factors that impact an object.

A good example of the importance of the link between theoretical research and in-situ studies can be found in our reference EC research project ('Development of evaluation criteria, prediction and control methods concerning sea-salt effects on monument stones', ENV4-CT95-0100). Although this project focuses specifically on the effects of NaCl the methodology and results are useful to illustrate gaps in our knowledge and potential opportunities for future research on salt weathering in general.

In the framework of the reference project stone monuments located in four different coastal environments were studied, i.e. on the Atlantic coastal belts of Spain (Galicia) and France (Charente Maritime), and the Mediterranean coasts of Italy (Apulia) and a Greek, Aegean island (Rhodes). The monuments at all four locations are build out of different types of stone (calcareous sandstone, limestone, calcarenite and granite) and are located at varying distances from the coastline (0 - 120 km) and at different heights (0 - 800 m) above sea-level. The selected areas are shown in *Figure 3*.

Figure 3. Location of the four sampling areas.

In addition to the in-situ exposed stone blocks, analyses were also performed on small stone prisms, which were freshly quarried (extracted from the quarries that correspond to the respective monuments), which were submitted to artificially accelerated weathering. The latter technique allows the simulation of the deterioration of stone exposed in a coastal environment, on an acceptable time scale and under standardised conditions. Soluble salt concentrations were determined with Ion Chromatography (IC) and Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). Micrometer-scale salt distributions inside the stone samples

were investigated with a Scanning Electron Microscope equipped with an Energy Dispersive X-ray detection system (SEM-EDX).

The highest chloride accumulations in the studied monuments are found at a height of about 1 m. The very highest chloride concentrations are mostly found within a surface layer of 1 cm but significant enrichment of chlorides continues to at least 12 cm below the surface. In Rhodes the maximum Cl^- and Na^+ concentrations in the weathered layers of the calcarenite ramparts of the city, amounted to 1.36 and 0.62 % b.w. respectively and the average concentrations were 0.26 and 0.09 % respectively. In Apulia the maximum Cl^- and Na^+ concentrations in the weathered layer of the calcarenite and limestone monuments, amounted to 6.77 and 5.95 % b.w. respectively and the average concentrations were 0.90 and 0.80 % respectively. In Galicia the maximum Cl^- and Na^+ concentrations in the weathered layer of the granite monuments, amounted to 0.33 and 0.24 % b.w. respectively and the average concentrations were 0.09 and 0.06 % respectively. Finally, in the Charente Maritime area the maximum Cl^- and Na^+ concentrations in the weathered layer of the limestone monuments, amounted to 0.97 and 0.52 weight-% respectively and the average concentrations were 0.27 and 0.17 % respectively.

Average Cl^- concentrations found in stone prisms after exposure to artificial sea-spray were highest (4.3 %) in bioclastic limestone, lowest (0.07 %) in microcrystalline limestone and intermediate (0.64 %) in granite.

NaCl is especially effective in disrupting stone material when it crystallises at the surface whereas e.g., $CaSO_4$ is more effective when crystallising underneath the surface layer.

The intensity of the symptoms typical for sea-salt weathering of natural stone (e.g., granular disintegration and the formation of honeycombs) clearly decreases with increasing distance from the sea. Logarithmically decreasing relationships were found between the Cl^- and Na^+ concentrations in granite samples taken from monuments and their distance to the sea. The Cl^- and Na^+ concentrations have decreased by 50 % after about 0.7 km and 3.5 km inland from the (Galician) coast, respectively. Decreasing logarithmic relationships were also found between the Cl^- and Na^+ concentrations in the total (wet + dry) deposition and the distance to the sea. The Cl^- and Na^+ concentrations have decreased by 50 % after about 0.4 km and 1.0 km inland from the coast respectively, and by 90 % after about 58 km and 271 km respectively. The Cl^- and Na^+ contents (weight-%) of granite samples taken from monuments are linearly related to the respective Cl^- and Na^+ contents of the total deposition (ppm), according to $[Cl^-]_{stone} = 0.0061 * [Cl^-]_{tot.dep.} + 0.0136$, and $[Na^+]_{stone} = 0.0048 * [Na^+]_{tot.dep.} + 0.0162$. Airborne sea-salt particulate seems to contribute significantly to the salt content of building stones oriented towards the prevailing wind direction (if this air mass has a recent marine history).

The influence of microclimatic conditions at the stone surface (e.g., orientation relative to prevailing wind directions, airflow, sun exposure) on the concentrations of Cl^- and Na^+ found in the stone can be at least of the same importance as the distance to the coastline. A marine environment is not only characterised by higher NaCl concentrations in the groundwater and wet and dry deposition but also by higher relative humidities and higher wind speeds. These three factors act synergistically, resulting in the intensification of the weathering of natural building stones.

Although well-organised interdisciplinary projects can solve a lot of pending complex scientific questions they also tend to identify new problems and confirm uncertainties that exist about generally accepted theories. Some of the problems and

inconsistencies encountered in our reference research project described in this section will be used to illustrate the next section.

4. Salt weathering: where do we go from here?

There are serious gaps in our understanding of salt crystallisation within porous materials. The following will give an overview of outstanding questions.

4.1. Salt input/transport

In the context of the reference research project mentioned earlier more than 150 stone powder samples were extracted (in cooperation with the National Technical University of Athens, Greece) from the walls around the ancient city of Rhodes at different heights and depths into the stones. These samples were used to determine the ionic and humidity contents of the biocalcarenite building stones. The most striking characteristic of the obtained concentration profiles is the fact that in most parts of the fortification, the highest SO_4^{2-} concentrations are located at greater heights in the wall than the highest concentrations of both Cl^- and NO_3^- (Cf. *Figure 4*), which seems to be in contradiction with the generally accepted model of Arnold and Zehnder [1990] concerning the evolution of salt systems in masonry. They state that salts are transported by capillary rise of diluted saline solutions from ground moisture and surface water at the base of the wall. The driving force for this capillary rise is the evaporation above the ground. According to Arnold and Zehnder, the transported salts are precipitated in a spatial sequence according to the respective ion activities of the salt phases in the system. This model predicts that in the lower zone of the wall mainly less soluble and less hygroscopic sulphates and carbonates are present, in the upper zone the much more soluble chlorides and nitrates, forming very hygroscopic solutions, are accumulated. It should, however, be noted that their model is solely based on considering rising damp, wet or dry deposition onto the monument are not taken into account (although they acknowledge it to be an important input of salt species), and on superficial sampling with desalination paper, rather than extracting samples in depth. It is clear that in the case dry and wet deposition become the major contributors to the content of a salt species in natural building stone the generalisations made in the model of Arnold and Zehnder [1990] are no longer valid.

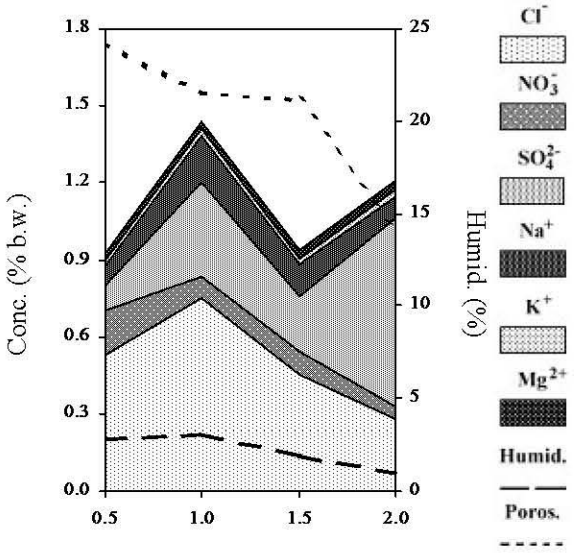

Figure 4. Evolution of the concentrations of different ionic species and humidity with height at one particular location (facing the sea) of the wall surrounding the ancient city of Rhodes .

More research is needed into the macroscopic transport and distribution of humidity and soluble salts in masonry and other substrates with complex porosity. The Relationship between the macroscopic distribution of salt phases and the physical characteristics of the pore system (microscopic distribution, Cf. 4.4.) and environmental parameters (input by rising groundwater or atmospheric deposition?) should be studied more closely.

4.2. Accumulation of salts

In order to simulate weathering phenomena caused by the accumulation and crystallisation of salts, on a much smaller (much more workable) time scale, weathering simulation tests can be performed. These tests should preferably be dynamic to simulate the weathering as faithfully as possible. In the reference research project these types of experiments were carried out at LCCM (La Rochelle, France). Their dynamic simulation set-up allows the accelerated simulation of the weathering processes that result from exposure to seawater spray (Cf. *Figure 5*). The weathering patterns that appear in the course of the simulated exposure are similar to those observed in situ, for the same type of stone. One day in the simulated exposure is expected to correspond to one year of in situ exposure.

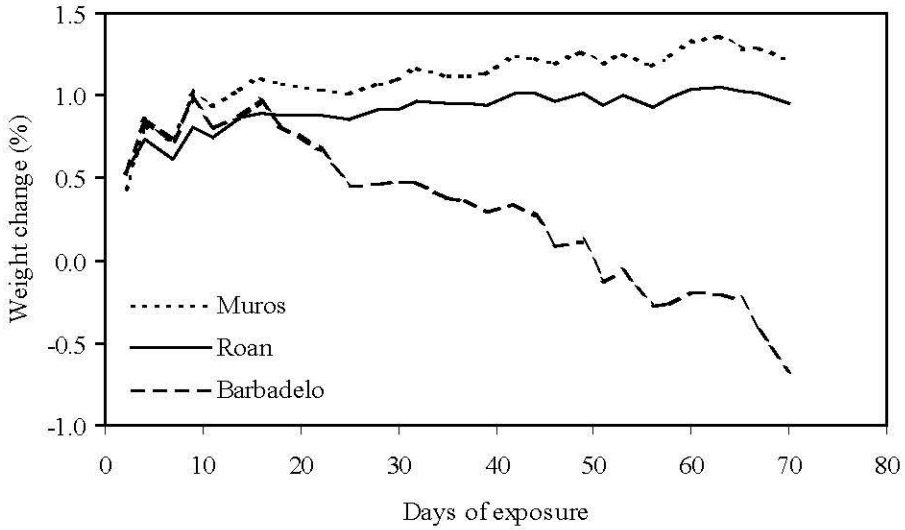

Figure 5. Weight changes of Spanish granite prisms in the course of 70 days of exposure to artificial seawater spray (average of 5 samples of each granite type).

The amount of NaCl accumulated in the stone, however, is not directly proportional to the state of conservation of a natural building stone exposed in a marine environment. This susceptibility is mainly determined by the porosity characteristics (e.g., pore radius distribution and pore interconnectivity), which are key intrinsic factors affecting the susceptibility of the stone to sea-salt weathering. It is essential to have reliable methods for accelerated testing, and that is not possible unless one understands the mechanisms responsible for damage. Otherwise, it is possible that the test will amplify the effect of a mechanism that is not important in the field. One must use a test that reflects the field conditions to be experienced by the material of interest. In transferring the complex situation encountered in the real environment to laboratory testing and vice versa requires the following considerations:

- What are the general principles for a good experimental design in laboratory simulation experiments?
- Do studies under accelerated laboratory conditions really imply different damage mechanisms and processes from field-exposure experiments?

4.3. Synergistic effects

At present there have been few detailed studies focusing on how synergistic effects or co-associations among degradation mechanisms work and how important they are in influencing the relative importance of different decay mechanisms. There is a clear need for further, carefully designed studies (from laboratory experiments to field exposure programs and modelling exercises) to investigate such issues. Research into co-associations is potentially one of the most exciting areas that remain relatively untapped. It is likely that the nature and importance of synergistic effects varies with lithology and other stone characteristics, but this certainly requires further investigation.

Several authors have described the indirect importance of 'time of wetness' in the weathering of building stones, which is greatly enhanced by the presence of

hygroscopic salts. Around 75 % relative humidity 1 g of NaCl already takes up about 3 g H_2O, at 90 % relative humidity the H_2O mass taken up amounts to about 6 g. The very presence of a liquid in the pores of stone submitted to stress, greatly increases the rate of crack propagation. This phenomenon can be explained as a reduction in the surface energy of the minerals constituting the stone, due to the adsorption of a liquid. Thus when considering the damage produced by salts, the crack-enhancing effects of the solution itself must be taken into account. In addition a moist surface is a better receptor for air pollutants.

4.4.Porosity

Deterioration processes of monumental stones are closely related to the movements of fluids (mainly water) through their interior. These movements are, in turn, mainly conditioned by the pore volume, pore size distribution and the degree of connectivity between them. Porosity characteristics (e.g., pore radius distribution and pore interconnectivity) are key intrinsic factors affecting the susceptibility of the stone to salt weathering [Theoulakis and Moropoulou, 1999]. These characteristics determine where and how much salt will crystallise by affecting the ease of transport of pore solutions and water vapour. The efficiency of water (liquid and vapour) transport through the pore system may determine the degree of super saturation that is attainable in the pore solutions and thus the energy that might become available to rupture the stone.

From the results of the reference research project it could be shown that based on considerations of free energies of crystallisation in porous substrates an explanation can be found for the differences in susceptibility of different stone types to sea-salt weathering under similar, controlled conditions.

Laboratory salt crystallisation experiments by Rodriguez-navarro and Doehne [1999] performed on relatively small stone samples resulted in filling of the smaller pore radii (< 1 μm and < 0.2 μm respectively), increasing the porosity (%) of larger pore ranges. Results of our reference study show that in the case of French (Crazannes and La Pallice) limestones salts (mostly NaCl) crystallise in larger pores (2-100 μm), thus filling the pore volume in this pore radius range, decreasing porosity (%) in this range and increasing the porosity in the smaller range (Cf. *Figure 6*).

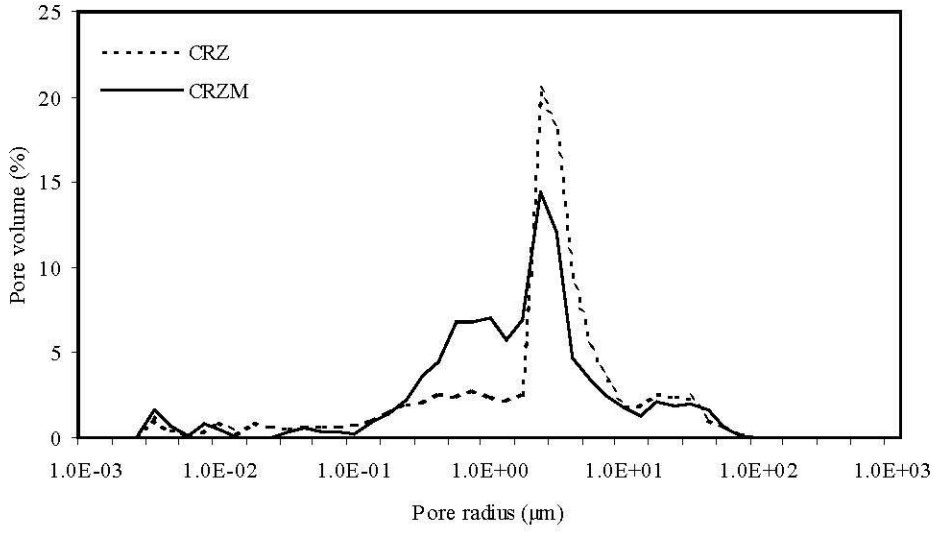

Figure 6. Average pore radius distributions of Crazannes limestone: sound quarry samples (CRZ) and weathered monument samples (CRZM).

It seems that one has to be very careful with using the results of tests on the resistance of different stone types against salt crystallisation weathering under laboratory conditions, using single salt solutions, and simply extrapolating them to real-live building stones exposed under ambient conditions and affected by mixed salt solutions. Moreover, the very difference in dimensions between the stones used for laboratory testing and those used in buildings may bias the laboratory test results significantly by altering e.g., the drying speed of the stone.

In order to develop a transport and degradation model for the stone substrate, i.e. to give a sound description of the degradation mechanism(s), a number of questions should be answered:

- What is the effect of the difference in pore systems of stone and mortar on the transport of salt solutions and on the occurrence of damage?
- Which pores (pore sizes) are mainly involved in the transport process?
- Are these pores the same as those in which crystallisation starts?
- How much super saturation can develop before nucleation occurs?

4.5.Pore microclimate

The crystal habit is an important indication of the thermodynamic/kinetic regime under which the crystallisation took place. Most stone samples examined in the context of the reference project showed NaCl crystals that do not crystallise into their most stable (cubic) habit but rather into lobe-like layers with a smooth surface along and perpendicular to the pore walls (Cf. *Figure 7*). This crystallisation morphology is independent of the stone type and is probably characteristic for the crystallisation kinetics.

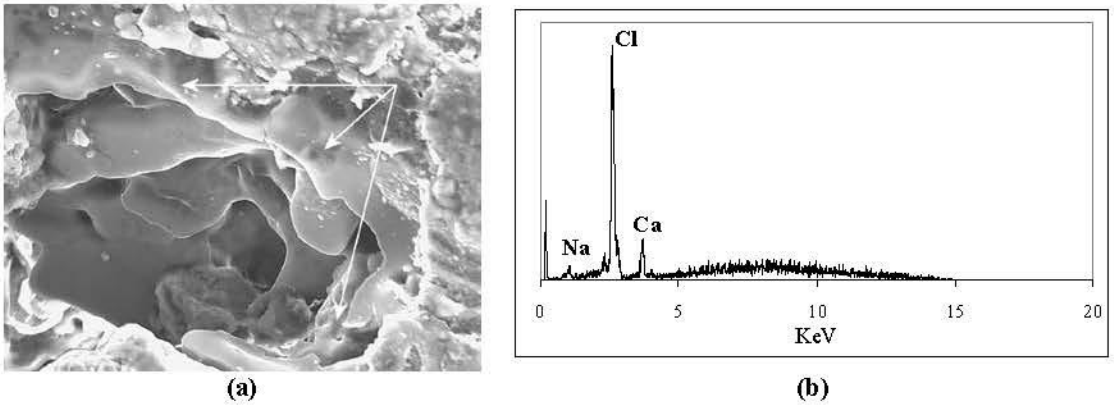

Figure 7. (a) SEM micrograph of the inside of a stone (biocalcarenite) pore showing NaCl crystallised as smooth layers, (b) X-ray spectrum recorded from the crystal (sample taken from the fortification of Rhodes).

Characteristics like e.g., crystal habits, crystal structures and degree of hydration are indicative for the (rate of) change in relative humidity and temperature inside the pore system and should be investigated more systematically.

4.6. Protective treatments

Although the chemical composition of a building stone seems not to be a key factor in determining the susceptibility of the stone to salt weathering, it will be in designing protective treatments against this weathering mechanism. Preventing damage from crystallisation pressure can be achieved by applying treatments to the internal surface of the stone that reduce the salt/stone interfacial energy and thus the ability of growing crystals to exert pressure on the pore walls. A variety of monomeric and polymeric coating materials could be used [Moropoulou et al., 1994]. Surfactants can also be used to modify or suppress the growth of crystals. In addition research is needed to determine how consolidants interact with salt deposits already present in the pores.

5. Conclusion

By now, the thermodynamic basis of crystallisation stress caused by a single salt is quite well established (under idealised conditions), however, the theory still seems to be unable to unambiguously predict the differences in weathering rates caused by different salts and salt mixtures in practice. Given the importance of salt damage, it is surprising that this has not been studied more thoroughly. The study of (complex) salt systems in heterogeneous porous stone substrates holds many scientific challenges and opportunities for the future. Some of the outstanding questions are:

- Which mechanisms are responsible for the macroscopic distribution of salts and their solutions through the complex pore systems of masonry?
- How much salt do stones accumulate and how can this accumulation best be simulated in laboratory tests?
- How important are synergistic effects between salt loads and other causes of deterioration (e.g., humidity, air pollution) and how do these co-associations affect weathering rates.
- How do the physical characteristics of pore systems affect the susceptibility to weathering of different stone types and how can microclimate and climatic changes inside the pore systems be elucidated?
- How can damage due to soluble salts be durably prevented and how can stones affected by salts be consolidated?

Although more theoretical elaboration is highly necessary for this study, significant advances in our understanding of salt weathering are only attainable if theoretical models are efficiently combined with systematic in-situ studies. In this context it should be stressed that international and interdisciplinary cooperations are indispensable in order to cover a wide geographical and scientific reach.

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PUBLIC AND PRIVATE SECTOR COOPERATING IN THE RESTORATION AND REVITALIZATION OF ARCHITECTURAL HERITAGE IN CROATIA

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The Mediterranean region of the Republic of Croatia is the most important part of the country when speaking of either the achieved level of development or the potential for tourism development. In its Mediterranean region, Croatia does not present any special feature in comparison to other countries in the so-called Mediterranean circle, especially when talking about the development of cities. There are hardly any settlements of significance, and cities in particular, that cannot document their «roots» with data extending back to ancient Greek and Roman times. Further, these cities are generally still the centers of the region in which they are located. Even today, they are the political, economic, cultural, and tourism centers of everyday life.

Objective issues, such as the abundance of natural harbors, numerous islands, isolation from the hinterland, and the relatively poor traffic infrastructure, have turned the Croatian coastline with its population of almost a million into the most urban part of the country, confirming the theory that Croatia is a land of cities. Some of them, due to their beauty, uniqueness, tradition, conservation and so on, have become the most beautiful examples of what the Mediterranean has offered throughout the centuries. Therefore, it is no wonder that out of a total of six Croatian localities on the UNESCO World Heritage List, five are located on the coast: Dubrovnik, Split, Trogir, Šibenik and Poreč. But, this list is not concluded as far as Croatian expectations go, and the following localities could very well find themselves on this list: Ston, Korčula, Hvar, Kornati, Rab, Pula, etc.

The Croatian part of the Mediterranean, through historical circumstance, was generally part of some other country, such as Venice, Italy, the so-called Illyrian provinces under Napoleon, the Austro-Hungarian Empire, and so on. Except for Dubrovnik, which was an independent republic. Under these states, this region was never considered particularly important, except for its defensive aspect, ie. Pula, or Rijeka as a port. Life in general moved on in the traditional manner, which resulted in relative backwardness in comparison to some other parts of the country, especially northern and northeastern Croatia. Nor was it much different in Yugoslavia, until the development of tourism in the late sixties of the last century. However, today we could say that this relative backwardness is now the main comparative advantage of this region.

Namely, in the times of socialism and the adoption of communistic ideologies, the Mediterranean part of Croatia, as with all the other areas of the former state, was earmarked for the development of collective agriculture, heavy industry, energy, large port infrastructure, fuel pipelines, etc. There is no need to emphasize that this meant an absolute break with tradition, so that traditional small enterprises could be destroyed, such as olive groves, vineyards, shell farming, sponge fishing, fishing, maritime trade,

etc. and replaced with the so-called industrial complexes. The traditional homes in small localities and private houses were exchanged for collective housing, and an industry was developed for which there were no workers. A new population was brought in from the hinterland, which had other standards of culture and civilization. Other nations, other religions and other languages were given consideration when this source was exhausted.

Fortunately for present-day Croatia and others, many of the above-mentioned plans that were then known as the five-year plan of the former state remained either unrealized, or only partially so. Therefore, no irreparable devastation was done to urbanism, cultural heritage and culture. However, irreparable damages did occur wherever such concepts were applied by the former regime. For example, the historical center of the city Rijeka vanished, the Kaštelan Bay was ecologically destroyed, the cultural landscape of Rijeka dubrovačka disappeared, and so on. On the other hand, it would be unfair to blame solely the former regime for such failures. There were cases where western countries or institutions, such as the World Bank, acted not only as the direct initiators, but as the financiers of programs that later proved to be catastrophic. A case in point was the new concept of building a city-hotel project known as the Babin Kuk hotel settlement in Dubrovnik

In any event, the move towards democracy and the return of capitalism after fifty years of a more or less dogmatic and communistic indoctrination of the economy, left Croatian Mediterranean cities unprepared in all aspects (organizational to financial, and without adequate human resources). The problem would be enormous even under the best of conditions, let alone under the kind of circumstances where Croatia had to fight a war for its independency and freedom. In some matters, unfortunately, the war was used as a good alibi for the undertaking of such activities and actions that were made possible in such a situation. We can add to this the almost non-existence of a civic society and the complete absence of any such institutions. Generally, the central authority and the local government in only smaller measure, or in other words the cities themselves, were the only possible parties in the restoration and revitalization of post-war Croatia.

In comparison to other Mediterranean countries and regions, Croatia at least entered the 21st century with an enormous stock of highly valuable artistic and historical architectural heritage. Frequently, these monuments and artifacts "cry out" for restoration and renovation. However, they have preserved their originality throughout the centuries. Most often, issues revolve around problems related to the wear and tear of monuments after centuries of use, aggressive climatic activity (high temperatures, salt, sea, wind and so on), earthquakes (the Croatian part of the Mediterranean shares the same fate of the entire Mediterranean region – earthquakes, unfortunately, are not rare and they are known to be devastating, as exemplified by Dubrovnik in 1667, Makarska in 1963 and Ston in 1995 – to mention only some of the worst), negligence and devastation (generally, due to inadequate adaptation), etc.

On the other hand, Croatia was the most tourism-oriented republic of former Yugoslavia. Therefore, it was only logical for the new state to lean towards the development of tourism. Tourism was and still remained the most interesting for it was labor-intensive. This was not a negligible factor in a country with high unemployment (about 15.2%), and

where a great need for foreign currency existed (especially under post-war conditions). Croatia and tourism have always gone hand-in-hand with new trends in global tourism. It happens to be that mass tourism is no longer "in". An ecologically conserved environment and historic originality are the global "in" factors of the 21st century.

The claims made in the introduction, the analysis that follows, and the conclusions are based on research carried out in Dubrovnik. The financial issues were analyzed using the operational results of the Institute for the Restoration of Dubrovnik for the years 1989-1999, as well as the annual reports for each year from 2000-2002. The author of this paper (together with colleagues from the Institute for the Restoration of Dubrovnik) carried out the following research, the results of which were used to analyze the topic of this paper: Dubrovnik – A Destination of Cultural Tourism,

- Organization of the Restoration of Dubrovnik,
- Local Government Ties with Culture and Tourism &

Some Questions Related to the Spatial Dispersion of Tourists in Dubrovnik.

The above reasons have led to a general consensus - politically, professionally, and by the public at large, that the potential offered by architectural heritage is a main trump-card in the development of Croatian tourism, and consequently, of the entire economy. Of course, this conclusion was reached neither easily nor swiftly. Frequently, it became apparent in the worst possible manner – from errors, and those made personally. It was shown that only certain cities and/or regions began to profit from tourism, particularly those tourism entities that could offer authenticity to a destination and that did not fall under the classic hotel and tourist supply.

In any event, the importance of architectural heritage was understood. However, at the same time it was understood that restoration and revitalization involved highly professional, long-term, complicated and very, very expensive labor. Consequently, local authorities, tourism professionals and conservationists concluded that restoration and revitalization were the tasks of the central state. This wrong conclusion, which will be easily understood by all those who either know or come from transitional countries, is the result of decades of political and ideological communistic indoctrination, whereby everything is connected to culture and art, and is therefore a state or budget obligation. Accordingly, and on the basis of available data, we estimate an 85:15% ratio of state investment and all other investments in restoration and revitalization.

The conclusion mentioned is the result of poor judgment, which was not so rare among the professionals in conservation services in transition countries, and similarly so in Croatia. Specifically, restoration and revitalization were equated with the protection and conservation of cultural monuments, which is in truth a state task. Another reason is the fact that Croatia is a centralized state (which is most probably due to the fact that the country was at war until recently). All such and similar social activities are planned, authorized and financed at the state level, that is, by the central government. There are also objective reasons - the result of an undeveloped civic society in Croatia. Such reasons as the inexistence of funds, trusts, sponsors, NGOs, and a general lack of consciousness among citizens and business people with regard to the need of conducting

restoration and revitalization in another manner, and not only under the direction and at the expense of the state.

Nonetheless, at the end of the nineties, Croatia faced the following situation with respect to the restoration and revitalization of its architectural heritage. Primarily, there are many such monuments along the Croatian coastline (a few hundred) that were seriously damaged during the war, ie. Dubrovnik, Zadar, Šibenik, etc. Some monuments were damaged by earthquakes, ie. Ston, others were abandoned, devastated, uninhabited or only partially so. But, all are burdened by the lack of infrastructure and privatization processes, including the return of property to their rightful owners under denationalization procedures.

The Croatian Ministry of Culture deals with restoration and revitalization issues by way of local conservation departments, which are responsible for all architectural heritage. Here, certain organizational sections are responsible for certain counties. The Ministry of Public Works, Reconstruction and Building takes action only in cases involving the results of war devastation or larger natural catastrophes. The Institute for the Restoration of Dubrovnik is the only other organization that deals with such issues (since 1979, it is the only institute of its kind that was established by separate law) and another city institution, the Split Historical Center Office. The Society of Friends of Dubrovnik Antiquities in Dubrovnik has existed since 1952, the only NGO that dealt with such issues in former Yugoslavia. The remaining organizational bodies were either formed recently or are without any organizational or financial possibilities of taking on any significant role in the processes mentioned.

A positive factor under certain social and political conditions of Croatia is the fact that the state and its budget is the main, and in some historical centers, the only investor in restoration and revitalization issues. Compared to the period prior to the Homeland War, nowhere and never have more efforts been put into restoration and revitalization. Some of the results are better than just good. For instance, in less than a decade, the war damages in Dubrovnik have been completely removed. The heavily earthquake-damaged town of Ston was restored in less than three years. Restoration activity has started on hundreds of buildings and numerous historical monuments. The state budget, even though more restrictive with each year, allots greater funds on a yearly basis to such issues.

However, we believe that, in spite of all the positive circumstances, this is not the right path in the long-term. Restoration and revitalization have to be the result of careful and long-term collaboration between the public and private sectors, state institutions and businesses, local authorities and NGOs. Namely, the good results mentioned are due to the relatively weak starting position. That is, very little was invested in the former state, and revitalization was non-existent. In spite of how absurd this may sound, this was normal. Revitalization was directly opposite to the main idea of the policies at the time. These policies were meant to create a new man, new society, and new political system that had never previously existed. As such, there was neither room here nor any desire for anything that could be associated with a return to the old way.

Unfortunately, a fifty-year history has had great repercussions on the present situation, when considering the restoration and revitalization of historical centers. Some things are practically riveted for the future, and as much as it hardly seems likely, the "culprit" is the new state. For instance, the right to purchase so-called state flats created a population structure in the historical center that did not meet optimum standards in terms of age group, education or general culture. Some solutions to the provisions that regulated denationalization, the return of confiscated property and privatization prevented the radical and sometimes necessary changes to architectural heritage. The war period, and the transitional chaos in general, created incorrigible or barely corrigible issues involving architectural heritage.

Consequently, the revitalization process has not yet been started. There are two reasons for this: first, there is no civic consensus, and thereby, no automatic or political desire to initiate this. Second, there was no firm belief, even among tourism professionals, that historical monuments and cultural heritage were indeed the diferentia specifica that could lead to the new repositioning of Croatia on global tourism markets. Of course, such direct clarification, except among scientists and professionals in this field, is never expounded openly. The fact that there is no revitalization is justified by the supposedly automatic transformation of restoration into revitalization by the unseen hand of capitalism, which coordinates all processes automatically, etc.

The fact that the revitalization process has not really been started anywhere is not because no one is aware of this necessity. On the contrary, regardless of the manner in which it is formulated, this is a quite frequent topic among experts and the general public. But, as has been mentioned in the previous paragraph, not all of the necessary conditions have been fulfilled for preparing tourism, policies and the general public on this subject. However, regardless of what has been said, a move towards the restoration and revitalization of Croatia's architectural heritage is not so impossible. But, it should be stressed that we are then dealing with cases of cooperation between the public and private sectors, which is the result of the personal engagement and enthusiasm of local politicians, experts and tourism employees, and not the result of planned and politically supported cooperation. Positive cases do exist and we will illustrate two for Dubrovnik.

Dubrovnik was chosen for the following reasons. This is a city with one of the longest tourism traditions, a city that was placed in the first group of localities in ex-Yugoslavia, a city that was placed on the UNESCO World Heritage List in 1979, and a city that has the only NGO that has a fifty-year track record, and which deals with the issue at hand. This does not imply that other cases could not be found along the Adriatic coast, ie. Hvar, Split, Opatija, Poreč and so on, however, each has some element missing or we come across a discontinuity of activities in the ex-Yugoslavia period.

Not going into any direct political debate, the fact remains that ex-Yugoslavia was the first, and for a long time, the only country behind the Iron Curtain that accepted the idea of registering certain localities with the UNESCO World Heritage List. De facto, in doing so, it allowed partial leeway in terms of sovereignty over restoration, conservation, exploitation, urban planning, and other issues involving the management of resources

deemed to be the sole and sovereign right of the state under communistic ideology. Dubrovnik ranks first among these localities. The importance of Dubrovnik, which is located in a seismic region, brought together an awareness of the obligations contained in the UNESCO World Heritage List with the knowledge that the seismic activity of 1979 presented a very serious threat to the city if no action was to be undertaken, and that the city could be heavily damaged by another earthquake. In such a political climate, it was a relatively easy job to convince the Federal Parliament at the time to pass special laws on the restoration of Dubrovnik.

The Law on the Restoration of Dubrovnik regulated issues on urban zoning, rights and obligations in procedures involving the anti-seismic restoration of certain buildings and building blocks. Most importantly, it regulated the financial sources needed for the restoration of the architectural heritage. The law is still in force today, however, with major alterations, corrections and amendments. The most important outcome of this law was the establishment of a permanent restoration organization that took the form of the Institute for the Restoration of Dubrovnik. An Expert Advisory Committee on Restoration was also formed that gathered relevant experts from various fields on a parity basis, such as art historians, constructors, restorers, architects, statisticians, etc, who prepared a theoretical basis and who evaluated projects prior to their evaluation by conservationists. In the system of the times, a well-organized financing system was established. However, it became inapplicable under the new political system and the return to a market economy. Nonetheless, there was an awareness of the need for financing restoration projects, such that no interruptions occurred, not even during the war years. The result is that Dubrovnik has been almost completely documented by architectural photos (the photos are in the process of being transformed digitally). Up until the war, almost 90,500,000.00 US $ was spent on the restoration of major architectural heritage. Post-war restoration has been practically finished (less than 15 buildings in need of restoration remain, with low-level roof damage), and the heavily damaged and razed palaces, hundreds of roofs, etc. have been restored. TU PODACI. Almost 13,800,000.00 US $ was spent for this purpose by the end of 2002.

Another successful example is the work done by the Society of Friends of Dubrovnik Antiquities, the only NGO in the restoration and conservation of monuments in Dubrovnik on an ongoing basis (established 1952). In the times when communistic ideology prevailed, it was not in the least easy to promote, let alone to come into conflict with the past, and similarly so for cultural monuments and plans for the development of a "better future". With such suspicious-minded ideology, it was difficult to find ways of funding projects, especially in a situation when the entire economy was in the hands of the state, and business policies were colored by political and ideological decisions.

Regardless of this, the Society of Friends of Dubrovnik Antiquities managed to acquire a concession for the city walls (of course, due to ideological reasons, it then had a completely different name, and even the society's staff created an impression that there was no concession involved) under the stipulation that all revenue obtained from entrance fees would be reinvested into the restoration and conservation of the walls. When tourism, which was halted with World War II, began to return to Dubrovnik in the early

sixties, it became an increasingly important source of revenue. With the weakening of ideological constraints, the society expanded its activity to include fortifications throughout the former region of the Dubrovnik Republic. It also started other activities, such as restoration, publication, scholarships, etc.

The only purpose of citing the Institute for the Restoration of Dubrovnik and the Society of Friends of Dubrovnik Antiquities is that these positive examples have a common feature. They both deal with forms of public and private initiative that were only just tolerated, and never encouraged. The main political crimen would be to try to spread this to other architectural heritage in other environments. Quite contrarily, the special status of Dubrovnik was always emphasized, as a city that was endangered by earthquakes, in combination with the development of tourism, and the then very important reputation of the country globally, which considered Dubrovnik important and as a kind of Yugoslavian showcase.

On this basis, these positive examples were never repeated anywhere. Not one Croatian locality obtained its "own" law, and no institution for restoration, as in Dubrovnik, was established anywhere, nor was any civic initiative allowed that could even approach the one in Dubrovnik. Something similar, but at an infrastructure level, was done in Split with the establishment of a Municipal Office for the Historical Center. The only real cases of cooperation between private and public initiative occurred recently (mid-nineties) in Poreč, whose extremely good results culminated in being placed on the UNESCO World Heritage List. Unfortunately, Poreč is only an exception. A general opinion, with the public and experts alike, and even politicians, is that Dubrovnik is "something different".

This attitude is not only deeply wrong, but it is also undemocratic. It goes against the development of civic initiative and civic society. Therefore, we plead for the creation of an encouraging environment that develops cooperation between the public and private sectors. But, not in such a manner that the solutions of other countries are uncritically implemented without any regard to their existing tradition. Namely, Croatia, and we believe that this is true of other transitional countries as well, has its infrastructure of public and private entities that have dealt with the issue under question, both now and in the last century, and a legal basis for the establishment once again of broader activities. Conditions need to be created whereby the public and private sector can establish cooperation, and this can be accomplished by changes at the following levels:

- political,
- legal and
- economic.

Policies are given the task of ensuring that all activity related to monuments, except for the conservation of monuments, and all that comes under the management of conservationists, is left to market competition, without any favoring of organizational or owner type entities. Also, policies are required to help open procedures of funding the restoration and revitalization of architectural heritage. A prerequisite is to inform not only the local authorities, but the local population as well with the plans, programs, and ideas

for certain architectural heritage. The main question relates to the issue on the legal equality of architectural heritage, which we believe could be realized only with the elimination of all particular regulations, and with the introduction of rulings to general regulations on the basic right of everyone to establish their own institution in accordance with the local evaluation of needs and potentials, keeping in mind the prescribed minimal conditions that such an institute must satisfy.

The regulation of anything and everything, or the desire to regulate everything, is the result of a fifty-year old communist tradition, and the belief that if a regulation exists, it is then allowed. The move to a democracy, and accordingly, the transformation of this principle into a new one, where everything is allowed unless otherwise specified by regulation or prohibition, has not yet come to life with the general public, and even less so in state and local bureaucracies. We therefore continue to believe that everything must be regulated, that everything has to be unified, and that a regulation must encompass all possible situations. Of course, the ability to predict, especially bureaucratic fantasy, generally results in distorted solutions, and inapplicable regulations, where some laws change even ten times over. This all creates legal uncertainty, particularly in this field, considering that each architectural heritage is a world unto itself. In this manner, we have regulations on monument fees that are not being applied, and a proposal submitted by a mayor of a historical city has been laying idle for more than 5 years, waiting to be included in parliamentary procedures. Or, the Law of Dubrovnik that has been altered so that from cca 75 articles, cca 98% were changed, and where ten are being actually applied. Regulations on their application are even worse, so that there are constant problems tied to the construction and adaptation of cultural monuments, sound and heat insulation, fire-proof and earthquake-proof norms, standards for the categorization of hotels and restaurants, security measures and so on, which are generally foreseen for new buildings, and not for cultural monuments

Economically, problems arise in the de iure different status of legal entities, and all the more so in de facto the privileged status of large versus small, old and non-privatized (state) companies in comparison to those private, and industry versus trade. On the other hand, the public sector, due to a chain of limiting legalities, can hardly manage any cooperation with commerce without avoid stepping into the borderline zone of legalities. There is no way for commerce to realize the kind of advantages that could significantly affect decisions on becoming involved in any work outside of commercial undertakings, which could stimulate and achieve the restoration and revitalization of historical centers.

The above reasons point towards the need of carrying out changes at all three levels. Basically, in the order that is indicated here, considering that it is not realistic to expect simultaneous change. If for no other reason than that the legal infrastructure is a prerequisite to change. This claim holds a partial answer to the question posed in the introduction as to why cooperation between the public and private sector was possible in certain environments. Unfortunately, we are dealing with a welcome exception that occurred through the personal efforts of politicians, economists and the practically silent agreement that where regulations objectively veto something, then it will be bypassed on the principle that everything is done for the general good.

Finally, we wish to emphasize that Croatia, and according to our knowledge, as are some other transitional eastern countries, is experiencing a situation whereby public opinion is starting to show a relatively high level of dissatisfaction with the market economy as it is. Mostly because they find themselves in a situation whereby "the invisible hand of capitalism" does not work on its own, as believed. On the opposite side, concerning the restoration and revitalization of architectural heritage, we have a situation where there are neither indirect nor short-term effects. The direct benefits of investment are not even worth mentioning. Moreover, the work requires a high level of investment, the process is long-term, and the management is sophisticated, accompanied by a powerful force of non-economic factors. The enormous exposure of the project to experts and the general public should be added to this. They are usually more contra than pro. There is also the strong influence of the local community that tries to soften the unrest of the voting body in the architectural heritage, which provoke change through restoration and revitalization

In the aim of minimizing the problem we have talked about, a preliminary step to important restoration operations, and especially the revitalization of architectural heritage, is to take on the kind of approach that gives everyone (citizens, political parties, professional societies, NGOs, local authorities, etc.) enough time to get acquainted with the detailed, accurate, and well expounded proposals that have already worked out the eventual points of conflict and alternative solutions wherever possible. Also, the media must be allowed, especially the local media, to be present at all proposals, no matter how bizarre some proposals might appear at first glance. Visibility of procedure, no matter whether dealing with the design of a project or the choice of a contractor, will lessen irrational resistance, or lower any suspiciousness towards the project that something is happening behind "our backs".

Accordingly, the general question that arises from the analysis deals with just how much action has been undertaken up to now by the so-called transitional countries and the extent to which they are capable of resolving the issue of how to include both public and private sectors in the restoration and revitalization of architectural heritage. No less important is the question of how much aid can be expected from countries that are considered as being developed democracies, other than a general call to adapt to already existing models. Finally, there is also the question of the validity of specialized experts when dealing with strictly spatial and time-limited activities, where the need for such activity suddenly stops as soon as the «momentum picks up».

On the basis of what Dubrovnik has experienceed up to now, we can conclude that it is impossible to directly implement organizational management methods and types. What is needed is the development of our own teams, teams that are capable of implementing available methods and types and shaping them into the economic-political reality of the moment. This in no way implies that technical help should be disregarded, i.e. UNESCO or ICOMOS experts. On the contrary, such aid has to be incorporated into the model that ensures the application of lege artis.

Based on the above, we suggest an analysis of the actual state of cooperation between the public and private sectors, and a comparison with the models that exist in countries that we consider to be model cases. Afterwards, a democratic debate should be used to create the kind of political climate and social environment that is generally approves alterations of the legal infrastructure. This kind of debate must include political parties, NGO's, associations, eminent individuals, and the inclusion of well-known foreign organizations and individuals.

We suggest the carrying out of legal alterations by doing away with restrictions as much as possible, and by using a minimal number of regulations and organizational forms. The latter is especially important as we do not have an already known model that can be applicable in a so-called transitional situation, neither professionally nor politically.

Finally, the economy should create a network of incentive measures, from certain tax exemptions to the granting of incentive funds that are meant to encourage and speed up the cooperation of the private and public sectors. The objective is to preserve and revitalize the architectural heritage through joint efforts. We believe that cooperation would be achieved, nonetheless, where tourism is concerned. However, such measures make sense when you want to make up for the years lost, to speed up the processes and to change both cultural and economic management attitudes.

The above will remain only a proposition, eventually a good one. However, only a proposition, if one does not ensure the workings of a legal state, civic society and growth of democratic standards. Namely, the restoration and revitalization of architectural heritage is not only the activation of hidden economic resources or only the conservation of historical monuments. It is an undertaking that, as a rule, strikes at the heart of what a local community is, sometimes at what a nation is. The result, no matter which kind, is also a monument for forthcoming generations, and which will present an objective truth for that which we are, without any regard to the pretensions held at the start of the project. In times when we have no time to undergo all the developmental phases of mature democracies, it is generally a challenge to know one's own weaknesses, not to repeat the mistakes of others, and to anticipate one's place in global processes, and especially in cases concerning the restoration and revitalization of heritage.

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PROTECTING THE BURIED ARCHAEOLOGICAL RESOURCE: THE RE-USE OF FOUNDATIONS

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Abstract

The inscription of World Heritage Cities recognises the wealth and diversity of their architecture, representing many centuries of occupation. Associated with this above ground record of past culture, are the below ground archaeological deposits which contain the material residue of past populations. The impact of new build and service provision on these deposits can be damaging, with the potential for physical, biological and chemical degradation. The preservation of these deposits in cities that have a continuity of occupation over thousands of years is an important consideration. One method by which this preservation can be accomplished is through the re-use of foundations of previous buildings.

This paper will discuss some of the impacts of construction before concentrating on a number of examples from Britain, where re-using previous foundations has achieved the preservation of below ground archaeological deposits.

Introduction

There are many different types of historic buildings, city layouts and monuments preserved and enhanced by their inscription as world heritage cities. Some have had a long development, representing many hundreds of years, others are comparatively young. What they all have in common is a sense of history, still preserved in the standing buildings and open spaces for all to see and enjoy today. Some of these sites cover vast areas, such as the Historic City of Toledo and the Medieval City of Rhodes, whilst others, such as Bryggen in Bergen are only districts within much larger cities. Underneath many of these sites, archaeological deposits contain evidence of the lives of the inhabitants of these towns and cities, and a record of their activities, along with previous street plans and older house foundations. Often the only time that these deposits are exposed is during the course of research excavations or though construction activity.

Within England, construction on archaeological sites is controlled by Planning Policy Guidance 16, or PPG16 (DoE[1]). This document sets out how archaeology should be treated as a material consideration within the planning process; where it is nationally important the presumption should be in favour of its preservation *in situ*. Material that is not of national significance should be excavated and preserved by record.

Planning new development

The need for continued development and regeneration of towns and cities is recognised, in England through PPG16, and in World Heritage Cities through the OWHC management guide, and within historic areas new development should seek to blend in with the existing building design and fabric. We would, however, like to suggest that there is a need for this sensitive approach towards development to extend to archaeological deposits as well as buildings. Moreover, this approach may also need to cover larger areas than those described in the inscription. Historic cores of cities shift, and within our World Heritage Cities it is possible that some of the events that shaped their growth, and particular areas of importance, may be situated outside of this area; these also need careful management, preservation and protection.

Construction impacts

Construction can be damaging to the evidence contained in archaeological deposits. Not only will inappropriately designed buildings not fit in visually with surroundings, the impacts of construction on below ground deposits need to be understood and considered. There are three main types of impacts: physical, chemical and biological. Physical impacts can include either total, or partial loss or damage to deposits and artefacts through foundation construction. Underground car parks and cellars are perhaps the most damaging of such activities, but foundation walls, foundation pads or piles, and ground beams will also impact on archaeological deposits. As will be demonstrated later, pad foundations do take up large amounts of ground area, and although these foundations are not necessarily deep, there is still the potential for significant loss of archaeological information. For larger buildings, it is often inevitable that a piled foundation design will be used. There are two types of piling, displacement and non-displacement. The first, as is suggested by the name, involves the displacement of material adjacent to the pile, as it is driven into the ground. This will lead to a disruption of archaeological deposits and the information that may be gained from them. There is also the potential for material to be dragged down, both under the pile, and also for deposits adjacent to the pile to be smeared down as the pile is inserted. Although only a few instances of this have been recorded on archaeological sites (Biddle[2]; Dalwood[3]), this does not necessarily indicate that it is not happening, rather that it is not being investigated or recorded.

As a result of concern over damage caused by driven piles, archaeologists have more recently encouraged the use of bored or continuous flight augered (CFA) piles, the rationale being that only the area of the pile is disturbed. However, there are also potential problems with this strategy, as if the auger is not rotated at the correct speed, then it is possible that deposits adjacent to the pile will also be drawn into the auger (Nixon[4]). Equally, when a pile is cast *in situ*, collapse of unconsolidated deposits in the bored hole may also occur. For that reason it is often necessary to use some form of sleeve when augering or boring through archaeological deposits. Sleeves are also used to prevent migration of concrete when such bored holes are filled. A further consideration of the likely damage is the number of piles needed at any particular location. Driven piles are not usually of a diameter greater than 350mm, and as a result where greater loads are to be imposed than can be supported by an individual pile, a cluster of piles is used. These often take up a greater overall area than a single, larger augered pile would do (Arup[5]). Archaeologists also need to be aware of new

developments in foundation construction, which may cause damage to deposits. For example, there is increasing use, particularly on contaminated sites, of full displacement CFA piles. This type of pile has also been developed to reduce the need for material to be transported from site to landfill. Although there are no studies into the effects of this technique, the potential for damage is clear. Rather than removing the soil from an area the size of the auger, this material is forced out laterally, affecting an area larger than the pile itself.

The biological and chemical impacts of construction are more difficult to recognise, and as a result very few studies demonstrating where such conditions have occurred are available, with the exception of Davis *et al*[6]. The main parameters controlling such impacts are pH and redox, and many of the resultant changes to the burial environment are also related to changes in groundwater levels or geochemistry. Where archaeological materials are in waterlogged conditions, there is often much better preservation of organic remains, as aerobic bacteria are inactive in this environment (Corfield[7]). However, the reintroduction of oxygen will lead to the re-activation of bacterial activity, which will cause organic materials to decay (Caple[8]). Equally, stable anaerobic burial environments are also essential for the preservation of metal artefacts, as these inhibit corrosion. Again, any change to this environment is likely to lead to a destabilisation in the passive layer, reducing corrosion resistance (Edwards[9]).

De-watering of deposits for the purpose of site stabilisation, or through drainage of perched water tables, will lead to such problems arising. Equally, concern has been raised that particular foundation designs may create pathways for oxygen or oxygenated water transport to lower levels. There is also the possibility that interactions between liquid pile grout (or cement) and the burial environment may occur in bored and augered piles, another reason why sleeves are recommended on archaeological sites. More detailed assessments of the impacts of construction, and the effects on preservation *in situ* are given in Williams and Corfield[10], Davis *et al*[11], and Corfield *et al* [ed.][12].

Enabling development

The challenge is thus to ensure that development can progress without damaging archaeological deposits. We have set out above some of the impacts associated with construction, and although these will not occur at all sites, it is necessary to consider each site individually to assess what, if any, the potential impact on archaeological deposits will be. In England, a current norm is that if a foundation design does not damage more that 5% of the archaeology, then this is an acceptable compromise between the need for development and the need for conservation (Arup[5]). Therefore, methods that reduce the number of piles, attempt to carry service trenches higher up in the ground or in the building itself, or remove the need for any below ground impact at all, are more likely to lead to better long term preservation of our finite archaeological resource.

As well as considering the other techniques for preservation *in situ* that we have just mentioned, it is also worth pointing out the potential for re-using foundations, and the benefits that this will have on the protection of archaeological remains. The two examples that we will use to illustrate the potential for re-use of piles come from England, and the towns of Colchester and Lincoln. Colchester is in the County of

Essex, and lies approximately 60 miles north east of London. Lincoln, in the county of Lincolnshire is further north of London, approximately 140 miles directly north. Both of these towns have a very long history, and although there is evidence for prehistoric activity adjacent to both of them, it is their Roman and Medieval history that is most impressive. They are not themselves World Heritage Cities, but contain archaeological deposits of similar quality and complexity to those that might be expected from many of our World Heritage Cities, thus making them good analogues.

Shallow foundations: An example from Colchester

The archaeology of Colchester

In AD 43, the Romans invaded Britain, with four legions (perhaps around 40 000 men), under the command of Aulus Plautius. They landed at Richborough in Kent, and came shortly afterwards to the Iron Age settlement of Camulodunum. Here they erected a legionary fortress, covering an area of about 50 acres, and evidence from tombstones around the town suggests that this fort was occupied by the XXth Legion. In AD 49, the garrison was transferred and the site was enlarged to the east and became a civilian settlement, the first *colonia* of the new province. It is likely that this town had all the usual Roman trappings, for example public buildings, baths and temples, including one particularly large temple dedicated to Clauduis.

However, the withdrawal of the garrison left the town badly protected, and in AD 60, the Iceni of Norfolk, led by Boudica sacked Roman Colchester. The town was burnt to the ground and its inhabitants likely massacred. Archaeological evidence for this attack has been recovered from a number of excavations, where burnt structural and artefactual material has been found. Despite the almost total destruction of the town, it was rebuilt, with large town walls, standing 6 metres high in some places, and over 2 metres thick. The street layout still retained much of its previous design, based on that of the original fortress, though expanded substantially to the east and slightly to the north. Even today, some of the roads in the town follow the line of the Roman layout, including the present day High Street, which runs approximately along the line of the *decumanus maximus*, the main Roman east-west street (Crummy[13]).

After the decline of the Roman town around AD 450, there is a period with limited evidence for occupation; three Saxon huts, dating from the 5th to 7th centuries AD, and a collection of isolated finds from various sites in the town date to this period (Crummy[14]). Finds from the 8th and 9th centuries AD suggest a concentration of activity around the High Street area (as opposed to the earlier more dispersed distribution), and it is likely that this area saw continual occupation and development from this time onwards. In around 1075, a castle was constructed in the east of the town, on the site and foundations of the Roman Temple of Claudius. Evidence for development on the north side of the High Street in this area was lost when the road was diverted southwards around the new bailey. From the 10th or 11th centuries at the centre of town, the High Street was almost certainly the location of a market, being wider than any of the other street, and in part incorporating St Runwald's Church. On the north side of the road, the site of the Moot Hall, with facilities for a wool market, was enlarged in 1373-4, encroaching onto the High Street (Crummy[14]).

The archaeology of 22-24 High Street

The development site was located on the High Street, numbers 22-24, stretching back to the street behind, Culver Street. The site lies at the heart of both the Roman and Medieval towns, and this area, within Insula 27, contained large Roman residential properties, as well as Medieval and Post-Medieval shops and street frontages. The site is by the market place, opposite the Moot Hall. Other sites in the vicinity have seen archaeological excavation, such as the Cups Hotel site (Crummy[15]). Previous development of the site in 1969 removed a timber framed building, dating from as early as 1597, from number 24 High Street, and various archaeological investigations in this area demonstrated that there was a high chance that significant deposits would still be preserved (Chadwick[16]). A hoard of coins was found on the adjacent site in 1902, containing about 12 000 silver pennies and a further hoard of 14 065 silver pennies was recovered from 21-23 High Street in 1969 during the development of the previous building on the site (Crummy[17]). It is likely that deposition of these coins occurred in a twenty year period either side of 1250.

Foundation re-use

The re-development of the site in 1969 involved not only the demolition of existing medieval buildings, but also the construction of significant foundations. In total around 33% of the ground surface of the site was affected by the excavation and construction of pad foundations. These foundations were approximately 0.45m deep and 2.5m square. The locations of the foundations were recovered by the archaeological consultant, from details held in the Building Control Records at the Local Planning Authority, and from the original foundation plan which had been kept by the land owner Chartwell Land. As there was now an accurate record of the location of the previous foundations, the consultant, Paul Chadwick of CGMS Consulting, then discussed the possibility of re-using these foundations with his structural engineers and the local authority. These discussions lead to a Written Scheme of Investigations with a mitigation strategy of foundation re-use for all but 15 of the pad foundations (Chadwick[18]). This solution would not only lower construction costs, but would have great benefits for the preservation of the archaeological deposits. Furthermore, it complied with both the local development plan policy, and the Government's guidance on Archaeology and Planning (PPG16[1]), that 'nationally important archaeological remains should be preserved *in situ*'. During the redevelopment, it was necessary to excavate very small parts of the site, for the construction of the lift pit and tower crane foundations, and there was also a need to install a few new foundation pads. These were placed in the same location as the previous foundations, but were slightly larger, necessitating a small amount of archaeological excavation. The total impact on the archaeology during the course of this development was minimal, and where excavation did take place, archaeological deposits were recorded.

Deep foundations: An example from Lincoln

The archaeology of Lincoln

Lincoln has a similar depth of history to Colchester. The Roman use of the area started in around AD 55-60, when a legionary fortress was built on top of the hill at this site, overlooking the junction of the rivers Witham and Till to the south. The site was used by about 5000 soldiers from the *Legio IX Hispana* for a decade or so, before being replaced in AD 71 by the *Legio II Adiutrix* (Jones[19]). After the advancement of

the army to further north in AD 78, the fortress became, like Colchester, a *colonia*, probably around AD 86-96, partially settled by retired legionary soldiers (Jones[20]). From this point forward the town grew, and whilst the main public buildings were still located around the area of the original fortress, at the top of the hill, further development of the town continued down hill to the river. The hillside area contained a number of public monuments, such as baths and a fountain, but was mainly an area of private residences (Jones[19]). To the south of the river, on the low-lying ground, a commercial suburb developed along the roadside, up to one kilometre distant from the south gate of the town (Jones[20]). During the fourth century Lincoln became one of the four provincial capitals of Roman Britain and the prosperity of the city lasted until the end of the century. A church was erected in the courtyard of the forum possibly during the late fourth or fifth century, and the site continued as a religious centre even when most of the rest of the town became deserted (Jones[19]).

By the mid 10th century Viking settlement had led to a period of urban revival, and Lincoln was clearly a town of national importance, with evidence of a mint, other industrial activity and trade with Scandinavia. Excavations have uncovered a number of timber buildings dating to this period. By the time of the Norman Conquest (1066) it is estimated that around 5000 people lived in Lincoln (Jones[21]), a population figure only equalled or bettered at the time by York, Norwich (Jones *pers. comm.*) and London (Kemp[22]). In 1068 a Royal castle was erected in the city and shortly after, in 1072-75, the Episcopal See was transferred from Dorchester on Thames to Lincoln with a cathedral under the control of Bishop Remigius (Jones[23]).

During the 11th and 12th centuries there was expansion both inside and outside the city walls, with building in both timber and stone. A number of these stone buildings still survive today, including the 'Jews Houses' on Steep Hill (the Medieval Mikelgate). Other surviving later Medieval stone buildings include the Bishop's Palace (one of English Heritage's Guardianship sites, open to the public), and the Greyfriars (part of the Franciscan Friary infirmary that until recently housed the City and County Museum). Excavations this year have also led to the discovery of substantial below ground stonework of the Blackfriars site, a Dominican monastic establishment.

Much of the wealth of Medieval Lincoln was based on trade, particularly cloth and wool. However, a number of factors, including the shift in location of production to rural areas, and the superior quality of Flemish imports began to lead to a decline in trade. This problem was further exacerbated by the silting of the river Witham, and loss of the staple to Boston, a port further downstream and closer to the coast. The decline in trade was followed by a decline in population and many areas were abandoned. By the mid 14th century Lincoln was only the 16th most populous city in the country (Jones[23]).

The archaeology of Flaxengate Car Park

This site, like that of 22-24 High Street Colchester, is within both the Roman and Medieval city of Lincoln. It is situated within the hillside area, outside the original fortress but within the later *colonia,* and located about 150 metres east of the present day High Street (which follows closely the line of Ermine Street, the main Roman north-south road). The importance of the archaeology of the area is reflected by the fact that much of it is a scheduled Ancient Monument (County Monument

Lincolnshire 115: Lincoln Roman Colonia (*Lindum*)). This means that the area is protected by law, and any plans to develop the site must be approved by the Secretary of State for Culture, Media and Sport. She in turn takes advice from the English Heritage Inspector of Ancient Monuments for the County.

Excavations at the site currently occupied by the Flaxengate multi-story car park in 1945-8 by Graham Webster revealed the remains of three Roman buildings, the earliest of which may date from as early as AD 70-110. Material from this building includes three coins and pottery from eight vessels, all dated to this short period. At some point shortly afterwards, a pit was dug through the occupation deposit associated with this building. Around the middle of the 3rd century AD another building was erected on site. The excavation recorded to north-south running walls, possibly a corridor or colonnade, with adjacent rooms to the south. Marble wall veneers discovered at this site suggest that it may have been a building of some status. This building was demolished towards the middle of the 4th century AD and a further building constructed, which was probably occupied until the end of the century. Although medieval robbing of the walls removed much of the evidence for this structure, the extent of the gravel floor across the site indicated that it must have been a building of some size. The site was then abandoned, and evidence from the 1945-8 excavations suggest that it remained so for the next five centuries (Coppack[24]). More recent excavations of the car park have yielded late Saxon material and deposits, in particular, kiln wasters of Lincoln Sandy Ware (Trimble[25]).

The Medieval evidence includes a stone lined well, from the late 12th century, and two houses, one of which dated to the early 13th century and had a cellar at least five and a half feet deep. There were also a number of pits dated to between the 10th and 14th centuries. However, little later material is known to survive on the site, as much of these later deposits were obliterated by the cellars of nineteenth century houses. However, despite this loss of archaeological information it is cleat that until that time, much of the medieval layout of the town's burgage plots had been preserved, and this can be discerned in the 1888 Ordnance Survey plans (Coppack[24]).

Foundation re-use

Clearance of 19th century 'slum' housing occurred over much of the Flaxengate area from the mid 1940s to 1960s (during which time Webster had excavated the site), and most of this area then lay derelict during the 1960s. To the south of the Flaxengate car park site, along Grantham Street, the Ministry of Labour building and car park were built in 1960. These were followed in 1969 by the construction of the multi-story car park. As suggested earlier, the building of houses during the 18th and 19th centuries may have removed some of the later Medieval deposits, and the construction of the car park on this site has also led to some loss of similar material. However, much of the earlier Medieval and Roman archaeology, up to 3-4 metres of deposits, is still buried beneath the ground floor slab of the car park.

A few years ago it was decided that, due to structural instability, the car park would have to be demolished, and the site was proposed for the new City and County museum. The was essential, as for a number of years the City and County had been offering low levels of access to over two million objects that it wanted to both store and interpret to the public. Because of the archaeological sensitivity of the site, the developers (in this case Lincoln City Council and Lincolnshire County Council) were

keen to ensure as little damage as possible during the construction of the new museum. As specialists in heritage solutions, Prince Research Consultants Limited were appointed to write the business plan and lead on the design developments of the new museum. Their archaeologist Steven Chaddock took the responsibility for trying to balance the needs of constructing the new museum, with those of preserving as far as possible, the archaeological material below ground. Working with the City Archaeologist Mick Jones, the English Heritage Inspector of Ancient Monuments Glyn Coppack, the architects Panter Hudspith, and the structural engineers Price and Myers, the scheme outlined below was developed.

A study of the potential for pile re-use was carried out by Buro Happold. Unlike the site at Colchester, where engineers had to rely on plans of the previous building to locate the piles, at Flaxengate, the location of the piles was indicated by the current location of the columns of the car park. This study indicated that many of the piles at the site could be re-used. However, the new building has very different demands to meet in comparison to the 1960s multi-storey car park, and unfortunately, in areas such as the main galleries, the existing piles will not be able to carry the type of loads needed. As a result, some new piles will be required to ensure a good foundation. These piles will be capped or thickened into the concrete slab and ground beams. The main benefit of the scheme, as proposed, is that the majority of the building will sit on or above the present concrete slab, which reduces the need for excavation of foundations and thereby minimises archaeological impact. The new building will be constructed on piled foundations in order to minimise the impact on intact archaeological levels. The design of the sub-structural layout has been developed from the initial requirement for four smaller piles supporting one pile cap, to the present scheme that uses single larger, 0.75m diameter piles instead, which will reduce the area taken up by new piles. It has, however, been possible to re-use piles elsewhere in the building, and this will mean that there is still less of an impact on the archaeological deposits from new piles.

Conclusions

Although we began this paper by listing a number of impacts of construction, it has been our main purpose to champion the re-use of foundations, particularly on archaeological sites. At the two sites discussed in this paper, it can be seen that this was not achieved completely, as at both sites a number of new foundations were also needed. This is, however, to be expected on some sites, as different buildings may have new uses that previous foundation designs cannot support. The new museum, with its need for open galleries, is a good example. However, there are many other sites where foundation re-use is clearly an option, and if it is considered early on in the design phase, any conflicts between the loading capacity of the foundations and those of the new building could be resolved, without recourse to further foundation construction.

On sites where it is necessary to build new foundations, consideration should also be given to possibilities for future re-use, particularly on archaeological sites. This means that there needs to be a system of documentation for the plans of new buildings so that pile plans can be looked at again. Furthermore, information relating to the loading capacity of the piles, and any results on pile testing carried out before the construction should also be retained. It is worth emphasising that the re-use of piles is

not just suggested to ensure better preservation of archaeological sites. It has also been warmly embraced by others within the construction industry, particularly those interested in sustainability. Research such as that currently underway at the Buildings Research Establishment (BRE) shows that re-use should increase in the future. This research includes a European 5th Framework funded project RUFUS (Re-Use of Foundations on Urban Sites), which aims to provide a best practice handbook and guidance for both engineers and developers, and to tackle some of the resistance to the re-use of foundations, not only for technical reasons, but because of a lack of exemplars. This is important for our work, because we need the engineering research and case studies to show that foundation re-use is possible, so that more developers will consider such an approach in the future.

Acknowledgements

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An experiment of international interdisciplinary teaching approach (Belgium, Spain, France, Greece, Italy): the seminar-workshop "Cultural heritage and seismicity" of the Colmars les Alpes.

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1. A small history of the working team.

Since 1991, specialists of safeguarding and rehabilitation of the patrimonial heritage and old sites in natural risks prone areas, and more precisely in seismic risks areas, met in a network. This network constitutes one of the components of group PACT of the European Federation of networks (F.E.R.) placed under the aegis of the Council of Europe.

This component PACT 19 (A), gathers geophysicists, geologists, structural engineers, civil engineers and architects... all professors of universities, schools of architecture or researchers coming from Belgium, Spain, France, Greece and Italy. Among the activities of the network (courses, researches, expert evaluations...), summer seminars-workshops of awareness in Europe brought together, since 1994, students and professors around case of studies. These workshops are intended to students of second cycle (+ 2 years of higher studies) or of third cycle (doctorate) like to teachers - researchers concerned with the subject. Thus were held nine seminars - workshops which organised work in followed formative conferences of a work on site under the angle of the taking into account of the risks, of the evaluation of the degrees of vulnerability, the urban and architectural mitigations... always from the point of view of the sustainable development and the adaptation and the improvement of the resources and the local techniques.

The nine villages analysed, since 1994, were: Figuerola d' Orcau (Spain - 1994), Archanes (Greece - 1995), Peyresq (France - 1996), Santo Stefano di Sessanio (Italy - 1997), Jerica (Spain - 1998), Nissyros (Greece - 1993), Colmars les Alpes (France - 2000), Nicosia (Italy* 2001) and Castielfabib (Spain-2002).

2. The case study of Colmars les Alpes.

For its 7th seminar-workshop of summer, Pact 19 undertook, from the 10 to July 16 2000, the study of the village of Colmars les Alpes (Alpes de Haute Provence).

In addition to the European specialists who moved on the site and the members of local associations of the Pays de Peiresc and of the Pays des 3 "V" (Verdon, Vaire, Var), implied themselves with
enthusiasm in the project, showing by there a keen interest for the step:

- Le ministère de l'aménagement du territoire et de l'environnement ;
- Le conseil Général des Alpes de Haute Provence ;
- La Chambre de Commerce et d'Industrie ;
- Le CEPAM ;
- Le Parc National du Mercantour ;
- La réserve Géologique de Haute Provence ;
- Le CETE Méditerranée ;
- La Maison de Tourisme du Haut Verdon ;
- La Communauté de Communes du Moyen Verdon ;

- La Mairie de Colmars les Alpes ;
- L'Office de Tourisme de Colmars les Alpes ;
- Les artisans et les habitants de Colmars les Alpes...

Colmars les Alpes joined together all the desired characteristics. Strong of an old history and a built inheritance of quality, still very preserved since were preserved in particular the enclosing walls on all the perimeter, Colmars les Alpes is classified in **Ib Zone** in the seismic zoning of France, and also presents, according to the PPR (Map Risks Protections), a whole series of major natural risks (floods, movements of ground, avalanches and fires of forests).

The History of Colmars begins at the 11th century before J.C. with the arrival on the site of the Gallites. It continues until today with projecting facts such as the development at the 15th century of the cloth and woollen manufacturing industry; the arrival of King François 1st at Colmars at the 16th century with an important reinforcement of the systems of the fortifications of this border town between France and Savoy; to the 17th century, King Louis XIV entrusts the revision of the fortifications to Vauban and its lieutenants Creuzet de Richerand and Niquet, they will raise in particular the forts of France and Savoy; Napoleon Bonaparte resides at it to prepare there the wars of Italy at the 19th century;...

3. The work on site

The work on site of the actors of the summer seminar-workshop of Pact 19, moved towards the **interdisciplinary analysis** of the site followed of proposals of mitigations and rehabilitations, actions based, not only **on the characteristics of the site** in the broad sense, but also **on the public interests** exposed by the local communities. **The seminar-workshops of summer want to be a teaching aid of awareness and formation for the students (more or less 30) but also a contribution to the continued local thoughts.**

Here, by way of indication, the program of the 7th seminar-workshop:

7th international seminar-workshop of the old frame in zone of seismic sensitivity

France the case of Colmars les Alpes

(Alpes de Haute Provence)

from the 10 to July 16, 2000

Organization and preparation:
Hugues Wilquin, Sandrine Bouchet, Jacques Rosier.

Program:

Monday July 10:
- 11.30 reception of the participants (Mayor of

Colmars...)

- 14.00 Presentation of the social and tourist problems of the S.Bouchet valley of the association of Pays of Peiresc; B.Deleuil, in charge of mission of the municipality of Allos
- 15.30 Visits on site in company of M.Blanc, municipal adviser, J.Paglioni, C.Rathgeber, historian and of Mr. Rene Blanc, craftsman.
- 18.00 Opening, at the fort of Savoy, of the exhibition "companions of the Tour of France", organized by the Compagnonnic Union of the companions of the Work of the Linked Duties, Cayennes of Toulon, Aix-en-Provence and Nice

Tuesday July 11:

- 8.30 Formation of the groups and session of work 1
- 14.00 Presentation of the history of the village C.Ratgeber
- 15.30 Session of work 2
- 20.30 Practical of the restoration and the rehabilitation- H.Wilquin of the Polytechnic University of Mons (Belgium)

Wednesday July 12:

- 8.30 Session of work 3
- 14.00 Session of work 4
- 17.00 Practical local of the safeguarding and the rehabilitation of Heritage J.-L. Blache, G.Donnini-Community of municipalities of the Middle Verdon; Mediterranean experiments - B.Goyeneche-CEPAM-Alp-Mediterranean; Annot and Allos - V.Mouthuy, S.Deligny.

Thursday July 13:

- 8.30 Session of work 5
- 14.00 Data-gathering and seismic charts of risks - J.Bonnin - School and Observatory of Physique of the Globe, University L.Pasteur (Strasbourg I) Geology and seismic risks regional - Mrs. M. Guiomar Reserves Geological of High-Provence Presentation of the guide "To prevent the seismic risk in the old centers". - G.Jacquet - Center Technical of Equipment (CETE), Institute of Prevention and Urban Risk management
- 15.30 Visit of patrimonial sites of the area (Vergons, Annot, Entrevaux)

- 20.30 the safeguarding of the vernacular habitat Greek examples I Efessiou and F.Gouielmos of the Polytechnic School of Athens (Greece).

Friday July 14:
- 8.30 Session of work 6
- 14.00 Some aspects of seismic vulnerability assessment- V.Petrini- Politecnico of Milan
- 15.30 Session of work 7
- 18.30 Diagnosis of the form, interpretations of disorders structural-J.Rosier - Laboratory of Civil Engineering of the University of Limoges

Saturday July 15:
- 8.30 Session of work 9 and 10

Sunday July 16:
- 8.30 Session of work 11
- 11.30 Closing session and opening of the exhibition

4. Objectives and methodology.

The principal objective of these workshops is to make it possible to students to work, in an international context and in **interdisciplinarity** within the framework of the conservation and the rehabilitation of the old frame in seismic medium. This type of experiments will develop in the university formations to meet the needs for a European reality increasingly present. The stake of such a work lies in the diversity of the approaches which they are cultural, professional, economic....

The program is balanced between **informative or formative communications** around the explanation of the causes, the taking into account and the comprehension of the symptoms of the effects of the seismic risks like on methods and examples of restoration, rehabilitation and mitigation through work on site in small framed groups.

The objective of the work of each group is to study an object, environmental, urban, architectural, technical... to analyse it and propose an action, a mitigation, a rehabilitation, an installation, an evolution in order to preserve the cultural heritage which this inheritance represents. Each group works according to an original method suitable to develop several aspects of the same built unit. The ones will analyse the "skin", the others the form, the others the constructive techniques, the others the historical reading, the others the environmental data... In each workshop, the goal is to answer the question of becoming frame, its safeguarding and its evolution in the studied context.

The practical part of the workshops has the aim of doing a work on site which allows the collection of data and reality analyses on the basis of informative and formative communications and of the councils of framing groups. All that helps to formulate the question of becoming in all its architectural, technical, social, cultural...future At the

end of the week, drafts of solutions and tracks of rehabilitation and mitigation must be elaborate in group to be used as support with the exhibition intended to the elected officials and for the local population, but also to nourish the proposals which will be elaborate after the workshops by each member of the groups. This work could then be used as a basis for diplomas or various publications.

After three preliminary statement and preparation campaigns, the preparation team suggested for the work on site were, in Colmars, the following:

- **vulnerability with the natural risks**
- **the study of the skins and the colors as markers of the history of the frame and the landscape**
- **the study of a monument (the Saint Martin church) by the morpho-chronology like elements of a local seismic history**
- **the study of the re-use of a monumental unit (the fort of France)**
- **the study of two small buildings with degraded structure (the houses Barbaroux and Guyon)**

Each group was followed, permanently, by several framing, of different countries and specialities. Nationalities and specialities of the students were voluntarily mixed in each group in order to cause confrontation and the dialogue between the cultures and the different "angles of sight".
The first goal of the seminars - workshops remains obviously the awakening of the need for a true interdisciplinary work, in dialogue, on this kind of problems (and not of a multidisciplinary work in layers of successive and tight approaches).

The goal, the suggested methodology, the tracks of thoughts, the documents - resources, people - resources and the teaching intentions were clearly presented in the teaching cards supplemented by the first documentation, statements preliminary and an illustrated report resulting from the preparation campaigns.

Holding account owing to the fact that the objectives targeted by the seminar had been voluntarily limited to remain from the realistic point of view for five days an effective work, the results exceeded the hopes.

Elements not envisaged with the starting program were added such as the identification of the small vernacular inheritance: statements of doors, windows, shutters... and a study of overall vulnerability of blocks of houses.

Lastly, at the end of the workshop, it appeared more interesting to amalgamate the results of the group "vulnerability" to those of the specific studies, in particular the results of the group in charge of the specific study of the habitat (analyses of two houses).

5. Results

Which was finally the result of this working week for the five groups:

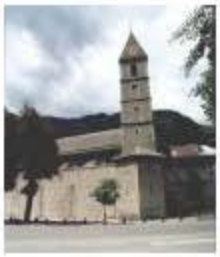
VULNERABILITY WITH THE NATURAL RISKS

A chart of the sandstones, alluvia, deposits sedimentary and rock exposures were put in adequacy with a location and a typology of crackings and damages. The easily flooded zones imply an immediate vulnerability of the buildings which settled there. The vulnerability of the buildings was finally gathered with the studies of the various buildings of the villages (together of joint houses, Saint Martin church, fort of France, Guyon and Barbaroux houses).

STUDIES OF THE "SKINS" AND THE COLORS

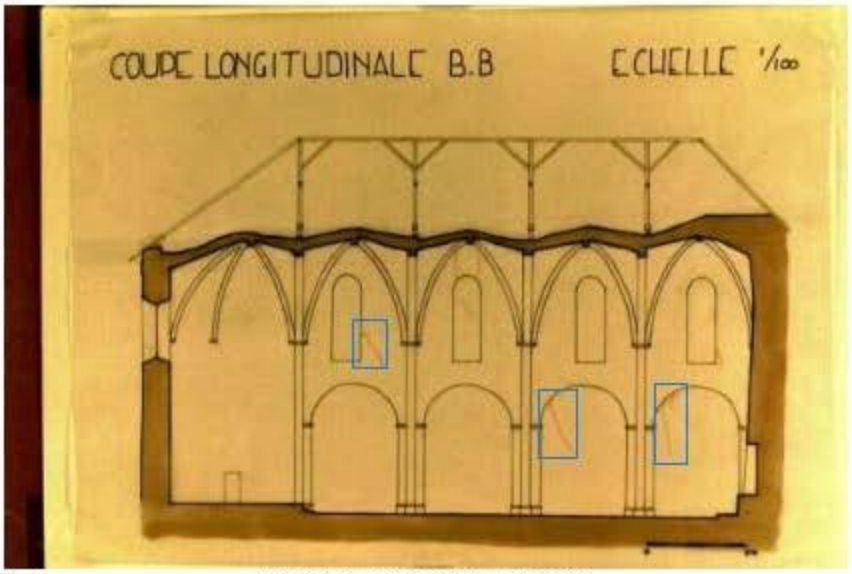
A state of the "skins" (materials of facades) was drawn up (which will be correlated with a report of the damage useful to an inventory of fixtures of vulnerability as mentioned above) as well as a statement, according to code NCS (Natural Colour System) of the existing chromatic range. Proposals of restoration or a rehabilitation of the "skins" is proposed as well as a harmonic chromatic pallet according to the statements and harmonies resulting from technique NCS. Other statements of doors, shutters, roofs, materials of frontages... are also put forward in order to supplement the typological approach of the urbanised core.

SAINT MARTIN CHURCH



External view and damages on the vaults inside

From the historical texts (in particular the relation of the building site of the last church, "translated" into contemporary terms and put in relation to the architectural and structural observations on the building itself) and of the observations on the building itself (raised of deformations, pathological analyses...), of the assumptions of morphological and constructive evolutions during centuries are presented. It is then possible to draw up a mechanism of ruin under the effect of an earthquake. Proposals of mitigation (placement of ties, reinforcement of the chaining...) and for a rehabilitation are then advanced (the details are prescribed by it and sometimes drawn).



Deformation of the vaults

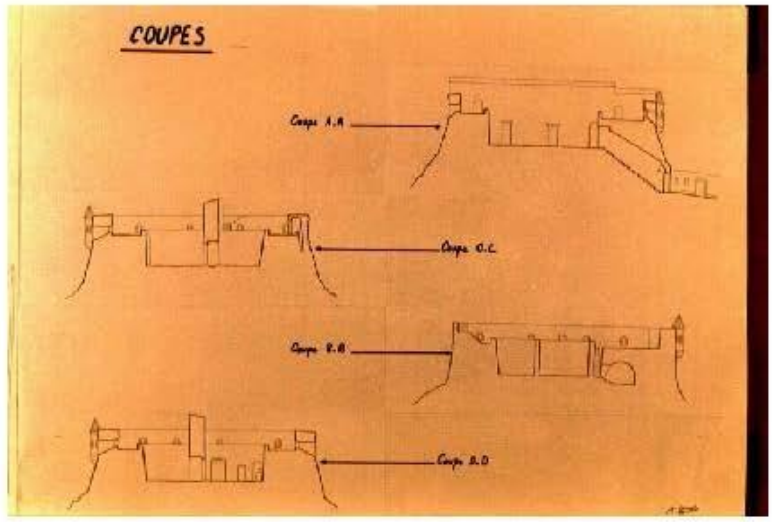
Construction system of the carpentry

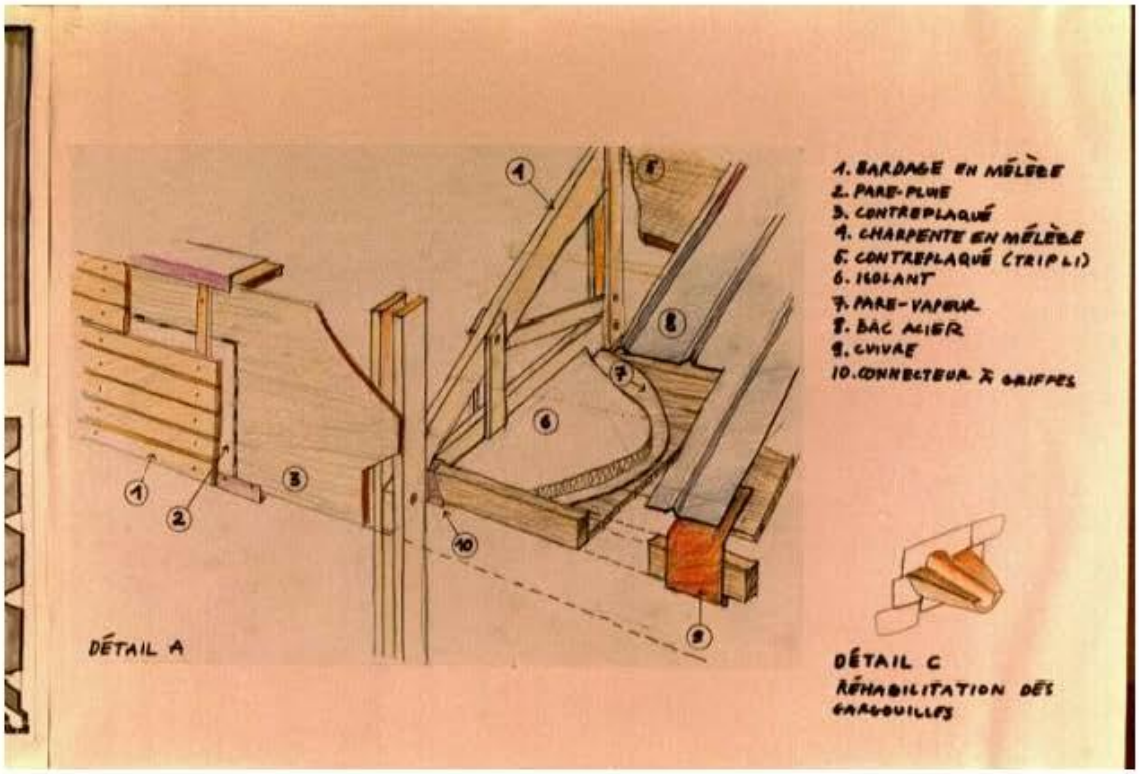
Propsals of reinforcement

FORT OF FRANCE

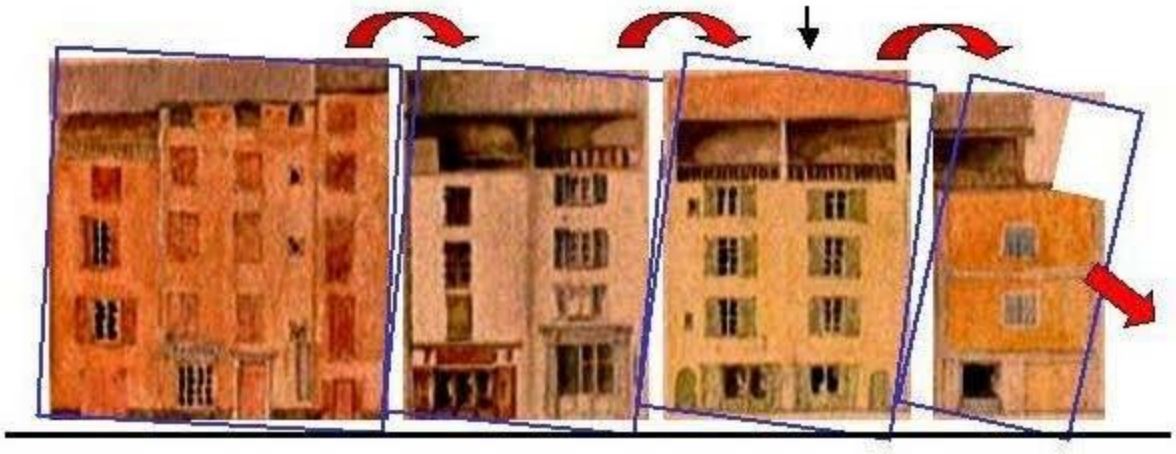
The study of the historical documents (in particular of the texts and the drawings of the collaborators of Vauban) and of the scars and marks of the building itself made it possible to draw up a report of the morphochronological evolution of it. The structural analyses and of the ground enabled us to draw up a "clinical" state of the building. The functional needs and the state of the building and the substrate founder led the members of the group to propose a "Cyberfort", at the same time center of information

Internet on the sustainable development and local center for young people, build in "light" (state of the building and the ground) and reversible (according to the charter of Venice of the ICOMOS-
International Council of Monuments and Sites) construction (wooden carpentry). The way of building and the technological details are drawn by it.





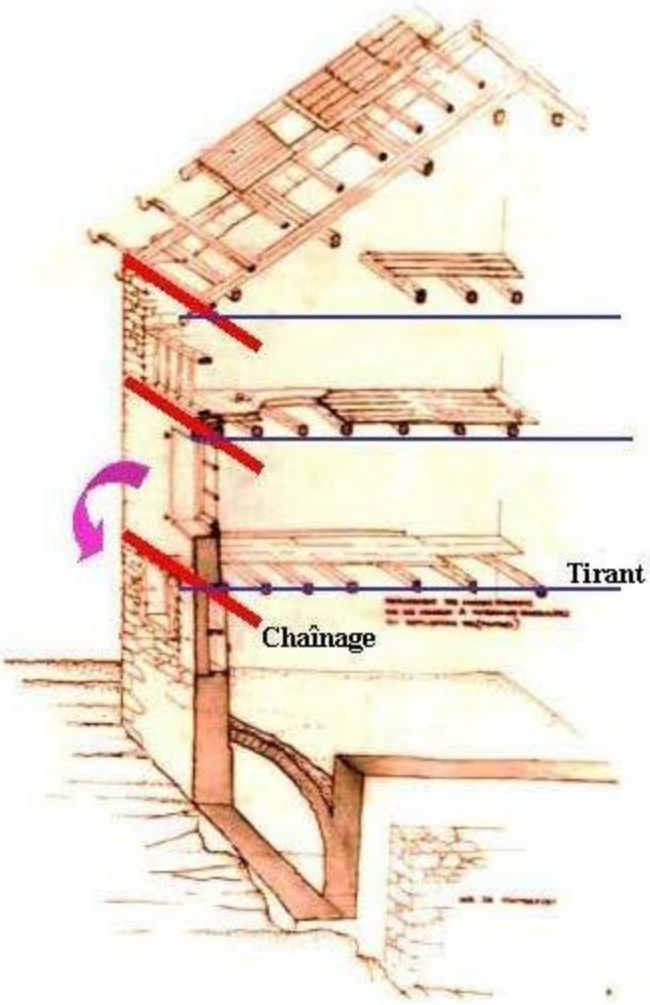
Barabaroux house



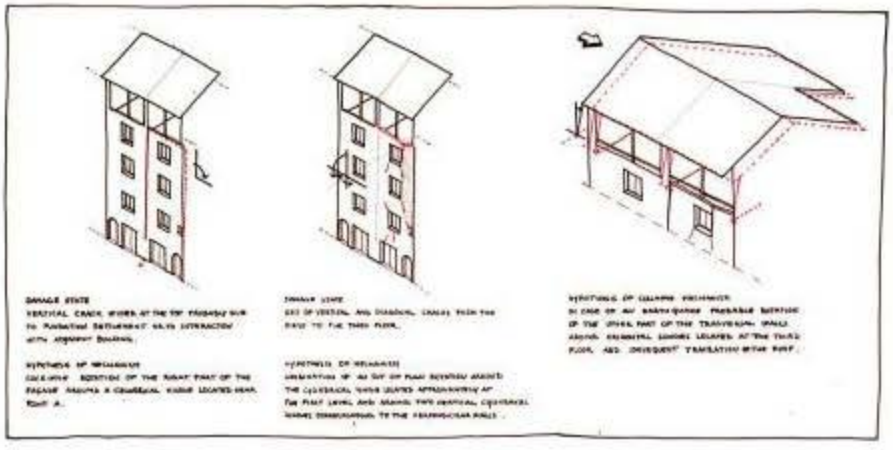
Guyon house

GUYON AND BARBAROUX HOUSES

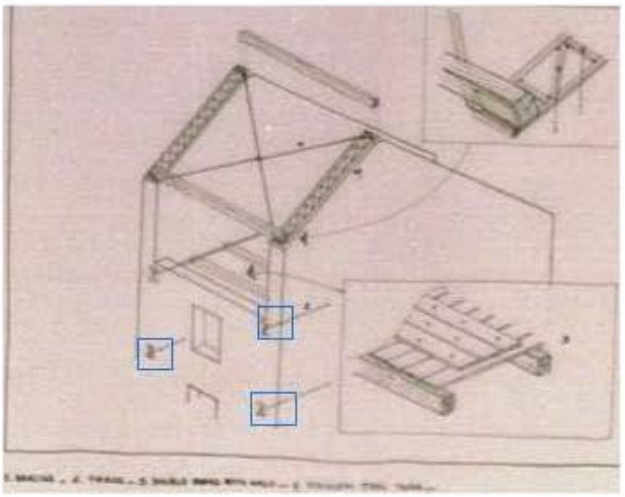
Precise statements of the buildings in plans, sections , facades... but also the details construction, the cracks, the deformations and displacements... are drawn up in order to include/understand the constructive systems and their evolutions in time. The weak points of the constructive systems are drawn up starting from the cartography of the damage (cracks, displacements...). Seismic assumptions of requests try to explain this damage in the buildings in their context (arranged, insulated). Proposals of mitigation (chaining, ties, details adapted...) are advanced to not only answer the seismic requests but still to encourage an architectonic effort of harmony of the core built in a prospect durable and local development.



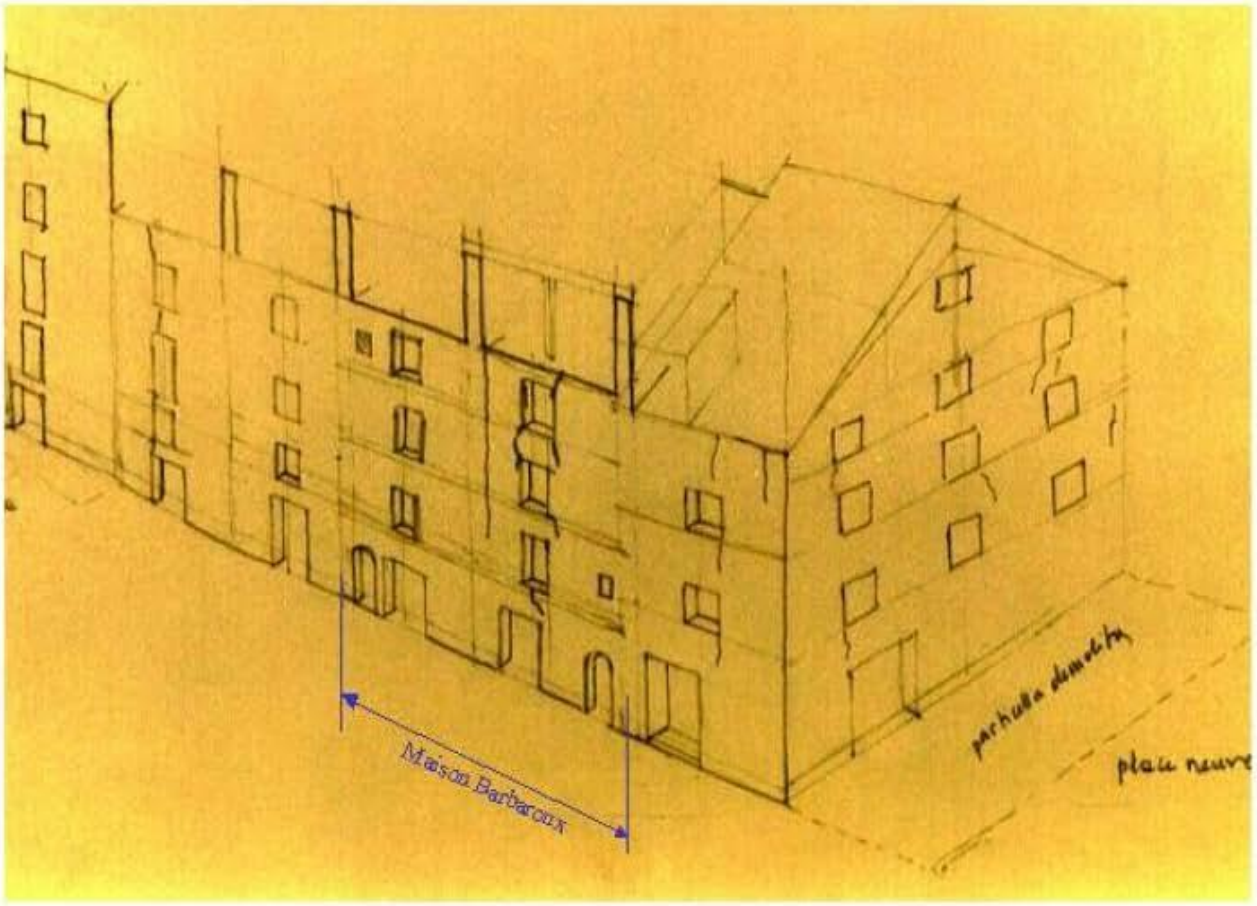
Mécanisme de rupture-colapse possible: Maison BARBAROUX



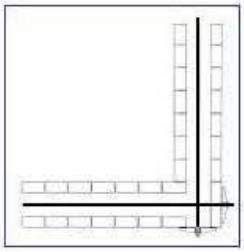
Barbaroux house



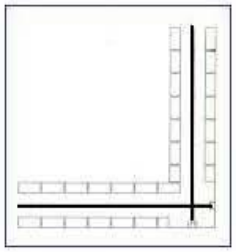
Reinforcements proposed



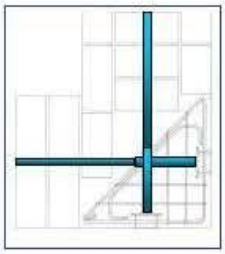
Grande Rue : mise en évidence de la parcelle démolie



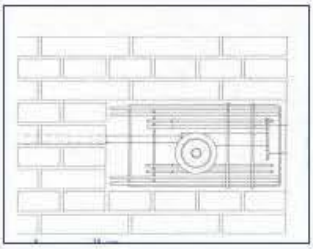
Ancrage extérieur



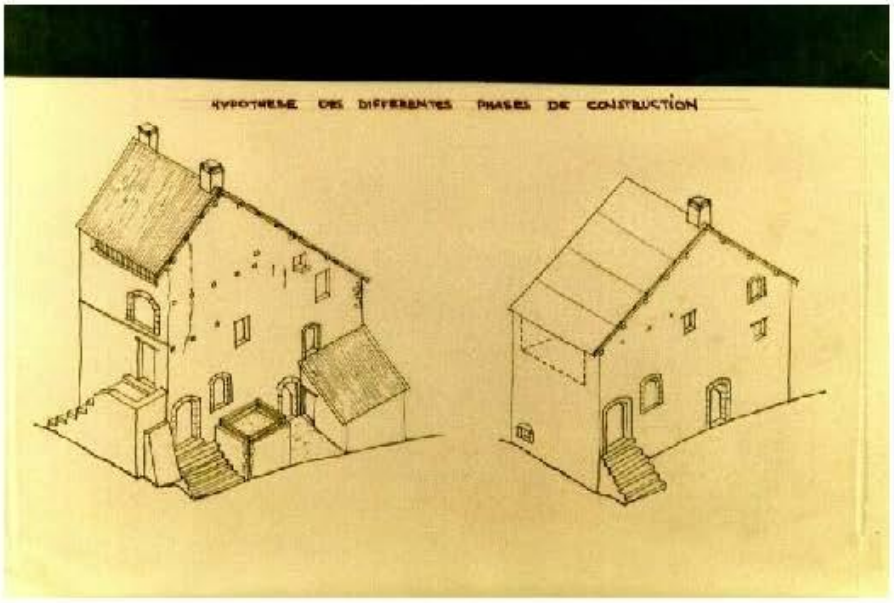
Ancrage intérieur



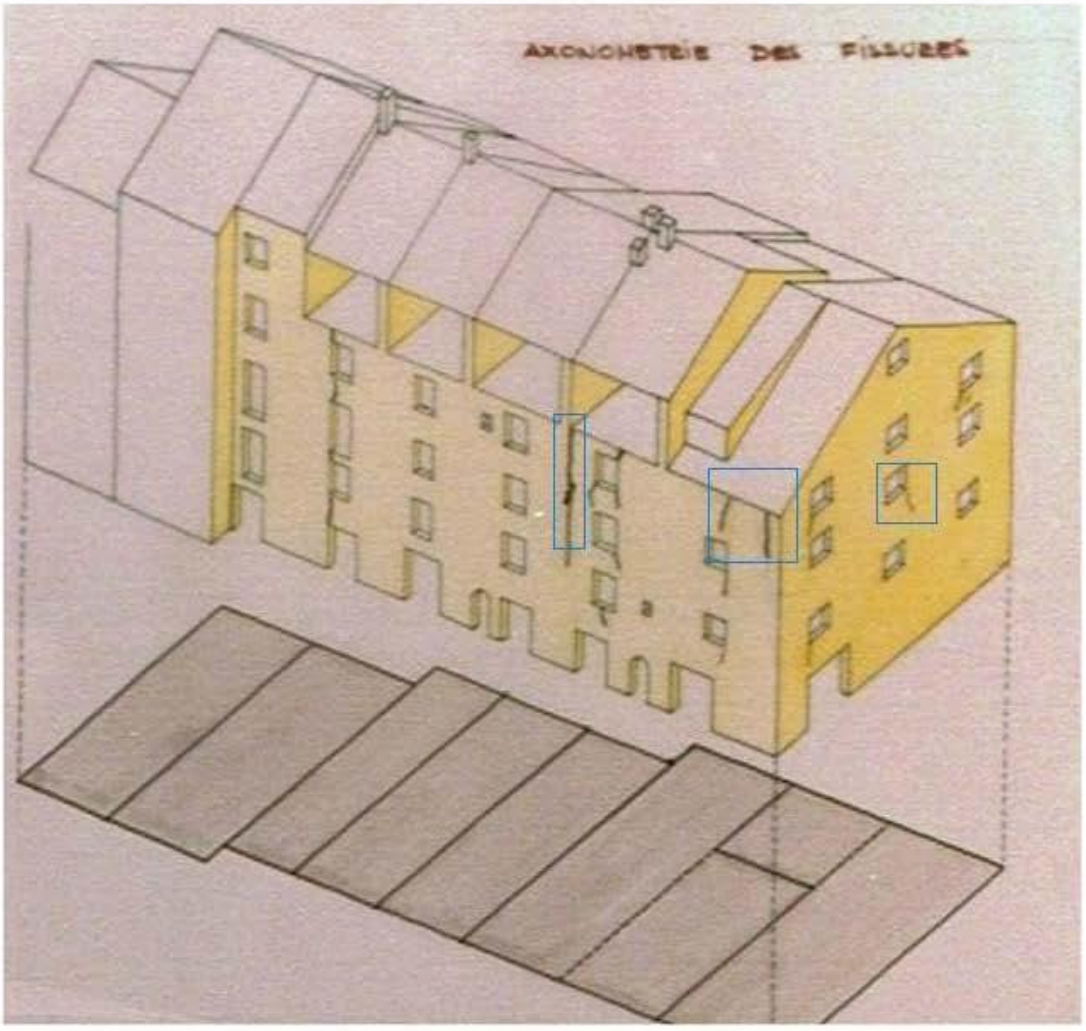
Ancrage précontraint
vue en plan



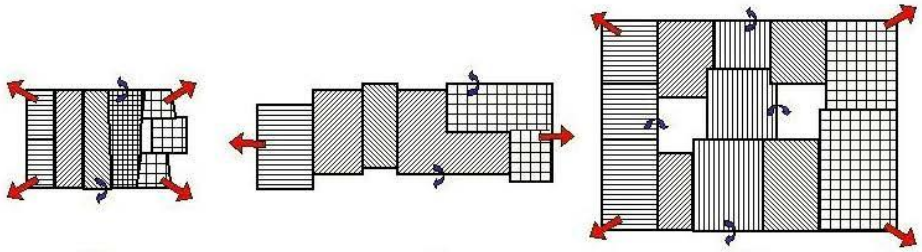
Ancrage précontraint
vue de face



6. Conclusions



In conclusion, it appears completely obvious that the initial challenge to inform, make people sensitive to and make work on a real case of study, with about thirty students of different countries and "cultures" is not as insane as it appears to with it in first approach. From initial formations very varied which are spread out, for the paraseismic one, since knowledge zero until the control of the tools of modeling and calculations by finite elements of buildings subjected to dynamic stresses, in particular seismic, starting from approaches of the rehabilitation and the restoration which are distributed since the absolute respect of the history and the old techniques until the contemporary interventions boldest, we have to notice that the alloy takes in some days under the pressure of the work on site and the responsibilisation of the students i



(a) (b) (c)

If the new building or to build will be able "to perhaps move" under possible seismic requests, ***the buildings or the sets of buildings*** *(because the overall effect is of primary importance to include/understand) of a site chosen to carry the traces of the seismic effects* ***HAVE MOVED****...! ! !*

They are a speaking laboratory. It is then possible to explain the risks and their consequences by the traces of their effects, and to correlate these consequences with **the vulnerability** of the buildings.
What is inevitably very teaching and very immediate!

INTEGRATED CONSERVATION APPRAOCH: A CASE OF SHIRAKAWA-MURA IN JAPAN

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Kazuhiko Nishi: Agency for Cultural Affairs, Ministry of Education, Culture, Sports, Science and Technology

Abstract

Integrated conservation approach has been widely discussed and adapted in development of various sites of cultural heritage in the world. Shirakawa-mura, known as a historical region with traditional Japanese residence architecture, was listed as World Heritage Site in 1995. In 2000, over 1.2 mission tourists visited the site and contributed to local economy. At the same time, however, the problem related to excessive traffic and tourists was identified as a serious factor to deteriorate the quality of daily life of the residents. Local government in cooperation with local community planned and experimented various methods to control traffic along with promoting sustainable tourism. This study focuses on: 1) identifying the problem Shirakawa-mura faces as a world heritage site; 2) highlighting some specific measures and experiment used to cope with growing problem in the preservation district, and 3) identifying characteristics of development of Shirakawa-mura in the context of integrated conservation approach.

Introduction

In the context of conservation and management of cultural heritage of the world, sustainable development and management of the heritage sites has become an important part of the total plan of development. Being registered as a World Heritage Site can give positive effects by attracting people and boosting the development of local economy through an expansion of tourism. At the same time, it is also true that excessive volume of tourists and its sudden development affect local community negatively.

Integrated conservation approach has been widely discussed and put into practice for the development and management of historical sites by professionals and researchers in the field of conservation of cultural property. This approach highlights the importance of holistic planning and management of the sites including government officials, local experts, local community, professionals of various fields such as industrial development, tourism, local investment, law, architecture, civil engineer, transportation, and social development.

This study looks at the case of the World Heritage Site in Japan, Shirakawa-mura. When a small village in rural Japan, Shirakawa-mura, was registered as the World Heritage Site in 1995, the community welcomed it as cultural prosperity of the region. Several years later, however, local residents started to suffer from rapid increase of tourists and consequently, experiencing negative effect on daily living. Local government and community people worked together to develop policies and methods to cope with the problems that community was facing. This study particularly focuses on the management method and development plans introduced in preservation district. It identifies efforts of local government and

community to introduce regional development plan in the context of integrated conservation approach.

Background

Shirakawa-mura, or a village of Shirakawa-go, is located in mountainous area in Gifu prefecture. Its location, however, is closer to Ishikawa and Toyama prefectures, the Northwest of Japan. With annual average temperature of 11C and heavy snow of 2-3m during the winter, it is identified as hazardous snow area of Japan. It has a total population of 2,200 with 912 household[1]. One third of the population is concentrated in the village center, Ogi-machi. In the past, major industry of the village shifted from agriculture to hydroelectric energy, and then to tourism. Currently, 57% of working population is engaged in the third industry, represented by tourism[2].

Shirakawa-mura is known for its traditional Japanese architecture called "Gassho-zukuri" or Gassho-style. Traditionally, local community was active in preserving their traditional architecture, and established "Conservation Committee" in 1971. Further, with the cooperative labor system called "yui" – unite, each household shared its labor power to repair and rebuilt the roof of this traditional architecture, which is made of natural material of locally grown products (Figure 2)[3]. With constant community effort and commitment to preserve its cultural property, it was first identified as Japanese Important Traditional Architecture Preservation Zone in 1976, and then registered as a World Cultural Heritage Site in 1995. As a residential district, it is the first and only World Cultural Heritage Site in Japan.

Figure 1. Shirakawa-mura Overview

Figure 2. Restoration of Gassho-zukuri
Rethatching of roof

Problem

Prior to 1995, the average number of visitors was estimated between 500,000 to 700,000 annually. As shown in Figure 3, after the registration of the World Heritage Site, the number of visitors increased constantly. It increased to one million in 1996, and then it was estimated over 1.5 million in 2002[4]. During the past eight years, the reaction of the local people had become mixed and more complicated[5]. Complaints of the local residents varied from bad mannerism of visitors invading into their daily life to traffic congestion and illegal parking seen everywhere in the preservation district[6]. Since these traditional architectures themselves serve as local people's residents, massive number of tourists directly affects daily living of people in the

village. This section identifies the problems through analysis of quantitative and qualitative data gathered through interviews and surveys [7].

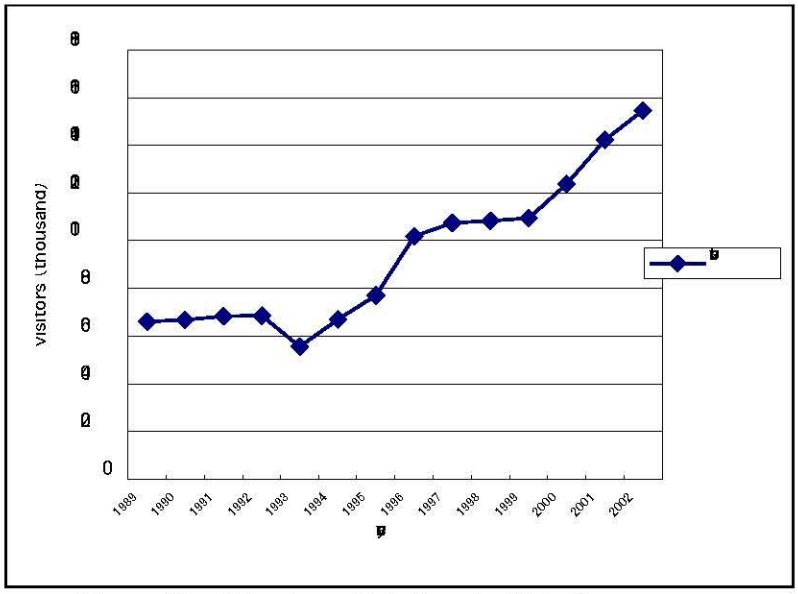

Figure 3. Number of visitors to Shirakawa-mura
Source: Number or tourists in Shirakawa-mura, Shirakawa-mura administration, 2003

The analysis reveals the following four major points: 1) sudden increase of tourists and excessive traffic had negative impact on local community: 2) expansion of tourism business created income gap between tourism business owners and others; 3) expansion of tourism industry increased the abandoned agricultural land; 4) increased number of renovation of houses is gradually changing the landscape of preservation district.

1) Sudden increase in tourists and excessive traffic had negative impact on local community: According to the survey, 49% of the local residents responded the increased number of tourists affected negatively. Negative impact included bad manner of tourists, high density of population during the daytime, traffic pollution, and deterioration of natural environment. Among major problems the local community faced, the excessive traffic was listed as one of the most serious problems. The survey reveals that 68% of local residents suffered from tourist vehicles and sightseeing buses. Traffic jam hampered daily life of the residents. It also increases level of anxiety of traffic accidents, illegal parking, along with excessive noise of the vehicles. In this condition, 87% of the respondents believe that traffic regulation in the preservation district would be necessary to keep their daily living safe and sound.

2) Expansion of tourism business created income gap between tourism business owners and others: As shown in Figure 4, after 1996, the average income for business owners increased drastically, and thus the income gap between the business owners, namely tourism related business, and others became evident. Further, the survey result indicated the residents who are not engaged in tourism business felt more negative impact from increased tourists, and also felt that they only suffer without any gain. This situation created tension between two groups. They even

felt losing good old community mind in the village. In a small community like Shirakawa-mura, such sudden increase in income gap may have negative impact on mind of people.

Interviews with local administration revealed the following. Recognizing above mentioned problem, the administration tried to introduce re-distribution system of public income such as profit from public parking located in the preservation district. They planned to allocate the profit among those who do not own tourist business. However, this plan was not implemented due to the opposition that this system is not totally fair nor justified for tourism business owners.

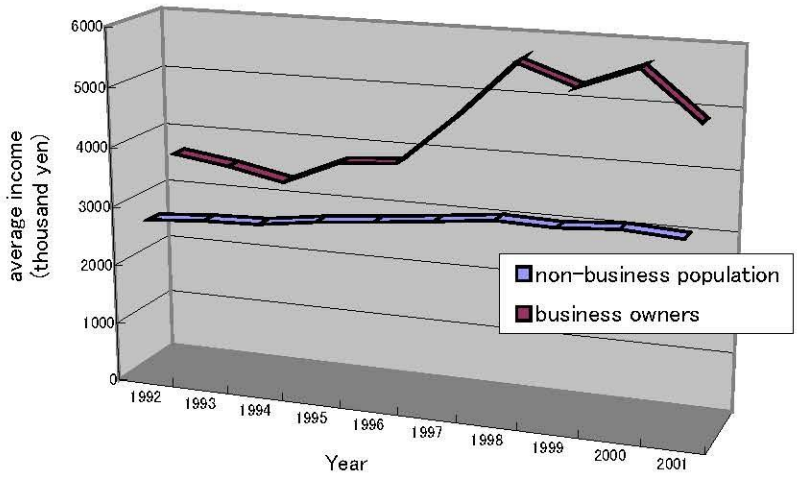

Figure 4: Average Income of Shrakawa-mura population
Source: Annual data document of Shirakawa-mura administration (1993-2002)

3) Expansion of tourism industry increased the abandoned agricultural land: During the last decade, the increase in abandoned agricultural land has become evident. Agricultural land, particularly represented by rice field was seen as an important part of traditional landscape of Shirakawa-mura. In 1976, Ogi-machi had 23 hectors of agricultural land, but it was decreased to 9 hectors total in 2000. Among 9 hectors, an estimated 3 hectors of agricultural land are left uncultivated[8]. Document analysis and interviews find that boost in tourism industry has changed the attitude of local people toward agriculture. In 1980, population engaged in agriculture occupied 17.7 % of total work force but it was decreased to only 1.3% in 2002[9]. Many households own agricultural land for its additional income. Thus, it is often the case that with increased business in tourism, many could not afford to spend time and labor in cultivating agricultural land. Income from parking business and souvenir shops give more profit than selling agricultural products and this reduces people's motivation to keep rice field cultivated. Other analysis includes: an average size of traditional rice field in Ogi-machi is too small to introduce advanced machines, and thus, rice production is considered rather inefficient. However, World Heritage Shirakawa-mura Foundation considers this problem serious and started to introduce experimental methods to cope with this current situation.

4) Increased number of renovation of houses is gradually changing the landscape of the preservation district: Since late 1980's Shirakawa-mura suffered from constant decrease in its population. However, in 1998, after being listed as World Cultural Heritage Site, population saw an increasing trend. It recorded over 2,000 in 2003 after 13 years. Explanation include: a) expanding tourism industry is attracting young generation to return to the village; and b) increased public construction projects also attract labor population[10]. Shirakawa-mura welcomes this trend, particularly increase of young families. However, at the same time, increased number of reconstruction and renovation of houses is affecting the overall landscape of preservation district. Traditionally, since 1971, all requests on reconstruction of architecture have been submitted for approval of Preservation Committee. The number of application increased drastically since 1996 to cope with increasing population of the village. The current guideline on reconstruction of architecture within preservation district allows maximum of 50% expansion to the current residence. Increasing number of such reconstruction of residence is gradually changing the overall landscape of the preservation district. This shows the difficult problem of balancing the demand of residents and conservation of cultural heritage site.

Management methods experimented

Given the background mentioned above, the Shirakawa-mura experimented several methods to deal with the growing problems. This section introduces two particular experiments: 1) traffic control experiment; and 2) agricultural land reform experiment.

1) Traffic control method

In cooperation with the Road Division of the Ministry of Land, Infrastructures, and Transportation, Shirakawa-mura government and community carried out traffic management experiment in 2001. The experiment had four objectives: 1) to test adaptability of traffic control system at world heritage site; 2) to test the feasibility of introducing park & ride system; 3) to see the effectiveness of pre-reserved parking system; and 4) to analyze the economic impact of traffic control to tourism industry[11]. It had four aspects of its organization as shown in Table 1:

Table 1. Traffic Management Experiment in Shirakawa-mura (2001)

methods	details
1. Restricted entry of vehicles to Shirakawa -mura, Ogi district (central part of the world heritage site)	• Between 9:00-15:00 entry to the district by automobile was restricted • Resident pass was issued to the local resident but cooperation to limit the use of automobile was promoted • Special pass was issued to the visitors who pre-registered for special visits including lunch
2. Introducing shuttle buses and bicycles	• A total of three parking lots were created (560 parking space) to introduce shuttle bus to transport visitors • Shuttle bus from parking to the preservation district is free of charge and runs every 10 to 20 minutes

	• Among thee parking lots, one parking was reserved for pre-reserved visitors (85 space, 300yen each) and another parking was prepared for non-reserved visitors (338 space, 500 yen each) • One parking was reserved for sightseeing bus only (2,000 yen) • Free rental bicycles were set up for visitors
3. Pre-reservation of parking lots and discount parking fees	• Internet parking reservation was introduced with discounted price • Reservation desk and mobile phone reservation were set up • Information on parking availability was announced at the above mentioned parking-reservation system
4. Introducing electric automobiles	• Two electric automobiles (five passenger seats each) with drivers were prepared for handicapped visitors • Three electric automobiles (two passengers seats each) were prepared for experimental ride for local residents

Source: Report of Shirakawa-mura basic traffic plan, Gifu prefecture, 2001.

The result of the experiment suggests several positive aspects of this traffic control system. They include: 1) average time of visitors' stay in the district increased by 50% from 1.5 hours to 2.2 hours, and consequently, an average spending per visitor increased by 10%; 2) the level of noise by visitors decreased; 3) over 90 % of visitors responded positive to the introduction of traffic control system; and 4) 70% of local residents requested the introduction of traffic control system.

Despite the experiments in 2001 and 2002, the systematic traffic control management has not yet been introduced. The interviews reveal that 10 percent of residents in preservation district oppose to the traffic control. The dominant reason is the possibility of negative impact on tourist business, particularly for those who own private parking space attached to the shops and restaurants. Shirakawa-mura administration believes that traffic management has to be initiated by local community and thus, has not imposed any measures as a policy. In fact, in 2003, local community of Ogi-machi took an initiative to organize the experiment for three days during the peak season, introducing one-way system to control the traffic. It was planned, organized and implemented by the Ogi-machi management committee. This initiative is considered as a major step for the introduction of appropriate method. With these experiments and survey conducted in the past, the Construction Division of Shirakawa-mura administration suggests the following points in the basic traffic control plan. It identifies the maximum visitors that preservation districts could hold per day is 10,000. The plan would not support constant increase of visitors. Rather, it aims at providing tourism experience of high quality within maximum number of visitors per day. The specific measures include reservation system for parking with price control, traffic control within preservation districts (30days per year), and allocation of 850 parking spaces to several different locations.

2) Agricultural land reform experiment

With growing problem of abandoned agricultural land, several different experiments took place in Shirakawa-mura since 2000. Conservation Committee formed a team to cultivate the land with technical support of World Heritage Foundation. In 2001

and 2002, an Old People Club and a public school respectively took an initiative to cultivate unused land and produced rice. Although such experiments had a positive effect, the World Heritage Foundation finds the necessity to introduce systematic plan to deal with 3 hectors of uncultivated agricultural land. Board of Education and Industry Division of Shirakawa-mura administration spent last three years to analyze the current situation along with research on alternative methods used in other parts of Japan. Such alternative methods include land-ownership system, introducing subsidy to cultivation of land, rehabilitating agricultural land with environmental education. The difficulty includes the balance between introducing subsidy and keeping motivation of current farmers who produce rice and other agricultural produce without additional subsidy. Further, since the Shirakawa-mura community has kept the policy of "not for sale" "not for rent" and "not to destroy" with regards to the property in the village for long time, it is important that land-ownership method is limited within the residents of Shirakawa-mura.

Integrated Conservation Approach in Shirakawa-mura

Analysis of the evolution of development plans of Shirakawa-mura as well as research on the activities found that integrated conservation approach is reflected in the effort of Shirakawa-mura to preserve the cultural heritage site in sustainable manner. These initiatives include: 1) World Heritage Shirakawa-go Conservation Foundation was established in 1996; 2) the Fifth Development Plan (2001-2010) of Shirawa-mura is characterized by holistic approach to development; 3) traditional "Conservation Committee" has evolved to reflect the voices of various stakeholders; 4) Integrated plan of action was formulated to tackle the existing problems.

1) World Heritage Shirakawa-go Conservation Foundation:
World Heritage Shirakawa-go Conservation Foundation was established in 1996. The Secretariat consists of four professionals, headed by a member of Board of Education of Shirakawa-mura, and it includes one architectural engineer. In addition, during tourist season (April to November) additional staff members are hired to assist its management. The major activities of the Foundation include research, assistance and guidance of world heritage conservation activities, management of public parking, pre-examination of reconstruction applications, partial restoration of cultural architectures and cooperating with major construction activities in preservation districts. The Foundation is characterized by its close collaboration with different divisions of Shirakawa-mura administration, such as Environmental Planning Section (General Affairs Division), Agriculture and Forestry Section, Construction Section, and Tourism Section of Industry Division. Prior to this Foundation, each section worked relatively independently. This Foundation makes it possible to share information and activities among experts and people involved in cultural heritage conservation, reflecting various opinions and other related activities.

2) Evolution of Development Plans
Five Development Plans were prepared in the past in Shirakawa-mura. Although the effort of local community to preserve cultural properties is stated in these plans, each plan had different emphasis reflecting evolution of the region. The first three Development Plans (early 1970s-1995) mainly aimed at development of industries to support economic activities in the region. For example, the Second Development Plan (1975-1985) focused on the tourism to improve living of people in hazardous

snowy region. The Third Development Plan (1986-1995) is then emphasized on preservation of cultural properties as well as development of viable local products. The earlier development plans were relatively single sector oriented to promote particular segment of local economy rather than introducing holistic approach to the regional development[12][13]. The Fourth Development Plan (1995-2000) identified the importance of improved basic infrastructure along with preservation of natural environment, as well as preservation of cultural heritage for the next generation[14].

The Fifth Development Plan (2001-2011) is characterized by its integrated objectives of development of nature, people and living, and its economy[15]. The interviews and document analysis reveal the following three major aspects of this plan: 1) integration of tourism development, cultural preservation, and quality of individual living; 2) bottom-up approach as a process of development; 3) local residents as the center of development plan with emphasis on young generation. First, for the first time, development of tourism is identified as a part of cultural oriented policies of development. It also emphasizes the importance of tourism development in relation to the other sectors. Management plan of the heritage site together with enhanced quality of living of local community has become the focus of its total development plan. The preservation of cultural properties is not only seen as tourism attraction, but rather, it is identified as non-monetary reward and pride of the local community. Second, it is also noted that bottom-up approach was utilized as a process of collecting residents' opinion to organize the Firth Development Plan. The third parties carried out interviews and organized community meetings to widely listen to the voices of local residents. Third, the local residents themselves are the center of this development plan. "For villagers to read", "Easy to understand", "With the language of Shirakawa villagers" were the key factors always considered. Unlike the previous development plans, involvement of external development experts was kept minimal, and rather, the voices of different groups in the community were emphasized. Particularly, active involvement of children was considered most necessary as an important next generation, and every child in the village submitted their opinion in writing. This development plan was distributed in each household in Shirakawa-mura. Interview with the team in charge of development plan supported the idea that a listing as a World Cultural Heritage Site positively increased the sense of responsibility of villagers, and thus, the organization of Fifth Development Plan received strong support of the community.

3) Evolution and initiatives of Conservation Committee since 1971

Shirakawa-mura "Conservation Committee" was established in local community in 1971. With the initiatives of local groups, the committee aimed at protecting environment and landscape of the region, particularly, in preservation districts. Until today, any request of changes such as new construction, renovation and road pavement are submitted to monthly meeting of "Conservation Committee". Standard procedure of the monthly meeting includes analyzing the request of renovation for approval to its plan according to the existing guidelines and resident regulations (Figure 5). During the 15 years between 1977 and 1991, 461 cases were examined and majority of the plans were either approved or reformulated for approval based on guidelines. Further, it should be noted that the process of its application involves different groups, such as Ogi-machi Preservation group, Board of Education, and Council of traditional building preservation (Figure 5). This indicates the any changes within the preservation districts are well informed and examined by different

levels of local community and administration. Normally, this process takes between two weeks to one month. This self-sufficient procedure illustrates a strong commitment and the initiatives of the local community to preserve the traditional and cultural properties as well as improving the quality of life of local residents.

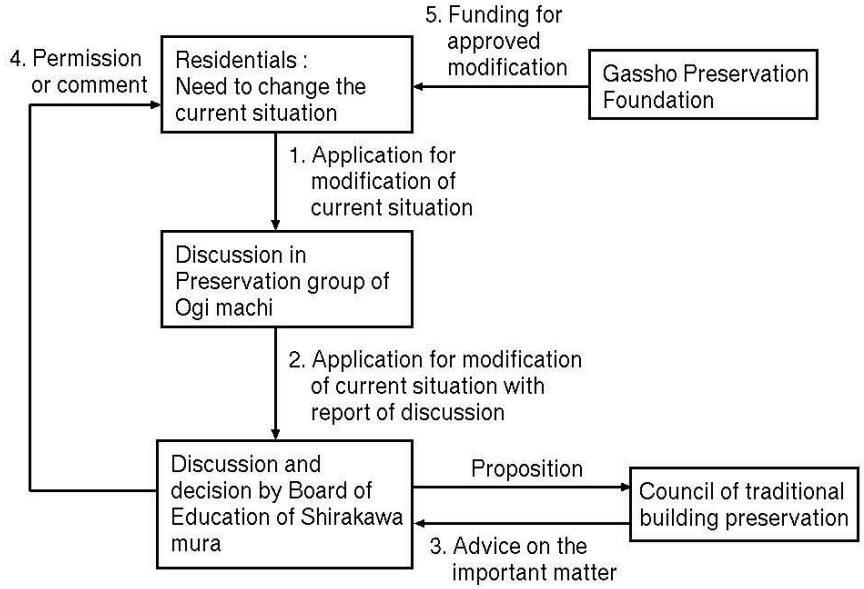

Figure 5: Application Procedure for Renovation of Architecture
(Source: Document of Shirakawa-mura administration, Shirakawa-mura, 2003)

4) Integrated Plan of Action

Since late 1990s various studies took place to deal with the growing problem. Shirakawa-mura administration carefully analyzed these studies and produced a plan of action, called "A total plan of Shirakawa-mura". The content of this plan of action has three major areas: traffic control, agricultural land reform and preservation of landscape. Since traffic control and agricultural land reform plans were discussed earlier in this paper, this section covers preservation of landscape plan.

Preservation of landscape Plan: Construction Division, Agricultural Division, and Board of Education work together in formulating preservation of landscape plan. It is noted that importance of preservation of Gassho style houses as a main architecture is easy to receive attention. However, preservation of landscape includes other properties and objects surrounding Gassho style houses. Board of Education of Shirakawa-mura takes initiatives to identify other important cultural properties to be included in conservation guidelines. Preservation Charter of Cultural Preservation of Shirakawa-mura, clearly specifies that restoration of cultural property of the region shall follow the traditional techniques with materials locally available [16]. This is to follow Nairobi Declaration of 19th UNESCO General Conference (1976), defining the importance of the balance and harmony when restoring the cultural properties. In Shirakawa-mura, the restoration activities carefully select appropriate stonewall and hydro facility equipment, rather than creating totally new facilities.

Problem identified in the region is inter-sectional. It includes traffic control issue, abandoned agricultural land, as well as overall landscape of the preservation

districts. In order to cope with these problems, various sectors such as transportation division, tourism division, agriculture sector, education and culture sectors, as well as construction division, need to work together. This plan of action reflects such needs and closer cooperation among different sectors are required to implement the plans.

Conclusion

The study looked at the case of Shirakawa-mura, a World Heritage Site in rural Japan. This case represents the complexity of preservation of cultural property as residential site, giving special attention to the balance between the tourism development and keeping good quality of life of local residents. Analysis of development plan of Shirakawa-mura and activities and experiments conducted in the region shows the efforts and commitment of local community to preserve their residential areas as traditional cultural heritage. At the same time, evolution of "Conservation Committee" and the new process to prepare the latest development plan created the opportunity of local voices to be heard and reflected in development plans. It also illustrated how the positive effect of being listed as a World Cultural Heritage Site, along with the growing problems they faced triggered local community to develop its own improvement plan in integrated manner. This case shows the integration of different sectors of local government and community is a key to its sustainable development, along with conservation of cultural heritage site, particularly, in small and traditional village of Shirakawa-mura.

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TITLE:

Succession and Tourism-Use of Intangible Cultural Heritage: the Roles of Local Government and Communities in the Old Town of Lijiang, China

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ABSTRACT:

It goes without saying that any consideration of "preserving the heritage in its entirety" would necessitate that we also attach importance to such intangible cultural resources as one of the elements that constitute the heritage environment.

In light of such considerations, this study aims to elucidate the currently prevailing status of the preservation of intangible resources in World Heritage cities and the use thereof in tourism. The study will then consider the role played by local communities as the successors to and perpetuators of such intangible cultural resources. As a specific case in point, the study examines the old town of Lijiang, China, where progressively rapid moves to turn itself into a tourist site have been under way since its listing as a World Heritage site back in 1997. I look particularly at traditional handicraft techniques and carry out on-site interviews with local manufacturers of handicraft items, in order to clarify the processes involved in the creation of new tourism-related merchandise in accordance with traditional handicraft techniques. At the same time, the study also aims to clarify the stance of local government vis-à-vis the use of intangible cultural resources to produce tourism-related merchandise. In light of these findings, I will present some proposals concerning the roles of local government and regional communities in perpetuating their intangible cultural assets in the future.

SUCCESSION AND TOURISM-USE OF INTANGIBLE CULTURAL HERITAGE: THE ROLES OF LOCAL GOVERNMENT AND COMMUNITIES IN THE OLD TOWN OF LIJIANG, CHINA

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Abstract

This study aims to elucidate the currently prevailing status of the preservation of intangible resources in World Heritage cities and the use thereof in tourism. The study will then consider the role played by local communities as the successors to and perpetuators of such intangible cultural resources. As a specific case in point, the study examines the old town of Lijiang, China. Particularly traditional handicraft techniques are looked at and on-site interviews with local manufacturers of handicraft items are carried out, in order to clarify the processes involved in the creation of new tourism-related merchandise in accordance with traditional handicraft techniques. In light of these findings, some proposals concerning the roles of local government and regional communities in perpetuating their intangible cultural assets will be presented.

1. Introduction

1.1 Research Objective

Through focusing on the production of "tourist art", the aim of this paper is to clarify the present situation regarding the protection and tourist use of intangible resources in world heritage cities and communities, and to make clear the issues which face local communities in coping simultaneously with both the succession and tourist use of these resources. Culture that is produced for tourist use, or existing culture that is stimulated by tourist activities to be renewed for tourist use, is known as "touristic culture" (Picard[1]). Within this touristic culture, "tourist art" refers to folk art (works of art and craft which have been developed within and have real relevance for the way of life of a specific cultural or ethnic group) that is produced for and marketed to tourists (Graburn[2]).

1.2 Research Background

As UNESCO and other international organizations have pointed out, the number of tourists visiting world heritage cities and communities has increased in recent years following their listing as world heritage sites, and the question of how local communities and administrations can control the impact of this phenomenon is becoming a major issue. In other words, the issue is how to manage the conservation and succession of traditional culture, while at the same time promoting sustainable tourism use (Office of the UNESCO Regional Advisor for Culture in Asia Pacific[3]). However, discussion of such issues thus far has been almost entirely confined to tangible property listed as world heritage such as buildings, monuments and sites (physical cultural properties, real estate and so on). On the other hand, there has been insufficient discussion on the issue of intangible cultural heritage, which is passed down from earlier generations for each specific region, and at the present time the body of research available on this aspect is almost non-existent.

Recognizing this situation, Yamamura[4] and Drdácký[5] have reported on the case of old towns in Asia and Europe listed as world heritage sites, where the outward appearance and scenery of designated buildings is carefully planned and conserved by the nation, but where the population structure and people's lifestyle patterns have been drastically transformed by the rise in tourism, and where traditional culture is also being drastically altered and is vanishing. As a result, they raise alarm bells concerning heritage preservation policies which are skewed towards physical structures. Taking into account of this situation, it could be claimed that there is an urgent necessity to examine methods of "holistic heritage preservation", which would include attaching higher importance to intangible heritage as one element of the structure of the heritage environment of such preservation sites. As mentioned before, there is a severe lack of a body of basic research on this matter, and so the first urgent task would be to grasp the situation of intangible heritage in various world heritage cities and communities, then use this as a basis to deepen discussion on ways of protection and succession, and on ways of sustainable tourism use.

1.3 The characteristics of the present research

Within the above context, as an example of tourist art created in a world heritage city, this paper will deal with art and craft works utilizing religious images, to be found in the Old Town of Lijiang, which is situated in the Lijiang Naxi Autonomous County in Yunnan Province, China (hereafter referred to as Lijiang). Specifically, attention will be paid to tourist art based on the motifs and production techniques of *Dongba* painting, which is the religious painting characteristic of members of the *Naxis* of Lijiang. So far, there has been no report on the actual situation of tourist art relating to *Dongba* painting. As the first international report dealing with tourist art in Lijiang using data based on empirical survey research, this paper is highly significant.

2. Summary of Research Respondents and Study Method

2.1 Native *Naxi* people of Lijiang and *Dongba* painting

The *Naxi* Tribe is a minority group of people who have their own language, writing system and religion. The total population of the group is estimated at 278,000, and 66.5% of the population, or 198,000 *Naxis*, live in Lijiang, where they are the native people (population figures from 1996). Situated in the center of the city, the Old Town of Lijiang, Dayan town, is designated as a world cultural heritage site. *Dongba* culture is a culture specific to the *Naxis*, based on "*Dongba* religion", which is a religion centered on animism. The term "*Dongba*" signifies a male shaman, and the priesthood is passed down specific families in a hereditary fashion (He ed.[6]).

Originally, *Dongba* art were paintings created for religious purposes, and they depict myths and scriptures, using motifs such as spirits, people, plants and animals, monsters and *Dongba* pictographs (over 1,400 pictographs specific to the *Naxis*' writing system) to illustrate sutras and festival scrolls (Guo ed.[7]). However, from the establishment of the People's Republic of China in 1949 until the adoption of open policies at the end of the 1970s, the *Dongba* religion, like other religions at that time, had its beliefs restricted by the government, and in particular it was banned during the period of the Cultural Revolution (1966-1976). During this time, not only did *Dongba* festivals practically disappear from the Lijiang area, but the succession of *Dongba* culture from generation to generation was also brought to a standstill (Gao ed.[8]). As a result, *Dongba* paintings, as traditional religious art, virtually ceased to

be produced. On the other hand, since 1949, *Dongba* art has started to be produced not as religious art but as pure works of art. Artists from Lijiang who have acquired the traditional techniques of *Dongba* art have also absorbed new techniques and, using traditional designs and motifs and *Dongba* pictographs, have started to produce pictorial works using new methods of expression. In the region, this new form of *Dongba* painting is known as "Contemporary *Dongba* art" (Guo ed.[7]). Furthermore, since the designation of the Old Town of Lijiang as a world cultural heritage site in 1997, and the consequent sudden rise in tourism, contemporary *Dongba* art has started to be produced as tourist souvenirs, that is, adapted as tourist art (Yamamura et al.[9]). These tourist souvenirs are mainly produced using wooden blocks, on the front of which are carvings of *Dongba* art. However, there are a wide variety of styles depending on the craftsperson, and there is no standard umbrella term for existing products. Therefore, for the sake of convenience, the phrase "contemporary *Dongba* crafts" will be used in this paper as a general term for the craft products which are produced for tourists, using *Dongba* art.

2.2 The general situation of contemporary *Dongba* craft workshops

In the main tourist area of the Old Town of Lijiang, as of June 2000, there were 27 shops producing and selling contemporary *Dongba* crafts (Yamamura et al.[9]). All of these 27 shops are workshop-type, individually managed shops which produce and sell crafts on-site (hereafter referred to as contemporary *Dongba* craft workshops). Table 1 shows the types of proprietors and the length of time the present workshops have been operating. Based on the family registration system currently used in China, the proprietors have been divided, according to their registration types, into "permanent inhabitants", who reside permanently in Lijiang, and "Temporary residents (immigrants)", permanent inhabitants of areas outside Lijiang who only have a "provisional residence permit" (Table 1). The result is that just over half of the proprietors (14 people) are permanent residents, mostly the *Naxi*s, while almost half (13 people) are immigrants, 12 of whom belong to the *Han*s, the major ethnic group of China. In other words, approximately half of the contemporary *Dongba* craft workshops are managed by immigrant *Han* people who have no previous contact with *Naxi* culture.

Table 1. Year of opening and categories of proprietors

Year of opening	Population of proprietors				Total
	Permanent inhabitants		Temporary residents		
	The *Naxi*s	The *Han*s	The *Naxi*s	The *Han*s	
1996	1	0	0	1	2
1997	2	0	0	1	3
1998	0	0	0	1	1
1999	9	0	0	4	13
2000	0	2	1	4	7
N.A.	0	0	0	1	1
Total	12	2	1	12	27

2.3 Study Methods

Taking into account of the above situation, in order to clarify the actual conditions of the creation and production of contemporary *Dongba* crafts, empirical research was carried out in September 2001 in the following manner:

(1) In order to carry out a detailed interview investigation, participants were selected from among the proprietors of contemporary *Dongba* craft workshops (hereafter,

workshop proprietors). Participants were carefully selected from among the 27 proprietors to provide a balance of representation including workshops which have been in operation from the beginning as well as which have recently opened, and workshops run by local *Naxi* proprietors as well as those run by immigrants. Of the selected representatives, five proprietors agreed to take part in the study.

(2) The author visited the workshops in person and carried out one-to-one interviews in Mandarin directly, gathering and confirming basic information about the proprietors themselves and the conditions of operation of the workshop.

(3) In addition to the above, supplementary data were also collected as necessary from other workshop proprietors, ordinary inhabitants and local public institutions.

3. Results

3.1 Particulars of the organization of contemporary *Dongba* crafts

Based on data obtained from interviews with workshop proprietors, Table 2 shows basic circumstances, while Table 3 summarizes the motivation for starting the shops and the acquisition of production techniques.

Table 2. Basic data on interview respondents

Proprietor (Age/Sex/ Ethnic group)	Address of workshop	Category of family registration (Place of origin)	Last educational institute	Previous employment (Employer)	Details of workshop	
					Year of opening	Ownership of the shop building (Monthly rent)
A (33/male/ the *Naxi*)	Guangyi St. Xinyuan Alley	Permanent inhabitant (Lijiang)	High school	Researcher (Lijiang County Museum)	1996	Private owner rented house (1,100CNY)
B (27/male/ the *Naxi*)	Guangyi St. Xianwen Alley	Permanent inhabitant (Lijiang)	Junior high School	Package designer (Lijiang Beer Factory)	1997	Public owner rented house (700CNY)
C (20/male/ the *Naxi*)	Guangyi St. Xianwen Alley	Permanent inhabitant (Lijiang)	Primary school	Part-time craftsman (Woodcarving workshop)	2000	Private owner rented house (200CNY)
D (33/male/ the *Han*)	Market Square	Temporary resident (Sichuan)	College	Teacher (Vocational junior high school)	2000	Private owner rented house (1,150CNY)
E (29/male/ the *Han*)	Xinhua St. Lower Huangshan Alley	Temporary resident (Guangxi)	Primary school	Jade seller (Self employment)	2000	Private owner rented house (300CNY)

Note: 1 CNY (China Yuan Renminbi) = 0.12 USD

According to the interview, Proprietor A, who was originally employed at Lijiang County Museum to research the disappearing *Dongba* pictographs and art, decided to set up his own enterprise, using the skills he had researched, in order to increase his income. He resigned from the museum in 1993 and took up the production of original paintings and engravings in paper and wood using *Dongba* art as subject matter. This is said to be the beginning of the production of contemporary *Dongba* crafts as tourist souvenirs in the Old Town district (according to interviews with Proprietor A himself and other workshop proprietors). Later, Proprietor A opened a shop directly marketed at tourists in the Old Town of Lijiang in 1996, and this was the first such shop to open in the Old Town district. Following this, Proprietor B (*Naxi*), a friend of Proprietor A, who at the time was in charge of package design at "Lijiang beer factory", was influenced by Proprietor A, and decided

to resign from the factory in 1997 and set up his own workshop, saying that he "wanted to make a living from what was originally a hobby – woodcarving and engraving". As is apparent from Proprietor C's comment that "woodwork is a skill passed down from our ancestors" (Table 3), *Naxi* men have a long tradition of using tree roots from the mountains around Lijiang, which are rich in timber resources, to make furniture and ornaments in the shape of animals. This is generally known as "*Gen-diao*" (woodcarving) and is popular even now as a hobby, with *Naxi* men often learning the skills from their families (Guo ed.[7]). The trigger for organizing the production of contemporary *Dongba* crafts, mixing traditional woodwork skills with techniques of *Dongba* art, was the original idea of young *Naxi* locals. In this way, contemporary *Dongba* crafts were originally the brainchild of young *Naxis*, but once Proprietor A opened the first workshop in 1996, *Han* immigrants soon started to arrive (Table 1), and the number has increased since then, so that now, as mentioned in the previous section, almost half the workshops are managed by the *Hans*.

Table 3. Motivation for opening workshop and acquisition of craft techniques

Proprietor (Ethnic group)	Motivation for opening workshop	Acquisition process of *Dongba* art knowledge and techniques/ product design method	Acquisition process of woodcarving techniques
A (the *Naxi*)	"The wages of my previous job were no good and I thought I would use my skills and start my own business."	"I originally had some basic knowledge of *Dongba* art. I studied *Dongba* art and drawing techniques in my previous job. I arrange and design my own products freely based on the design of original *Dongba* art."	"I learnt woodcarving techniques through my daily life and now they are part of my nature."
B (the *Naxi*)	"I wanted to make a living from what was originally a hobby – woodcarving and engraving"	"I knew to some extent the meaning in *Dongba* art. I use my own style for drawing. The majority of my products are creations based on *Dongba* design. I often refer to books on *Dongba* art for inspiration."	"Through my daily life, woodcarving techniques became part of my nature."
C (the *Naxi*)	"In Lijiang, the income for woodcarving is good."	"I knew to some extent the meaning in *Dongba* art. I use my own style for drawing. The majority of my products are creations based on *Dongba* design. I often refer to books on *Dongba* art for inspiration."	"Woodwork is a skill passed down from our ancestors. My parents taught me the skill. Later, my skill was improved through my part-time job."
D (the *Han*)	"I had no interest in my previous job."	"Mr. A taught me the meanings and drawing techniques. I have two types of designs. One is fully creative, another is using traditional designs as they are."	"After I moved to Lijiang, I learnt the basics of woodcarving techniques from Mr. A."
E (the *Han*)	"The local government banned selling jade and income was no good. In Lijiang, woodcarvings are a popular souvenir recently and the income is good. Although I have no experiences I thought I would try it."	"I learnt the basic knowledge of *Dongba* art from the *Naxis* and some books in my daily life in Lijiang. I use my own style for drawing. The Design of my products is fully creative. Although I don't follow any examples to create them, I often refer to my own handicraft experiences and other craftsmen's *Dongba* art for inspiration."	"I have experience making and selling woodcarvings in business before. I learnt the techniques then."

Note 1: A-E corresponds to the people in Table 2.
Note 2: See Yamamura et al.[9] for details regarding the prohibition of sales of jade in the Lijiang Old Town.

3.2 The acquisition of knowledge and techniques of *Dongba* art

When Proprietor A and Proprietor B opened their workshops in 1996-7, preceding the designation of Lijiang as a world heritage site, there was a trend of re-assessing the value of native culture in Lijiang. Concerning *Dongba* pictographs and art, Lijiang County Museum set up a short course for local residents in February 1995 entitled "*Dongba* Culture School", where reading and writing were taught. At the time,

Proprietor A was actually one of the teachers on this course. This course was continued until 1998, and produced a total of 135 graduates. Most of the course participants were local residents in their teens and twenties, and some of them went on to open the early workshops (according to interviews with Proprietor A. and Interviewee M, a researcher at Lijiang County Museum). Considering the fact that there was no place for the production of *Dongba* art as religious art, and that the religious significance of *Dongba* art was being lost among ordinary people, the creation of this kind of opportunity for citizens to gain a common knowledge of original *Dongba* art, and the resulting spread of the knowledge and skills of production of contemporary *Dongba* crafts can be seen as serving an important role. In fact, the period that this course was held coincided with when Lijiang was experiencing a sudden rise in tourism, and gradually the number of course participants who purely wanted to learn about the values of *Dongba* culture was exceeded by those who wanted to learn the techniques of producing tourist souvenirs. As a result, there was a strengthening of the opinion among the administration and in the museum that "although the aim of the course is the protection and succession of cultural heritage, the existence of the course is actually encouraging the commercialization and misuse of cultural heritage, and cannot be acknowledged as an educational activity of the museum". Furthermore, the museum itself suffered from a lack of funds for running the project, and so the course was discontinued in 1998. Since then, the museum has consistently taken the standpoint of opposing tourism use of *Dongba* art, and there are no prospects for restarting the course (according to an interview with the aforementioned Interviewee M.).

At present, systematic research into, and conservation activities for, *Dongba* art in Lijiang are mainly carried out by two institutions, namely, the County Museum, which is a public institution of Lijiang County, and the *Dongba* Culture Research Institute. In particular, the *Dongba* Culture Research Institute has gathered 8 young people in their teens from various parts of Lijiang who already have some familiarity with *Dongba* culture, and is taking charge of training them as the next *Dongba* generation. Through these kinds of activities, the revival and succession of painting production techniques is gradually being advanced. However, both the Research Institute and the Museum are taking a standpoint of consistent opposition to the commercial use of *Dongba* art for tourist purposes, claiming that "clear abuse of the meanings of pictographs and paintings is striking, leading to disorder in ethnic culture", and they will have nothing to do with the production of contemporary *Dongba* crafts (according to an interview with *Dongba* Culture Research Institute Assistant Researcher Shi-Ying Wang).

3.3 Product pricing and average monthly sales

Table 4 summarizes the product sales and business situation of the 5 workshops where interviews were conducted. As can be seen, in those workshops managed by the *Naxis*, product prices are at relatively high level but average monthly sales are low. On the contrary, in workshops managed by immigrant *Han* people, product prices are at lower levels yet overall sales figures are higher. In terms of capital for setting up business, the immigrants have an advantage. In this way, it can be hinted that the role of immigrant *Han* people is significant in the commercialization of contemporary *Dongba* crafts as a trade. It is probably valid to say that this shows a discrepancy between different ethnic groups, with the *Naxis* lacking the funds, know-how and skills to produce commercial products for profit in Lijiang, which still has a very short

history as a tourist region. Regarding the price difference, Proprietor A, B and C all answered that "*Naxi* proprietors spend a lot of time making highly elaborate products, so they can't reduce the prices" (according to interviews with the three). On the other hand, the level of knowledge of *Dongba* art and woodcarving techniques of the immigrant *Han* people is comparatively low. However, their ability to produce commercially viable trade products is superior, as are their capital reserves and business know-how, and they have started to make products which are cheap and at the same time interesting as souvenirs (according to interviews with Proprietor A, B and C, and with *Dongba* Culture Research Institute Assistant Researcher Shi-Ying Wang). This explains why, in spite of the fact that the product prices of immigrant *Han* proprietors are much lower than those of *Naxi* proprietors, the overall sales of the *Hans* are about three times higher than the sales of the *Naxis* (Table 4).

Table 4. Product prices and business situation of workshops

Proprietor (Ethnic group)	Approximate capital amount for starting the shop (means of preparing capital)	Average price		Average sales volume (monthly total)
		Wooden engraved picture (large)	Wooden engraved picture (small)	
A (the *Naxi*)	12,000CNY (From personal savings)	500CNY	100CNY	A little more than 1,000CNY
B (the *Naxi*)	1,000CNY (From personal savings)	4,000CNY	1,000CNY	A little more than 1,000CNY
C (the *Naxi*)	2,000CNY (From personal savings)	500CNY	200CNY	Nearly 700CNY
D (the *Han*)	12,000CNY (From personal savings)	300CNY	40CNY	Nearly 3,000CNY
E (the *Han*)	15,000CNY (From personal savings)	280CNY	40CNY	Nearly 3,000CNY

Note 1: A-E corresponds to the people in Table 2.
Note 2: 1 CNY (China Yuan Renminbi) = 0.12 USD
Note 3: Wooden engraved picture (large): Circular wooden block of approximately 30-40cm diameter carved and colored in *Dongba* art. Wooden engraved picture (small): Circular wooden block of approximately 15cm diameter carved and colored in *Dongba* art. In all cases, the same raw materials obtained by the same sales route are used, with the wood of an equal standard, so prices are comparable.

Obviously, the trend of prices and sales outlined above comes from only the five cases of workshops represented in this study, and does not constitute statistical proof since the prices of all the shops in the Old Town were not surveyed. However, *Naxi* proprietors of other workshops have also remarked that: "the immigrants have too strong a business sense. We local *Naxis* are creating culture, but they're just making crafts for money". This indicates the existence of a price difference between ethnic groups (according to an interview with *Naxi* workshop proprietor F). From these findings, it appears that *Naxi* proprietors tend towards producing contemporary *Dongba* crafts with the aim of making high-quality products related to their own culture. For example, the previously mentioned comment by a *Naxi* proprietor that he was "creating culture" demonstrates the consciousness that contemporary *Dongba* crafts, based on *Dongba* art and woodcarving, are still an aspect of ethnic cultural heritage which should be protected by the *Naxis*.

4. Discussion

4.1 Issues concerning the preservation and succession of intangible heritage

First of all, attention should be drawn to the fact that the production of *Dongba* art, as it has traditionally been passed down for generations as religious art, is now hardly practiced in the local community. This means that the original intangible heritage that

should guarantee the quality of contemporary *Dongba* crafts as tourist art has been virtually lost from general social life. Basically, this kind of intangible heritage has been passed down because it constitutes the wisdom of an ethnic lifestyle, and once the social significance of the heritage has been lost, as is the case with *Dongba* religion, it becomes impossible to continue the heritage within the regional society. The task of protecting and continuing intangible heritage is an unprofitable one, and though for the time being it is realistic for the *Dongba* Culture Research Institute and other existing public sector institutions to undertake it, the succession of heritage requires a great deal of expense, and so specific public aid from the government and other bodies is indispensable. In general, when it comes to the protection of cultural heritage, the restoration and repair of historical buildings and suchlike tends to take priority, and the protection of intangible heritage, being difficult to grasp, tends to be pushed into second place. This is exactly what happened in Lijiang, where concrete protection plans are only in force for the buildings of the Old Town designated as world cultural heritage, and where there are no current concrete plans and no public aid for intangible heritage protection (Yamamura et al.[9]).

Even at the *Dongba* Culture Research Institute, the public institute where efforts are being made to assure the succession of *Dongba* art, the present situation is that almost all the funds for activities come from international financial aid (according to an interview with *Dongba* Culture Research Institute Assistant Researcher Shi-Ying Wang). Furthermore, there is presently no system for using financial aid and profits from tourist trade for these kinds of protection and succession activities. In order to develop a system for promoting such activities, and in order to establish a financial aid structure, administrative policies and practice are urgently required.

4.2 Issues regarding access to heritage information

Next, attention should be drawn to the way in which information regarding the significance of *Dongba* art is provided to producers of tourist art, and the importance of this considered. The facts that, in present Lijiang, there are hardly any *Dongba* people presiding over the *Dongba* religion, and that associated religious events and so on are also in decline, mean that it is almost impossible to obtain this kind of information in everyday life. Also, as mentioned earlier, the County Museum and the *Dongba* Culture Research Institute, which are carrying out activities to protect and continue *Dongba* art, both refuse to have anything to do with contemporary *Dongba* crafts. In other words, there is no system or network for ensuring that the results of protection and succession activities are reflected in the quality of actual tourist art. In these circumstances, the producers of tourist art are making and selling products according to their own individual and arbitrary interpretations of the meaning and skills of *Dongba* art. Also, even if workshop proprietors are motivated to study *Dongba* pictographs and *Dongba* art, their only options are to study under former researchers like Proprietor A, or to gain fragmented knowledge from books, existing *Dongba* art or local residents. In other words, the quality of contemporary *Dongba* crafts is entirely entrusted to individual proprietors, and it is difficult to assert that the producers have a correct understanding of the information available. Therefore, it has to be said that it will be very difficult to improve the overall quality of contemporary *Dongba* crafts and to ensure their continued development.

Taking into account these circumstances, in order for producers to obtain accurate information about heritage, it is necessary for some kind of link or network

to be established between producers and institutions in charge of protection and succession, and for access to information about heritage to be established. On this point, the necessity can be understood as the right stressed by ICOMOS in the International Cultural Tourism Charter as the "physical, intellectual and/or emotive access to heritage and cultural development" (Brooks[10]). In this way, if access to heritage information could be assured, and accurate information could be transmitted to producers, and if the quality of contemporary *Dongba* crafts could be improved, then tourists' interest and knowledge could be heightened through the marketing of such tourist art, and subsequently people might become more interested in the real art, or in the original heritage. It is necessary for institutions responsible for the protection of heritage to understand this point, and to provide access to information to those in the tourist trade in a more pro-active way.

4.3 Issues concerning the discrepancy between ethnic groups

When focusing on the business conditions of contemporary *Dongba* craft workshops, it is clear that *Naxi* residents, who should be the original successors of the culture, are relatively weak in a competitive market, and that there is a possibility that they are not able to show enough independence in the process of commercialization and industrialization of their own heritage. As a context for this phenomenon, the lack of appropriate policies in this area is partly to blame. That is, in spite of the fact that Lijiang County administration, as part of its policy for the promotion of tourism, gives priority to businesses which make and sell contemporary *Dongba* crafts among applications for permission to open souvenir shops in the central district of the Old Town, the policy is limited to only giving permission for such applications as a priority, and there is no policy of business aid in terms of the capital and skills needed for starting up businesses (Yamamura et al.[9]). As a result, the local *Naxis*, even if they want to enter the tourist trade, tend to miss opportunities. In other words, it can be seen that it is relatively difficult for the local *Naxis*, who cannot compete with immigrant *Han* people in terms of capital and know-how, to enter the market.

In these circumstances, there arises a need for the administration to support residents who need such capital and know-how. For example, if the *Naxis* are able to become more actively involved in the regional industry through the support of administration industrial promotion policies, there would not only be an increase in attempts at the creation of works that make the most of the original regional context, it would also become possible for the *Naxis* themselves to effectively promote the attraction of the area and the importance of intangible heritage to tourists. At the same time, once immigrant people have understood the value of the area's cultural heritage, important issues will be how they should integrate into a society dominated by native *Naxi* people, how they can create a society where they can live together in harmony, and how their produced works should be put to use. In other words, the big issue in the area is not only the production of tourist art, but also the issue of how the immigrant population can integrate into the society as a whole as new residents, and how the new and original residents together can work to construct a new community.

5. Conclusion

Because this paper was restricted to an analysis of contemporary *Dongba* crafts as tourist art, the knowledge that can be gained from it is bound to be limited. However, what can be strongly asserted from this paper is that, in order to balance the

succession of intangible heritage with tourism use in a sustainable fashion, a reciprocal relationship on both the information and financial front needs to be properly constructed between the tourist art market and the protection and succession of its cultural parent body of intangible heritage. The role of the government and other public sector bodies is important in this process. That is, in terms of information, knowledge regarding the value and importance of heritage needs to be taken to the tourist art market and used to raise the quality of tourist art. In financial terms, if public aid and profits from the tourist art market could be used as capital for the protection of heritage, it would become possible to promote the protection and succession of heritage and maintain the high standard of the heritage itself. Only in this way will it become possible for the first time to guarantee the quality of tourist art. By creating a favorable cycle like this and raising the quality of tourist art, it will become possible to widen tourist interest in and opportunities for studying intangible heritage, if the market can be sufficiently expanded. This could lead to repeat visits to the area by tourists who have become interested in the original heritage, and increased co-operation in conservation activities. This is one way in which tourist activities can contribute to the protection and succession of heritage educationally and financially.

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SELECTION OF BIOLOGICAL AGENTS WITH BIOREMEDIAL ACTIVITY ON STONES IN HISTORIC CITIES

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Abstract

It is common knowledge that chemical atmospheric pollutants (SO_2, SO_3, NO_x and hydrocarbons) contribute to the degradation of artistic stoneworks. In order to optimise a strategy for the removal of sulphates, nitrates and organic compounds from stoneworks, this paper describes the use of biological agents for conservative interventions in monument conservation as an alternative method to chemical treatment and laser cleaning. The objectives of this research are the selection of microorganisms with the capability of sulphate and nitrate removal and the ability of degrading polycyclic aromatic hydrocarbons, the evaluation of their removal efficiency, and, finally, the investigation of the microorganism colonisation on a mineral matrix support, which is the delivery system.

Introduction

Historic Cities are in serious danger by pollution. In the last decades, alterations, such as black crusts, nitration and sulphation of carbonatic stones, deposition of dust and organic pollutants have markedly increased due to the combustion of petroleum and its derivatives. In particular, nitrogen oxides (N_2O, NO, N_2O_3, NO_2, N_2O_5, collectively known as NO_x) can react with water yielding nitric acid (HNO_3) as the most abundant product, whereas sulphur dioxide (SO_2), in presence of oxygen, is converted into sulphur trioxide (SO_3), which reacts with water to form sulphuric acid (H_2SO_4) (see Fig. 1).

Fig. 1 Formation of nitric acid and sulphuric acid

$NO_x + H_2O \rightarrow HNO_3$ (nitric acid)

$SO_2 + O_2 \rightarrow SO_3$ and then $SO_3 + H_2O \rightarrow H_2SO_4$ (sulphuric acid)

Nitric acid and sulphuric acid cause the transformation of the insoluble calcium carbonate ($CaCO_3$) respectively into calcium nitrate ($Ca(NO_3)_2$) and calcium sulphate dihydrate or gypsum ($CaSO_4.2H_2O$), both highly soluble and easily washed away by rain. Black crusts are composed of gypsum crystals mixed with atmospheric particles and different particulate matter called "smog", heavy organic compounds entrapped in the mineral matrix, including sulphate ions. The presence of organic compounds on the stone surface can be attributed to the presence of uncombusted hydrocarbons from petroleum, past conservation treatments and lysis of microbial cells.

It is a high priority task to reduce and control these degradative phenomena and therefore innovative conservation treatments are proposed by scientists. The European project "BIOremediation for Building Restoration of the Urban Stone Heritage in European States" (BIOBRUSH), no.: EVK4-2001-00055, which began in February 2002, offers an alternative to chemical treatments and laser cleaning of stone monuments. Microorganisms are generally associated to detrimental effects on stones; however, sometimes they can be used for the removal of harmful compounds and for the production of beneficial matters. In fact, in the BIOBRUSH

project, selected bacterial strains are used both for the removal of nitrates, sulphates and organic matters, which cause alterations on stones, and for the precipitation of calcium carbonate crystals. The selected bacteria, immobilised in an appropriate inert carrier, the delivery system, may represent an innovative treatment that is softer for stones and less dangerous for the environment than traditional methods.

Until now, the relevant publications on the bioremediation of stone are extremely few. The removal of sulphates was investigated with different bacterial strains after adhesion to sepiolite used as carrier (Ranalli *et al.*[1]; [2]). Microorganisms were also applied to stoneworks for the removal of nitrates and organic compounds (Lal Gauri *et al.*[3]; Heselmeyeer *et al.*[4], Ranalli *et al.* [5]; Ranalli *et al.*[6]). Finally, the calcite precipitation with the use of calcinogenic microbes was proposed for recovering treatments on stone (Orial *et al.*[7]; Perito B. *et al.*[8]). In this paper, the University of Milan, a BIOBRUSH partner, which has a previous experience of bioremediation on a small scale, describes its role and achievements in the on-going European BIOBRUSH project.

The selection of microorganisms and media

The first step was the selection of potential bacterial strains with the ability to remove sulphates, nitrates and organic compounds. In contrast to previous research, a consistent number of bacteria was selected and studied. Microorganisms used for biological remediation were either isolated from stones or acquired from the *Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH* (DSMZ), a German collection of microorganisms. In the collections, bacteria, which had been previously identified by researchers, are stored in order that anyone can purchase strains with desired abilities. In particular, a ten potential bacterial strains were acquired from DSMZ.

The following media were evaluated in order to test the capabilities of the isolated and acquired microbes: sulphate reducing bacteria medium according to Pfenning *et al.*[9], nitrate reducing bacteria medium according to D. Chèneby *et al.*[10] and, finally, M9 mineral medium (Kunz and Chapman[11]), added with a sole source of carbon chosen among the following PAH: acenaphthene, pyrene, phenanthrene, fluoranthene, naftalene and anthracene. Using these media, it has been assessed it was possible to evaluate the capability to reduce sulphate and nitrate and to degrade aromatic polycyclic hydrocarbons. In order to characterise the PAH degrading bacteria, microscopical and biochemical analyses, Gram staining, oxidase and catalase tests and API system, were carried out. The API system (bio Merieux) allows to characterise isolates on the basis of their physiological and biochemical characteristics leading to the microbial identification by comparing the obtained profile with a collection of known profiles. In addition, a more precise identification of microorganims was obtained by 16SrDNA fragment sequencing and alignment with NCBI nucelotide sequence database using BLASTn search options. After identification of each microbe, European laws and recommendations were investigated to check that selected and isolated microorganisms were non-pathogenic strains (COUNCIL DIRECTIVE 93/88/EEC of 12 October 1993, amending Directive 90/679/EEC).

The evaluation of microbial removal activities

Selected and acquired sulphate-reducing and denitrifying bacteria were then tested to demonstrate their potential as components of a bioremediation treatment for weathered stone. Another achievement was the use of the ion exchange chromatography (IC). IC was employed to screen among the microorganisms those with the best ability to reduce sulphates and nitrate. Using IC, the cultural liquid media without microorganisms, the controls, were tested to evaluate the initial quantity of sulphates and nitrates in each broth. Then, the inoculated cultural media were tested at

different times in order to evaluate the reduction of sulphates and nitrates within one week. The used IC instrument was a Dionex DX 100.

Another innovative approach was that the potential ability of isolated microbes to metabolise polycyclic aromatic hydrocarbons (PAH) was tested using high performance liquid chromatography (HPLC). First of all, different HPLC protocols were evaluated in order to select the best procedure to identify different aromatic compounds in a mixture of PAH. Then calibration curves were obtained to perform quantitative analyses. The cultural media obtained using M9 medium added with various PAH used as sole source of carbon were tested to check the quantity of each PAH prior to the inoculation with microbes. The reduction of each PAH after the inoculation of microbes was evaluated within one week using HPLC. The used instrument was a Merck-Hitachi HPLC.

Optical microscope observations were performed to morphologically describe all the above microbes and count them, prior to inoculation, using the Thoma's chamber.

The selection of an inert matrix and its colonisation

During previous researches, among organic and inorganic materials, it has been demonstrated that sepiolite from Tulsa (Spain) was the best inert for the developing of microbial biofilms with a high active biomass per unit volume (Ranalli *et al.*[12]). Thus, this material was the first selected as microbial support. Before direct use, the support underwent a pretreating process to eliminate or reduce interferences and release undesirable ions. Before adding the selected bacteria, aliquots of sepiolite were submitted to sterilisation. At this point it is important to bear in mind that sulphate reducing bacteria are strictly anaerobic microbes, nitrate reducing bacteria are facultative anaerobic microbes (facultative anaerobic microbes can grow either with or without oxygen), and PAH degrading bacteria are aerobic microorganims. In order to reduce nitrate, nitrate reducing bacteria must grow in absence of oxygen. Formulating the delivery system, it should take into account that results are strongly dependent on the presence or absence of oxygen.
Microbial counts, optical and electronic microscopic observations as well as determinations of microbial activity, using adenosine triphosphate (ATP) assay, confirmed that colonisation occurred. The latter test was used to evaluate the microbial activity on sepiolite. The reaction catalysed by the highly specific enzyme luciferase converts the chemical energy produced by the breakdown of ATP into light energy. Each molecule of ATP consumed in the reaction produces one photon of light. This light is measured by instruments called luminometers. The used luminometer was Biocounter Lumac M 1500 (Hawronskyi and Holah[13]).

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A PROPOS DE LA FORMATION DE SPECIALISTE EN VUE DE LA PRESERVATION DU PATRIMOINE CULTUREL EN TURQUIE

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En Turquie, le programme se rapportant à la formation de spécialiste en restauration des monuments historiques a commencé en 1966 à l'Université Technique du Moyen Orient qui se trouve à Ankara, où un Département de Restauration est fondé dans le cadre de la Faculté d'Architecture. Quant aux études de spécialisation en restauration d'Istanbul, c'est à la Faculté d'Architecture de l'Université Technique de Yildiz que commence d'abord un programme intitulé "Relevé et Restauration" au semestre d'automne de l'année académique 1973-74. Celui-ci est suivi par un autre qui débute à l'Université Technique d'Istanbul en 1974-75. Durant les années précédentes, des programmes du même genre sur la spécialisation en restauration ont commencé dans d'autres universités d'Ankara et d'Istanbul, de même que dans d'autres grandes villes comme Izmir, Edirne, etc. Et en peu de temps, ils sont devenus des programmes assez importants préférés par une grande partie de jeunes architectes. Ainsi grâce à eux, en Turquie plusieurs professionnels spécialisés en preservation et gestion du patrimoine culturel sont formés depuis 30 ans.

A partir des 1990s, à ces programmes sont ajoutées des écoles de spécialisation en restauration qui durent deux ans et qui permettent d'élèver des techniciens dans ce domaine. Les trois écoles de ce genre (deux à Istanbul et un à Safranbolu/Zonguldak, petite ville du nord-ouest de l'Anatolie) qui permettent d'obtenir un homme de métier intermédiaire pour cette spécialisation sont également assez préférées par les diplômés de lycée.

Les travaux de restauration en Turquie avant ces programmes de spécialisation

Avant le commencement de ces études, la restauration des monuments historiques était réalisée par des architectes qui ne se spécialisaient dans ce domaine que par l'intermédiaire des restaurations qu'ils réalisaient. Ces architectes travaillaient surtout aux restaurations de monuments importants comme des mosquées, médressés, mausolées, murailles etc. Et surtout à partir des années 1940s, ils savaient que ce n'était plus une "réparation" qu'il fallait faire comme autrefois, c'est pourquoi durant ces travaux, ils essayaient d'être aussi sensibles que possible. Grâce à ces restaurations, plusieurs bâtiments importants ont eu la chance d'être transmis à nos jours. Parmi les premiers architectes-restaurateur de ce genre, on peut citer quelques noms comme Architectes S.Cetintas et M.Kural des années 1930-40 qui ont travaillé aux restaurations des mosquées et mausolées d'Istanbul, d'Edirne et de Bursa. A part eux, trois femmes des années 1950s ont réalisé également beaucoup de restaurations: Architecte C.Tamer est connue par ses interventions à certaines mosquées, complexes, murailles terrestres d'Istanbul; Architecte M.Eyuboglu, connue surtout par ses travaux de restauration au "Harem" du Palais de Topkapi, de même que l'Architecte S.Emler.

Le Conseil Supérieur des Monuments Historiques qui date de 1951 était le premier établissement responsable de ces travaux. Ses charges définies par un règlement a permis de traiter le sujet d'une manière plus systématique et scientifique. La loi de Conservation parue en 1973 et dix ans plus tard la loi actuelle de 1983 ont établi la structure légale et organisationnelle se rapportant à la conservation des monuments historiques et des sites en Turquie. Un nouvel système est adopté: La loi de conservation était appliquée cette fois-ci par l'intermédiaire des conseils de conservation liés au Ministère de la Culture et éparpillés à travers l'Anatolie, travaillant alors dans des centres historiques assez importants du pays. Ce système continue à être en vigueur tout en se développant. Les membres de ces conseils composés par des architectes-restaurateur, urbanistes, archéologues et historiens d'art se réunissent une fois par semaine pour résoudre les problèmes de conservation des municipalités, des institutions officielles et privées de même que ceux des propriétaires. Leurs décisions se basent sur les articles de la loi actuelle et des "Décisions de Principes" dévéloppées par le Ministère de la Culture qui complètent la loi . Parmi ces décisions de principe, une des plus importantes est celle qui se rapporte à la préparation des projets de restauration. Selon elle, les projets de monuments historiques qui seront déposés au conseil de conservation pour être éxaminé doivent être minutieusement préparés incluant les trois étapes indispensables du travail: le relevé, le projet de restitution et le projet de restauration+nouvel fonctionnement du bâtiment. Cette préparation demande alors un travail assez sensible de la part de l'architecte qui s'y engage. Et ce système place la restauration dans un cadre plus scientifique, à commencer par la qualité du projet à préparer.

L'influence de la spécialisation des architectes en restauration aux travaux de conservation

Des programmes de spécialisation en restauration s'améliorent depuis 30 ans. Leurs nombres sont surtout augmentés entre les années 1970 et 1990. Ces programmes auxquels n'étaient acceptés que des diplômés architecture au début, deviennent de plus en plus pluridisciplinaires. Depuis un certain temps, des diplômés de différentes formations comme des urbanistes, ingénieurs, chimistes, historiens d'art sont également acceptés à ces programmes. Dans ces cas-là, ce qui manque aux étudiants à cause de leurs études de différente formation universitaire est rattrapé par l'intermédiaire de différents cours. Par exemple, il est surtout obligatoire pour ces candidats qui n'ont pas eu une éducation d'architecture, d'apprendre à faire des relevés ou de suivre des cours se rapportant aux concepts d'architecture.

Le programme de spécialisation en restauration de l'Université Technique d'Istanbul dans lequel j'ai pris part depuis sa fondation, se compose d'un programme d'un an de cours/deux semestres (voir l'annexe pour les cours du programme actuel) . Après ces deux semestres, l'étudiant est obligé de choisir un thème pour sa thèse finale (projet et rapport sur la restauration d'un bâtiment historique ou la réhabilitation d'un ensemble/projet de conservation urbaine) et la compléter en 4 semestres. Les cours obligatoires et éléctives de ces deux semestres sont de 3 crédits/3 heures et les 30% sont en anglais. Ceux du premier semestre traitent surtout la conservation d'un monument ou bâtiment historique, tandis qu'au second semestre, on s'occupe plutôt de la conservation d'un environnement

historique. A côté de ces deux échelles essentielles de la conservation, un troisième sujet important "Conservation de Matériaux" est aussi traité durant ces deux semestres par l'intermédiaire de deux cours qui se déroulent au laboratoire.

Pour les projets semestriels sur un bâtiment (semestre d'hiver) et un environnement historique (semestre de printemps) en but de pouvoir faire un travail plus pratique, on préfère généralement travailler à Istanbul. Mais une fois que les étudiants finissent leurs cours et sont au niveau de choisir un sujet de thèse, ils désirent souvent travailler en dehors d'Istanbul, surtout dans les villes ou villages d'où ils proviennent. A part cela, une importance particulière est accordée au choix de projets semestriels et de thèses liés aux propositions faites de différentes institutions qui permettent ainsi la possibilité de prendre part directement dans la préparation et même dans la réalisation de certains projets de conservation qui sont sous leurs responsabilités. C'est dans ce cadre que l'on a préparé comme projets de semestre avec nos étudiants du programme de la restauration, des relevés et projets de restitution et de restauration+nouvel fonctionnement de certains bâtiments historiques de différentes villes de l'Anatolie comme Tarsus (petite ville du sud), Kastamonu (ville du nord-est) et Izmit (ville de la Région de Marmara) où juste après le grand tremblement de terre de 1999, une petite mosquée était gravement endommagée. Tous ces projets sont réalisés suivant la demande officielle des municipalités de ces villes. Comme on le sait très bien, les responsables locales à commencer par les maires sont les gens les mieux placés dans une agglomération pour prendre la décision de protéger et d'entretenir le patrimoine architectural et naturel du lieu. C'est pourquoi, on essaie surtout d'aider ces responsables et d'essayer de résoudre leurs problèmes tout en prenant part très volontairement dans les projets qu'ils désirent réaliser par l'intermédiaire de nos départements.

Dans ce contexte, une des dernières collaborations faite avec une municipalité a eu pour sujet la restauration d'une maison traditionnelle et la révitalisation d'un environnement historique à Umurbey, un village historique de Bursa, ville située dans la région de Marmara. Après la demande à notre département du maire qui est très sensible à la conservation des biens historiques de son agglomération, le village est visité avec deux étudiantes qui étaient au niveau de thèse et analysé du point de vue de ses valeurs architecturales. La municipalité voulait réaliser une restauration exemplaire d'une maison historique d'Umurbey. Une des étudiantes a voulu travailler sur ce sujet et pour cela, on a choisi avec la Municipalité, une maison assez ancienne aux traits très traditionnelles qui était vide et en mauvais état. Son relevé étant pris, les projets de restitution et restauration+nouvel fonctionnement sont préparés pour la Municipalité tout en tenant compte de leurs désirs surtout pour la nouvelle utilisation. Ces travaux qui ont duré deux ans, toujours en grande relation avec le maire sont terminés en Janvier 2003, la thèse étant trouvée très réussie et approuvée par un jury composé de 3 professeurs. En ce moment, le maire est entrain de chercher des moyens financiers pour cette restauration qui sera un vrai exemple réalisé par la mairie pour les propriétaires des valeurs historiques du village.

Le second projet préparé par l'autre étudiante comme thèse finale pour le même village est sur la conservation d'un environnement historique se trouvant dans le site urbain de l'agglomération. Dans ce cadre, il fût également possible d'analyser en détail tout le patrimoine architectural du lieu et les décisions se rapportant à son plan de conservation actuel qui est en éxécution, de l'actualiser et de repasser et discuter les propositions de réhabilitation du plan. Il s'agit alors d'une autre échelle qui est aussi très indispensable pour la sauvegarde du village. La thèse assez détaillée a été présentée au jury en mi-Mai 2003 et sera terminée en automne 2003.

A part ces deux projets, un autre qui devait être réalisé aussitôt que possible est demandé de nouveau par le même maire aux deux jeunes architectes qui ont préparé ces deux thèses . C'était l'aménagement urbain de la place qui se trouve devant la mairie. Ce projet que le maire trouve très urgent sera réalisé bientôt. Ces travaux ont beaucoup influencé le maire qui participe d'ailleurs avec ces projets d'étudiants à une des sessions de ce symposium, les autres responsables locaux, de même qu'une partie des habitants autochtones du village. Grâce à ces relations continuelles, le maire déjà sensible à ce sujet a eu la possibilité de penser et de faire des commentaires sur ces trois projets de différentes échelles.Ces discussions lui ont permis d'apprendre ce qu'il doit et ne doit pas faire du point de vue de la sauvegarde de ses biens culturels. A peu près le même processus d'instruction était valable pour les habitants du site urbain qui étaient presque toujours en grande relation avec les étudiantes qui ont travaillé assez longtemps dans leurs districts. Ils se sont rendus compte ainsi de ce qui est nécessaire à faire pour ce genre de travaux de conservation, de ce qu'on pense sur les maisons anciennes dans lesquelles ils habitent, de la valeur si importante qui leur est accordée et de types de solution que l'on peut trouver pour la réhabilitation et la sauvegarde de leur propriété.

Un autre maire qui désire faire tout ce qu'il faut pour la réalisation de restaurations exemplaires et pour la sauvegarde et réhabilitation du site urbain est la majoresse d'Antakya, ville historique multi-culturelle très importante située au sud-est de l'Anatolie. Nous avons travaillé récemment, au second semestre du programme de spécialisation en restauration de l'Université Technique d'Istanbul (le semestre de printemps 2002-2003) sur un projet de conservation urbaine dans le site historique d'Antakya. Un travail de 11 étudiants, avec deux professeurs et trois assistantes est fait sur place durant 10 jours au mois de Février 2003, pour analyser d'une manière assez détaillée les valeurs architecturales de l'environnement historique de la ville. Des silhouettes de rues traditionnelles, des relevés de maisons historiques donnant sur ces rues, des typologies de façades, plans et éléments caractéristiques sont étudiés et des enquêtes sociales sont faites avec les habitants de l'environnement . Au retour, toutes ces informations sont évaluées d'une manière assez systématique et un projet de réhabilitation est préparé. Ce projet fût d'une part le projet de semestre des étudiants du programme, et d'autre part on pense qu'il servira à donner une idée concrète aux responsables sur ceux qu'ils doivent faire pour la sauvegarde de leur site urbain. Deux autres universités -Politecnico di Bari de l'Italie et l'Université Technique du Moyen Orient d'Ankara- qui ont travaillé dans le même environnement ont pris également des relevés de certaines maisons traditionnelles et ont fait une analyse urbaine du même genre au mois d'Octobre 2002. Les travaux de ces trois

universités seront exposés à la fin du mois de Novembre 2003 à Antakya dans les salles de la Chambre des Architectes d'Antakya et à la suite publiés à Bari sous forme d'un livre.

A part ces projets que l'on a réalisé par l'intermédiaire des étudiants, le personnel académique des départements de la restauration des universités est toujours prêt à préparer des relevés, projets de restitution et de restauration+nouvel fonctionnement aux municipalités, aux institutions officielles ou privées, de même qu'aux propriétaires des biens architecturaux et contrôler ces travaux jusqu'à la fin de leurs réalisations. Dans ce contexte, on peut parler d'un projet de restauration que l'on a préparé à l'Université Technique d'Istanbul par un groupe pluridisciplinaire de la Faculté d'Architecture, d'après la demande de la mairie d'une région d'Istanbul. Il s'agissait de la restauration d'un bâtiment historique industriel réutilisé comme "centre culturel". Le projet est terminé et approuvé par le Conseil des Monuments Historiques et la réalisation de la restauration est contrôlée également par le même groupe. Cette restauration a emporté le Prix National sur la Conservation accordé par la Chambre des Architectes de la Turquie.

A côté de ces projets de restauration de bâtiments historiques, les départements de la restauration des universités travaillent également sur les projets de sauvegarde des villes historiques. On prépare des plans de conservation urbaine aux mairies selon leurs demandes. Dans ce cadre, plusieurs plans de sauvegarde des villes anatoliennes sont préparés par notre département en collaboration avec le département de l'Urbanisme et approuvés par le Conseil des Monuments Historiques, ils sont mis en éxécution.

Les architectes restaurateurs et leurs rôles aux réalisations de restauration

Les programmes de spécialisation en restauration qui ont commencé à partir des 1970s ont permis à plusieurs architectes d'être diplômés comme "architectes-restaurateur" (le contingent annuel de ces programmes varie entre 5 et 15 étudiants). Une certaine partie de ces spécialistes travaillent dans des bureaux privés, une autre aux institutions officielles et une troisième dans d'autres différents domaines. Certains de ceux qui travaillent dans des bureaux privés font des projets de bâtiments modernes comme des bureaux, des unités d'habitation, des maisons et coopératives d'été etc. Tandis qu'une certaine partie d'entre eux travaillent sur des projets de conservation et réalisent leurs restaurations et réutilisations. La plupart des jeunes architectes spécialisés en restauration sont assez génés des décisions éronnées sur la conservation, prises par les patrons des bureaux dans lesquels ils travaillent. Mais comme ils ne sont pas les vrais responsables de ces projets, bien qu'ils essayent d'intervenir, la plupart du temps ils n'ont malheureusement pas l'autorisation de dire le dernier mot. Le même processus peut être également observé à la préparation des plans de sauvegarde des villes historiques. Dans le cas du manque de sensibilité et de connaissances des auteurs au sujet, la détermination des valeurs à conserver et l'analyse spéciale faites sans détails influencent directement les propositions si importantes pour le futur de l'environnement et causent alors des pertes qui ne peuvent être rattrapées à jamais.

L'insuffisance de spécialistes aux cadres des municipalités qui doivent contrôler les réalisations de conservation influencent également d'une manière assez importante les

manques de qualité de ces restaurations. Il est toujours facile de reconnaitre les projets préparés et réalisés par des architectes qui sont sensibles aux bâtiments et environnements historiques, même s'ils ne sont pas spécialisés en restauration. Par contre, les dégâts causés aux valeurs traditionnelles par des architectes qui ne s'intéressent pas aux caractéristiques des oeuvres sur lesquelles ils travaillent sont toujours très remarquables, malgré l'existence des architectes- restaurateur diplômés dont le nombre augmente de plus en plus chaque année.

Conclusion

On peut dire que ces problèmes peuvent être généralisés pour toute la Turquie à commencer par Istanbul. Les villes et villages historiques de l'Anatolie qui ont pu plus ou moins conserver leur patrimoine jusqu'à nos jours sont également soumis à ces risques. Mais malgré tout, quand on jette un coup d'oeil aux progrès réalisés à partir de la fin des années 1980s, on peut quand-même dire que surtout à la dernière décennie on commence à avoir un peu plus d'espoir pour la sauvegarde des biens. L'adoption des décisions internationales se rapportant au sujet, les discussions faites dessus, le cadre de l'ICOMOS qui s'étend de plus en plus en Turquie avec leurs membres qui essaient d'être influents au moins à leur entourage influencent de plus en plus l'amélioration de la prise en considération du sujet d'une manière plus sérieuse. A part cela, les programmes de télévision diffusés presque chaque jour aux heures primaires qui mettent en vue l'importance des valeurs historiques d'une agglomération, de même que l'importance de la sauvegarde des monuments, les institutions importantes comme des banques ou d'autres du secteurs privés qui organisent des réunions, discutent et publient des articles ou font des expositions sur les valeurs culturelles et leur sauvegarde participent également l'expansion de l'importance du sujet. Toutes ces activités attirent l'intérêt des maires et du public.

Les architectes-restaurateur et d'autres architectes qui sont sensibles au sujet sont de plus en plus glorifiés à commencer par la Chambre des Architectes et par d'autres institutions. Aussi le nombre augmentant des personnes de différentes formations universitaires diplômés en restauration permet l'expansion des participants à ce domaine. Les techniciens diplômés des écoles de restauration jouent un rôle de plus en plus important pour la perféction de détails appliqués aux restaurations.

Mais il faut avouer quand-même que malgré tous ces efforts, les pertes à jamais des valeurs historiques continuent à changer l'aspect homogène des sites urbains. On espère qu'au futur, avec toutes ces nouvelles tendances à commencer par l'augmentation des collaborations entre l'université et l'administration locale, le nombre de restaurations ou conservations urbaines à base scientifique conformes aux principes universels seront de plus en plus en grand nombre dans les villes et villages historiques du pays.

ANNEXE:

Programme de Spécialisation en Restauration
de l'Institut des Sciences Techniques de l'Université Technique d'Istanbul

Semestre d'Hiver

Cours Obligatoires:

. Théorie de la Restauration

. Techniques et Méthodologies de la Conservation

. Projet de Restauration

Cours Electives:

. Technique de Construction Traditionnelle I (Antique et Byzance)

. Technique de Construction Traditionnelle II (Seldjouk)

. Traditional Building Types and Potantialities for their Re-use (en Anglais)

. Aspects Légal, Sociologique et Economique de la Conservation Urbaine

. Différentes Approches à la Réhabilitation et Nouvelle Construction dans un Milieu Historique

. Laboratory Training for Architectural Conservators (en Anglais)

. Matériaux de Construction Traditionnelle

Semestre de Printemps

Cours Obligatoires:

. Site Conservation Project (en Anglais)

Cours Electives

. A Comparative Structural Analysis of Historic Buildings (en Anglais)

. Techniques de Construction de l'Architecture du Moyen-Age en Anatolie

. Architect Sinan as a Master Builder and Engineer (en Anglais)

. Architecture et Changements Urbains au 19e siècle à Istanbul

. Exemples de Conservation Urbain en Turquie et aux Pays Etrangers

. Deterioration and Conservation of Traditional Building Materials (en Anglais)

. Photogrammétrie en Architecture

. Techniques de Construction à l'Architecture Ottomane

. Restauration et Génie Civil

THESE

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THE IMPORTANCE OF EDUCATION IN THE PRESERVATION OF CULTURAL HERITAGE IN TURKEY

"The Role of the Restoration College of Safranbolu in the Preservation of the City of Safranbolu"

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Abstract

Since "The Year of Architectural Heritage of Europe-1975'', there is an increasing consciousness about the preservation of the cultural heritage of the past. Turkey, having one of the richest cultural heritages in the world, is aware of its responsibilities to preserve, protect and transfer this heritage to next generations. But, this heritage is spontaneously weared out day by day because of interventions, done in the name of "Preservation and Restoration".

There are both governmental and private institution that are directly or indirectly working on preservation and restoration. When the educational status of the staff in these foundations is examined, the result indicates that both the managers and other staff, working in restoration and preservation, have no education, directly deal with on restoration or preservation. Some of these are architects, city planners, art historians, archeologists, but the most of them are from irrelevant professions.

This situation negatively affects the restoration work in Turkey. So the cultural heritage in Turkey loses its value by restorations, done by those uneducated staff.

Besides the socio-economic, socio-cultural and socio-political status, educational institutions have a great importance in the preservation and restoration studies. Therefore, the purpose of this study is to carry out a comprehensive survey about "Education in Preservation" in Turkey, especially in Safranbolu and to make a proposal for an ideal education on preservation.

The Role of The Restoration Education in the Preservation of The World Heritage Cities in Turkey, such as in city of Safranbolu

The cooperation of scientists and public, occurring in Safranbolu after "*The Year of Architectural Heritage of Europe*", in 1975, brought Safranbolu to its current status. In that time, Istanbul Technical University chose Safranbolu as a place where "The Year of Architectural Heritage of Europe in Turkey'' is celebrated. Concept of Preservation Consciousness spreads among Turkey by the "*Preservation Weeks*" and "*Preservation Festivals*" in Safranbolu with participation of lecturers and students.

Scholars have informed the public in the meetings with thousands of people about subjects, "*What is The Preservation*?" "*Why Safranbolu has to be preserved*?", and the other cultural ones. Television channels and newspapers have mentioned these events, forming a public opinion about preservation. In addition, these events have led to the formation of consciousness of preserving their city in the citizens of Safranbolu. In the period, from 1975 to 1990, the legal arrangements, projects and applications about restoration and preservation in Safranbolu were completed by the governmental and non governmental organizations.

Another big progress in this circumstances in early 1990`s is the establishment of *The Restoration College of Safranbolu* that undertook important roles in the preservation studies of city of Safranbolu.

City of Safranbolu, registered as "World Cultural Heritage City" by UNESCO in 1994, is an important cultural heritage of Anatolia. Safranbolu, used in education as a perfect model, is an **open laboratory**. The Restoration College of Safranbolu, established in 1992 makes significant contribution into the studies for preservation and restoration of city of Safranbolu.

The Restoration College of Safranbolu has been tired to carry on its missionary duty of solving the problems in preservation and restoration of city of Safranbolu, the world cultural heritage city.

Before 1990, architectural faculties of universities had dreamed on preservation of city of Safranbolu and produced theories for that purpose. But, The Restoration College of Safranbolu have finally realized this dream. Zonguldak Karaelmas University, involving the Restoration College of Safranbolu in its structure, is a local University of Western Black Sea region. The University has undertaken an important mission that requires the responsibility of being scientific authority in restoration studies in Turkey.

Some of the activities of The Restoration College of Safranbolu are as follows:

*The first National Symposium on Restoration Education – 1996
* Symposium of City of Safranbolu in History – 1999
* Representing the city of Safranbolu in the abroad meetings of World Heritage Cities Organization and hosting the meetings in Safranbolu
*Other cultural organizations about preservation like; exhibitions, panels, etc.
* More than 30 project and application have been prepared by the lecturers and students of The Restoration College of Safranbolu since 1997
*International Symposium of Wooden Houses-2000 (See:Appendix1''Pictures of Safranbolu and College of Restoration'')

The lectures mostly consist of examinations, registration and documentation studies on the houses, streets and monuments of city of Safranbolu, an open laboratory. They have three positive results;

*Students learn the cultural heritage in the region, by seeing, touching and experiencing with them.
*Accelerating the registration and documentation of the cultural heritage in the corresponding region.
*Education of the public by the relationships between public, lecturers and students, working in education and registration studies the city.
One of the reasons of the technical developments in the restoration studies is voluntary counsel of the lecturers to the owners and the workers in applications.

Relationships between lecturers, students and workers are revealed in the restoration applications of either The Restoration College of Safranbolu or other contractors. The transfer of knowledge between the lecturers, students and workers is tried to be obtained in these relationships.

Educational Problems Relating to Preservation of Cultural Heritage In Turkey

Besides the positive features of The Restoration College of Safranbolu, the college with an education time of 2 years can not entirely succeed in solving the problems in preservation and restoration of cultural heritage in Safranbolu and in Turkey within the corresponding time period.
There are questions about the education of the professionals, interested in the architectural preservation. That is the second dimension of preservation education. These are:
*Does the present preservation education completely satisfy the needs for preservation?
*Is the education of the ones, trained about preservation, suitable for their purpose and principles?
*Where is the place of profession of preservation in the new economical realities?

It will not be correct to make a preservation plan for future unless the above questions are answered exactly in statistical basis, the most important part of this preservation plan is the education on preservation.

Training of specialists on all branches of this topic is a must for the preservation, restoration and transfer of this heritage to next generations. There are only schools at the level of "*college*" or "*training school*" about the restoration or conservation in Turkey. There are no education programs about preservation and restoration in universities. Lectures in the architecture departments of universities are about construction of new buildings and insufficient to solve in the problems about preservation and restoration. This insufficiency is tried to be covered by architects, having master or doctorate degree about restoration.

In Turkey, having a rich architectural heritage, the architects, working of the applications of preservation-restoration in municipalities, ministries , in other public offices , or working as a designer in the private sector; have to take a comprehensive education about preservation.
In addition, the architects also take a very important function upon oneself to form public opinion by maintaining the attitudes in working life.

But,when the architectural curriculum of education programs about restoration examined, the share of the lectures about restoration is about 5-10 % in the program. There are no lectures about *"Concept of Preservation'' ''Consciousness of Preservation of Cultural and Natural Heritage" and "Techniques of Restoration*" in it.

The master and doctorate programs about restoration and preservation include 20-25 credit lectures in 2-3 years and a graduation project

However, in recent existent programs of architectural education, there is very little weight of courses, gaining to the architects **sensibility** of the historical environment.

Therefore, according to some academicians,solving this issue by elective courses of restoration, weighted in curriculum, in leading manner and by making a transition to an architectural education system, educating specialists in restoration is defended.

The Restoration or Conservation Colleges in Turkey, having education period of 2 years and active for 15 years, could not achieve the expected success on preservation problems of cultural heritage in Turkey.

As mentioned in the "1st National Symposium on Restoration Education" (1), organized by the Restoration College in Safranbolu in 3-5 October 1996; it is not possible to succeed in restoration education with those lectures squeezed in two years period. The presence of these staff, trained in this way, causes problems in the studies for preservation of cultural heritage.

One of the most important problems related with traininig schools(colleges),offering an education of two years face is that graduates are not able to transfer their theoretical knowledge into practical knowledge.

Fig: 1: Curriculum of The College of Restoration in Safranbolu(Turkey)

1.st Year

1. Semester	Hours		**II. Semester**	Hours	
	Theory	Practice		Theory	Practice
Construction Theory I	2	2	Construction Theory II	3	0
Theory of Restoration I	2	1	Theory of restoration II	1	2
Traditional Material	2	0	Conservation of Material I	2	2
Photography	1	2	Restoration of Material Lab.	0	4
Technical Drawing Studio	4	4	(Stone-brick-Mortar) Measured- Drawing		
History of Art and Architecture I	3	0	Techniques Studio	2	6
Basic Art Education	0	4	History of Art and Architecture	3	0

2nd Year

III.Semester	Theory	Practice	**IV.Semester**	Theory	Practice
History of Art and Architecture III	2	3	History of Urbanization And Urban Conservation Project	1	2
Financial Analysis of Restoration and Management of Work site	2	2	Legislation of Preservation	1	0
Application Techniques of	2	2	Introduction to Archeology	2	0
Restoration Project Studio	0	4	Museology	2	0
Restoration of Material wood Lab. II	2	2	Restoration of Material Lab.	3	0
Advanced Measured- Drawing Techniques	0	2	Final Project	0	4
Conservation of Material Lab.	1	2	Structural Analysis of Traditional Buildings	2	2
Traditional Decorative Arts	2	2	Conservation and restoration of Traditional Handcraft Arts	2	2

Suggestions

*The target groups of the preservation education should not only include the professionals but they should also involve politicians, directors, contractors, private sector, owners, children, youth, students, etc.

*All kinds of educational processes should contain the culture of preservation.

*Not only the education of professionals, but also education of politicians, soldiers, children, local directors, youth, etc. is inevitable for a complete success in preservation of cultural heritage.

*The share of the lectures about restoration in the education programs of architecture faculties in universities should be increased.

*A cooperation with the private sector and civil organizations will also contribute a lot to the education and may have a positive effect on the profile of the graduates. There is need of a program based upon the cooperation of the organizations of the governmental and non governmental. Thus it will also help to find right places to work for graduates.

Proposal Program for Ideal Restoration Education

Anatolia; sheltering the ruins of the oldest settlements in the world and having with more than 70.000 registered cultural riches to be preserved, has various and rich cultural heritage

Specialists, totally trained in institutions with programs about restoration and preservation and instantly participating the restoration studies in Turkey, are needed.

Because of this there is need of architects who have better knowledge about the problems of preservation of traditional construction materials and technology. And there is also need of experts who are able to make an analysis and whose syllabus is completely based upon preservation and restoration.

So, the educational programs about restoration and preservation should be expanded in a longer period of education to be more effective and successful to solve the problems of cultural heritage.

A proposal program of 4+2 years education, having all its lectures in restoration and preservation and including 2 years period of specialization program, should be formed.
The suggested program, mentioned above, does not include 2 years pre-bachelor program. Students may graduate in 5-6 years completing the theoretical or practical specialization program.

Education system should be changed and based upon a practical system. Further ''**restoration**'' should become itself a **major department** and should have a special curriculum. The education of sensible students in the field of restoration aware of the preservation of cultural heritages is only in this way possible.(See:Fig:2 Proposal Curriculum of Ideal Restoration Education)

Fig: 2 Proposal Curriculum of "Ideal Restoration Education"

Curriculum of Architectural Restoration Program

1st Year

I. Semester	Hours Theory	Practice	**II. Semester**	Theory	Practice
Technical Drawing Studio	2	6	Architectural Drawing	2	6
Basic Art Education I	2	6	Basic Art Education	2	6
History of Art and Architecture	3	0	History of Art and Architecture	3	0
Theory of Restoration I	3	0	Theory of Restoration	3	0
Chemistry for Restoration	3	0	Theory of Materials	3	0
Mathematics	2	0	Photography-	2	4

2nd Year

III. Semester			**IV. Semester**		
Perspective and Models	2	2	Graphic Design	2	2
Measured- Drawing Techniques I	2	6	Measured -Drawing Techniques 2	2	6
Architectural Design Studio I	2	6	Architectural Design Studio II	2	6
History of Art And Arch. III	3	0	History of Art and Arch. IV	3	0
Diagnosis Techniques of Monuments	3	0	Restoration Techniques	3	0
Material Restoration Lab. I	2	2	Material Restoration Lab .II	2	2

3rd Year

V. Semester	Theory	Practice	**VI. Semester**	Theory	Practice
Restoration Project Studio I	2	6	Restoration Project Studio II	2	6
Traditional Decorative Arts I	2	6	Traditional Decorative Arts II	2	6
Financial Project of Restoration	3	0	Management of Work Site	3	0
History of European Art	2	0	History of Turkish Architecture	2	0
Urbanism	3	0	Urban Conservation Project	2	4
Structural Analysis Studio I	2	2	Structural Analysis Studio II	2	2
Conservation Lab.I(Stone)	2	6	Conservation Lab.II(Plasters)	2	6

4th Year

VII Semester	Theory	Practice	**VIII. Semester**	Theory	Practice
Restoration Project Studio III	2	6	Final Project Studio	0	8
Archeology	3	0	Museology	3	0
Environmental Design of Historical Settlement	2	2	Legislation of Preservation	2	0
Interior Architectural Design in Historical Buildings	2	2	Furniture Design	2	2
Approach to Installation Techniques of Historical Buildings	2	0	Approach to Illumination Techniques of Historical Buildings	2	0
Conservation Lab.III(Wood)	2	6	Conservation Lab.IV(Painting	2	6

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Appendix 1:Photographs:

1- Students of The Restoration College of Safranbolu during the measured- drawing studies of the Historical Aqueduct, named as ''İncekaya''
2- Inventory studies of Historical Village, named as ''Yazıköy''
3- Students during ''joint works'' of the stone wall in the restoration works of the Historical Safranbolu Clock Tower
4- During the renovation works of the wall paintings of old Mosque in historical village, named as''Yoruk'' in Safranbolu.
5- Students during "joint works'' on the stone walls, in the restoration works of Gürmen-Ramsey Residences.
6- During the restoration works of Gürmen Residences in Safranbolu

7,8 -General views from the city of Safranbolu

Figures:

1- 2 Years Curriculum of The Restoration College of Safranbolu

2- Suggestion for "Ideal Educational Program of Restoration''

"Proposal Curriculum of the Program of Architectural Restoration"

Key Words:

Training Schools of Restoration in Turkey,College of Restoration in Safranbolu, Ideal Restoration Education

THE NEW DEGREE COURSE IN "HISTORY AND CONSERVATION OF ARCHITECTURAL AND ENVIRONMENTAL HERITAGE" OF THE POLYTECHNIC OF TURIN – ITALY.

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Abstract

This paper proposes a description of and a reflection on the new three-year degree course in "*History and Conservation of Architectural and Environmental Heritage*" at the Polytechnic of Turin – Italy. In September 2002 the first students graduated from the course. We intend to analyse the three-year curricula in relation to the entry of this new professional figure into the professional world.
Another purpose is to compare the Italian didactical path and International experiences, especially through the activities conducted within the framework of the Erasmus Programme.

Foreword

The 2nd Faculty of Architecture implements the framework consisting of significant transformations now going on in today's society and the way in which they are paradigmatically reflected in the Turin area. These transformations, while bearing witness to the fact that mass production is being progressively transferred to newly industrialized nations, require large, industrialized, European cities to measure up in their production of attractive, high-quality goods and services, as well as in fields related to high technology. Furthermore, as a result of complex processes, new communications systems tend to transform a city that is physiologically compact into a "ramified" city. These processes design new territorial scenarios: they change the way we work, the way we exchange products and furnish services. They even change the way we design architecture by shifting attention from single architectural events - be they small, large, simple or complex – to the entire context of landscape and environment in which they are situation and with which they interact. Such changes must be compared with the identifying characteristics of the setting, with its diffused historical heritage, and with the role played by cultural resources during the carrying out of these innovative processes. The city, the territory, and the environment require interventions aimed at requalifying and developing their potential and resources, while introducing renewed roles for values and valences.
New educational programs are based upon the important transformations now being faced by contemporary society and how they are paradigmatically reflected in the Turin area as well as in all of Europe. Such problematic junctions constitute an epicentre of research and teaching for the construction of theories, methodology, and projective experimentation. The latter are at the core of the entire educational program and are fully consolidated during the third year of the program during an internship experience.
The program offered by the Turin Polytechnic, and more specifically by the 2nd Faculty of Architecture – so-called "***Architecture & Environment***" -, included 1st and 2nd level courses in Architecture (of Turin and Mondovì), in the *History and Conservation of Architectural and Environmental Heritage* (Turin), in *Urban, Territorial, and*

Environmental Planning (Turin), in a long-distance course for the *University Diploma in Territorial Informative Systems* (which beginning with the academic year 2000/2001 has been transformed into a 1st level undergraduate course in Territorial Informative Systems), and into a 1st and 2nd level Masters course.
The 2nd Faculty of Architecture focuses on project procedure and management, on analysis and historic-critical experimentation, on project communications methods and instruments, on environmental, landscape, and territorial contexts, on technological innovations, on the enhancement and management of historical-cultural heritage, and on the innovative use and knowledge of computer instruments.
This brief paper will illustrate and critically evaluate the results of a didactic experiment that is now in its fourth year. Special attention will be given to the degree course in History and Conservation of Architectural and Environmental Heritage in Turin by describing educational objectives and their relative professional figures.

1. Degree Course in History and Conservation of Architectural and Environmental Heritage

Degrees in Science in Architecture and Civil Engineering

1.1 Educational objectives

This three-year degree prepares professional figures that, in both private and public sectors, intervene upon the architectural and environmental heritage with the objectives of conservation, enhancement, and management according to cultural criteria, as well as in consideration of effectiveness and efficiency.
The 1st level degree graduate is capable of single-handedly carrying out historic, archivistic, and documentary analysis, as well as an analysis of the compatibility of an eventual transformation of historic-cultural heritage in various contexts. These graduates also carry out instrumental surveys in order to ascertain architectural, building construction, territorial, and environmental emergencies; the surveys of decay and its causes (destructive and non-destructive analysis); the analysis of compatible operative solutions, of needs and usage. Graduates use and control multidisciplinary, technologically advanced, cultural and instrumental methods; participates and contributes in all aspects of programming, planning, and the actuation of conservative and enhancement interventions; plans and manages maintenance programs; use *construction* and *facilities management instruments;* collaborate on an operative level during construction phases in restoration sites and in works direction, even with direct responsibility. They are also qualified to teach specific subjects in the secondary school system.
A brief description of courses now included in the third year program, with their disciplinary objectives and international credits now follows. The specific contents of each course are included in the notes.

1.2 Course Programs – 1st year

- Technological Culture in Historical Construction (6 credits).

This course furnishes students with basic knowledge concerning the elements and techniques that make up building organisms with the objective of emphasizing the relationships between production, planning, and construction processes.[1]

- General Mathematics (6 credits).

This course is subdivided into three modules in which the following are dealt with separately: differential and integral calculus of the functions of a real variable; linear algebra and elements of analytical geometry; descriptive statistics. For each topic, basic notions and the principal methods of problem analysis are presented, while remaining within a more conceptual than operative plane. The course, in fact, is organized to meet

the objective of furnishing the student with the capacity of reading, interpreting, and presenting results and problems of a mathematical and statistical nature, thus simplifying their approach to the actual solving of problems, for which specific software can be applied.[2]

- Basic Computer Science (2 credits).

An introductory course in computer science in which the initial components and logical structure of a computer are succinctly presented, followed by an introduction to software applications for writing texts and elaborating data. The course also includes extensive laboratory work consisting of guided exercises in applying the software presented during theoretical lessons.[3]

- Urban Planning (6 credits)

This course presents urban planning through two main aspects of urban studies and planning, with reference to the evolution of the discipline over time and with an international perspective. Topics include: the processes and problems of the city and territory in reference to the present day and comparison with urban planning policies of the 20th century; management tools of transformation with particular reference to the situation in Italy and its position in the international framework. The presentation is made through sample case studies analysed according to three main focal points that characterize ongoing innovations: the role of the environment and landscape in the organization of the territory; the role of actors in determining transformation and government policies; the relationship between territorial planning and local enhancement projects.

- Basics of the History of Urban Planning (6 credits)

This course supplies the student with the basic elements of the history of the city from ancient times to the present day, with a focus on the instruments necessary for a critical reading of urban and territorial phenomena, theories that have inspired models of urban development and transformation, and designs of ideal cities and urban reconstruction.[4]

- Basics of Economics and Estimation (6 credits)

This course presents students with the theoretic framework and methods by which it is possible to collect and evaluate the economic aspects and value of architectural and environmental resources. The latter are considered as an entity of mixed goods (with public and private components) that must be analysed according to micro-economic theories and an estimate of private goods, as well as by welfare economics and relative analytic and evaluative methods.[5]

- Basics and Applications of Descriptive Geometry and Computer-Aided Design (3+ 2 credits)

The objective of this course is to furnish students with the instruments and information necessary to recognize, analyse, and represent an architectural / archaeological / environmental form by following a logical process that begins with the direct study of its dimensional and characteristic aspects in order to continue with the use of the fundamental elements of applied descriptive geometry and graphic transposition, using both traditional methods and with the additional help of computer-aided design.[6]

Architectural Design Laboratory 1 (9 credits)

The activities to be carried out by the students are designed to offer an initial approach to the problems of architectural design, the relationship between design and knowledge, between the observation of phenomena and the taking of conscious decisions. This laboratory experience should develop the student's capacity to apply a multidisciplinary critical approach to the city and the constructed world.[7]

1.3 Course Programs - 2nd Year

- History of Modern Architecture (6 credits)
This course aims to stimulate critical thought concerning the principal aspects of European architectural culture with particular emphasis placed on the Italian states of the XVth to XVIIIth centuries, the figure of the architect with regard to the evolution of his training and role he played, as well as architectural theories.[8]
- Statics / Construction Science (6 credits).
The Statics program is an introduction to structural problems. As such, it presents basic theories of structure analysis. Structural aspects are fundamental to design and conspicuously influence architectural solutions. Therefore, the scope of this course is, above all, to carry out an in-depth analysis of structural behaviour, beginning with the simplest structures, understanding fundamental principals, and analysing design criteria within the context of a specific typology. [9]
-Materials Science and Technology (6 credits).
This course instructs the students in the chemical, physical, and mechanical characteristics of construction materials, the relationships between the microstructure and its properties, with the scope of diagnosing and understanding eventual causes of decay and, consequently, carrying out coherent interventions. [10]
- History of Contemporary Architecture (6 credits)
This course aims to stimulate critical thought concerning the principal aspects of European architectural culture with particular emphasis placed on Italian tendencies during the XIXth and XXth centuries, the figure of the architect with regard to the evolution of his training and role he played, as well as architectural theories. [11]
-Theory and History of Architectural Restoration (6 credits)
Architectural Restoration is a discipline that calls for specific scientific and technical-operative preparation. Due to its historical-critical and technical-scientific nature, it is founded in the knowledge of issues related to the constructive aspects of architecture and time-induced transformations of architectural heritage, with the scope of conserving and safeguarding it through the analysis of theoretic and operative problems related to restoration projects.[12]
- Urban Studies (6 credits)
To present urban planning through the two main aspects of urban studies and planning with reference to the evolution of the discipline over time and on an international level.[13]
- Environmental Control: Principals and Techniques (6 credits)
This course will furnish a basic understanding of the interaction between physical-environmental parameters and the conservation of historic, artistic, architectural, and landscape heritage. Students will be instructed in instrumentation and environmental monitoring procedures useful in verifying conservation conditions and indicating the most appropriate passive and active technologies to be implemented.[14]
Architectural Construction Laboratory I (9 credits).
The Architectural Construction Laboratory I, which is characterized by Architecture Technology and makes use of a specific contribution of the History of Architecture, develops a central theme of the elaboration of requalification and refunctionalization projects from a micro-urban scale to building details of significant buildings that are recognizable as part of contemporary architectural heritage.[15]
-Architectural Design Laboratory II (9 credits)
Laboratories have established the objective of introducing students to architectural design in relation to specific sites and with reference to detailed comparative studies of historic-monumental emergencies in the territory. This activity emphasizes how design is actually a complex, organized operation to be carried out on various scales and with a

coherent strategy for the resolution of specific problems with interventions capable of being integrated into the historic heritage.[16] .

- Topography, Surveying, and Surveying Methodology (3 +3credits)

The first part of this course will provide the basic instruments for surveying architectural organisms and their relative environmental context with special reference to cultural profile and professional applications for the graduate in The History and Conservation of Architectural and Environmental Heritage.[17]

1.4 Course Programs – 3rd year

- Technologies of Building Reclamation (3 credits)

This course provides the principal theories and technological instruments necessary to complete acquired knowledge from the previous technology courses and compare problems that arise with interventions aimed at the conservation, restoration, and reclamation of existing buildings.[18]

- The History of the City and Territory (6 credits)

To develop a capacity for historic analysis and critique of significant themes of monumental architecture in the city and in territorial, environmental, and cultural contexts for students in the degree course in History and Conservation of Architectural and Environmental Heritage. The course organizes its disciplinary contribution by integrating its program with that of integrated laboratory courses in Restoration, Design, and Estimation which have assumed an experimental focus on the extensive restoration site of Venaria Reale.[19]

- The History and Analytical Methods of Architecture / Legislation on cultural heritage (3+3 credits)

This integrated course further analyses the theme of Architectural and Environmental Heritage on various scales, from a single artefact to the territory, above all clarifying the concept of "heritage" within various historic periods in order to eventually deal with current aspects of individuation, classification, and safeguarding of those systems of elements that today's culture deems worthy of conservation.[20]

-Photogrammetry (3 credits)

Architectural photogrammetric survey is presented as an instrument of research and data acquisition finalized at a historic-architectural and urban environmental analysis. Contents: Basic elements of photogrammetry; Analog, analytic, and digital photogrammetry.[21]

Principles and Techniques of Environmental Control (6 credits)

This course furnishes basic knowledge of the interaction between physical-environmental parameters and the conservation of historic, artistic, architectural, and landscape heritage. Information is also given concerning environmental monitoring instrumentation and procedures useful in verifying conservation conditions and indicating the most appropriate passive and active technologies to be implemented.[22]

- Multi-media Communications / Computer Science for Multi-media Communications (6 credits)

Knowledge of conceptual, methodological, and computer instrumentation for the design of multi-medial applications on-line (Internet) and off-line, with special emphasis on the construction and use of multi-medial bases-data for the classification and documentation of cultural heritage, museum communications, and publications.[23]

- Marketing of Cultural Heritage and Services (6 credits)

Cultural marketing is a new discipline that has been confirmed by recent contributions and studies and now offers and opportunity for independent reflection and redefinition that goes beyond traditional marketing. The course stimulates critical thought on

specific aspects of artistic and cultural heritage products with an increasingly effective perspective on the coherent pursuit of the cultural mission and the need to guarantee adequate standards of results. [24]

-History of Gardens and Landscape /History of Modern and Contemporary Urban Planning (6 credits)

Correlated with the History of Modern and Contemporary Urban Planning, this course provides knowledge concerning the conceptualisation and history of the garden in a western context and the organization of anthropic landscapes. These ephemeral spaces, from the majestic gardens of the 1600's to the extensive urban parks of the 1800's, weaves a singular thread between culture and society, between urban dimensions and territorial identity, to be correlated with phenomena of absolutism, urbanism, and the industrial revolution.[25]

-Writing Project (6 credits)

Objectives: For the first time on an experimental basis, the 2nd Faculty of Architecture of Turin Polytechnic will offer a course with the objective of acquiring writing techniques in order to master a correct and contemporary usage of this fundamental instrument of communications that the architect must constantly employ in whatever field or activity he may decide to work.[26]

- IG Students (6 credits)

"IG Students" is a Foundation sponsored by the Italian Ministry of Labour and Social Services and promoted by the Society for Young Businessmen. The program promotes and manages the IG Student Training System.[27]

-Internship (3 credits)

An internship in Restoration is now being organized. The parameters of this course will depend on the collaboration of private and public agents who now work in this field on a local level. Other activities are also being planned that will, in any case, also depend on the willingness of external agencies to collaborate in a tangible manner.

-Final Examination (5 credits)

The final examination will consist in the compiling of a book with which the student must chronicle his professional training by demonstrating full comprehension of the relationships between the contents and instruments acquired during this three-year course of studies.[28]

- Restoration Laboratory I (Architectural) (4.5 credits)

Define the informative and methodological aspects of restoration for conservation on various scales (urban and non-urban landscapes, diffuse heritage, gardens, architectural complexes, archaeological heritage). Provide instruments and techniques for design, from knowledge to refunctionalization.[29]

- Evaluation Laboratory (4.5 credits)

This Laboratory will offer the opportunity to experiment evaluation instruments that, when used in an appropriate manner, can be useful during the various phases of conservation projects (planning, design, execution, and management). The Laboratory will define methodological procedures that are coherent with the nature of the heritage at hand (architectural or environmental, diffuse or monumental) and with potentially involved subjects as executors (private or public) and as beneficiaries (direct, indirect, potential, and future).[30]

"Venaria Reale" Work Shop 1 (2 credits)

The objective of this Workshop is to enhance historic knowledge of the Royal Palace of Venaria Reale and the complex known as La Mandria with respect to its architectural character and with regard to the urban and territorial organization of the 17th century village and gardens. The course will take place in connection with the activities of the

annual Laboratory and material taught in the course entitled History of the City and Territory.[31]

"Safe Smoke Sauna" Work Shop (2 credits)

The course presents the subject of restoration sites of a wooden building of historical/environmental value. It proposes reflection on problems connected to executive phases at an operative level

Workshop participants will study the enhancement processes of cultural heritage, with particular reference to experiences in European countries.

Year	1st academic period	cred.	2nd academic period	cred.
1°	Technical Culture in Historic Construction	6	Urban Planning	6
	Basics of the History of Architecture	6	Basics of the History of Urban Planning	6
	Basic computer science	2	Basics of Economics and Estimation	6
	General Mathematics	6		
			Free choice	3
	Basics and Applications of Descriptive Geometry	3	Computer-Aided Design	2
	English	2,5	English	2,5
	Architectural Design Lab. I	4,5	Architectural Design Lab. I	4,5
	TOTAL 1st YEAR	30	TOTAL 1st YEAR	30
2°	History of Modern Architecture	6	History of Contemporary Architecture	6
	Statics / Construction Science	6	Theory and History of Architectural Restoration	6
	Materials Science and Technology	6	Principals and Techniques of Environmental Control (*)	6
	Topography	3	Surveying and Surveying Methodology	3
	Architectural Construction Lab. I	4.5	Architectural Construction Lab. I	4.5
	Architectural Design Lab. II	4.5	Architectural Design Lab. II	4.5
	TOTAL 2nd YEAR	30	TOTAL 2nd YEAR	30
3°	Technologies of Building Reclamation	3	Free choice	6
	The History of the City and Territory	6	Free choice (**)	6
	The History and Analytical Methods of Architecture / Legislation on Cultural Heritage	3 3	Internship (on site)	3
	Photogrammetry	3	Final Examination	5
	"Venaria Reale" Work Shop 1	2	"Safe Smoke Sauna" Work Shop	2
	Restoration Lab. I (Architectural)	4,5	Restoration Lab. I (Architectural)	4,5
	Evaluation Lab.	4,5	Evaluation Lab	4,5
	TOTALE 3° ANNO	29	TOTALE 3° ANNO	31

Table 1. *Table of educational courses. New training model 2nd Faculty of Architecture. Degree Course in History and Conservation of Architectural and Environmental Heritage*

Conclusions

The present work intends to give a wide overview of the Degree Courses in History and Conservation of Cultural Heritage, which is characterised for being included inside the educational offer of a Polytechnic university as the Polytechnic of Turin.

Graduated students of 1st level will be acknowledged both on humanistic sectors both on technical subjects applied to the conservation of architectural, cultural and environmental heritage. This aspect appears particularly interesting also in relation to the growth of Erasmus/Socrates exchanges with universities of other European countries that pay special attention on the subject of cultural heritage and to the job opportunities in the European Union[32].

"*The development of a "Europe of knowledge" is a initiated and necessary process. Moreover it is a very ambitious challenge, that is a part of the Amsterdam treaty, which shows the resolution of the European Union in the promotion of a higher level of knowledge for its population, through an open access to the education and to the permanent up-to-date of the knowledge and taking into account that the initiated process involves several fields: innovation, culture, education, training and research, basic axes of the home politics of European Union... The interventions of the community are completely in accordance with the subsidiarity principle, since they act a role complementary to the actions engaged by each member State; the local and national responsible are indeed privileged subjects to promote the most important actions in the field of culture, but anyway the level of the European intervention is particularly useful, both for major cultural streams and specific sectors... New aspects such the diffusion of trades, the Information Society, the scientific and technological progress, lead to several changing: in Companies they bring new types of jobs, in schools and education stage new kinds of knowledge are needed... " (*words from Viviane Reding – of the DG Education and Culture of E.U. - see "The European policy…" in "Europa", June 2001)[33].

In conclusion I wish to briefly recall with critical points that emerged in the new Degree Course, the actual developments and perspectives – in the new didactical offers promoted by the faculty of Architecture of the Turin Polytechnic.

For the first aspect we must notice the difficulty of the student in following the various courses belonging to the different disciplinary sectors, solvable in the future with an horizontal co-ordination (for year) of the different disciplines and that vertical (for disciplinary sector) in the three years of Degree Course. For this aspect the Degree Course Council has assumed in the laboratories of construction, planning and restoration, the moments of real aggregation and co-ordination in which the theorical/humanistic/scientific/applicative disciplines converge to reach a better formative offer. This operation is possible for the interdisciplinary character of the Laboratories.

For the second aspect the perspectives, of the academic year 2002-03 has been instituted the two-years Specializing Degree in "Architecture for the Restoration and Enhancing of architectonic and environmental heritage" which offers a "natural" way out of specialization for the first level degree, giving a new professional figure of architect specialized in restoration of architectural and cultural heritage.

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Key words: training; cultural heritage; architectural and environmental heritage; professional figures; International confrontation.

Notes

1 The course consists of monographic lessons and supervised on-site experiences. The main topics included in lessons are: coherent terminology with a needs approach, construction systems correlated to the use of specific techniques in masonry, wood, metal, and concrete constructions. The supervised, on-site experiences, which are necessary to train candidates in the observation of materials, the identification of construction techniques, the analysis of building structures, are preferably organized with the professors of related courses. In order to reach this objective, the course does not divide the history of architecture from the history of art or of construction techniques, or from social, political, and economic history. The history of architecture – which focuses basically on western architecture – will be presented through its formative periods, beginning with the Cretan Civilization through recent experiences of the 1900's. Periodization, nomenclature, specific vocabulary, critical orientation, and theoretic-literary fundamentals will precede and accompany the various historical passages.

2 The following topics are presented: differential and integral calculus of one-variable functions; domains and images of functions of a real variable; elementary, trigonometric, and transcendent functions; behaviour of function domains at extremes, continuity, and singularity; function derivatives and their geometric interpretation, rules of derivatives, applications of derivative calculus; monotony intervals of functions and determining maximums and minimums; definite function integrals; calculating and area and its applications; indefinite integrals; main methods of integration. The sections on linear algebra and analytic geometry include: matrices and relative operations; determinants, algebraic complements, inverse matrices, matrix ranks; linear algebraic systems and their analysis and solution; lines and curves on a plane; introduction to conic equations and their graphic representation, recognizing a conic; lines, curves, and surfaces in space. The section on descriptive statistics includes: numeric and graphic representation of statistic data, indices of central tendencies and variability, linear regression and correlates.

3 Architecture of a calculator: conception of a calculator according to Von Neumann; CPU; memory; peripheral devices. Software: Algorithms and programming (introduction). Operating systems. Windows. Networks and Internet: Network typologies and topology. Physical means or data transmission. Communications connections and software. Internet.

Word Processors: Editors (Edit and Notepad). Microsoft Word. Electronic pages: Microsoft Excel. Relational Data Bases: Introduction to relational databases. Creation of a database on a conceptual level. Interrogation of databases. Microsoft Access.

4 Some representative cases allow an in-depth analyses of the methods and resources for studying the city during various epochs. This course is organized chronologically around the theme of urban space that is either public or intended for collective use, and the relationship between the city and some urban scale architecture that is as significant from a symbolic point of view as are the functions that it offers. Within this framework pertinent moments of transformation of the city will be analysed and specifically relevant models will be established. Resistance to change, connections to the fortified system, territorial relationships, projects that have been carried out, ideas, plans, strategies, and user programs will be studied.

5 Part of the course will be dedicated to acquiring elements of statistics for application in pertinent evaluative procedures. Elements of economics: a historic overview of economic thought and the evolution of the value theory. Economics of private goods: Private goods and wealth. The division of labour and exchange. The market: supply and demand. Competition and equilibrium. Imperfect markets. The theory of consumer choice. Economics of public goods: purely private goods, collective goods, purely public goods, mixed goods. Supply and demand of public goods. Pareto-optimality. Market imperfections and public intervention. Statistics: Methods of determining estimates with impossible linear algebraic systems or with infinite solutions. Elements of calculating probability, casual variables and notable distributions, punctual and staggered estimates of parameters, testing hypotheses, linear regression.

Estimation: The evolution of procedures for measuring the value of land and buildings with reference to the evolution of mechanisms of building and urban accumulation. The Italian estimative approach: appraisals of private goods: postulates and methods. Market, cost, and return values. Elements of financial mathematics.

6 Furthermore, the course will continue with the analysis of one of the following: vertical structures, horizontal structures (floors), coverings (vaults and trusses), architectural orders, and structures in iron and concrete. Recognize: perceiving forms and environments, critical and synthetic analysis of characteristic elements through a hierarchization, proportions dimensions, architectural orders. Language: methods of representation: comparison between traditional design and computer-aided design and integration, orthogonal, assonometric, and perspective projection, the description of typologies of constructive elements: vaults, roofs, trusses, walls, applying the methods of representation previously mentioned. Scales of representation: graphic symbology, pricing quotation systems, conventions and standards. Computer-aided Design: functional logic of computer-aided design programs (autocad 14), basics of bidimensional representation, potentiality and applications of three-dimensional representation (model).

7 This laboratory opens with a group of three introductory modules aimed at a critical observation of the part of the city, through visits and surveys; well-defined and easily-accessed parts of cities where there are clear signs of the phases of transformation and indications that diverse cultures left their mark over various periods through their arrival in and relationship to the city and their efforts to recover or cancel pre-existing aspects. The three urban departments being studied include: a) the way in which the Baroque city intervened on pre-existing medieval settlements, b) the way in which the 19th century city became grafted onto the Baroque city, c) the transformations of the 20th century which took place on pre-existing urban settlements. A part of the course is entirely dedicated to the restitution of the analyses carried out for each single case study and the refining of strategies of recognition and of safeguarding the individualized architectural artefacts.

8 Contemporarily the course will propose and introduction to the methodology of the History of Architecture and its diverse articulations and tendencies. As a course for majors in the History and Conservation, the teaching technique

will tend to interpret the reasons, circumstances, and context of projects selected as being particularly significant on one hand, and the analysis of the buildings themselves from the point of view of their current stratification and consistency on the other. The program may be articulated in two parts, the first on the architecture of the XV and XVI centuries, the second on the XVI and XVIII centuries.

9 The fundamental concepts of statics and the kinematics of rigid body systems are presented; examples and exercises are given on the calculation of the constraining reactions and the tracing of diagrams of internal stress characteristics in isostatic systems of flat beams and pressure values. Geometry of Mohr's areas and circles. Introduction to the concepts of deformation (deformable body) and tension, constitutive laws in elasticity. Hyperstatic structures. Topics to be studied in detail include: determining cross sectional geometric parameters in order to evaluate structural efficiency, kinematics of rigid bodies: analysis of structural kinematisms and schematics of real structures. Statics of rigid bodies: equilibrium of structures, determining the constraining reactions and the tracing of diagrams of the characteristics of stress, pressure values. Isostatic structures: analysis of the principal isostatic structural typologies, Gerber beams, closed structures, three-hinged arches, trusses. Deformable bodies: introduction to the concepts of deformation and tension, constitutive laws in elasticity. Hyperstatic structures: methods of resolution and the influence of an excess of constraints in structural response.

10 This course is ideally subdivided into three parts. The first part, which concerns Materials Science, provides the student with information concerning chemical, physical, and mechanical properties of materials in order to guarantee the understanding of deterioration phenomena that may effect them. The second part regards the treatment of materials from ancient and modern constructions. The third part regards the causes of material deterioration, the diagnosis of deterioration phenomena, and remedial interventions.

11 This course contemporarily introduces students to the methodology of the history of Architecture and its diverse articulations and tendencies. As a course for majors in the History and Conservation, the teaching technique will tend to interpret the reasons, circumstances, and context of projects selected as being particularly significant on one hand, and the analysis of the buildings themselves from the point of view of their current stratification and consistency on the other. The program may be articulated in two parts, the first on the architecture of the XV and XVI centuries, the second on the XVI and XVIII centuries. Each part will be evaluated as half of the total credits for the entire course. The first forty-five hours of lessons will be dedicated to Renaissance architecture, while the remaining hours will be dedicated to Baroque architecture.

12 The evolution of the discipline and concept of conservation is the reason to learn how these fundamental concepts of Restoration have had diverse interpretations over time. Safeguarding and restoration, which are both carried out through legal-administrative and technical-scientific tools, are both defined as actions of conservation of architectural and environmental heritage. These are the foundations of this course that considers the legal criteria based on existing laws and the theoretic and cultural aspects with special reference to the Restoration Charts, as well as operative ones that aim at conservation. With regards to operative methodology, this course will focus on those restorations considered not as "givens" but as results, meaning the "result of joint actions between restoration techniques and the seeking of appropriate functions" that are usually reversible and carried out with the scope of prolonging the life of the building.

13 Contents. The following will be presented and discussed: the problems and processes of the city and territory with reference to the present day, compared with those of the 1900's; tools that govern transformation with reference to the Italian situation in an international framework. This presentation will be based on various case studies in reference to three main focus points that characterize ongoing innovations: the role of the environment and landscape in the organization of the territory; the role of actors in determining transformations and in government policies; the relationship between territorial planning and local development projects.

14 Thermophysics of buildings (basics of heat transmission and psychrometrics, thermo-hygrometric phenomena in building components, phenomena of rising humidity in old masonry walls, methods of diagnosing humidity, methods and instruments for measuring humidity in masonry walls, techniques for resolving problems of rising humidity). Climatization (interior and exterior atmospheric pollution, the influence of thermo-hygrometric conditions and air quality on the process material deterioration, climatization techniques for limited areas with the scope of preserving works of art, problems in adapting historic building in order to conform to safety standards and environmental conditions); Illumination (basics of illumination, the influence of light and electromagnetic radiation on the process of materials deterioration, principles and techniques of illumination of limited environments for the preservation and exhibition of works of art, problems in adapting historic buildings to conform to emergency lighting standards). Instruments and methods for monitoring the environment (measurements of thermo-hygrometric and photometric limits and of atmospheric pollutants, procedures for monitoring the environment and the elaboration and representation of the resulting data).

15 Lessons and experiences will be conducted in the integrated Laboratory with approach methods that are specifically designed for each discipline. The teaching of the history of architecture includes in-depth material of the history of architecture of the XIX and XX centuries with reference to the issue of the conservation of architectural heritage and the idea of "modern" as a new cultural heritage to be safeguarded. Contents. The principal topics and specific study and design experiences will be articulated according to two distinct phases of study over the two academic periods and then followed up by respective examinations in Architectural Technology and the History of Architecture. Critical observation and cognitive surveys of existing buildings, in which students must be able to identify the relationship between design and technology, needs-demands-performance sequences, the use of materials, design significance, and the history of architecture, the history of the project and its execution, architecture-architect-commissioner relationships, and the relationship between architecture and the physical and historical context, in order to recognize the materials, singular typologies, constructive elements and systems, and the

technological specificities, as well as the significance and symbolic values of historic buildings. The History of Architecture will include the illustration and discussion of the design of the existing heritage (with its controversial terminology and the acceptation that has been assumed in relation to architectural debates) and its relationship with the concept of history in the culture of the 1800 and 1900's. Simulation of the recovery-oriented design process as related to an distinct building within the architectural context of Turin and its territory. As part of the History of Architecture, the relationship between modernity and the constructed city, the debate concerning pre-existing environmental aspects during years of reconstruction, the long-term history of some architecture in relation to the city and the territory will be discussed

16 These Laboratories will be carried out in three distinct phases: introduction to the field of design. The connection between The Palace of Venaria and the Park of La Mandria will be introduced through a series of theoretic lessons on the concept of cultural heritage, on the history of the Palace and its gardens, on the urban planning of the building and the Historic Center of Venaria, on the history and evolution of the parks and recreational equipment. Students will be given a pertinent bibliography; Construction of a master plan of minor interventions aimed at equipping the mutual assets of Venaria and La Mandria, both by inserting service elements (transport, information, parking, and refreshment facilities, etc.) and by constructing a "livable" park with recreational facilities; The successive phase, according to qualifications and performance identified within the framework of the master plan, the students will be called upon to develop one of the proposed themes, one of the selected buildings, on an architectural scale and organizing all aspects of design-construction that must be coherent with the historical environment in which the building is situated and with the other elements in the pre-established series of interventions.

17 The introductory part will be completed by the basics of descriptive or interpretive graphic representation and/or as a transformation of an anthropogenic environment, integrated with an introduction to methods of representation on diverse scales. Prerequisites to the course: understanding of analytic geometry and trigonometry: Major Project: knowledge, preliminary surveys, documentation; Survey: purpose, scale, details, precision; Measurement Instruments and Operations: Goniometers, levels, total stations; Fundamentals of measurement theories; Topographic surveying methods: fundamental, thickening, and support networks for topographic and photogrammetric surveys; Direct surveying methodologies: integration with topographic surveys, photographic surveys; Urban and territorial surveys. Introduction to cartography: Main cartographic systems and official Italian cartography; Basics of photogrammetry. Principles and Fundamentals of photogrammetry; terrestrial video cameras; interior and exterior relative orientation; introduction to restitution and straightening operations; Representation, restitution, communications: preliminary surveys, survey drawings and UNI graphic conventions.

18 . Methodological framework for a reading of the building to be subjected to interventions from a technological-construction-structural point of view and with reference to typologies of walls, wood, and reinforced concrete, and problems related to deterioration and restoration. The definition and critical analysis of traditional and innovative methods of intervention related and aimed at the recovery of various elements of the structural system. Indications concerning standards and the reading of significant case studies.

19 . As a result, the central theme will be the history of the city and territory during the period of Absolutism with emphasis placed on large monuments and relative contexts, with a view to studying the characters and potentialities within the history of the territory, from ancient regimes to contemporary times. The following topics will also be developed: capital cities and dominant cities between the Italian Renaissance and European Absolutism; the organization of the territory between the XVI and XVIII centuries; the Savoy state from the reinstatement of Filiberto to the post-unification period; Turin between Mannerism and Baroque: the invention of a capital; the establishment of the court and country residences; the Savoy "corona di delitie" (a network of royal residences) as a European concept; the 1700's and the capital of the realm; the territory of the old regime and the current territory; the territorial relationship between Venaria Reale and Turin in historical connotations and potenziality; the visualization of historical environmental values for an updated valuation.

20 Each theme will be approached by highlighting the close relationship between purely urbanistic-architectural aspects and legislative ones. Methods and instruments used to identify and classify environmental-historic heritage in light of historical knowledge compared with parameters of current readability will be analysed. Various scales of values of this heritage will be read, from the single building to nuclei of ancient settlements, to infrastructural systems, to the territory. With a view to "active safeguarding", the analysis of architecture will be conducted by identifying the characterizing elements, or those essential characteristics that must be maintained in any type of intervention or that may inspire a project that respects the element of cultural heritage to be intervened upon. Other filing methods will be compared and various themes analysed through the comparison of concrete results of research aimed at the drafting of urban planning tools that respect historical-territorial values. In the other module, the course will propose and outline of the basic principles that inspire the current Italian legislative standards concerning cultural heritage. The analysis of current legislation will be conducted from both an historical-legal and technical-legal perspective, retracing the various highpoints that, from the past century until today, have distinguished pertinent standard interventions. Therefore, connotations concerning the concept of cultural heritage and its safeguarding will be above all considered through a direct examination and comparison of legislative sources, of the relationship between centralisation and decentralisation, and of that between public and private. Finally, the solutions adopted by the Italian system will be compared to other those adopted by other European legislative systems.

21 Close-range photogrammetry (of neighbours): architectural photogrammetry. The filming project. Orientation of photogrammetric filming. Reference points Photographic straightening. Laboratories and/or exercises: FOTORIL Architectural Photogrammetry Laboratory of the C.I.S.D.A.

22 Thermophysics of buildings (elements of heat transmission and psychrometry, thermo-hygrometric phenomena in building components, phenomena of rising humidity in older masonry walls, methodology of diagnosing humidity,

methods and instruments for measuring humidity in walls, techniques for resolving problems of rising humidity in walls). Climatization (interior and exterior atmospheric pollution, the influence of thermo-hygrometric conditions and air quality on the process material deterioration, climatization techniques for limited areas with the scope of preserving works of art, problems in adapting historic building in order to conform to safety standards and environmental conditions). Illumination (basics of illumination, the influence of light and electromagnetic radiation on the process of materials deterioration, principles and techniques of illumination of limited environments for the preservation and exhibition of works of art, problems in adapting historic buildings to conform to emergency lighting standards). Instruments and methods for monitoring the environment (measurements of thermo-hygrometric and photometric limits and of atmospheric pollutants, procedures for monitoring the environment and the elaboration and representation of the resulting data).

23 This course integrates a theoretic approach and project method of communications through the learning of imaging software and software for multi-medial production. Students will be guided in the design and realization of a hypermedia project that will constitute the basis of their course grade along as well as the subject of their final examination. The didactic program will be articulated in four phases: acquisition of methodological and design instruments, deduced from hypertextual writing exercises and the analysis of on-line and off-line multi-medial products; acquisition of computer science skills, developed in correspondence to phase 1, through seminars dedicated to the learning of necessary software; designing an application; realization, informatization, and testing. Main topics of phase 1; a) invisible design or interior architecture: methods of hypertextual writing. The concept of text, of discretization, and the node as minimal units of information. The concept of "resolution", or of "scale" in hypertext. Text and multi-medial nodes. The territorialization of data, the form and visualization of the field structure of knowledge. The concept of structure ads a communicating form: "rules" of "good form" in communications processes. Symmetry, polarity, hierarchy, succession, gravitation, etc. Visual rhetorics of above/below, first/last, left/right, in front of/behind, large/small, etc. Types of anchors: hot words, sensitive areas, buttons. Node contents. Concept of coexistence and synchronocity. Concept of multimediality. The HyperMap. The map/territory relationship, metaphor of navigating, exploration, of getting lost. Metaphor of Ariadne's Thread. The frame allegory. b)Visibile design: the project of the home page interface and navigation tools. Node pagination. Editing multimedial texts. Graphic regulations. Story Boards.

24 . As a course for students in History and Conservation, both the theoretical part and the analysis of case studies will tend to contextualise and actualise reflections on issues connected to the museum sector and cultural heritage. The first 45 hours will be dedicated to the principles and operative instruments of cultural marketing. The remaining hours will be dedicated to in-depth analyses of case studies concerning the marketing of cultural heritage.

25 Contents. The didactic program, which is focused on the period between the 1500's and 1900's, will explore the formation of the concept of the garden in European cultural, from the Edenic garden to the Roman, medieval, and 15th century garden, in order to develop the themes found in Italian Mannerist gardens, from the French garden and the treatises of Boyceau de la Baraudière and dei Mollet, to the innovations of Le Nôtre, reflections on Dezaillier d'Argenville's treatise, to the classicist garden in England and Holland. New concepts of the Anglo-Sino garden, between picturesque and sublime, of landscape gardeners, H. Repton and the Red Books, J.C. Loudon between landscape design and metropolitan planning compared to P.J. Lenné in Germany. The theme of parks and eclectic gardens, from Les Promenades de Paris by Alphand to E.André's treatise. The interrelationship between European city-capitals and the territory, between the princely city to the age of Absolutism, will all be assimilated into the royal residences and country estates, as well as in urban parks during the 19th and 20th centuries.

26 Organised in collaboration with the Scuola Holden in Turin, this course offer students, especially those from the degree course in History and Conservation, the instruments necessary to approach the drafting of any text to illustrate, accompany, or narrate themes dealing with architecture and the history of architecture. The course will consist of lessons and seminar exercises. The students will be able to select from among three writing workshops: writing history, describing a project, or writing a thesis. Each workshop will consist of a group of 10-12 students and an instructor who will follow the drafting of the proposed practice essay. Some of the themes dealt with during lessons will include: writing as a structure of thought; from spoken works to written words; how to structure a text; jargon and language; bibliography, notes, and quotations; most common errors to be avoided; the structures of conventions, paraphrasing, marginal notes; self-correction tools; the presentation of a curriculum.

27 The purpose is to assist in the transition from the academic world to the working world through External Tutors of the Department (graduates, professionals, managers). Through the training program IG Students, students are offered the opportunity to carry out a concrete experience in creating and managing a real business in the "Laboratory". These simulations, which will be agreed upon by the Internal tutors of the Study Program, will regard specific cases and projects, yet to be decided upon, inherent to the development and management of architectural and environmental heritage.

28 The student, under the guidance of an assigned instructor, may further develop his understanding of particular aspects of the processes of restoration, conservation, and development of architectural and environmental heritage, clarifying areas of professional expertise and analysing interdisciplinary aspects, also through the use of specific case studies.

29 Directing and Organizing a design project: from the analytical phases of knowledge to the comparison and syntheses of widespread analytical acquisitions concerning the singularity of the fibre and context, to the intervention itself. This Laboratory will take place in two parts: Continue study of theories and methodology. Disciplinary orientation. Current tendencies in the fields of conservation and restoration on the international panorama. Critical observation of contemporary Italian and European culture through thematic topics like: conservation/innovation, experimentation of techniques and materials, "necessary" restoration, "occasional" restoration, of contemporary

architecture, etc. Restoration and context. The "city-palimpsest" and the "factory-document". The "territories" of restoration. Design instruments for historical, architectural, geometric, and physical knowledge of "existing conditions" (deterioration of material components, analytical surveying instruments, etc.) and conservation strategies. Design experience: acquisition, organisation, management of analytical data for the "knowledge project", syntheses of data and restoration project, also verifiable from an executive point of view with the in-depth analysis of the technical-structural aspects, of reuse compatibility and the cost-benefit valuation. The Laboratory may be integrated with conferences and seminars held by Italian and foreign experts in this field.

30 With a view to the entire procedure inherent in a conservation project, this Laboratory deals with, on theoretical and applicative levels, relative problems concerning: estimating costs of restoration interventions; restoration project and site management; finding public and private financial resources with a special focus on EU funding and sponsorship; valuation theories and techniques (monetary and non-monetary) according to formal and negotiable approaches; the identification of actions and measures aimed at guaranteeing economic and financial feasibility and developing regeneration processes within local contexts; the identification of new functions and the formulation and verification of management hypotheses; the experimentation of project financing and valuation techniques (cost benefits and Community Impact Evaluation) and/or techniques for demand analysis. This Laboratory also provides individual or collective experimentation on actual cases, which will specifically include the case of a large monumental complex which presents many challenges to be met and dealt with in order to achieve full refunctionalization. This laboratory will also include workshops, interdisciplinary seminars with professionals, technicians, and instructors, some of whom will come from abroad.

31 In order to achieve this objective, pertinent documentary, archivistic, and iconographic sources will be analysed in order to recompose the periodization of the complex, construction processes, and historical architectural characteristics of the building. On-site excursions aimed at an in-depth, first-hand analysis of pertinent themes will be an integral factor of these educational activities.

32 4th European Commission Conference on : "Research for protection, conservation and enhancement of cultural heritage: opportunities for European enterprises", Strasbourg (FR) 22-24 Nov.2000, European Commission, 2002.

[33] C. Bertolini Cestari (editor), *Wooden Handwork/Wooden Carpentry: European Restoration Sites*, Elsevier, Paris 2001.

The degree of "Chemical Science and technologies for the conservation and the restoration" at the University of Venice

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Abstract

At the University of Venice is fount a new degree of "Chemical Science and technologies for the conservation and the restoration", beginning from the 2000-2001 Academic Year.

This new degree, for a term of five years, is included in the category of Chemical degree and train graduates with knowledge about the scientific subjects (chemistry, physics, mathematics, etc.), humanistic subject (story of art, archaeology, etc.) and included laboratories of restoration.

The graduates can work in public institution as the Superintendence, in industries that produces materials for the restoration and conservation, public and private laboratories of analysis and diagnostics and practise as chemist consultant in projects for the conservation of Cultural Heritage.

“LA FORMATION A LA RESTAURATION DES ETUDIANTS DE L’ACADEMIE DES BEAUX-ARTS ”.

Codacci-Pisanelli Bianca

Résumé

L’Académie des beaux-arts de la ville de Lecce a eu la possibilité d’instituer pour l’année 2001-2002 un cours expérimental de conservation et de restauration. Ce cours, qui dure 5 ans, a le but de former aux problèmes de la restauration et surtout d’enseigner comment appliquer directement les techniques analysées.

Ce cours est divisé en trois branches : peinture, pierre et bois. Pour entrer dans l’Académie les étudiants doivent passer un examen écrit et oral.

Pendant les cinq années les étudiants étudierons plusieurs matières : histoire, technique, chimie, dessin.

J’ai tenu le cours de « Méthodologie de relèvement de la déterioration des monuments ».

Arguments traités

- méthode de travail pour l’ exécution du relèvement graphique
- les ordres architectoniques et les moulures
- lexique pour le relèvement d’œuvre d’art
- généralités sur les théories de restauration
- Géométrie plane : histoire des techniques de prospective
- symbolique graphique de la déterioration des matériaux.

fig1

La conservation et la restauration ont toujours été considérées disciplines fondamentales parmi les institutions culturelles et juridiques italiennes. Pour cette raison, au début du 20ème siècle ont vu la lumière les Académies des Beaux-Arts, définies par

l'Encyclopédie Italienne Treccani en 1929 « Institutions régulièrement constituées pour le développement et la connaissance des arts, qui ont le double rôle d'écoles et d'associations professionnelles. Elles ont le but, non seulement de promouvoir et d'enseigner les arts, mais également de contribuer à la protection du patrimoine artistique. »
Jusqu'à 1939, année de naissance de l'Institut Central de la Restauration de Rome (I.C.R.), les restaurations étaient exécutées par des artistes et des artisans qui possédaient, souvent, une grande habilité et expérience sans en avoir la préparation scientifique équivalente.
La création de l'Institut, requise par de célèbres experts, a permis l'évolution de la discipline de la restauration d'un niveau artistique et culturel à un niveau scientifique. Grâce à cela existe un corps de restaurateurs d'Etat.
L'évolution historique de la conception de la restauration est témoignée, à partir de la fin du 18ème siècle, par les discussions sur la théorie de base des projets contenues dans les ouvrages de plusieurs savants. Mais ces discussions ne concernaient pas la méthodologie d'application des projets. Le projet de restauration atteint son but, à travers un chemin complexe, lié aux différentes conceptions de son exécuteur. Sur le chantier il est nécessaire d'affronter et résoudre rapidement des situations de détérioration, plus au moins graves, sans possibilité d'avoir recours à un personnel agissant avec méthodologie scientifique et ayant capacités artistiques et artisanales.
Le fait que seulement les architectes soient agrées à la rédaction des projets de restauration, a été une prescription fondamentale pour la sauvegarde du patrimoine culturel. Ce privilège est né en même temps que la faculté d'Architecture qui auparavant n'était qu'une branche de l'Académie des Beaux-Arts.
Les Académies des Beaux-Arts ont poursuivi leur activité d'institutions pour la formation, dans le domaine des arts, des élèves ayant différents types de baccalauréat.
Les cours des Académies, que les étudiants sont obligés de suivre, ont une durée de quatre ans et sont : peinture, sculpture, décoration et scénographie.
La loi n°502 du 21/12/1999 a prévu la réforme des Académies, qui assurent la spécialisation et la recherche dans le domaine artistique, en délivrant des titres d'étude ayant la même valeur que les titres Universitaires.
L'Académie des Beaux-Arts de Lecce (fig.1), ainsi que quatre autres Académies en Italie, a obtenu l'autorisation du Ministère Italien de la Recherche Scientifique de tenir un cours expérimental de restauration pendant l'année académique 2001-2002, dans le but de former des professionnels pour la manutention ordinaire et la sauvegarde du patrimoine artistique historique et contemporain.
Le siège de l'Académie de Lecce est situé dans un ancien couvent dominicain du 17ème siècle pourvu des grandes salles équipées en laboratoires et d'autres, de différentes tailles, pour l'enseignement. Le cours expérimental est réservé à un nombre limité d'étudiants sélectionnés après concours d'entrée. Les cours sont tenus par des professeurs choisis par un comité scientifique, les matières d'enseignement concernent les disciplines indiquées par l'Institut Central de Restauration de Rome. Le cours expérimental a une durée de cinq ans, à l'issue duquel les étudiants obtiennent un diplôme de l 'Académie en Sauvegarde et Restauration.
Le cours est divisé en trois branches : "Pittorico, Ligneo, Lapideo" (concernant les œuvres peintes, en bois et en pierre).

La discipline, pour laquelle j'ai fourni une contribution au cours, est dénommé ''Méthodologie de relevé de la dégradation'', elle fait partie des cours de la première année et se base sur la connaissance du dessin comme méthode pour améliorer la connaissance de l'œuvre à restaurer. Le but du cours est de montrer comme le relevé graphique de l'état de l'œuvre doit fournir une série d'informations sur lesquelles on devra programmer les interventions de restauration. Pour cela les matières d'enseignement concernent les principes et méthodologies du relevé direct, de la restitution géométrique et du dessin de la situation réelle.
En particulier, les sujets suivants sont abordés :
1) Méthodologie de travail pour l'exécution du relevé graphique
Au cours de cette première phase est mise en évidence l'importance du relevé direct et indirect. Les étudiants, après avoir pris connaissance du fonctionnement des différents instruments servant au relevé, tel que le ruban métré, le fil à plomb et le niveau, exécutent le relevé sur la base d'un schéma graphique simple et précis : l'esquisse (fig.2). Les étudiants apprennent l'importance de la précision du mesurage de l'œuvre. Avec la triangulation ils vérifient l'exacte position de l'œuvre dans son contexte et les différentes parties de l'ensemble de l'œuvre étudiée.

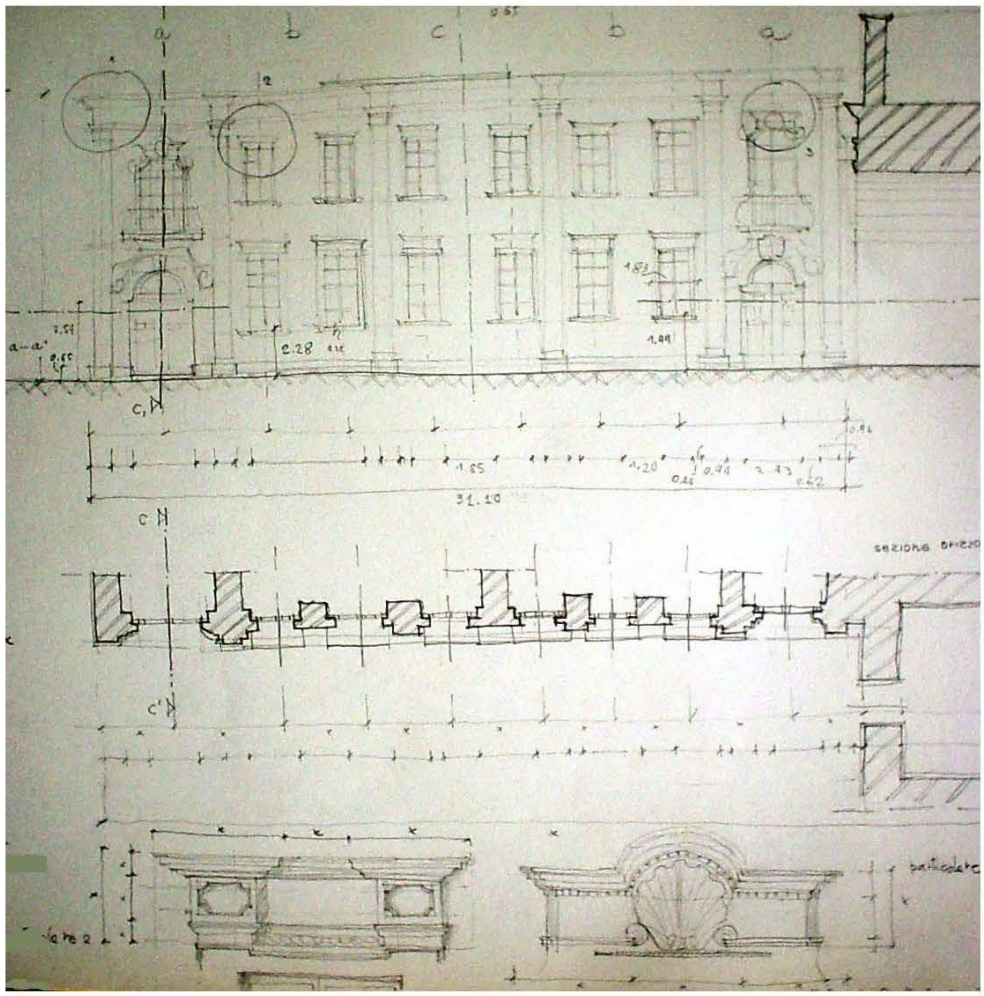

fig.2

2) Ordres architectoniques et molures.

Cette partie du programme est directement reliée au cours d'Histoire de l'Art, et a pour but de stimuler la capacité d'observation des détails architectoniques, de leurs caractéristiques géométriques et, surtout, des lois qui en règlent les proportions (fig.3)

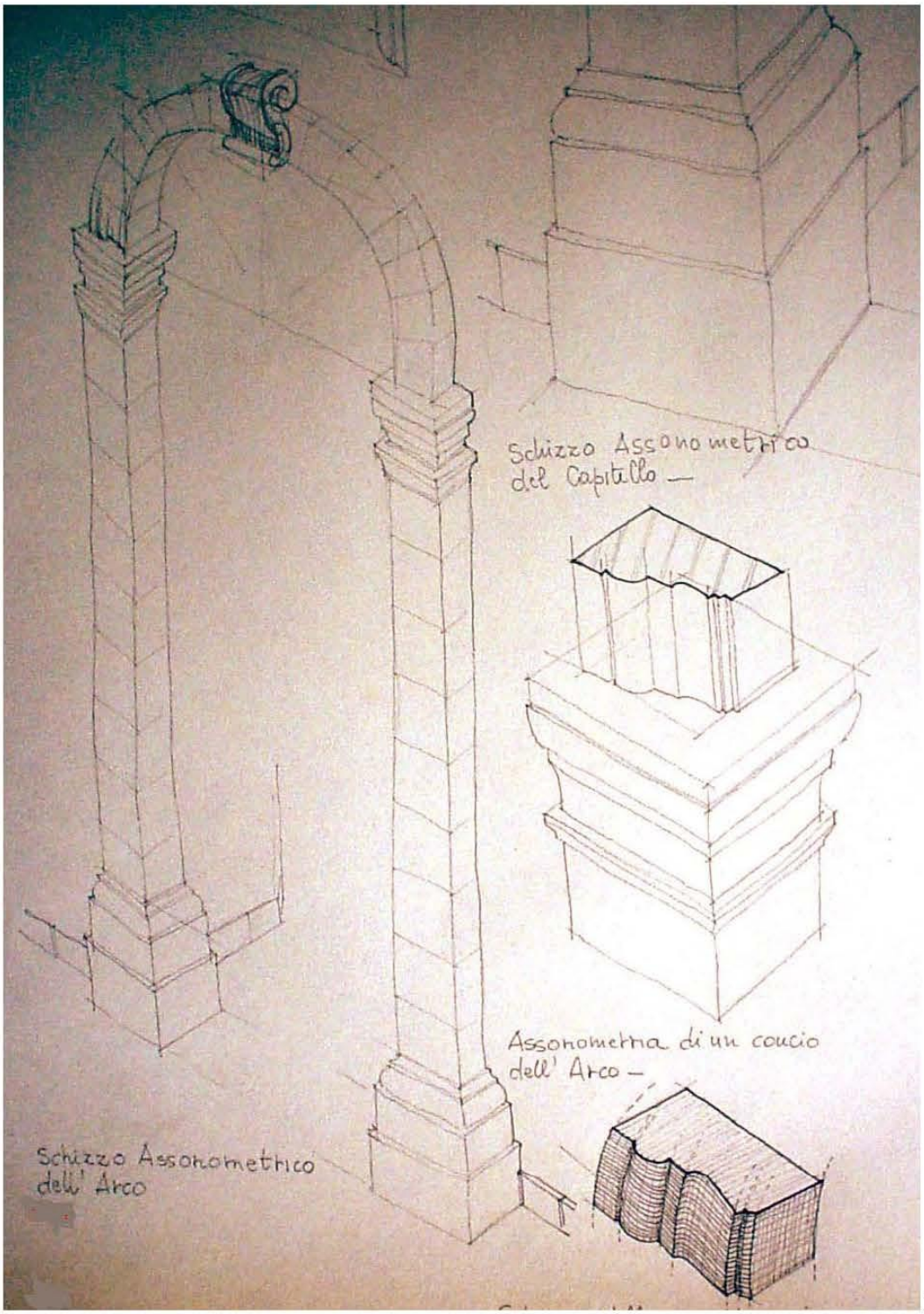

fig.3

3) Lexique pour le relevé d'une oeuvre d'art.

La connaissance du langage spécifique pour la définition des caractéristiques artistiques d'une oeuvre est une partie indispensable pour la préparation culturelle du restaurateur. En utilisant le langage usuel et en introduisant des termes peu utilisés dans le langage courant, on obtient une meilleure capacité de décrire les oeuvres. La description graphique jointe à un riche exposé dialectique donne lieu à une lecture analytique de l'œuvre étudiée.

4) Généralités sur les théories de la restauration.

Il est fondamental de mettre en évidence comme les méthodologies du relevé sont strictement liées aux différentes théories sur lesquelles se base la restauration opérationnelle. Dans cette optique et d'une façon synthétique on illustre l'évolution de la conception de la restauration des oeuvres d'art. En partant des découvertes archéologiques du 18ème siècle, à travers la dialectique du 19ème siècle de Ruskin et Viollet le Duc, on souligne l'importance de la naissance de structures comme l'Institut Central de la Restauration italien. A travers la connaissance de l'évolution historique de la restauration on met en évidence les différents rôles donnés au dessin en fonction des théories qui privilégient la restauration philologique ou la restauration critique.

5) Aperçu de géométrie plane : histoire des techniques perspectives.

Pour pouvoir positionner correctement l'œuvre dans son contexte naturel, il est indispensable de connaître les théories actuelles de base pour la restitution en perspective et l'évolution historique de la discipline. Après un court excursus théorique on reconstruit les grilles théoriques qui ont été la base pour peintures et sculptures connues.

6) Symboles graphiques et aperçu sur la dégradation des matériaux.

La restitution graphique de la dégradation est mise en évidence et constitue la partie plus importante des produits finals. Les différents symboles utilisés au niveau international pour définir graphiquement la dégradation d'un oeuvre sont étudiés grâce à la publication ''Normal'' du I.C.R. et à travers la lecture analytique des dessins. Par l'analyse des relevés exécutes et en particulier par l'observation de la dégradation il est possible de comprendre directement comment mettre en évidence des phénomènes comme l'exfoliation, l'érosion, les patines, etc.

Ce cours expérimental pourra atteindre son but seulement dans quelques années, lorsque les premiers étudiants deviendront restaurateurs, mais, sans aucun doute, un premier objectif a été atteint : celui de garder vivant l'intérêt de la culture vis-à-vis des problèmes liés à la manutention des monuments ''cachés'' de notre péninsule.

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STUDIES IN ARCHITECTURAL CONSERVATION AT THE WROCŁAW UNIVERSITY OF TECHNOLOGY IN POLAND

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Abstract In 1998 the college level schools of Wrocław, the capital of Silesia, were encouraged to organize specialized courses in the conservation of monuments. The initiative came from professional conservators' organizations. The motivation came from an increasing demand for qualified specialists and the lack of educational possibilities in this field in western Poland. After an initial attempt to organize conservation education by a collaboration between the Academy of Fine Arts and the University of Technology, the courses have finally settled at the latter's Department of Architecture. In consequence the study programme cannot differ very much from the studies in architecture. Its objective is to train architects to be especially well prepared for the challenges of the protection of heritage and the conservation of monuments. The programme has been elaborated using the Architecture syllabus as a framework. The syllabus has been enriched by about 30% of specialized courses in conservation technologies and topics related to heritage protection. In addition, a great part of the core syllabus has been modified to rely on examples and techniques from the field of conservation. The first five-year course began in 1999.

Organization of the courses

In 1999 the first course on Architectural Conservation began at Wrocław University of Technology. Its organization started a year earlier, when the rectors of tertiary education institutes in Wrocław, the capital of Silesia, were encouraged to organize specialized courses in the conservation of monuments. The initial initiative came from professional conservators' organizations. Several departments of leading schools soon supported it. The motivation was an increasing demand for qualified specialists. The absolute lack of educational possibilities in this field could be also observed in southwestern Poland. At that time in Poland only the academies of Fine Arts in Warsaw and Cracow, and the University of Toruń offered studies at masters level in the restoration of stone, murals and art objects. Postgraduate courses in these same specializations were also organized at several universities and polytechnics. An initial attempt to organize conservation education in Wrocław was made by a collaboration between the Academy of Fine Arts and the University of Technology. The courses have finally found their place at the latter's Department of Architecture and by this choice their profile was decided as the education of architects - conservators. This way for the first and only time in Poland, a five-year course of MS in Architectural Conservation has been organized. The first course began in 1999. Now, four years later as the first students are approaching the diploma, the experience and observations have been collected and the necessary changes in the syllabus have been made. It is time now to present the programme to a broader forum.

Courses' main ideas

The programme of the course is treated as a specialization in studies at the architecture faculty and in consequence cannot differ very much from the studies in architecture. Its objective is to train architects to be especially well prepared for the challenges of the protection of heritage and the conservation of monuments.

A graduate in Architectural Conservation, given the diploma of Master Engineer, will be an architect prepared to work in urban protection or landscape protection, in conservation of archaeological sites and of course of architectural heritage: buildings with accompanying painted or sculptured decoration and architectural details. He/She will be also familiar with the problems of industrial archaeology and protection of postindustrial heritage. As an engineer and architect a graduate will be able to prepare architectural documentation and projects for new architecture and also for modernization and adaptation of older buildings for modern uses. Besides this main educational aim, a future architect-conservator is also trained to work in broader interdisciplinary ensembles on strictly conservation projects. Thanks to the specialist knowledge attained and relevant experience gained by the graduate, they will be able to collaborate and work effectively with other specialists involved in conservation processes. These are disciplines such as archaeologists, Art historians, technologists and civil engineers, restorers of mural paintings and conservators of stone, brick, wood and other building materials. The persons involved in organization of the course have referred very much to their own experience as professionals in these fields or as architects-conservators themselves.

Study programme restrictions

Organization of the course faced some restrictions of the study programme. It has been elaborated using the Architecture syllabus as a framework. This fact brought well-defined expectations and it was the main restraint. There are also other requirements, especially those coming from some technical university general programme rules. There are basically three kinds of limiting requirements to be respected in the syllabus:

- General study time defined at a certain maximum number of teaching hours that must not be extended, according to the requirements of the European Community (*Bologna...* [1]; Baster-Grząślewicz[2]).

- A minimum of courses of basic education, which are obligatory at the Wrocław University of Technology (*Regulamin...* [3]). They should cover about 30 per cent of the whole study time, and they are divided into: Management and Social and Humanistic Sciences, Mathematics, Physics, Computing, Foreign languages and Sport.

- Needs of architectural education (*Program...* [4]). A strict number of teaching hours of appropriate courses are not laid down in this case. In practice however the requirements are well defined. They concern teaching of Architectural design, Urban planning, Building, Structures, Static, Drawing, painting and sculpturing and History of Art and Architecture. What is not strongly required is Country Architecture and Planning, although these topics are present in the architecture syllabus.

Syllabus structure

A core syllabus of Architectural Conservation in consequence of these restrictions and requirements has to consist of almost only the aforementioned topics that build the program of architectural studies. That is about 48 per cent of theoretically non-conservation courses in the study time added to the previous 30 per cent of so called basic education, required by the University of Technology (*Regulamin...* [3] ;

Program... [4]). Having also included the obligatory number of student electives, not more than 14 per cent of the whole study time is left for specialized courses actually dedicated to conservation problems and skills. Their introduction in a larger proportion into the study programme in such a situation became very problematic. However, these specialized courses should produce a broadening of knowledge for the future graduate in conservation in respect to a non-specialized architect. Of course any syllabus based on the architectural one, could have still been enriched by very well selected courses on conservation technologies and theory. However, the addition of these narrower disciplines would not be sufficient to educate a conservator.

To solve the problem, which means improving the teaching of conservators, in addition a great part of the core architectural syllabus has been modified to rely on examples and technologies from the field of heritage protection. The course titles and their main ideas, and the knowledge and skills taught remain the same as for studies in Architecture. Additional information about conservation has nevertheless been introduced and has become the equally important. The first example of a similar adjustment comes from the architecture syllabus itself. There, some omissions of the general University requirements have been applied to achieve better results in specialized teaching. They have also been repeated in the Architectural Conservation programme. They consist in including such dedicated courses as Mechanics, Physics and Statics of Structure or Structures into obligatory courses in "Physics", similarly introducing notions of Descriptive Geometry into "Mathematics" or Aesthetics into "Management and Social Sciences". A similar inclusion was made in the conservation programme for the Methodology of Research and some conservation laboratories. Architectural Survey Technologies, being recently computer aided, have taken part in the obligatory courses in computing. Such decisions have made it possible to broaden both: a group of architectural topics and to some extent also the specialized conservation courses.

The greatest possibilities of introducing actual conservation questions into the study programme have been achieved by a modification of the architectural courses to rely on examples from the field of conservation and heritage protection. This cannot of course be considered in terms of a percentage of study time replaced by specialized topics, since no course has actually been substituted for another. Such replacements are neither expected or desired nor even suggested, since the eventual goal is to have well-qualified architects. All the changes that give more specialization have been made in the way some skills are taught. Modifications in respect to the architecture syllabus have been made to the courses in: Elementary Design, Architectural Design (of individual dwellings, collective dwelling houses, public buildings, industrial buildings, interiors), Urban Planning, Building, Building Materials, Structures and Computer Aided Design. The course of History of Architecture and Town-building History of the Architecture syllabus were revealed to be very full and complete, hence sufficient also for the purposes of the conservation education.

The about 14 per cent of every syllabus at the University of Technology is reserved for actually specialized courses. In the programme of Architectural Conservation these are:
- Theory, history and legislation for conservation,
- Revalorisation of Cultural Heritage settings,
- Revalorisation of urban spaces,

- Green spaces - planning and protection,
- Industrial archaeology and protection of industrial heritage,
- Conservation of buildings,
- Research methods in conservation,
- Methodology of archaeological research,
- Documentation for architectural conservation,
- Chemistry in conservation,
- Materials for conservation,
- Technology and techniques of conservation (ceramics, stucco, stone, wood, metal)

These courses serve to specialize future architects in conservation problems, which means to give them particular the kind of knowledge that would be very useful for their future work, but is not necessary for all architects - non-conservators. In some of these courses they can learn the history and theory of conservation and acquire up to date information about current legislation in this field. They can also learn about recent tendencies, attitudes, problems and discussions in conservation. A large group of courses is dedicated to specialist knowledge of other professionals in the field of conservation and of related sciences. Students can obtain basic information about the work of restorers, conservation technologies, laboratory researchers, archaeologists, dendrochronologists and other specialists. In this case the basic idea is not to teach expert skills and understanding enough to undertake actual projects in these professions. Instead, the graduates' knowledge and basic experience should be sufficient for a conscious collaboration with such professionals. Another group of courses is dedicated to particular expert knowledge of an architect-conservator. It starts from the specialized architectural courses, focused on: adaptations of older buildings for modern uses, conservation or reconstruction of older buildings' historical forms, repairing and consolidation of ancient structures or urban scale revalorisation. It also includes however some other accompanying abilities, like surveying (particularly expected from architects working on conservation of archaeological sites), architectural and archaeological research, or preparation of conservation documentation.

Special attention will be paid to the "Technological and architectural project of conservation". It is planned to be done by a student just before the diploma project. It is supposed to use the knowledge already attained by a student from both fields: architectural design and technological conservation.

A diploma project does not necessarily have to be a conservation project. Students – future fully qualified architects - should be left free in their choice for their final project subjects. Many professors conferring degrees, who are architects-conservators with great experience, are at students' disposal.

Evaluation of the project

This paper presents the Studies in Architectural Conservation - specialized courses established in 1999 at the Department of Architecture of the Wrocław University of Technology. Organizing the studies was a continuation of an earlier experience in teaching architectural conservation and the protection of monuments. However, it was the first time that a five-year course at M.A. level in this field was established in a college level school in Poland. The organizing process with all the requirements,

expectations and restraints; the courses' main ideas and the syllabus structure are presented in the project.

Problems and perspectives

- Education of architects specialized in the protection of heritage and the conservation of monuments.

- Training of future architects to collaborate with other professionals involved in conservation and restoration.

- Possible use of the experience attained by organizing studies in Wrocław in future training of conservators in other architectural schools.

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Supplement - Programme of studies: Architectural Conservation

First year **Semester 1**	**Semester 2**
Aesthetics	*Plein-air* drawing practice (in the field)
Introduction to the History of Architecture	Materials for conservation
Technology of building materials	Computing. Introduction to CAD systems
Mathematics (Algebra and Analysis)	Physics of structures
Descriptive geometry	Mechanics of structures
Mechanics of structures	Descriptive geometry
Building	History of Architecture (Antiquity)
Free-hand drawing	Building
Elementary design. Spatial composition I	Free-hand drawing
	Introduction to urban planning
	Introduction to architectural design and urban planning. Spatial composition II
Second year **Semester 3**	**Semester 4**
Foreign languages	Survey training
Student elective	Foreign languages
Corrosion of building materials	Theory and legislation of conservation
Survey techniques for architectural conservation	Polymers in conservation
Survey techniques for architectural conservation	Survey techniques for architectural conservation
Descriptive geometry	Masonry (Structures)
Timber structures	Town-building history
History of Architecture of Poland	History of Architecture of Poland
History of Architecture (Middle Ages)	History of Architecture (Renaissance - Neoclassicism)
Building	Building
Free-hand drawing and sculpture	Free-hand drawing and sculpture
Architectural design (Individual dwellings)	Architectural design (Small public buildings)

Third year **Semester 5**	**Semester 6**
Sport	Designing practice
Foreign languages	Sport
Methodology of scientific research	Foreign languages
Technology & techniques of conservation (ceramics)	Methodology of archaeological research
Metal structures	Technology and techniques of conservation (stucco, stone)
Concrete and tensile structures	Repairing and consolidation of building structures
Town-building history	Town-building history
History of Architecture (XIX century)	History of Architecture (Modern)
Urban planning in historic environments	History of Architecture of Poland (after 1944)
Free-hand drawing and painting	Urban planning in historic environment
Architectural design (Collective dwelling buildings)	Free-hand drawing and painting
	Architectural design (Public buildings)

Fourth year **Semester 7**	**Semester 8**
Sport	Conservation practice
Microbiological corrosion	Sport
Technology and techniques of conservation (wood, metal)	Student elective
Revalorisation of Cultural Heritage settings	Technological research for the conservation project
Industrial archaeology and protection of industrial heritage	Research methods in conservation
Art History (Styles in Architecture)	Conservation of buildings
History of Contemporary Architecture	Protection of industrial heritage
Green-spaces - planning and protection	Documentation for architectural conservation
Urban planning in historic environments	Art History (Styles in Architecture)
Architectural design (Industrial buildings)	Regional architecture
	Urban planning in historic environments
	Architectural design (Monumental architecture)
Fifth year **Semester 9**	**Semester 10**
Student elective	Student elective
Management	Final design (diploma project)
Building legislation	
Technological and architectural project of a conservation	
Revalorisation of urban spaces	
Selected problems of contemporary Architecture	
Architectural design (Interiors)	
Introduction to the final design (diploma project)	

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Architectural Conservation course, Conservational education, Study programme, University studies, Wrocław in Poland

MULTIDISCIPLINARY AND INTERNATIONAL COOPERATION IN MSc PROGRAMS FOR THE PROTECTION OF CULTURAL HERITAGE

André De Naeyer
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Abstract
The on-going restructuring of many university programs to make them comparable and exchangeable all over Europe as well as the creation of different kind of new study or vocational courses for the protection of cultural heritage, do emerge a urgent need for coordination and consultation regarding education and training in this field. This paper pleads for a multidisciplinary and international approach which must contribute to the protection and problem-solving in World Heritage Cities. It is proposed to establish a international network of academic (or comparable) institutions, to organise training for a international recognised and protected title "International Master in Conservation of …(to specify)" of the highest scientific quality.

A new European context

Today, in most European universities, study curricula and contents of courses are reorganised, in order to fit within the so-called 'Bologna and Sorbonne' – context. The 'Bologna Declaration' (1999) and the Sorbonne Agreement are two documents on the structure of higher education in Europe in which the partners agree to organise university education systems similar to the Anglo-Saxon and American model based on a Bachelor Degree (after 3 years of study) and Master Degree (after 1 or 2 more years). The scientific value and time-load of each discipline has to be expressed in ECTS points (European Community Course Credit Transfer System). The main concern in this re-structuring is to make education programs comparable, to guarantee specific quality levels and to promote national and international exchange within educational programs between different institutions and different disciplines.

For this reason, many 'rebuilding' and 'restructuring' of programs and course contents is going on ; some universities already started with the new system, but most of them will start with the first bachelor-year in 2003 or 2004.

Of course, this 'Bologna-Sorbonne' context also has negative consequences as it means the release of traditions which characterised the specificity of a single school or institute – the 'opposition' says it mainly will result in a levelling down to less quality and less diversification in education ! The future will prove if it is true or not !

Need for up-to-date training and education

The still growing social and economic basis for cultural heritage and the scientific complexity of involved matters, are asking for appropriate training and education facilities. Not only universities, but also many institutions and private or public organisations, discovered this market, and organise study programs of all types and of all kind. They are of different levels and deal with wide variety of subjects such as : policy making, organising inventories, techniques and methodologies for intervention, management aspects, arts, crafts and vocational aspects, … Also the field of scientific research is offering great opportunities - the E.U. 5th FP has promoted a lot of initiatives and has been of great catalysis. Unfortunately, the E.U. 6th FP has changed his priorities !

Present opportunities :
"International Master in the protection of Cultural Heritage"
"World Heritage Cities Conservation Master"

The present changes in the European university context makes it sensible and opportune to consult and agree about scientific standards and possible curricula within the field of education for cultural heritage. Such agreement about credits and evaluation standards

- makes university titles **comparable** within national and international scale, and **guarantees highest scientific quality,**
- also **guarantees better employment chances** for students and participants of such programs,

- **protects** the cultural heritage **better** against destruction, misuse, technical mistakes or destructive interests.

As the protection of cultural heritage becomes a important international matter (not limited to World Heritage Cities, but considering all major heritage sites or objects whose protection status is submitted to international cultural tourism) , and the need for exchange of experience always becomes more urgent, today is the right moment to establish conditions and contents for a '**International MSc Degree in the protection of cultural heritage'** . The organisation should be based on cooperation and exchange of a limited group of university institutes or departments as a so called '**joint master'**, and the program should offer specific groups of 'modules' (e.g. theory, history, archaeology, intervention techniques, methodology, management, financing,….) depending on the type of activity for which this master is preparing (e.g. preservation architect, museum curator, city administrator, …). The scientific responsibility of each 'module' will be taken by that university department or official institution where the scientific experience and the critical mass in that specific field is the best. It also will be necessary to take in account the cultural and geographical specificity of each type of heritage (architectural, urban, landscape, movable heritage, museum collections, etc….)
A international and multidisciplinary jury has to judge and quote the final 'Diploma Work'.

Very famous international training centres such as ICCROM, Getty Foundation, European Foundation of the Council of Europe, etc… and lot of national institutions or universities with long experience in this matters, have to be the first partners involved in such '**Network for a International Master Degree**'. I also refer to the standards and recommendations established by international organisations such as the ICOMOS International Training Committee and maybe also by ICOM (International Council of Museums) and ECCO (European Confederation of Conservator-Restorers' Organisations).

But also the present network of World Heritage Cities is an excellent basis for a **'WHC Conservation Master Degree'**. It could consist of a limited number of traditional classes on theoretical and technical matters, and be completed by some months of practical training in three or more World Heritage Cities. The creation of a "**WHC Experience Exchange Forum**" also can contribute in great extend to the protection and the management of World Heritage Cities. For this reason, it makes sense to establish a first 'Working Group' to look after possibilities and refine already existing initiatives.

Education and training in the field of arts and crafts, or vocational training in different restoration disciplines must also be integrated within a similar international recognition and homologation system. According to existing courses, one suggests qualifications as **'Bachelor in Conservation of ….."** for this education and training.
Appropriate programs and procedures have to be established.

Modalities and questions

I invite the participants in this symposium to comment on this idea of a '**international joint master'**, considering many questions and a lot of practical problems as :

- what should be the best preparation (= type of **bachelor**-degree) for starting a '**master** in protection of cultural heritage' ? ,
- possible difference between 'professional master' (or 'bachelor' ?) and 'academic master' ? ,
- should it be a 'initial master' or a 'master after master' (= post graduate) ?,
- what about civil law conditions, requiring for building restoration work always and only a accredited architect (not necessarily specialised in cultural heritage) ?
- what can be the position of the proposed new **WHC-Training Course** ? Should it be a independent one, or has it to be integrated in existing training centres, (ICCROM, Getty, Council of Europe, Unesco, Consortium of limited number of national institutes, …),
- what is the experience with already existing (national) initiatives and is there any guarantee for possible surplus value compared to this existing ones ?
- what can be the contribution of industry ?
- what kind of teaching (theory, practice, project work, …) and kind of teaching network (institutions, universities, individuals, ..) is appropriate ?
- possible modules and time schedules ?
- accreditation of the final diploma ?
- needs for and impact of scientific and applied research ?
- homologation and protection of diploma !
- …..

The answer on all this questions will help us to establish needs, structures and modalities for a **International Msc Program for the Protection of Cultural Heritage.**

EDUCATION AND TRAINING FOR THE CONSERVATION OF CULTURAL HERITAGE

THE FIELD WORK EXPERIENCE AT THE FRESCO RESTORATION LABORATORY OF THE SOPRINTENDENZA ARCHEOLOGICA DI POMPEI

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Abstract

School years form a person's cultural and civic identity - it is very important that during this period the relevance of protection and care for the historic and cultural heritage should be learned. Pompei archaeological site is par excellence the site of historic memory, as it preserves the complexity of social, cultural, economic and artistic aspects of an ancient civilization. Pompei is therefore a place where any learning and enrichment to be gotten by a confrontation with history, are enhanced to the highest degree.
Pompei is also a place where the artistic heritage extreme wealth affords chances for experiences in the field of conservation that are not to be found elsewhere. It is only natural, then, that the Soprintendenza staff, together with its engagement in restoration and conservation, offers an assiduous assistance to young people from all over the world who come here looking for experience and training.
This document is about some of the fieldwork experiences in the last two years. We will consider the work, partially still in progress, of several groups of students from different schools. In particular we will examine the intervention realized on some frescos of the Domus del Principe di Napoli, and the experience of a group of students from the Malta Centre for Restoration that have restored a mosaic floor in the Domus del Larario di Achille.

Different kinds of students and schools, experience length, production of reports and essays

The request for fieldwork experiences in Pompei is always substantial, as it comes from a wide range of different schools. If we take the last three years into account, we will find highly specialized schools, like the Malta Centre for Restoration, or ENAIP, Scuola Regionale per la valorizzazione dei Beni Culturali di Botticino, but also professional training schools like CESMA, Centro per la ceramica ed il restauro, and different kinds of secondary schools asking for short period experiences in the field for their students. Requests from independent students or restorers, with rather different curricola, have been accepted too by the Soprintendenza Archeologica di Pompei, even if a strong preference is accorded to the schools. In this case the fieldwork has been directed according to the specific interests of these persons and to their grade of experience.
As there is a variety in the people concerned, also the work produced is of different kinds. Very short periods of one or two weeks have allowed a first approach to conservation for young students with no previous experience, approach which has been integrated with general notions regarding materials and techniques. This is the case of the fieldwork organized together with the Istituto Statale d'Arte Torre Annunziata, whose students, divided in groups of three, each for a period of one week, have worked on a small area of original plaster in the Domus del Principe di Napoli.
As far as students of specialized schools were concerned, the fieldworks have been of longer duration, usually one or two months, and the objects of the work have been frescoes or mosaics whose conservation problems requested a complete range of intervention, so as to offer a full experience. This is the case of the fieldworks done, in the last three years, by the students of the CESMA, each for a period of about two months. They have restored some frescoes in the Domus

Figure 1, 2, 3 - Officina del Garum, Pompei

del Principe di Napoli (see following chapter), and some parts of floor mosaics in the Domus of F. Rufo and of M. Castricio.. On the other end, the students of the ENAIP have been working, each group for about one month, on a large fresco in really critic conditions on one of the walls of the Peristilio in the Officina del Garum (Figure 1, 2, 3). The M.C.R. has sent three students to Pompei, for a period of three weeks, to integrate their training with an experience of mosaic restoration. They have worked on the mosaic floor of the Sala degli elefanti in the Domus del Larario di Achille (see following chapter), a mosaic whose refined technique together with its bad conditions allowed a check of the theoretical learning of the school.

Figure 4, 5 - Fragments belonging to the Domus del Bracciale D'Oro before and after the pictorial integration by R. Testa.

The individual fieldworks have been diversified according to the specific interests and to the grade of experience. Qazim Kertusha, for example, a conservator of Tirana Archaeological Museum, during his two weeks stay, has gathered information about technique and materials for the detachment of frescoes.
Similar as regards the subjects, but completed by an important experience of the pictorial integration technique, were the fieldworks of Ebe Navarini and Rossella Testa, (Figure 4, 5). Their permanence was prolonged to several months, so as to assist to the work of the Soprintendenza's technical staff, in that period busy in the restoration of an important fragmentary fresco, belonging to the Domus del Bracciale d'Oro, witch is now in the "Storie da un'eruzione" exhibition. To end with, the three months experience of Micaela Vignati was solely dedicated to the learning of the pictorial integration technique "a tratteggio" (Figure 6, 7).

Figure 6, 7 - Exercises and pictorial integration "a tratteggio" of frescoes fragments belonging to the Domus di F. Rufo, by M. Vignati.

Some of the fieldwork experiences have produced, apart from the conservation work, reports and essays, too, which complete, deepen and enrich it. Among the others, the material elaborated by the ENAIP students, two rather conspicuous monographies about technique and weathering phenomena of the Pompei frescoes and in particular of those of the Peristilio in the Officina del Garum.

The restoration of the frescoes of the Portico in the Domus del Principe di Napoli

The intervention was carried out by ten students of the CESMA , Centro per la ceramica ed il restauro, Castellamonte, Torino, during the period between 1/5 and 31/7 of 2001 and 3/6 and 31/7 of 2002. We decided to operate in this ambient since the Esedra, located inside the portico, had already been restored during a previous field work. The Soprintendenza's technical staff constantly attended the students. We are planning to complete the whole restoration of the Casa in the year 2004.

Figure 8, 9 – Pompei, Domus del Principe di Napoli;
details of the frescoes and of the Larario

Description

The portico shows an "Opus Incertum" brickwork and masonry columns and a third – fourth stile decoration, consisting of wide backgrounds containing small pictures of naturalistic subject. This main decoration is framed into slender theatrical architectures. The portico faces a small garden; a brickwork "Larario", located in the middle of the garden, is entirely frescoed with a simple decoration (Figure 8, 9).

State of preservation

The villa, whose architectural structures had already been restored, has a tiles roof over the portico and the other outer rooms, and a concrete cover over the inner rooms. The new roofing of the portico has preserved the painted surfaces in a fairly good state. Nevertheless, there were some water infiltrations in the middle lowest sections. This problem has led to frequent detachment of the painting layer. There were also salt efflorescences and areas where the plaster was detached from the brickwork, due to the concrete fillings used in previous restoration interventions. Another problem due to the past maintenance practise, was the presence of several layers of wax on the walls, and the deposition of dirt on them through the years.

The intervention

The intervention had four following stages: to begin with, after the facing (with cotton veil and acrylic resin) of the areas where it was necessary, all the plastering and integrations of the previous restoration were removed, as their constitutive materials were not suitable. At the same time the students took care of the detached areas, filling them with grout, and of the decoesion phenomena of the original plaster, by an impregnation with emulsified acrylic resin in low percentage water solution. The following stage was the plastering of borders and missing parts with a mortar realized after several tests to be suitable with composition, colour and texture of the original. In the end extensive tests of chemical and mechanical cleaning were executed, removing the yellowish wax layers together with the dust (Figure 10, 11).

Figure 10, 11- Pompei, Domus del Principe di Napoli; details of the cleaning tests

The restoration of the mosaic floor of the "Sala degli elefanti" in the Domus del Sacello Iliaco

The intervention was carried out by three students of the M.C.R. (Malta Centre for Restoration) Area B, Stone Conservation, during the period between 10/9 and 27/9 of 2002. The three students' names were: Frank Chetcuti, Robert Cassar and Connie Formosa. The choice of the object of their intervention followed an M.C.R.'s indication, as they still missed an experience in the mosaic restoration. Thus the mosaic floor of the "Sala degli elefanti" in the "Domus del Sacello Iliaco" was chosen, as its conservative problems allowed an all comprehensive experience in the field. The students were constantly attended by the Soprintendenza's technical staff. The main difficulty was the lack of time to complete the work thoroughly. The following text and the graphic documentation drawings are based on the students' report of the experience.

Description.

The mosaic floor is executed with the direct method technique and consists of two parts, one in geometrical patterns and another, smaller, in white tesserae with a black border. A polychrome border with intertwining foliage motives divides these two parts. The geometrical part consists of nine squares each with a different elaborated geometrical pattern. Five squares forming a cross are surrounded by a border with a twisted rope pattern. This border is polychrome, executed in various colours: the rope pattern is made up of yellow, orange, red, green, white and black tesserae on a black background and is flanked by orange borders on both sides. The centre of square 6 (Figure 12) is in the shape of a stylised flower in polychrome tesserae of the same colours mentioned previously. The constitutive materials are limestone for coloured tesserae and slate for black tesserae.

Figure 12 - Detail of the centre of square

State of preservation

The black slate tesserae were in a bad state of deterioration: in many places they were only a few millimetres thick or even missing. Many areas were hollow or detached, in some places the detachment was resulting in bulges that raised the tesserae up to two centimetres off the setting mortar.

Figure 13, 14 - General view before cleaning

In some of the detached areas the tesserae were loose. The whole floor was covered in a thick layer of dust and large areas in a hard blackish brown incrustation. Several reconstructions in tesserae were discovered, together with integrations realised with grey mortar mixed with cement. **(**Figure 13, 14**)**

Figure 15 - The pavement after the first washing

Figure 16 - Cleaning test with EDTA

The intervention

The project started off by cleaning the floor with a soft broom. This was done to remove loose dirt, which had accumulated on the floor throughout the years **(**Figure 15**)**. Great care was taken while doing this job not to disturb or remove any loose tesserae that were detached from the surface. After that, a cleaning test was carried out in three different areas. For this, water and 5% New Des (detergent) was used. Soft brushes were used in this process, slightly rubbing the area concerned. After the areas were cleaned, they were photographed and documented. Following this sequence, the whole floor was treated in the same method discussed above. The whole area was rinsed with fresh water to remove any residues from the detergent.

The second stage of the work was the testing of different kind of chemical materials to achieve the cleaning of the surface. After a completely unsuccessful attempt with a solution of Ammonium Carbonate, relatively better results were achieved with EDTA. The EDTA (solution 5%) was applied in certain areas in order to remove very hard and compact incrustations. This was done by gently rubbing the area, and rinsing very well with fresh water afterwards. Compresses of the solution (paper pulp + EDTA) were also applied to certain areas, followed by compresses with fresh water in order to extract any leftover salts within the mosaics. Great care was taken when applying the EDTA because it can easily dissolve slate and corrode limestone, the main components of the floor. On the whole, the EDTA solution was not very effective **(**Figure 16**).** The other method, which involved cationic resins, gave much finer results. This was prepared by making a soft paste by mixing the cationic resin with deionised water. The paste was then applied to the area that needed further cleaning. It was left for about 15 min, during which time the paste was slightly moved by using either a soft brush or wooden skewer to increase contact between the resin and mosaic surface. The area was then well rinsed with water. **(**Figure 17**)**

For mechanical cleaning only a scalpel was used. Great care was taken not to scratch the surface of the tesserae. In certain areas a small chisel and hammer was required. This was only used in particular cases to remove cement and other forms of mortar that were applied to the mosaic floor in previous interventions.

At this point, the floor was checked for hollow spaces and areas with missing tesserae. These were then marked with white chalk so that the areas could be consolidated. These areas were also documented on the drawing of the floor. A mix of 2 parts impalpable pozzolanic dust and 1 part Lafarge with water was used for consolidation to achieve a fine grout. The selected area to be consolidated was first wetted very well before the grouting was added. This was done to obtain a better adhesion between the grout and the mosaic The grout was applied by injecting, so that it would fill all the empty space. In certain lifted areas, a piece of flat wood was needed so that, after the grout was injected, it could be pressed down to try to get the area in its original position **(**Figure 18).

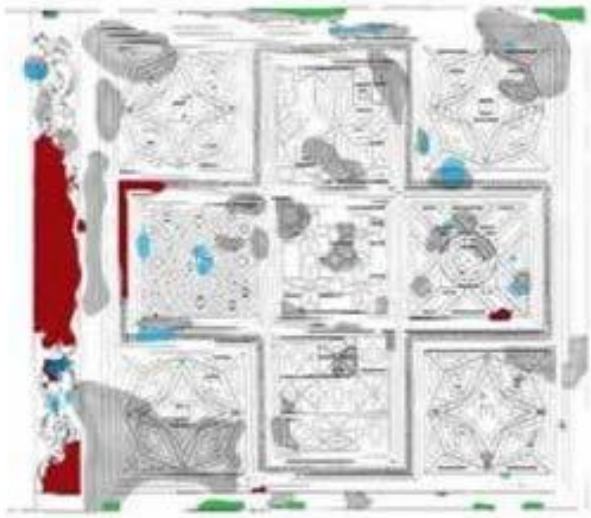
Figure 18 - Grouting detached parts

Figure 19 - Integration of lacunas with mortar

The loose tesserae were attached in place by using a mix of Ledan and C30 mortars. In some cases the grout mentioned before was also used. The Ledan - C30 mix was prepared by adding some water to obtain a workable paste. In some cases, small reconstructions with original tesserae, found scattered on the spot, were carried out. In other cases, where the lacunae were larger, a mixture of 2 parts Lafarge, 1 part sand and 1 part marble powder was used . This was applied with a spatula, left to dry for a few minutes and carefully rubbed with a sponge to remove excess mortar and get a homogenous surface. The areas were then rinsed well from any residues left from both the grouting and mortars used **(**Figure 19**).**

The whole floor has been washed and consolidated. Because of the lack of time, more importance was given to the decorative part of the mosaic. Some conservation work still needs to be done on both areas. Among these tasks, there is the consolidation of the black deteriorated tesserae with Ethyl silicate, the cleaning of the white area with cationic resins and mechanical methods, the removing of the dark grey cement integrations on large parts of the floor and their substitution with an inert mortar.

Graphic documentation of the intervention on the mosaic floor of the "Sala degli elefanti" in the Domus del Sacello Iliaco



Colour Key Code

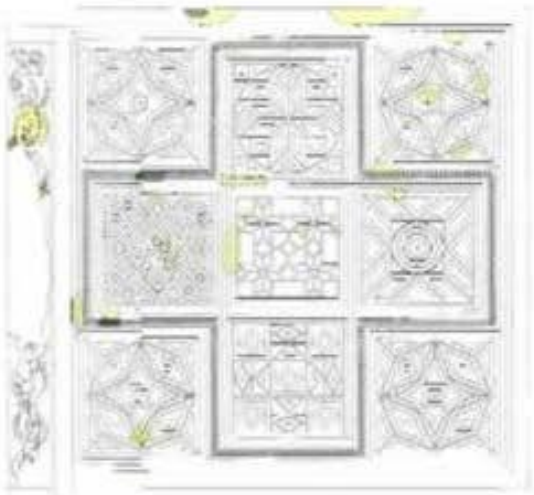
State of Conservation

Cement

Missing Tesserae

Plaster

Black Crust



Colour Key Code

Intervention

Consolidation and reintegration

Plaster Integration

Conclusion

Attending students in a field work, surely implies a great effort in terms of organization and commitment for the technical staff of the Soprintendenza. In this moment of personnel shortage, this situation unavoidably leads to a displacement of part of staff from its ordinary duties. In most cases, though, this problem is compensated by the students' work, which truly contributes to the conservation of the archaeological site.
The core of meaning, though, of this experience is the consciousness of giving to young people an occasion of awareness, knowledge and practice. We hope that this people, in the future, will choose to be the custodian of our cultural heritage, in all the different ways that this can be achieved.

RENOVATION APPROACH TO THE ROLE AND METHODOLOGY OF TEACHING GRAPHIC DISCIPLINES AS AN INTEGRAL PART OF EDUCATION OF ARCHITECTS FOR CONSERVATION (COMPREHENSIVE TEACHING PROGRAM APPROACH).

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Abstract
This paper presents an alternative approach to incorporation of graphic disciplines in the study process for conservation purposes.
The special role of the graphic images of the protected buildings, and thereby, - graphic disciplines in conservation of monuments derives from the primary importance of the role of the perceptual aspect in conservation of the architectural heritage.
Graphic disciplines may be divided into two groups: freehand, and those which use precise methods. The author has been involved, since 1989, in teaching graphic disciplines of both types: mathematics related descriptive geometry and perspective, - and freehand drawing and painting, and at the same time – in conservation of monuments including in situ investigation. The involvement in fields so diverse, but indispensable for architects, especially architects-conservators, has given rise to the conclusions and suggestions presented in this paper. They are based inter alia on a teaching methodology in freehand drawing developed by the author (Lobovikov-Katz [1]) and also on analysis of the role of the graphic disciplines in architectural education for conservation.

The paper proposes a comprehensive modular approach in teaching graphic disciplines for architectural conservation purposes, where the basic modules are used for creating a flexible education system adaptable to different teaching tasks and conditions. The approach is also applicable outside the specific field of architecture.

Key words: graphic disciplines, education for conservation, modular approach.

Introduction

Graphic images in conservation of monuments

The exceptional role of the perceptual aspect first in creation and then in preservation of the architectural heritage explains the extreme importance of graphic images of the protected buildings. These images were and are being directed to different purposes and are created by means of different techniques. They may be primarily divided into two groups according to the technique: precise and artistic.

Precise images The images of this group are naturally created on the basis of various techniques of documentation and investigation, yield information on the different types of monument characteristics. This information is in turn provided by various measurement techniques, such as photogrammetric and topographic surveying, etc.

An important point is whether the image is created for conservation purposes, or not. Another important point is the degree of suitability of a two-dimensional image for restoration of a three-dimensional monument or its elements. The precise images are well suited for this purpose due to their accuracy.

Artistic images They are usually created by means of different freehand drawing and painting techniques. They are mainly non-conservation-aimed and serve to depict the architectural and artistic values of the historic buildings and sites (Fig. 1). However, if they are faithful reproductions, they may also, like their "precise" counterparts, provide information on geometry (architectural form), materials (building and decorative), building techniques and material deterioration. Comparative analysis of paintings with reference to the physical remains in situ, to available information on the painter's accuracy level and to the association with a specific historical epoch - usually also makes it possible to assess the reliability of these images.

Examples of accurate freehand images provide also suitable data for in situ reconstruction of a monument. The compatibility and accuracy level of an artistic image may be assessed through an attempt at its rectification. The result (rectified image) may be evaluated against in situ measurement.

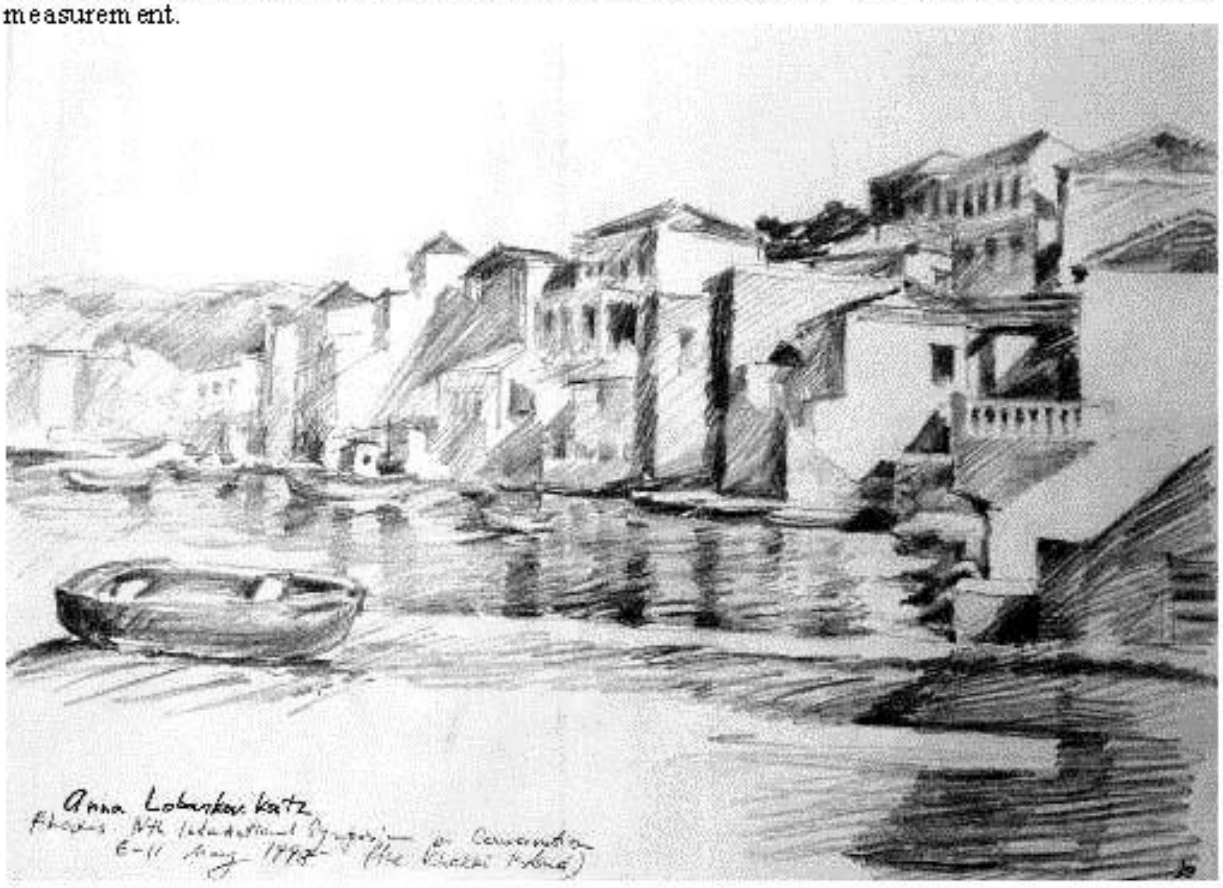

Figure 1. A view of Halki Island, Greece, 1997. (Drawn and checked by author, pencil)

In general, graphic images may serve different purposes and be useful in pointing out the following categories of monuments' characteristics:

1. Geometry (form) (original design; deterioration)
2. Material (properties, deterioration)
3. Technology (building techniques).

Graphic images of monuments may contribute conservation /restoration process on its decisive stages:

1. Understanding of monument

2. Documentation of monument
3. Analysis of monument in terms of its values and material disintegration.
4. Modeling of results in the preliminary stage of conservation/ restoration/ rehabilitation process
5. Documentation of restoration process.

It should be borne in mind that certain kinds of precise techniques, for example photogrammetric survey, are usually not included in the basic architecture curriculum. By contrast, basic disciplines like descriptive geometry and perspective (especially the first) are an indispensable basis for education of the architect, whether a conservator or not.

Proposed teaching approach

Present situation

In general, in spite of the clear link between the graphic disciplines and the conservation of monuments, the current mode of teaching of the former is not compatible with the aims of the latter.

This is especially the case on the undergraduate level, where the freehand drawing, descriptive geometry and perspective courses are not adapted to the problems of conservation. In addition, the graphic syllabus varies from institution to institution depending on the specific situation and local tradition.

On the graduate level, the interdisciplinary character of the field of conservation makes for mixed student audience, including specialists with practical experience. The architects among them are supposed to have taken graphic disciplines at the undergraduate level, and thus the latter are not included in the curriculum. As regards non-architectural students, the situation is even more problematic. These (archaeologists, geologists, engineers, chemists, etc) usually have no experience in graphic subjects, which renders them unfit for many conservation tasks.

Briefly, the present educational situation can be summed up as follows:
Non-architects working in conservation lack a professional skill which may be very useful in their practice and which they can acquire, given a proper educational program and methodology, in a relatively short time.
Architectural students are taught graphic disciplines, freehand and precise, without linkage and subsequently or simultaneously are taught conservation of monuments. Thus they are forced to traverse the same road ***thrice*** and still have to improvise on their own after graduation.

The proposed approach

The approach emerged from practical experimentation, following the development (by the author) and years-long application of a ***teaching methodology*** for grownups with little or no experience in the field, especially undergraduate students in architecture, - and also for students in other fields (civil engineering, chemistry, electrical engineering, aeronautics, computer sciences, etc). It helped create a tool for ***rapid*** acquisition of freehand drawing ability of good quality, thus achieving a goal seemingly impossible in a traditional skill – maximum professionalism in minimum time.
The experience of consecutive presentation of the three different graphic disciplines: descriptive geometry, perspective and free hand drawing, to the same audience led to creation

of shortcuts through the similar parts of these courses, which are based on the same rules or aimed at development of the same skill.
Finally, the combination of conservation practice (especially documentation and investigation of monuments) and teaching - both theory and practice - helped underscore the principal "conservation requirement" points in the graphic disciplines.

The teaching approach is based on creating a flexible system of teaching modules which may be interlinked or incorporated in the relevant conservation courses, with allowance for the characteristics of each specific syllabus and the related level of the audience.

The basic modules have to be small (mainly from 8 to 12 academic hours), thus providing a possibility of easy combination. Different modules should be created for different aims and serve different purposes.

Freehand drawing and painting, descriptive geometry and perspective can be taught in this manner. A brief analysis of the course content can help to subdivide it into groups according to their purpose (artistic or precise).

The main aims of the two fields can be briefly formulated as follows:

1. Development of the spatial visualization ability.
2. Development of the ability of depicting of a three-dimensional object by a two dimensional image of acceptable quality.
3. A possibility of reconstructing a 3D object according to its 2D images.

All the three aims suit the main conservation tasks.
The first aim corresponds to one of the principal conservation aims – understanding of the monument. A 3D structure can not be understood without spatial visualization. True understanding is essential for a compatible conservation program, and is extremely important in rehabilitation projects, where correct interpretation of the spatial essence of the monument is always crucial.

The second aim is directly connected to the different stages of conservation process – from documentation of monuments to that of conservation steps and maintenance. The importance of the former has increased in the recent decades, partly due to better understanding of its independent value as a universe databank creation, as an "antidote" to globalization and, especially, against the background of the disasters which are destroying so many monuments, only 2D images of which remain.

The third aim is indispensable in restoration and rehabilitation projects.

Creation of modules
Creation of the modules should start with an analysis of applications and aims. The initial aim of creation of a 2D image is achievement of a true linear perspective, which corresponds to development of basic ability in freehand drawing. A subsequent important item in freehand drawing is *relevant contrast,* or *relevant darkness (density)*, which is crucial for creating the illusion of depth in a 2D picture – air perspective. This is directly linked with light and shade transmission.

The list of objects in freehand drawing may vary depending on the aims of each specific conservation course and the level and profession of its participants.

Table 1.
Modular structure version of the basic freehand drawing courses.

TOOLS / TASKS			FREEHAND DRAWING (Selected "Conservation-Compatible" Techniques)			
			Pencil	Pen and Ink	Watercolor	
					Black-and white	Color
Subjects	Aspects		A	B	C	D
PRELIMINARY		0	Basic technique	Basic technique	Basic technique	Basic technique
Linear Perspective	Basic Terms & Rules	1	Basic forms I			
	Simple Objects	2	Basic forms II	Basic forms I		
	Complex Objects	3	Complex forms	Basic forms II		
Air Perspective	Relative Density	4	Basic forms	Basic forms	Basic forms	Basic forms I
	Relative Density	5	Complex forms	Complex forms	Complex forms	Basic forms II
Composition	Study of Object	6	Basic forms	Basic forms	Basic forms	Complex forms
	Object-Drawing Structure	7	Complex forms	Complex forms	Complex forms	Complex forms

Table 1 presents a schematic view of the interrelationship of the teaching modules for selected courses on freehand drawing under the modular approach.

The aim Students of architecture are supposed, on graduation, to be capable to use the skill for three main conservation purposes:

- Understanding of the monument, its values and conservation problems
- Documentation of the monument by different techniques, including watercolor for facades and details
- Development of conservation project by different techniques.

The tools, their contribution to education and conservation of monuments Table 1 summarized the techniques of free-hand drawing. Those most commonly used in conservation of monuments are pencil, pen and ink. Watercolor, especially in colors, is less frequently taught for beginners: still, it should not be neglected altogether, as it contributes significantly to the development of tint distinction ability, which is important to the conservator in many respects. Moreover, inclusion of black-and-white watercolor in beginners' courses helps much in imparts ability to assess relative color intensities density of the drawn objects and background.

Tasks The main educational tasks as presented here are acquisition of skills in linear and spatial perspective and composition. In other words, a 2D image of the object should be drawn in the proper lines so as to create a spatial impression, and it should be also properly composed – i.e. present a good view of the object (while suited to different conservation purposes) and be properly laid out on the sheet of paper in a proper format. This seems to be the essence of architectural drawing in general.

Module duration The proposed basic module (M) is 8 academic hours. It may be halved (½ M), doubled (2M), or even used in its 1 ½ version (1 ½ M).

How does it work (operation and application) The flexible modular structure in Table 1 is composed of four techniques (tools: A, B, C, D). Each technique can be taught independently, or contribute some of its modules to other courses, for example, water color studies can be preceded by the basic modules of elementary pencil drawing (A1, A2, A3). Correspondingly, modules C4, D4 and also C5, D5 (watercolor black-and-white and in color) can contribute significantly to A5, B5 and other advanced modules in traditional drawing.

Apart from that, single modules may be included in the conservation courses. The basic modules A0, A1, A2 can be included in the courses on documentation and investigation of monuments. Choice of the modules for such purposes would be influenced by numerous factors, such as the aims of the course, the character of the local protected heritage, the professional profile of the audience. For example, in the cases of exceptional importance of the color or craftsmanship incorporated in local heritage, selected watercolor modules may be taught even to beginners' non-architectural students. This has been tested in practice with very good results. Some modules can be included in such theoretical courses as history of architecture, thus helping reveal the main proportions and values of famous monuments as an introduction to in situ appreciation of the monuments under conservation. The basic modules A1, A2 can be also included in engineering courses in the context of structural deterioration, etc. Selected modules should be also included in courses on urban conservation.

While Table 1 is constructed specifically for the benefit of beginners, courses for the intermediate and advanced audience can be organized under the same principle.

Conclusion

The modular approach was planned with a view to better results in education for conservation without an increased teaching-hours quota for the graphic disciplines, used in a more intensive way. The separate methods included in the approach have been successfully tested in practice. It is also based on a methodology practiced by the author for many years, for the benefit of both architectural and non-architectural students, with very good results over a very short time. The best results should be achieved if the approach "permeates" the entire conservation curriculum with the profiles, durations and quantities of specific purposes.

It will benefit and reinforce the conservation of monuments through active practicing of an ancient professional field: the art and the science of creating graphic images. Restudy of the values, aims, applications and interconnections in this field has yielded a flexible educational system whose purpose is to reveal the three-dimensional, multimaterial, multitechnological and colorful richness of the cultural heritage.

Finally, the approach will also contribute significantly to advanced programs in conservation studies, addressed to graduate students or professionals with lack of experience in graphic disciplines.

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INSTITUTE FOR CULTURAL MEMORY (CIMEC) AND THE NATIONAL CULTURAL HERITAGE RECORD IN ROMANIA

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cIMeC, August 2003

I. A brief history of the national inventory for cultural heritage

Due to many centuries of wars and problems, the Romanian cultural heritage has suffered greatly. Only few old buildings have survived to the present days because Romanians developed in great part, a wooden architecture, vulnerable both to fire and earthquakes.

The preservation of historical monuments, protection of sites, and conservation activity have a tradition of a one hundred years with the best period occurring between 1960 and 1977. But too often, especially during the past thirty years, the activity was interrupted, the organisations and people changed, the archives dispersed, the information lost.

These difficulties were amplified by short-sighted cultural politics. Romania still suffers from the lack to stability ot our legislative and organisational system in regard to the cultural heritage. There are too many "formers" and "futures" in matters of laws, regulations, programmes, and organisations. The scarcity of funds and experts, the economic environment in transition, the technological disparities all cause great problems.

A modern system for the inventory of the national cultural heritage was initiated in 1974 after a new " Law for the Protection'of National Cultural Heritage" was passed. It was the first attempt to establish a unified system for the recording of collections and sites at three levels: institutional, territorial, and national, using a standard format.

This inventory of movable heritage was continued in the eighties by the network of museums and territorial offices for cultural heritage. However the institutes of archaeology and the universities with archaeological collections did not join this national inventory system. The inventory of monuments and sites was affected a great deal by the disintegration of the institutions responsible for the record, survey, protection, and restoration of immovable heritage, thus creating the inability to oppose large scale demolition of historical monuments, archaeological sites, historical centers of towns and entire villages.

For a country like Romania, which started relatively late in developing its national archaeological records, the main work at present is to gather, in a reasonable period of time, a core of information about monuments and sites, which cam be further enriched with information from field work, bibliographic sources, sites archives, aerial - photo archives, if funding and time allow. The following material presents the initial results.

II. National Databases in Romania

The Institute for Cultural Memory (cIMeC), a public institution under the Ministry of Culture and Religious Affaires in Bucharest, was founded in 1981 mainly for the computerization of the national cultural heritage inventory, the development of national cultural heritage databases and the adjacent methodological and documentation standards, thesauri, authority lists and reference databases. CIMEC managed to become one of the most stable heritage institutions, with a distinct place along side the traditional ones. At present, our institute is the largest repository of computerized information concerning Romanian cultural heritage.

The main aims of the national databases for cultural heritage are:

- to support protection, evaluation and research of cultural heritage,
- to be a point of access and
- to answer general questions on objects, collections, sites and monuments.

Although CIMEC is dependant on the information provided by other institutions it has the established capability to process, preserve, and disseminate the material. We started in 1982 by recording cultural heritage objects cards, sent by museums and county heritage offices. We have completed: 120,000 records of archaeological objects, 170,000 records of coins, 110,000 old books, 70,000 ethographical objects, 30,000 objects of decorative arts, 130,000 records of fine arts objects, 55,000 documents and historical objects, 70,000 natural sciences specimens.

Ten years later, in 1992, we started to record the immovable heritage: archaeological sites and historical monuments.

III. Some problems related to the development of a national heritage record.

The recording of **cultural heritage collections** started in Romania as early as 1982 and is by far the largest database we maintain (about 780,000 records). It is also the most time consuming and problematic, and requires a relatively large team to administrate it:

1. the costs to develop and implement the system were high; the design of in-house data standards and authority lists took several years
2. due to the large number of institutions involved - hundreds of museums, libraries, and territorial offices, which sent object cards for data entry to our Institute in Bucharest, we had to organize a complicated information flow inside and outside cIMeC in order to register, classify, store, control and process the data, communicate, report, provide training to participating institutions, etc.
3. the information collected in a central database, despite the relative stability of the museum collections, runs the risk of becoming obsolete, due to the absence of a data network among the cultural institutions as well as due to the lack of computerization of local inventories, not yet common in our country.
4. the evolution of technology during the past fifteen years imposed costly changes: the transfer of three hundred thousand records from the old technical environment to the new one - that is, from Mistral-2 on an Iris mainframe to relational databases on IBM compatible personal computers - was a very long, complicated and costly task.

We succeeded but we still do not have solutions for all the problems (for instance, the records exist in a single table and the relational functions are not used properly). In short, "on our own" may mean "more expensive" in terms of development, maintenance, and up-dating. In the nineties we could not have afforded the development of a similar costly project for sites and monuments.

The sites and monuments database, started ten years after the beginning of the movable heritage record, was able to benefit from the experience we had and from the new

technical facilities, but also from the international experience of the national archaeological records in several countries, as well as the logistical support of the archaeological documentation working groups of ICOM/CIDOC and the Council of Europe.

We were encouraged to starting using:

- the draft core data standard for archaeological sites and the standard for architectural monuments of the Council of Europe
- whatever resources we could afford - very modest, in fact, a commercial relational software package and a small team
- an already compiled list of the most important Romanian monuments and sites as a source of information.

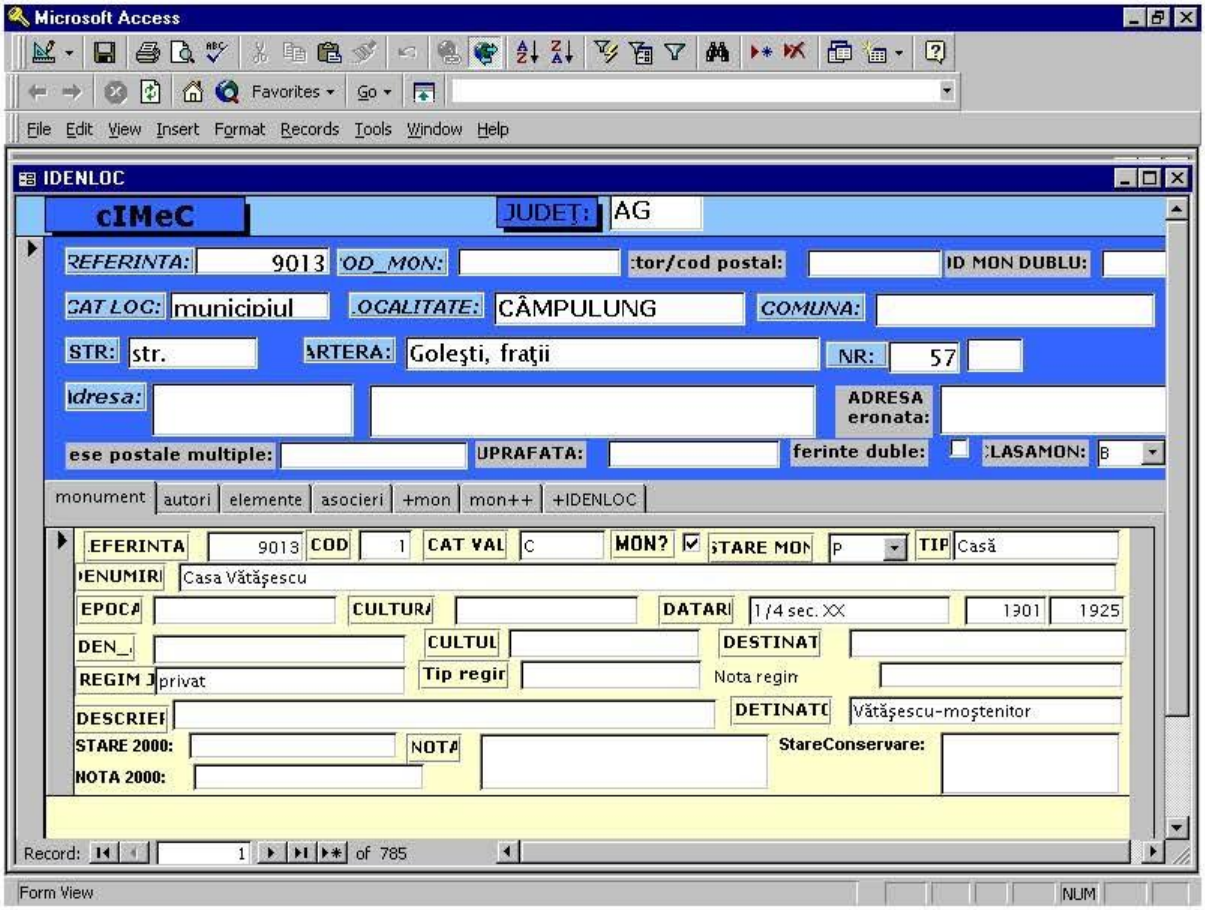
We developed a core national archaeological record which proved capable of answering the basic inquires about monuments and sites, and providing selections on category, period, location, protection status, etc. We are aware that we still have a tremendous amount information to up-date, that we lack geographical locations and a mapping system, but 31.000 records on computer are a concrete fact, not a dream. While periodic revisions of the database, in order to refine the information, up-date it and add new modules, will always be required, in Romania or elsewhere, these will be done in a shorter period of time and with reasonable cost. This is due both to having used the better structure provided by core data standard and to the possibility of sharing knowledge and experience with other countries facing similar challenges.

The main CIMEC databases are the following:

1. National Databases of Movable Cultural Heritage – DOC-PAT (PCN movable)

start date:	1982
number of records:	760,000
source of information:	object cards sent by museums and cultural heritage territorial offices
coverage:	Romania, all heritage disciplines, all types of objects and specimens
content of record:	50 information fields, about 20 of them mandatory
data standard:	compatible with the CIDOC data standard for museum objects
terminology control:	thesauri: object names, artists/historical periods, material and techniques
technical support:	Microsoft Access 97

2. Sites and Monuments Database – DOC-MON (PCN immovable)



start date: 1992
number of records: 33,000
source of information: National List of Protected Monuments and Sites, compiled by the Direction for the Historical Monuments, Assemblies and Sites in 1991
coverage: Romania, archaelogical and historical monuments and sites, all periods
content of record: 45 fields, about 8 mandatory

data standard: compatible with the CIDOC core data standard for archaeological sites
terminology control: controlled vocabulary for site/monument type, historical periods, location
technical support: Microsoft Access 97

3. Archaeological Excavations Database

start date: 1992
number of records: 9. 000
source of information: excavation reports
coverage: Romania, systematic and rescue excavations, all periods
content of record: 18 fields, about 5 mandatory
data standard: internal
terminology control: authority lists for persons and organizations
technical support: Microsoft Access 97

. 4. Museums and Collections Database

start date: 1991
number of records: 780
source of information: questionnaires
coverage: Romania, all types of museums
content of record: 42 fields, about 12 mandatory
data standard: internal
terminology control: authority lists for persons and organizations
technical support: Microsoft Access 97

5. Museum Personnel Database

start date: 1991
number of records: 3,300
source of information: questionnaires
coverage: Romania, curators, restorers, museum researchers, laboratory staff
content of record: 20 fields, about 10 mandatory
data standard: internal
terminology control: authority lists for persons and organizations
technical support: Microsoft Access 97

The projects share the principles of unity and flexibility of the data structure -mandatory fields for the identification information but also optional ones, terminology control, and the possibility of filling them in stages. Several authority files were developed in connection with the main heritage databases for:

In our country, the national databases developed at cIMeC:

- facilitated collaboration among various institutions and bodies in the country, who are otherwise reluctant to contribute support to long term projects like those of national inventories

- confirmed the role of institutions specializing in documentation, the only one dedicated to providing technical and methodological support for maintaining large computerized records
- contributed to disseminating documentation standards
- contributed to promoting the unity of records at all levels
- were a point of access for foreign institutions and bodies interested in Romanian cultural heritage.

In planning our future development, we must be realistic. We cannot count on spectacular changes in the near future (in terms of funding, available experts, equipment, computer facilities). Therefore, we do not plan spectacular extensions of the present databases.

6. New Projects in 2003 at CIMEC

Our Institute is deeply involved in cultural heritage documentation as a mean to protect our cultural heritage. Good information could be a way to prevent destruction of historical buildings in a period when the ownership regime is changing very quickly from state to private, from private to private, etc. We must be able to give reliable information about the location, value and legal status of monuments and sites to the Ministry of Culture, central and local administration, newspapers, non-profit organizations, universities, tourism companies and any other body or citizen interested about.

We have several projects concerning the improvement of the Historical Monuments List, threatened categories of vestiges like prehistoric caves and ancient mines, or folk architecture which is disappearing under our eyes. We have an important mission in dissemination of information on our cultural heritage using classic and new media, like the Internet and CD-ROM.

The Digital Image Archive of Archaeological Monuments and Romanian Church's.

The existing photos and those to be sent in the following months will be scanned and archived on CD-ROMs.

National Inventory of Archaeological Caves, Mines and Rock Shelters in Romania (600 records) will be published both in a book and on the Internet until the end of the year. It is for the first time that an important cultural heritage in danger is recorded sistematically in order to be protected.

National Databases of Ortodox Church in Romania (15000 records) will be published both in a book and on the Internet until the end of the year.

The virtual museum of the ethnographic monuments in Romania

The Virtual Museum project belongs to the Institute for Cultural Memory, in collaboration with the **17 open air museums and museum sections**, with assistance from the Ministry of Culture and Religious Affairs – the Division of Museums and Collections. The project aims at exhaustively illustrating about 1500 monuments of folk architecture preserved, in Romanian museums or **in situ**, under the guardianship of ethnographic museums or the local authorities (for instance, 4 monuments belonging to the Romanian Peasant's Museum,

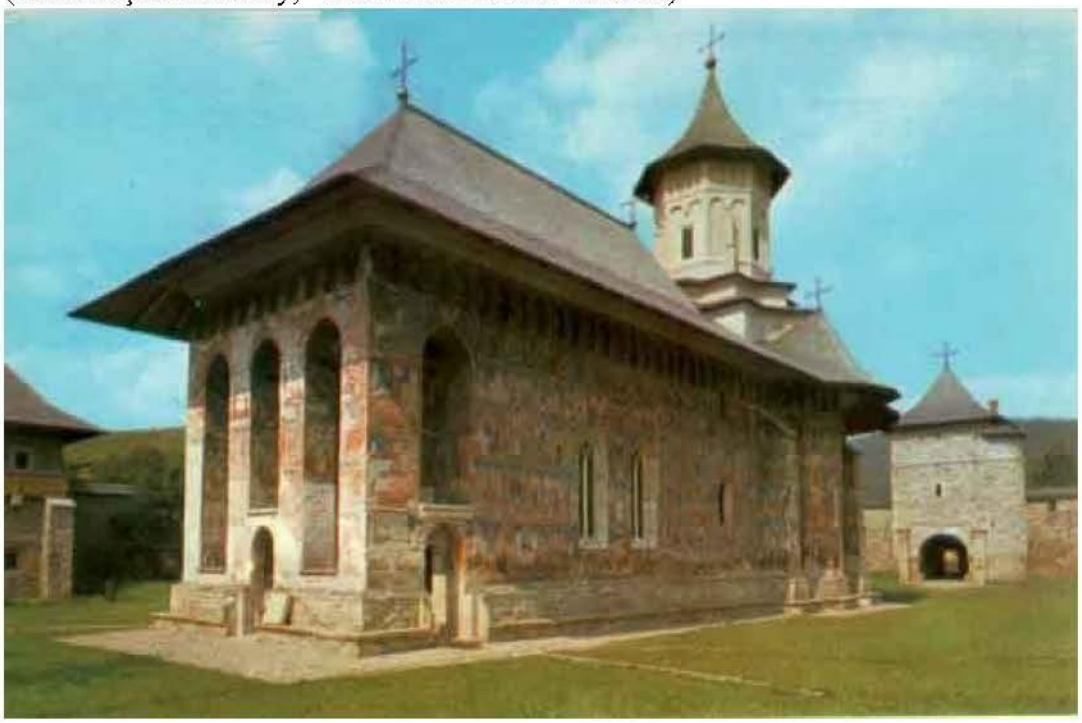
the peasant household at Enisala, belonging to the Institute for Eco-Museum Researches in Tulcea).

The annual Programme for the Restoration of Historical Monuments

At the beginning of every year we receive from the Heritage County Offices the proposals for urgent restoration works. We are processing this information as a basic source for further decisions. That implies to consider the present state of the monument, its importance, the design work and most needed restoration activities, the cost estimations, etc. We are recording several hundreds monuments and archaeological sites which need such work. Apart from the administrative decision, this record is important by offering a general view over this type of monuments, especially the desperate situations which need alternative financing sources for their saving. Also, we will publish on Internet the list of monuments in need.

Most of the projects are financed by the Ministry of Culture and Cult. CIMEC works on contracts with the departments of the Ministry of Culture and Religious Affaires.

(Moldoviţa Monastery, "The Annunciation" Church)



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CONSERVATION SCIENCE: TEACHING GRADUATE-LEVEL ART CONSERVATION STUDENTS IN A UNIQUE MUSEUM/UNIVERSITY COLLABORATIVE PROGRAM

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Abstract

The Winterthur/University of Delaware Program in Art Conservation (WUDPAC), a 3-year post-baccalaureate program leading to a Master of Science degree in Art Conservation, is one of three art conservation graduate programs in the United States. Conservation science has been an essential part of WUDPAC's curriculum since its inception in 1974. While the science curriculum has evolved as the role of conservation science in the Program and the field has changed, over the last quarter-century two primary objectives have emerged. The first is to impart an understanding of the materials used to make and conserve objects of art; the second is to impart an understanding of how these materials can be characterized. This paper provides an overview of WUDPAC, its context within art conservation education in the US, an outline of the Program's conservation science curriculum, the philosophy behind this curriculum, and ideas for the future of conservation science in WUDPAC.

I. The Program

The Winterthur/University of Delaware Program in Art Conservation (WUDPAC) is a 3-year post-baccalaureate program leading to a Master of Science degree in Art Conservation and a Certificate in Conservation. The program is a cooperative venture between a museum (the Winterthur Museum, Garden, and Library, Winterthur, Delaware, USA) and a university (the University of Delaware, Newark, Delaware, USA). Winterthur Museum, established in 1952 by Henry Francis du Pont, houses a collection of decorative arts and antiques made or used in the United States from 1640 – 1860. These items are exhibited in nearly 200 period rooms and four gallery spaces. The University of Delaware, founded in 1743, is a comprehensive state-assisted university with 16,000 undergraduate and 3,000 graduate students.

WUDPAC graduate fellows (up to ten fellowships are awarded annually) may major in objects, paintings, textiles, furniture, paper, book or photograph conservation. Majors are chosen at the completion of the first year of study, a year devoted to the holistic examination of art (x-radiography, infrared reflectography, UV fluorescence, etc.) and the characteristics, structures, and chemical and physical properties of artists' materials. The second year course of study includes instrumental analysis of cultural property, hands-on treatment experience, and in-depth study of the materials and methods of manufacture of objects of art. There are a total of six conservation science courses in the program, four in the first year (basic and applied science of the materials used to make and conserve art, including the interaction of light with matter), and two in the second year (advanced analytical techniques). The structure and content of these science courses is discussed below. A day-long comprehensive examination is administered at the end of the first year to confirm that fellows are prepared to move on to their second year of study; a day-long qualifying exam serves the same purpose for the transition from the second to the third year.

Classes are taught by three full-time University faculty as well as thirteen adjunct faculty (full time Winterthur Museum conservators and scientists who devote up to 40% of their time to teaching). WUDPAC fellows obtain hands-on work experience as interns in art museums, private conservation practices, regional conservation centers, and government conservation laboratories in the summers following their first and second years. They gain further hands-on experience by spending the third year of the program in a ten-month conservation internship at one of the facilities listed above. Fellows' internship experiences are presented at a final oral presentation (generally a slide lecture of 30 minutes duration) and a one-hour final oral exam.

II. Context within the U.S.

WUDPAC is one of three graduate programs in art conservation in the United States. The other programs are available through the State University of New York College at Buffalo (Buffalo State College), and the New York University Institute of Fine Arts. The Buffalo program offers a Master of Arts degree and a Certificate of Advanced Study in Art Conservation. It, like WUDPAC, is a three-year program and is similarly structured with two years of classroom/treatment experience and one year (plus two summers) of museum internships. Students are taught by six full-time faculty, visiting lecturers, and adjunct faculty. Buffalo students gain treatment experience on museum and private collection objects accepted into the program during an annual conservation clinic. Art is brought into the department for evaluation, and, if suitable for teaching purposes, eventual treatment. The Buffalo program offers formal majors in paintings, paper, objects, photograph and book conservation; concentrations in textile and ethnographic/ archaeological object conservation are also available. Conservation science is taught in a four-course sequence, with the first two courses (the first academic year) devoted to the interaction of light and matter, basic physics, optical mineralogy, and the chemical and physical properties of inorganic artists' materials. The second academic year is devoted to the chemical and physical properties of organic artists' materials, light and color measurement, and instrumental methods of analysis. Laboratory courses are dedicated to optical microscopy and instrumental analysis.

The New York University Institute of Fine Arts Conservation program offers a combined Master of Arts degree in Art History and an Advanced Certificate in Conservation. Students complete fifteen conservation courses and six art history courses in three years, and an internship in a museum or other conservation facility in the fourth year. The M.A. in Art History is earned after five semesters, and the Advanced Certificate in Conservation is awarded upon the completion of the program. Instruction is by three full-time NYU faculty members and sixteen adjunct faculty who are full-time conservators and scientists at the Metropolitan Museum of Art, the American Museum of Natural History, and other institutions in and around New York City. Conservation science at NYU is taught as four courses over three-years covering the preparation, manufacture, and identification of inorganic and organic materials used to produce and conserve art. Three additional laboratory courses cover spectroscopy, chromatography, mass spectrometry, electron microscopy, and an organic instrumental methods laboratory.

III. Current Physical Science Requirements for Admittance to the Programs

While science prerequisites for acceptance into North American graduate programs in art conservation have varied during their histories, currently there is general agreement on the

scientific background necessary for a student to pursue graduate work in art conservation. New York University requires four semesters of college-level science courses, including two semesters of organic chemistry. Buffalo State College requires twelve semester hours of chemistry, preferably a two-semester introductory class with a laboratory for science and/or premedical majors and the first semester (four semester hours including laboratory) of a two-semester organic chemistry course sequence. Completion of the second semester of the organic course is strongly recommended but not required. WUDPAC requires four semesters of college-level chemistry with laboratory – two each of general and organic chemistry. Additional science courses, especially chemistry, are strongly encouraged. In addition, requirements for entry are: a Bachelor's (B.A. or B.S.) degree from an accredited institution; 5-6 courses in Studio Art; 5-6 courses in Art History; and at least 400 hours volunteer/internship/paid work in a conservation laboratory. Additional evidence of cabinet-making skills is required for the furniture major.

IV. Science Curriculum Outline and History

Despite the degree, Master of Science (M.S.), awarded upon completion of WUDPAC, the program does not, nor has it ever, trained scientists. Rather the focus is on producing conservators who are prepared to enter the job market as well-trained and academically educated assistant conservators. In the first year, all students are tracked together through a series of "blocks", a sequence of 5-7 week units, each providing a basic introduction to one of the possible major conservation interests. Concurrently, students take two science courses. The first two-semester sequence (ARTC 615/616) provides an introduction to the chemical and physical properties of many materials used in conservation. Texts include Mills and White, Organic Chemistry of Museum Objects 2nd ed. (Butterworth, London, 1994); Horie, Materials for Conservation (Butterworth, London, 1987) Brill, Light and its Interaction with Art and Antiquities, (Plenum, NY, 1980) as well as numerous individual articles and handouts.

Paralleling the first-year block is a second two-semester science sequence (ARTC 670/671) that deals more specifically with the scientific aspects of each major area. For example, during the Paper and Textiles blocks, students delve more deeply into cellulose and dye chemistry, visit a paper mill, and host a guest lecturer from local industry to speak about paper sizing and additives. Correspondingly, the inorganic objects block science includes an introduction to ceramic science, silicate chemistry, metals corrosion and metallography, among other topics. All first-year science courses are taught/coordinated by a full-time University faculty instructor with considerable support from other science faculty and guest lecturers.

In the second year, students work full-time in the Winterthur Museum Conservation Laboratory dedicated to their major field. For example, students majoring in Paper Conservation spend most of their time in the Winterthur Paper Conservation Laboratory, under the direct supervision of Winterthur staff paper conservators. They also take an elective course, perhaps in Art History. The only additional required course is a two-semester sequence, ARTC-672/673, which focuses on scientific analysis (instrumental techniques) and a science research project.

The number and general outline of science courses within WUDPAC has been more or less constant since the program began in 1974. However, the content of each course has varied significantly over the past nearly 30 years. Early emphasis on polarized light microscopy and microchemical testing has greatly decreased, to be replaced with topics reflecting the increased

use of sophisticated instrumental analysis in conservation. Except for changes in relevant topics over time to reflect changing materials, methods and interests of teaching conservators and scientists, all courses have remained intact. This is particularly true for the first-year courses.

The original science curriculum as outlined in 1974 was rather loosely organized, with no apparent focus or overarching theme. One first year 2-semester course, ART 570/571, "Chemical and Physical Techniques Used in Examination of Art Works" was taught by two Art Conservation Program scientists, a University of Delaware textile chemist, and visiting lecturers. The course was described in program literature as "Classroom discussion and laboratory application of the important chemical and physical techniques used to identify and characterize metals, ceramics, glass, polymers and other art materials. Techniques that conservators should be able to perform on their own will be covered in depth". Over the span of two semesters, the course included microscopy, x-radiography, measurements and data analysis, experimental design, pH, watermark detection, C-14 and TL dating, color measurement, thermal methods, pyrolysis GC, XRD, SEM, metallography, IR, UV and spot tests.

The second course, ART 515/516 "Properties and Structures of Art Materials" was taught by University Materials Science, Geology, Chemistry, Engineering, Textile Science faculty and visiting industrial scientists. Topics included polymer chemistry, natural and man-made fibers, detergents, bleaching, yarns, dyes and wood. Actual class hours for these four courses were proposed to be 240 or 120 hours/ semester – about 8 hours/week or 4 hours/course/week.

For the second-year science course, ARTC 672/673, only 3% or 25 class hours were originally devoted – less than one hour/week. Over the next several years, however, most of the instrumental techniques had moved into this course with a corresponding increase in time commitment. By 1980, topics included IR and Raman spectroscopies, SEM, pest prevention, XRF, GC, Health Hazards for Conservators, and developing a research project. The actual research was conducted in the spring. There was little cohesiveness to the fall lectures, no readings, no homework (other than preparation of a research proposal, for which little instruction was given) and no examinations, i.e., little that would reinforce or provide additional information to support the learning process. Student dissatisfaction with this scheme resulted in the hiring of a new University faculty science instructor in 1986. That fall, ARTC 672 was reorganized into a more typical format -- each instrumental topic was presented in one 3-hour weekly lecture (a "technique of the week") with readings, problem set assignments, exams and some laboratory work. The text used was the standard American undergraduate instrumental analysis book: Skoog, Principles of Instrumental Analysis, 3rd ed. (Saunders, Philadelphia, 1985).

The Spring session, ARTC 673, remained focused on independent research projects under the direction of faculty and staff scientists. Monthly student progress meetings assured that students and faculty were kept abreast of research progress and to provide a forum for the discussion of problems. A science "mini-symposium" was instituted where students presented 15-minute talks on their work, providing an opportunity to share results with the WUDPAC conservation community – an important aspect of doing research.

The second year ARTC 672-673 curriculum, which is now entirely taught by Winterthur staff scientists, remained fairly constant over the next 15 years. Some topics such as INAA, and

AA/ICP included in the early years were dropped in favor of others such as PIXE and HPLC, available to WUDPAC students at the University of Delaware; longer sessions on XRD and SEM-EDS were implemented when these instruments were added to the UV-Vis, XRF, FTIR, GC-MS already available in Winterthur's Scientific Research and Analysis Laboratory.

By 2000 it was clear that substantial revisions in the ARTC 672/673 curriculum were again necessary. With the increase in number and use of instrumental techniques in conservation and in the conservation literature, instructors felt that topics needed a more in–depth presentation. The long-standing "technique of the week" approach presented students with extensive textual and lecture material but little hands-on practical experience with various instruments. Instructors did not wish to relinquish any topic – UV-Vis, FTIR, XRF, XRD, SEM-EDS, PIXE, GC-MS, HPLC, TLC – so instead elected to spread them out over 1 ½ semesters (20 weeks rather than one 13 week semester). To force all topics into one semester would come at the expense of hands-on experience. The first semester is now devoted to spectroscopic techniques while the first 7 weeks of the second semester are devoted to chromatographic methods. A three-hour lecture by one of the two co-instructors or by an outside speaker with particular expertise (e.g., Dr. Charles Swann on PIXE) one week is now followed by a full 3-hour laboratory session the next week. Laboratory sessions increase hands-on student experience with XRF, FTIR, XRD, SEM-EDS, GC-MS and TLC. In these lab sessions, students analyze samples from objects they are currently treating, and are required to submit written laboratory reports discussing the analysis purpose, procedure, results and conclusions.

One of the difficulties in teaching instrumental analysis to non-science students is the lack of a suitable textbook. Texts written for standard undergraduate instrumental analysis courses examine each topic and its necessary instrumentation at a level beyond what is necessary for most conservation students. While the goal is that students complete the course with a working knowledge of FTIR, for example, it is not necessary that they understand the Fourier transform or the intricacies of an interferometer. As new instrumental analysis texts are published, they are examined for their suitability in a course for conservators. Unfortunately, for our purposes, these texts are increasingly focused on electronics and analytical instrumentation rather than the practical uses of the technique. As a result, ARTC 672/673 has come to rely on course manuals designed and prepared by WUDPAC science faculty for short-courses ("Analytical Techniques for Conservators", Getty Conservation Institute, Winterthur Museum, Williamstown Art Conservation Center, et al) taught to small groups of mid-career conservators in 1996, 2000, 2003. Chapters on XRD, XRF, SEM-EDS, FTIR, TLC, and GC-MS are presented at the appropriate level, and are supplemented by more technical readings from Skoog and Leary, Principles of Instrumental Analysis, 4th ed. (Saunders, Fort Worth, 1992) and Braun, Introduction to Instrumental Analysis (McGraw Hill, NY, 1987). Additional readings directly from the conservation literature, e.g., Studies in Conservation, are assigned to bridge the gap between theory and conservation application.

Student progress is evaluated by the assignment of 5 written lab reports in which students are expected to completely describe their analytical experiment, present and summarize the resulting data, and draw appropriate conclusions. Important mathematical relationships such as Beer's Law and Bragg's Law, vital to the understanding of spectroscopy and diffractometry respectively, are reinforced through assigned and graded problem sets. As a review exercise,

each student prepares a short paper on an assigned technique, e.g. XRF, and gives a 15 minute oral presentation summarizing what they have learned. The written/oral presentation also includes an annotated bibliographic review of 2 published papers from the conservation literature in which the particular technique is used. Finally, a written exam allows students to demonstrate proficiency in analytical terminology, solve relevant mathematical problems, and discuss at some length how they would apply various techniques to a particular conservation problem. Students are also graded on a comprehensive scientific research proposal for technical study of one or more complex objects. The actual research is performed in the second semester.

By 2000, student science research projects had also become problematic. Students and staff conservators often felt these projects were an opportunity to undertake major publishable projects. Self-imposed student pressures to gather sufficient data (despite the not-understood but nevertheless normal vicissitudes of research) so as to complete a major project in a semester's time led to great stress and frustration for student and faculty alike. The research project emphasis had turned from an educational experience through which the student would learn the processes of scientific research regardless of topic, to externally imposed pressures to address major conservation research questions. Such a project would be an ambitious task for students under the best of circumstances and a quite unrealistic goal given the time constraints of a single semester research project undertaken in while simultaneously completing other coursework.

To address this concern, the focus of ARTC 673 science research projects was changed. Beginning in 2001, the projects became carefully defined and supervised technical study projects. With the assistance of both conservation scientists and supervising conservators, each student chooses a complex object (or group of objects) from their specialty that lends itself to the application of a number of complementary analytical and instrumental techniques. During the first semester, the student writes a comprehensive research proposal in appropriate scientific format, describing the object together with its historical context, providing a complete literature search on the characterization of similar objects or materials, an experimental design for the project, a budget, a timeline and a complete set of references. As the research proposal is completed in the first semester, experimental work begins early in the second semester, providing sufficient time for thorough scientific study. Students are encouraged to use all appropriate traditional techniques – PLM and fluorescence microscopy, microchemical tests, infrared reflectography, etc., before undertaking more sophisticated instrumental analyses.

With some training, students are allowed to perform their own instrumental analyses - XRF, micro-FTIR, XRD, and GC-MS, generating data that they must synthesize into cohesive written and oral reports. Even though students cannot be allowed hands-on use of SEM-EDS, they are present with the instructor during the SEM-EDS analyses. Once data are collected, faculty work one-on-one with students, interpreting, evaluating, collating and summarizing data, pointing out areas where additional work is necessary or, conversely, indicating when sufficient data has been acquired. This is vital to the success of the project because while most of today's students are highly computer literate and can easily run instruments, they do not have the necessary experience to critically evaluate data quality, or undertake proper interpretation. All work relating the project, including experimental details, is documented in a bound laboratory notebook. Students conclude the project with a written research report, again in appropriate scientific format, and an informal oral presentation to their classmates and WUDPAC faculty.

In the first year of this new technical study research project, students investigated the base metal and corrosion products found in a collection of archaeological Roman coins, an unusual 19th C. Russian steel pincushion, a painted paperboard box with pincushion bearing the likeness of Andrew Jackson, 7th US president (1829-1837). Two of these projects were presented at the annual ANAGPIC (Association of North American Programs in Conservation) student conference held in April 2002 in Boston, MA. This conference provides an opportunity for students from all North American programs to meet, exchange ideas, and present their work to each other and to the combined faculties. Student research projects are also occasionally presented at the Annual Meeting of the American Institute for Conservation of Historic and Artistic Works, or at the Eastern Analytical Symposium.

The current class is working on a pair of panel paintings from an altarpiece by Antonio Vivarini, a 17th C. English stumpwork textile fragment, an unusual 19th C photograph album; an 18th C. Chinese tortoiseshell birdcage; a group of ethnographic painted baskets, and a spectacular pair of Chinese export porcelain urns. Work on the Vivarini paintings will be presented at this year's ANAGPIC conference at New York University.

Faculty assessment after nearly two years of this revised curriculum is that students retain more about the hands-on application of instrumental techniques to the characterization of artists' materials. Equally important, they feel a sense of accomplishment in having completed an entire study, rather than leaving many open and unanswered questions.

V. Philosophy

WUDPAC's conservation science curriculum is designed to produce conservators who are fluent in the materials used to make and conserve objects of art, the properties of these materials, and their identification. WUDPAC fellows are instructed in both instrumental methods of analysis (in ARTC 672/673) and "low-tech" materials identification methods such as chemical spot testing and polarizing light microscopy. This background will enable them to identify the materials found in museum collections, an activity that is critical to successful conservation treatments, regardless of whether or not they are ultimately employed in a museum with a conservation science laboratory. WUDPAC graduates are also expected be able to formulate, design, and implement art conservation research upon completion of the conservation science curriculum.

To achieve these overall goals for WUDPAC's conservation science program, the ARTC 672/673 sequence was designed around a specific set of pedagogical objectives. One of these is to provide WUDPAC fellows with the basic theory behind each of the spectroscopic and chromatographic techniques most commonly encountered in art conservation. Only with an understanding of how each instrumental method works and what type of information it can provide will WUDPAC graduates have the necessary background to identify methods suitable for their particular materials analysis problems. Even given this background, it is expected that graduates will work with conservation scientists to determine the best experimental protocol for a particular analytical problem. The ultimate goal of the ARTC 672/673 curriculum is to produce conservators who will work as informed collaborators with conservation scientists. It is not designed to provide the type of in-depth spectroscopy background held by physical scientists.

To teach spectroscopy at this level in an art conservation Masters' degree program would sacrifice class time necessary for reviewing the application of specific techniques to objects of art, as well as that needed for hands-on experience with typical art conservation samples. As such, the fundamental principles of molecular orbital theory and band theory are discussed as part of ultraviolet visible spectroscopy, but group theory is only taught as far as it relates to infrared and Raman spectroscopy.

A second objective of the ARTC 672/673 curriculum is to provide WUDPAC fellows with basic practical information about each analytical method such as requisite sample sizes and sample preparation procedures. This information should enable WUDPAC graduates to make an informed decision about whether certain techniques, while they might provide the desired information, are appropriate for a given museum object. Each chromatographic and spectroscopic technique discussed is identified as being noninvasive (no sample required), nondestructive (samples are required but not consumed by the analysis), minimally invasive (microgram to milligram sized-samples required) or invasive (greater than milligram-sized samples required). It is expected that WUDPAC graduates will use this background information, in conjunction with curatorial and conservation scientist input, in selecting an appropriate method of analysis and providing appropriate samples to the conservation scientist.

An additional objective central to the 672/673 curriculum is providing fellows with an overview of the advantages and disadvantages of each method of analysis. These factors go beyond sample size and ease of sample preparation to include the accessibility of each technique (whether they will have to seek it out at a university or a national laboratory) and the availability of reference spectra/databases on artists' materials. For example, the Infrared and Raman Users' Group (IRUG Spectral Database Edition 2000, www.irug.org) has made thousands of reference spectra of modern and aged artists' materials readily available to museum scientists and art conservation laboratories, greatly enhancing the utility of these techniques for solving art conservation questions. On the other hand, while INAA is an extremely useful trace analysis technique, its requirement for a nuclear reactor for sample irradiation has limited its accessibility to art conservators. An overview of these considerations can be very helpful for conservators as they examine their analysis budgets and time frames.

A fourth objective of the ARTC 672/673 curriculum is to enable our students to gain first-hand experience, where possible, in data collection, interpretation and evaluation for each analytical technique. Such experience familiarizes the student with the scientist's analytical procedure, and also helps students understand where potential data interpretation problems may arise (e.g., the misidentification of escape peaks, diffraction peaks, and sum peaks in x-ray spectroscopy). Perhaps more importantly, first-hand experience demonstrates to students the necessity of proper sample preparation procedures for obtaining meaningful results, and it exposes them to the realities of analytical data interpretation. This experience also demonstrates how instrumental methods of analysis can provide complementary information about an object, and it highlights why many different types of analysis are often required to obtain a full understanding of an object's materials and condition.

VI. The Future of Conservation Science Education at WUDPAC

There is not yet a consensus on a core conservation science curriculum for art conservators in the United States, but instrumental methods of analysis is acknowledged to be an important component of this curriculum. Keeping this subject as relevant as possible for future art conservators will involve maintaining the appropriate balance between the four key components of this subject: the most commonly employed instrumental methods, new innovations, techniques prevalent in the early art conservation literature, and less commonly used but still pertinent techniques. The bulk of classroom time will remain devoted to the techniques most commonly employed by conservation scientists. These techniques represent the instruments most likely to be found in museum laboratories, and therefore to be encountered by art conservators.

Art conservation graduate students should gain maximum familiarity with these techniques, not only through lectures and laboratories, but also through reading assignments, problem sets, exams, hands-on experience, and research projects. To achieve this goal, WUDPAC students should continue to have access to instruments in an on-site teaching laboratory. While the financial cost of such a laboratory is substantial, students' familiarity and confidence with instrumental methods of analysis is essential for the progression of the field. The Winterthur/University of Delaware Program Scientific Research and Analysis Laboratory (SRAL) currently houses open architecture XRF, XRD, SEM-EDS, FTIR microspectroscopy, UV-Vis, and GC-MS. This facility will be updated as the field evolves and new techniques begin to see routine use in art conservation.

A second important component of instrumental methods education is the incorporation of new innovations in the field into the course structure. Museum laboratories are generally not early adopters of new instrumental innovations, largely as a result of financial constraints. However, even if museums cannot acquire new advances in instrumentation until five to ten years after academic or industrial laboratories, it is essential that art conservation graduate students be exposed to these innovations. This will ensure that students are prepared not only for the field at present, but also for its future. Recent examples of this phenomenon within the North American art conservation community involve area detectors for x-ray diffraction and environmental/variable pressure scanning electron microscopes. These technologies have only recently been incorporated into museum laboratories, but have been widely available to academic and industrial laboratories for the past decade. While it may be difficult for teaching laboratories to acquire these new technologies, they can still be introduced into WUDPAC's curriculum in a number of ways. These include in-class lectures, reading assignments, guest lecturers, and field trips to university, industrial, or government laboratories.

It will also be important to continue our efforts to incorporate less commonly employed but still useful instrumental methods into the ARTC 672/673 curriculum. Examples of these methods include XPS/ESCA, ESR/EPR, Auger spectroscopy, AFM, and thermoluminescence. While the general spectroscopy background that WUDPAC students gain during graduate school should enable them to learn much about these techniques outside of the classroom, experience has shown that few graduates develop the necessary confidence to do so. As such, these techniques are best integrated into the curriculum through annotated bibliographies, field trips to local academic laboratories, reading assignments, guest lecturers, and classroom presentations by students. It is unlikely that we will look for ways to incorporate these techniques into our teaching laboratory, as the likelihood of our graduates encountering these techniques cannot justify the associated expense or equipment maintenance time. In addition, these techniques are

generally employed for the study of archaeological rather than fine or decorative art materials; the addition of a new graduate program for the training of archaeological conservators in the United States (at the University of California, Los Angeles) is likely to decrease our enrollment in this specialty.

A further goal for ARTC 672/733's future curriculum is to ensure that students have a good working knowledge of the instrumental methods of analysis that have been traditionally used by conservation scientists. These techniques occupy a substantial place in the art conservation literature, but have been recently replaced by less invasive and destructive techniques. AA and INAA are examples of such techniques that, while historically important, are unlikely to continue to play an important role in the characterization of fine art due to the large sample sizes required. These techniques still do see widespread use for the study of archaeological materials, however, and so they should not be removed from the conservation science curriculum altogether. Annotated bibliographies, reading assignments, in-class presentations by students, and field trips could all play an important role in communicating these topics.

An additional way to update WUDPAC's current instrumental methods of analysis curriculum would be to include a more formal case studies approach to learning. The ARTC 672/673 curriculum now provides a brief (10-15 minute) review of how each method has been applied to objects of art as an addendum to the main focus of the lecture (how the technique works, what kind of data it provides, how to interpret this data). It might be worthwhile to dedicate an entire class at the end of each semester to the examination of complex materials analysis problems in art conservation, and to allow the students to work together to formulate solutions to these problems using techniques studied during the semester. This would allow students to have a more realistic experience in applying their instrumental analysis knowledge to solve art conservation problems. A second approach to an in-class case study exercise would be to assign each student one technique covered during the semester, and then have the students act as representatives for their techniques to solve problems posed to the class on authentication, technology of manufacture, provenance, and materials identification questions.

V. Summary/Conclusions

While the physical and chemical properties of artists' materials has remained central to WUDPAC's conservation science curriculum, the characterization of artists' materials has evolved from predominately polarized light microscopy and microchemical spot testing to instrumental methods of analysis. The current focus of instrumental analysis instruction at WUDPAC is on the methods most commonly employed in museum laboratories - GC-MS, XRD, SEM-EDS, XRF, FTIR, and UV-VIS. The philosophy behind the current course design is to provide the fellows with hands-on experience to ensure that they understand the theory behind the analytical methods, sampling considerations, sample preparation procedures, data collection, and basic data interpretation. With this background, WUDPAC graduates should be prepared to work with conservation scientists as informed collaborators, providing them with appropriate samples and being able to effectively use the data produced by them. The future of conservation science education at WUDPAC will involve finding an appropriate balance between the most commonly used techniques and the techniques that are not as common but with which the fellows should become familiar. Finding room in the curriculum to incorporate new methods as they rise to prominence in the field while still providing some exposure to the techniques of historical interest will be an ongoing challenge.

LA NECESARIA INTERDISCIPLINARIEDAD EN LA FORMACIÓN DE LOS URBANISTAS CONSERVADORES DE LAS CIUDADES HISTÓRICAS.

Pilar Morillo Rocha.

Extracto.

Las Ciudades Históricas son puzzles complicados si no se comprenden todos sus elementos y relaciones. En ellas todo está interrelacionado. Son entes vivos y complejos y no simples realidades físicas, aunque éstas sean primordiales, determinantes y definitorias. Tampoco se puede trabajar en ellas por lo general edificio por edificio, sino con planes de conservación, de revitalización, de puesta en valor… de diferentes conceptos, nombres y objetivos.

Cada vez mayor número de profesionales de disciplinas varias integran estos equipos. Frecuentemente se producen en ellos disfunciones, déficits y problemas de coordinación y entendimiento entre sus miembros y de éstos con los ciudadanos, administradores y electos.

Tanto la Dirección como sus diferentes miembros adolecen a menudo de visión de conjunto, global; tampoco hay entendimiento y comprensión de las otras disciplinas.

Parece necesario formar personal altamente cualificado, con visión de conjunto, capaz de coordinar equipos interdisciplinares (a la vez que especialistas que sepan integrarse coherentemente en éstos) que sepan devolver (o dotar de una coherente) su integridad física, histórica, artística, económica, social, funcional, de identidad en suma, a estas bellas ciudades a transmitir a la posteridad además de disfrutarlas y vivirlas nosotros.

La autora, Urbanista procedente del campo de la Historia del Arte, Investigadora, estudiosa de Métodos de Conservación Urbana, propone avanzar en la formación de Urbanistas Especializados capaces de gobernar equipos altamente cualificados y compenetrados para la Conservación de las Ciudades Históricas.

La Ciudad Histórica no es una simple suma de edificios, de construcciones antiguas a mantener en buen estado, logrado lo cual habríamos conservado la ciudad. Es verdad que si hubiéramos conseguido esto, la salvación y pervivencia física de la suma de edificios antiguos, del tejido físico urbano, tendríamos un gran trabajo hecho y adelantado para la conservación integral de los entes denominados ciudades históricas.

Pero todos nosotros sabemos que esto no es tan claro ni tan sencillo. Creo que era acertado lo que pensaba mi Tutor en la Universidad de York, el Profesor Listrum, para los casos extremos de fracciones del tejido urbano, especialmente de terciarización, cuando me decía, aunque no sea la situación perfecta "conservemos el tejido y los edificios tal cual eran físicamente y hagamos concesiones con el uso, que la vida da muchas vueltas y podremos tal vez

devolverle su uso coherente y original si no se ven alteradas sus estructuras internas y carácter físico". Es verdad que ésta no es la mejor de las situaciones, ni la ideal, aunque se da con extremada frecuencia.

Las ciudades son entes vivos y complejos, y no simples realidades físicas, aunque éstas últimas sean primordiales y básicas en la esencia de lo que es una ciudad histórica. Sería como un puzzle complicado, en el que encajar piezas, que corresponderían a un diseño sumamente complejo, y de elementos varios de diseño y color, en el que arriesgamos dejar multitud de huecos, y no lograr encajarlo, si no hubiéramos comprendido todos los elementos y sus relaciones.

En una ciudad histórica todo está interrelacionado, y aunque, en el tiempo y en la historia, hayan estado dotados de una cierta flexibilidad y cambios, tanto en las estructuras físicas como en el tejido y las funciones, hoy estas ciudades están sujetas a cambios extremos, en la mayoría de los casos, y mucho más si la ciudad moderna ha crecido entorno a ellas, de tal manera que, ya sea simple ciudad grande o conurbación, las ha alterado por completo desnaturalizándolas y asfixiándolas.

Los pueblos y ciudades pequeñas han tenido a veces mejor suerte y han logrado conservar su integridad, carácter, identidad y equilibrio. A veces se podría pensar que esas no tienen problemas, lo que no es verdad porque dependen mucho de su entorno regional económico, y todos ustedes son especialistas y saben las dificultades y complejidades, incluso en ellas.

Las otras, aquellas afectadas por el urbanismo moderno, rodeadas de nuestros monstruos, por así decirlo, de ciudades, en líneas generales han sufrido todo un proceso terrible, que ustedes conocen y no es éste lugar para exponer o analizar.

Pero el proceso en casi todas partes presenta líneas y rasgos generalizados, que sí que vienen al caso enumerar algunos para lo que posteriormente quiero exponer, y que es la razón de esta modestísima comunicación al congreso y es la necesidad de personal altamente cualificado, con visión de conjunto, capaz de coordinar equipos interdisciplinares, que sepan devolver su integridad física, económica, social, funcional y de identidad, en definitiva, a estas ciudades (o dotarlas de una coherente).

Estas ciudades históricas, en otro tiempo bellas, y con un cierto equilibrio y calidad de vida (sin pretender ningún análisis idílico ni romántico nostálgico) han sido maltratadas fundamentalmente por nuestro siglo.

Abandono de las clases pudientes y/o tugurización, colmatación del espacio y desaparición de los espacios libres y jardines internos o privados, degradación física por falta de mantenimiento y cambio en las funciones y usos, alteración de las armonías volumétricas, matéricas y cromáticas por construcciones ajenas al diseño y carácter general de la ciudad en la que se ubican y las sustenta.

Desastres físicos y vitales en general como resultado, repito.

Ludovico Quaroni, mi querido Maestro, decía: La Ciudad Antigua es Bella y la Moderna Fea, por eso debemos conservarlas ("La citta antica e bella e la moderna brutta, per quello doviamo conservarla"). Hay mucho de verdad en sus palabras, aunque él, gran arquitecto contemporáneo, sabía que el urbanismo moderno era capaz de ofrecer buenos productos, aunque no fuera lo frecuente.

Pero lo que sí es cierto es que este urbanismo moderno, ahogando estas ciudades antiguas, rodeándolas e interviniendo en ellas, no solo con actuaciones arquitectónicas, sino muchas veces urbanísticas (alteración de trazados, etc.) han dañado seriamente la mayor parte de nuestras ciudades antiguas, causando verdaderos estragos muchas veces.

Muchas ciudades han logrado conservar su trama y carácter, a pesar de sus graves alteraciones funcionales y de su degradación, otras se han limitado a conservar los monumentos y sustituir el tejido conectivo antiguo por otro moderno. O incluso por uno falazmente mimético. En la mente de todos están ejemplos de diferentes situaciones.

Pero vayamos a lo esencial.

Todos nosotros estamos de acuerdo en querer salvar, por así decirlo, nuestras viejas ciudades, conservarlas, consolidarlas, darles calidad de vida de nuevo, cuando la hayan perdido, y hacerlas habitables y bellas. A veces esto requiere cirugías extremas, costosas y dificultosas. Otras veces la situación no es tan dramática, como la de las hermosas ciudades que nos acogen a veces y por la que todos nosotros deberíamos intentar ver cómo ayudar, tanto con un granito de arena, como con sensibilidad al problema y con campañas internacionales, pero no solemos estar organizados, y cuando lo estamos, no tenemos capacidad a veces para usar, o no sabemos, esas organizaciones. Deberíamos trabajar más intensamente en esta dirección, organizarnos los profesionales y no estar tan dispersos ni atomizados.

Para conservar estas ciudades todos sabemos que no podemos ir trabajando edificio a edificio mientras se cae al resto de la ciudad o nada cambia en el entorno. Por ello trabajamos con planes de urbanismo que llamamos Planes de Conservación Urbana, a veces, y otras veces de Revitalización, Puesta en Valor, y otros nombres que corresponden a diferentes objetivos y conceptos.

El problema es cómo hemos planteado hasta ahora estos Equipos de Conservación de Ciudades Antiguas.

Se han planteado de manera desigual, a veces improvisada y a menudo deficiente en su staff, y sin organizar dentro de ellos bien las funciones de sus integrantes. Por lo general, o más bien, se ha dado mucho el caso de que los proyectos eran básicamente arquitectónicos, con apoyaturas débiles o fuertes de historiadores de arte, economistas, sociólogos, geógrafos, abogados, etc. y la mayor parte de las veces sin atender a los aspectos de la gestión del plan y de la ejecución posterior.

La situación difiere mucho de unos países a otros, incluso regiones, escuelas y tendencias, y también llevamos pocos años de experiencias en planes de conservación urbana. Pero muchos, muchísimos, se resienten en sus planteamientos, y resultados, de un hecho: la falta de visión global.

Me explico.

No siempre se hacen análisis físicos, económicos y estructurales de la relación con el resto de la urbe y con el territorio. Los análisis económicos y sociales de la ciudad suelen ser de apoyatura y a veces de mera justificación (porque tiene que haberlos) y no en profundidad e interrelación con todos los elementos del "puzzle ciudad antigua", y de las consecuencias, todas conexas, de cualquier acción y decisión de cualquier tipo (física, usos sociales, gestión, etc.). Esta es la dominante en los casos españoles.

Los estudios de historia urbana, hasta hace bien poco eran anecdóticos, y en muchos casos suelen ser eruditos y porque "deben estar ahí". Estudios como los que promueven los Emiliano – Romagnolos, o la escuela de Guidoni, sobre estructura urbana histórica e identidad histórica urbana específica como base esencial para la proyectación y planificación, no son tan frecuentes. Aunque la situación va mejorando poco a poco. Los mismos catálogos, aparentemente centrales, y a los que se les da en teoría tanta importancia, demasiadas veces no pasan de ser meros inventarios de edificios a conservar sin descripciones profundas de las características y valor y necesidades y estado de los edificios... Y menos frecuentes aún son los catálogos o inventarios por áreas, por escenas urbanas como se dice.

Los análisis geográficos urbanos suelen carecer de la importancia que debieran, y los mecanismos de gestión y programación estratégica son también como "documentos sueltos".

Muchas veces faltan en el equipo hasta arquitectos especializados auténticamente en conservación.

Y por supuesto no se programa ni plantea, por lo general, el tema de los artesanos que lo han de ejecutar, la evaluación de si hay los necesarios, ni la necesaria previsión de formación seria de éstos cuando faltan. Menos aún integrarlos en los equipos como expertos.

Respecto a las organizaciones de vecinos y ciudadanos las consultas son meramente formales, por lo general, sin contar realmente con ellos dentro del plan y del equipo.

A veces el jefe del equipo es un arquitecto restaurador culto y capaz, humanista y con visión de las diversas disciplinas. Pero no es lo mas frecuente, aunque haya casos y países líderes en buenos jefes de equipo especializados en esta práctica. Pero todos sabemos que no son la mayoría y que una golondrina no hace verano.

Los equipos en definitiva suelen ser grupo con expertos en diversas áreas (cuando son realmente expertos) que hacen su trabajo por separado, luego se coordinan los trabajos (y no siempre en serio, porque a veces son documentos que están ahí porque hay que tenerlos, por prescripción legal o por apariencias, pero no siempre son tenidos en cuenta y conozco muchos que podrían perfectamente no estar por ineficaces incluso).

En fin, lo que quiero decir es que, excepto los brillantes casos que conocemos, ha sido muy frecuente un urbanismo de conservación de ciudades históricas que no era verdaderamente interdisciplinar.

Al arquitecto jefe del equipo le tocaba la grata o ingrata tarea de ensamblar todo. Y como, por lo general, no eran urbanistas, los planes tenían una dominante físico-formal de conservación arquitectónica meramente y no urbana.

Cuando el jefe del equipo era del equipo era un urbanista no siempre ello mejoraba la situación, porque se han visto urbanistas que no sabían nada de ciudades antiguas, con los resultados que cabe esperar.

No se trata de buscar responsabilidades ni tampoco de adjudicar culpabilidades. Tampoco se pretende polémicas gratuitas. Sino formular propuestas de profesionales rigurosos, constructivos y pragmáticos.

En realidad tenemos pocos años de experiencia en conservación de ciudades antiguas y, hasta cierto punto, la inexperiencia nos ha hecho cometer errores estructurales.

Pero creo que hace tiempo que ha llegado la hora de que demos pasos de gigantes y no nos atasquemos en la práctica habitual, efectuando poco a poco correcciones, y lentamente mejorando. Ha llegado la hora de que reflexionemos seriamente sobre el modo en el que estamos trabajando, que encontremos métodos nuevos de trabajo interdisciplinar, estructurado y coherente, que formemos especialistas que sepan a la vez de otras áreas, y sobre todo que formemos urbanistas de alta cualificación con visión global de todo lo que implica conservar una ciudad histórica, que Vds. saben que es sumamente complejo y que todos los temas y acciones repercuten íntimamente unos sobre otros.

Urbanistas Especializados en Conservación de Ciudades Históricas, capaces de gobernar equipos altamente cualificados y de hacer los trabajos junto a todos estos expertos (comprendiendo incluso cada experto el trabajo de los demás) y las implicaciones y consecuencias de las propias propuestas y análisis.

Primero serían estos urbanistas especializados, a formar ya, (en número importante, y para cuya formación Vds. Saben que contamos con ilustres profesionales). Ellos inmediatamente formarían sus equipos especializados. El efecto sería multiplicador enseguida. Incluso se podría además empezar a dar a los expertos visión global de la ciudad antigua y de sus problemas.

Y creo que no es tan difícil y que los tiempos y la Disciplina de Conservación de Ciudades Antiguas requieren un cambio de rumbo, de estrategia y de métodos.

Muchos de nosotros sabemos ya hace tiempo lo necesario que es cambiar métodos y “modus operandi". Se está reclamando casi a gritos una nueva metodología apoyándonos en la experiencia. ¡Pongámonos a la tarea ya!

Estoy segura que el cambio será beneficioso para nuestras Bellas Ciudades Antiguas, que hemos de transmitir a la posteridad, además de vivirlas y disfrutarlas nosotros.

Muchas gracias.

"5 years experience on European Perspectives of the relevant NTUA MSE direction for Materials and Conservation Interventions"

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Abstract

In this work, the 5 years experience of the *Master of Science and Engineering (MSE) "Protection of Monuments", Second Direction "Materials and Conservation Interventions"* of the National Technical University of Athens is presented. More specifically, the curriculum has been structured according to the current needs of the specialized students of the program taking at the same time into account:

- The interdisciplinary structure synthesis in order to face and solve, in a sufficient way, real time and real scale problems
- The European and international guidelines for the Protection of Cultural Heritage
- The National Law for the Protection of Cultural Heritage
- The current techniques and innovative technologies training
- The development of the synthetic and analytical ability of the students

Additionally, in order to assure the continuous amelioration of the program, it is evaluated by several efficiency indexes related to factors such as the innovator character of students dissertation thesis and the publication of their results in international scientific journals or conferences proceedings, as well as the continuation of students study to PhD research work or the program graduates' ability in finding satisfactory employment after the completeness of the program.

Structure and Administration

The Master of Science and Engineering entitled *"Protection of Monuments"* (Director: Prof. N. Kalogeras) of National Technical University of Athens is divided in two directions:

- *Direction A: Conservation and Restoration of Historic Buildings and Sites (Responsible: School of Architecture Engineering - Studies director: Prof. Em. Biris)*
- *Direction B: Materials and Conservation Interventions (Responsible: School of Chemical Engineering - Studies director: Prof. A. Moropoulou).*

The administration framework of the MSE program lies as follows:

- The Specific Interdepartmental Administrative Committee (EDE) decides on educational and administrative matters of the Program
- The General Assemblies of the NTUA Schools of Architecture (Coordinator), Chemical Engineering, Civil Engineering, Rural and Surveying Engineering decide annually for the program curriculum, the lecturers and the students' admittance.
- The NTUA Senate approves the relevant General Assemblies decisions
- The Ministry of Education publishes in the Journal of the Greek Government thw MSE degree and function.

Curriculum Structure

The precondition for attending the program is the 4 or 5 year University studies on Conservation, Architecture, Engineering (Chemical, Civil, Survey, Materials, Mineral, Land and Urban Planning, Environmental), Chemistry or any other relevant field, as well as Archaeology and History of Art. This master leads to a new professional profile in the Protection of Cultural Heritage for engineers, architects, scientists of different scientific background and experience. The conceptual approach of the curriculum structure is the response to the following needs in the field of Protection of Cultural Heritage:

- Advanced diagnostics and monitoring of deterioration process in architectural surfaces of historic and traditional buildings
- Environmental impact assessment and mapping on real scale-real time production
- Selection, application and evaluation of proper, effective and compatible conservation materials and techniques for restoration interventions
- Strategic planning of conservation interventions, environmental management for the protection of monuments, complexes and sites, preservation management of monuments, complexes and sites

Criteria for selection of Students who comply with the qualifications

- Overall grade obtained in the degree or diploma
- Performance in diploma dissertation or other studies of relevant subject
- Any relevant professional or research activity
- General skills as described by the candidate's referees
- Justification of intent for participation through written exams and oral interview

Educational Tools

The educational tools that are used are:

I. Lectures

II. Laboratory exercises (NDT, instrumental techniques and semi-industrial devices)

III. In situ investigation – field trips

IV. Research Dissertation Thesis

In the educational programme there are 30% of lectures and 30% of laboratory exercises and 40% of the elaboration of Dissertation Thesis through lab and in situ investigation. The Program structure of the 2nd Direction is presented analytically in table 1.

The postgraduate course in full-time mode is spread over three terms, *October-January* (Obligatory lessons and laboratory exercises), *February-May* (Optional lessons), *June-September* (research dissertation).

The course is run at the university campus and other recognized centres of excellence: National Centre of Scientific Research "Demokritos"; National Hellenic Research Foundation; TITAN Cement Industry; Foundation of Great Hellenism.

Table 1:

Program structure of the 2nd Direction "Conservation Materials and Techniques for the Protection of Historic Buildings and Complexes"

Courses	**Number**	**Hours**
Obligatory Lessons common for both directions	3	88
Obligatory Lessons	3	187
Optional Lessons	choice of 3 out of 6	51
Laboratory Exercises	4	326
In situ investigation/ Field Campaigns	1-3	
Research Dissertation (Thesis)	1	274
Scientific Collaboration with Professors-Consultants		100
TOTAL		1000

I. Courses - Lectures

The courses of MSE "Protection of Monuments" - Direction "Materials and Conservation Interventions" given are:

1. Obligatory Courses common for both directions: 1.1 Theoretical and historical approach of restoration, 1.2 Introduction to the pathology and restoration of monuments and building materials, 1.3 Legislation and management

2. Obligatory Courses: 2.1 Science and engineering of building materials and architectural surfaces, 2.2 Science and engineering of conservation-restoration-protection interventions, 2.3 Monuments' protection-environmental management

3. Optional Courses: 3.1 Specific topics of materials science and engineering, 3.2 Monuments' conservation and protection specific techniques, 3.3 Pilot applications of conservation interventions in monuments, 3.4 Specific topics of planning the environmental management for historic complexes, 3.5 Specific techniques and technologies on conservation and preservation of cultural heritage, 3.6 Archaeometry

II. Laboratory exercises

In the courses of laboratory exercises the students are occupied by an integral laboratory exercise regarding the following topics:

- Application and performance evaluation of effective and compatible materials techniques and conservation interventions: Cleaning, Consolidation, Protection, restoration mortars
- Assessment of the structural performance of repair materials techniques and design (structural analysis, earthquake testing, finite elements models)
- Strategic planning of sustainable preservation of monuments, complexes and sites

For the accomplishment of these laboratory exercises, students use:

A. Non-destructive techniques:

in lab scale, where students are provided the necessary background in materials evaluation and for in situ investigation – field trips, where they examine and assess materials on real structure scale. NDT techniques such as fibre optic microscopy (FOM), infrared thermography (IR Thermo), ultrasonic pulse velocity (US), digital image processing (DIP) and ground penetrating radar (GPR) are commonly employed.

B. Instrumental laboratory techniques

For the mineralogical, physical, chemical, mechanical characterisation of materials studied, the NDT techniques results could be validated using instrumental laboratory techniques, such as: mercury intrusion porosimetry, differential thermal and thermogravimetric analyses (DTA/TG), thermomechanical analysis (TMA), Fourier transform infrared spectroscopy (FTIR), UV visible - infrared spectrometry, scanning electron microscopy with energy dispersion by x-ray analysis (SEM-EDAX), and others.

C. Semi-industrial scale devices

The MSE program is equipped with semi-industrial scale devices, such as:

- Ageing test chambers
- Materials production and configuration

IV. In situ investigation – field trips

A different integrated fieldwork project is scheduled towards the completion of the courses, laboratory exercises and semi-industrial scale devices. Students, working in small groups, could apply the theoretical and laboratory knowledge to describe and solve a real scale and real time problem, using the NDT and instrumental techniques that are available. They are also requested to manage and evaluate the obtained data in order to approach a practical solution to the problem.

Therefore, students develop personal initiatives, critical apprehension and a realistic approach for studying practical problems. The in situ investigation – field trips are organised in the scale of real structures & complexes, such as:

- Medieval City of Rhodes (non – destructive techniques' application: FOM, US, IR, DIP)
- Archaeological Site of Eleusis (sustainable preservation of Archaeological Sites from industrial pollution)
- Hagia Sophia Basilica and Byzantine Monuments in Istanbul (earthquake protection by preparation of compatible repair mortars simulating historic ones – NDT application in the dome area for the revealing of plastic mosaics)
- Historic buildings of Athens (Athens Academy, National Library of Greece, National Archaeological Museum and several neoclassical buildings) (cleaning, strategic planning of conservation interventions of the facades)
- Venetian fortifications of Heraklion in Crete (environmental impact assessment by GIS management)
- Acropolis of Athens
- Osios Loukas Monastery in Fokida and other monuments and sites

V. Dissertation Thesis

During the implementation of the dissertation thesis, the student faces a real scale - real time problem by collecting, combining and managing NDT techniques data (in situ and in lab) and instrumental techniques data (in lab), using methods such as:

- Stochastic and multi-variety & discriminated analysis.
- Lifetime engineering, monitoring and control to face the problems of deteriorating built environment.

- Phenomena simulation by deterministic models (i.e. physicochemical decay mechanisms).
- Geographical Information Systems (GIS) supported by Fuzzy logic system, concluding to materials and decay mapping, consisting the background for the strategic planning of preservation and conservation interventions.

Decision making tool for Strategic Planning of Conservation Interventions

The development of a decision making tool for the management of historic complexes and monuments contributes to the elaboration of long – term strategies concerning the maintenance of the structures, urban planning, but also the limitation of the environmental loads.

Strategic planning of conservation interventions employs high measuring in situ monitoring and control techniques of environmental impact assessment, as well as the spatial management of the attained information.

Non – destructive techniques are used along with laboratory investigation techniques and G.I.S., in order to manage a multidisciplinary database.

Interdisciplinary Character of the Program

The lecturers of the program are not only professors of Greek universities but also visiting professors from international universities. Furthermore, since the Master programs should present a clear professional orientation, professional experts on this field also participate. The categories of lecturers are presented in Fig.1.

Furthermore, the program prime characteristic is the multidisciplinary character regarding the professors and the students that attend the program, of different disciplines such as Engineering, Natural Sciences, Human Sciences, e.t.c. Fig.2. and Fig.3 present the NTUA Professors' and the students' origin per scientific field respectively.

Fig.1. Lecturers' categories

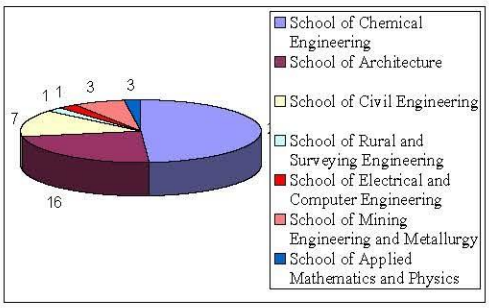

Fig.2. NTUA Professors' origin per scientific field

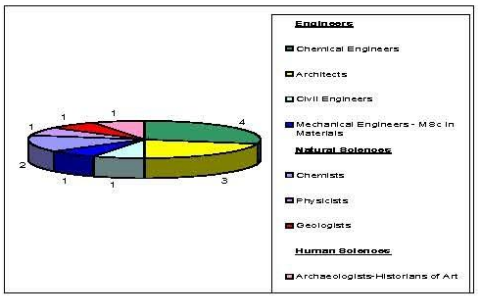

Fig.3. Students' origin per scientific field

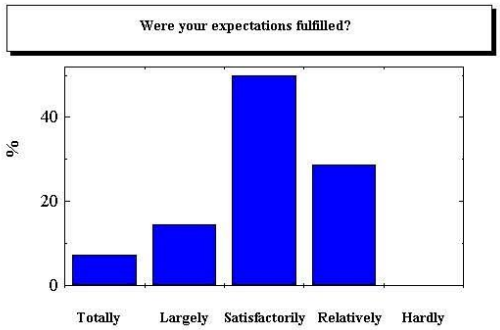

Fig.4. Students' Evaluation

Evaluation of the Programme

A. Subjective evaluation

Internal by the students

The prime target of the programme is to fulfil the student's prospect. For this reason, analytical and organised questionnaires are distributed to the student and the obtained information is gathered and assessed in order to improve the quality of the MSE curriculum. Fig. 4 present the some data derived by a student's evaluation of the program.

Internal by Professors of the Program

External by distinguished Professors of foreign Universities

B. Objective evaluation

By several factors, such as the derivatives of students' dissertation thesis (table 2) or the students' relevant employment after graduation (table 3).

According to Internal and external, subjective and objective evaluation, MSE Program's recognition and perspectives are attributed to its:

- Multidisciplinary character
- High scientific level and specialized education in the field of European Cultural Heritage
- Coherence of the courses
- Longevity of the program

The data that derived by the aforementioned evaluation comprise valuable data for the continuous amelioration and reassessment of the program.

Table 2. Derivatives of Undergraduate Students Dissertation Thesis in Percentage (%)

35 %	**Continuation to PhD Research work**
30 %	Publications in international scientific journals
47 %	Publications and presentations in national and international conferences
53 %	Participation in Research or Applied science projects

Table 3. Employment perspectives of MSE graduates

30 %	Ministry of Culture
40 %	NTUA Researchers
10 %	Industry
20 %	Other

Conclusions

It is concluded that the reasons justifying the development-viability of this MSE Program are the following:

- Advanced knowledge and high level of specialized education in the field of Cultural Heritage.
- Multidisciplinary character.
- Effective structure (combination of theory with fieldwork and exercises, orientation of MSE Thesis to real problems in the field of Protection of Monuments).
- Response to issues of the scientific community's research needs.
- New labor posts-opportunities based on sustainable preservation heritage and new European strategies
- Need for legal recognition of the study (selection and design of materials and interventions), similar to the architectural – structural study.
- Need for common international policies for the development and recognition of the new professional profile in the Protection of Cultural Heritage, and more particularly in the preservation of historic cities, as well as the attainment of new European strategies:
- Incorporation of historic town centers into contemporary towns (Main issue of the International Symposium of the International Council of World Cultural Heritage in Rhodes, September 2002).

- Tourism development for the protection of cultural heritage.
- Keeping heritage "alive" through towns, architectural sites and open laboratories for education and research.

Acknowledgements

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ΣΥΜΜΕΤΟΧΗ ΚΑΙ ΕΚΠΑΙΔΕΥΣΗ ΣΤΗΝ ΠΡΟΣΤΑΣΙΑ ΠΟΛΕΩΝ-ΜΝΗΜΕΙΩΝ. 20 ΧΡΟΝΙΑ ΕΜΠΕΙΡΙΑΣ ΣΤΗΝ ΠΑΛΙΑ ΠΟΛΗ ΤΗΣ ΡΟΔΟΥ

Η Παλιά Πόλη της Ρόδου πέρα από μνημείο Παγκόσμιας Πολιτιστικής κληρονομιάς κατοικείται και συμμετέχει ενεργά στη ζωή της σύγχρονης πόλης. Στην παρούσα ανακοίνωση τίθενται τα ζητήματα της συνεργασίας και της εκπαίδευσης των φορέων διαχείρισης και όλων των κοινωνικών ομάδων που σχετίζονται άμεσα ή έμμεσα με την προστασία και την εξέλιξη της πόλης. Εξετάζονται οι δράσεις όλου του φάσματος των χρηστών την τελευταία εικοσαετία, διερευνούνται οι πρακτικές που ακολουθήθηκαν και παρουσιάζονται τα αποτελέσματα τους.

Η προστασία και ανάδειξη ενός μνημείου που λειτουργεί ταυτόχρονα ως αναπόσπαστο κομμάτι της ζωής της σύγχρονης πόλης είναι δράση πολυδιάστατη. Ο σχεδιασμός και η αποτελεσματική διαχείριση του είναι αντικείμενο όχι μόνο του Υπουργείου Πολιτισμού ως υπεύθυνου για την προστασία και ανάδειξη του μνημείου αλλά και του Δήμου Ροδίων σε ότι αφορά την εξυπηρέτηση των πολιτών και τη λειτουργία της πόλης στα πλαίσια της σύγχρονης πραγματικότητας. Το 1985, η Ρόδος ευτύχησε να έχει σε καίριες διοικητικές θέσεις ανθρώπους με παιδεία και όραμα για τον τόπο. Με πρωτοβουλία του τότε Δημάρχου και του Εφόρου Βυζαντινών Αρχαιοτήτων Δωδ/σου, δημιουργήθηκε η πρωτοπόρος για την εποχή «Προγραμματική Σύμβαση ΥΠ.ΠΟ. - Τ.Α.Π.Α. - Δήμου Ροδίων» με σκοπό την προστασία και ανάδειξη της Μεσαιωνικής Πόλης. Ο ενιαίος αυτός φορέας είχε και έχει τη δυνατότητα να λειτουργήσει καταλυτικά ως προς τις σχέσεις των φορέων και τη διαρκή προσέγγιση με το κοινό.

Έτσι δημιουργήθηκαν οι προϋποθέσεις για ανάληψη πρωτοβουλιών και κοινών δράσεων για τη διαχείριση του μνημείου σε όλο το φάσμα των χρήσεων του. Στελεχώθηκε με εξειδικευμένο προσωπικό ένα γραφείο, ώστε να έχει τη δυνατότητα να ανταποκριθεί στις απαιτήσεις του δύσκολου έργου της προστασίας μιας «ζωντανής» πόλης-μνημείου. Η διπολικότητα του νέου φορέα δημιούργησε τις συνθήκες για άμεση ενημέρωση για τις εκατέρωθεν προτεραιότητες και δράσεις και δημιούργησε συνθήκες αποτελεσματικής συνεργασίας.

Η ευαισθητοποίηση των παραγόντων του Γραφείου σε θέματα πολιτισμού οδήγησε το 1988 στην ανακήρυξη της πόλης μνημείο Παγκόσμιας Πολιτιστικής Κληρονομιάς. Το 1991 η Παλιά Πόλη συμμετείχε με εκπροσώπους της δημοτικής αρχής και του γραφείου Προγραμματικής Σύμβασης στην πρώτη διεθνή συνάντηση των Πόλεων Παγκόσμιας Πολιτιστικής Κληρονομιάς της UNESCO στο Κεμπέκ του Καναδά και συνυπέγραψε τη διακήρυξη του Κεμπέκ. Το 1993 γίνεται ιδρυτικό μέλος της Ένωσης των Πόλεων Παγκόσμιας Πολιτιστικής Κληρονομιάς και σήμερα έχει την τιμή να φιλοξενεί το 7^{ο} Συμπόσιο του Οργανισμού.

Η έννοια της εκπαίδευσης είναι ευκολότερα ανιχνεύσιμη όταν αναφέρεται στην ομάδα διαχείρισης της πολιτιστικής κληρονομιάς και στην προκειμένη περίπτωση στις αρμόδιες υπηρεσίες του Υπουργείου Πολιτισμού και στο Δήμο Ροδίων. Διακρίνονται δύο κατηγορίες προσωπικού: το επιστημονικό και το εργατοτεχνικό. Κάθε κατηγορία είναι σε θέση να επηρεάσει καθοριστικά το παραγόμενο έργο. Η καλή λειτουργία της ομάδας

είναι ζήτημα συνεργασίας αλλά και παίδευσης αφού εξαρτάται τόσο από τη δυνατότητα κατανόησης μεταξύ τους, όσο και από την εκατέρωθεν στάση τους απέναντι στο μνημείο. Σημειώνεται ότι σημαντικό κομμάτι της εκπαίδευσης και ενημέρωσης επιτυγχάνεται με την τριβή μεταξύ τους για την αντιμετώπιση των καθημερινών προβλημάτων.

Στον όρο «επιστημονικό προσωπικό» περιλαμβάνονται τα εξειδικευμένα στελέχη Ανώτερης ή Ανώτατης εκπαίδευσης υπάλληλοι (μηχανικοί, αρχαιολόγοι, συντηρητές) και συνεργάτες (κοινωνιολόγοι, ανθρωπολόγοι, δικηγόροι, γεωλόγοι και γεωτεχνικοί) που ασχολούνται κυρίως με την εκτέλεση επιστημονικού έργου σε θεωρητικό και πρακτικό επίπεδο αλλά και με την οργάνωση των Υπηρεσιών. Συνήθως στην κατηγορία αυτή ανήκουν άτομα υψηλής εξειδίκευσης και ως εκ τούτου είναι ευαισθητοποιημένα σε ζητήματα συνεχούς επιμόρφωσης. Έτσι, η διοργάνωση, η συμμετοχή ή η απλή παρακολούθηση συνεδρίων, ημερίδων και σεμιναρίων είναι συχνότατη ενώ σημαντικό ποσοστό των εργαζομένων έχει ολοκληρώσει, ή βρίσκεται σε διαδικασία ολοκλήρωσης μεταπτυχιακών σπουδών και διδακτορικών διατριβών. Σε παράλληλο επίπεδο υπήρξαν και υπάρχουν συνεργασίες με Πολυτεχνικές Σχολές και Πανεπιστήμια του εσωτερικού και του εξωτερικού σε επίπεδο ερευνητικών προγραμμάτων και διπλωματικών εργασιών. Ενδεικτικά αναφέρεται η συμμετοχή σε Ευρωπαϊκά προγράμματα όπως ο διαγωνισμός EUROPAN 2 το 1990 όπου αρχιτέκτονες από όλο τον κόσμο κλήθηκαν να μελετήσουν τη διαμόρφωση τεσσάρων βομβαρδισμένων πλατειών της μεσαιωνικής πόλης. Επίσης το πρόγραμμα RECITE – REBUILD στα πλαίσια του οποίου μελετήθηκε η αποκατάσταση των δημοτικών λουτρών “Yeni Hammam” και του μουσουλμανικού δικαστηρίου με αξιοποίηση της ηλιακής ενέργειας για παθητικά συστήματα θέρμανσης και δροσισμού.

Παράλληλη και συνεχής είναι η επιμόρφωση σε ζητήματα που αφορούν τόσο την Παλιά Πόλη όσο και το χώρο της αναστήλωσης γενικότερα. Στον τομέα αυτό είναι καθοριστική συμβολή του Αρχαιολογικού Ινστιτούτου. Η βιβλιοθήκη που λειτουργεί στο χώρο της Υπηρεσίας είναι σημαντικότατο βοήθημα στην ενημέρωση και κατάρτιση του επιστημονικού προσωπικού. Δεν είναι λίγες οι φορές που ο συγκεκριμένος χώρος γίνεται εστία μετάδοσης γνώσεων από τους παλιούς στους νεότερους κυρίως τις απογευματινές ώρες. Επακόλουθο των παραπάνω και σε συνδυασμό με το μελετούμενο αντικείμενο είναι η έκδοση, από τη μεριά των φορέων, διάφορων πονημάτων με γενικότερο ή ειδικό ενδιαφέρον.

Ιδιαίτερη μνεία πρέπει να γίνει και στο ρόλο που διαδραματίζουν οι επιτροπές ελέγχου και παρακολούθησης των έργων που επιτελούνται. Διακρίνονται σε αυτές που σκοπό έχουν τη διαχείριση και τον προγραμματισμό μελετών και έργων και σ’ αυτές που γνωμοδοτούν επιστημονικά για τα ζητήματα που ανακύπτουν. Η σύνθεση τους αποτελείται από επιστήμονες εγνωσμένης αξίας, εκπροσώπους διαφόρων φορέων που εμπλέκονται στο έργο της Συντήρησης. Είναι ευνόητο ότι η μεταφορά της εμπειρίας των μελών των επιτροπών σε συνδυασμό με την επιτόπια έρευνα και ενασχόληση του επιστημονικού προσωπικού αποτελεί γι’ αυτό καθοριστικό παράγοντα απόκτησης τεχνογνωσίας.

Αμέσως με τη δημιουργία του Γραφείου Προγραμματικής Σύμβασης, ανέκυψε το πρόβλημα της στελέχωσης του με εργατοτεχνίτες που θα μπορούσαν να υλοποιήσουν τις μελέτες αποκαταστάσεων με τις ιδιαίτερες

απαιτήσεις της η κάθε μια. Οι οικοδομικές πρακτικές που ακολουθούνται τελευταία είχαν παρασύρει τους περισσότερους τεχνίτες μακριά από τις παραδοσιακές οικοδομικές μεθόδους. Αρχικά ζητήθηκε μέσω του Υπουργείου Πολιτισμού η συνδρομή του Ο.Α.Ε.Δ. και του Ε.Ο.Μ.Μ.Ε.Χ. για την κατάρτιση του εργατοτεχνικού προσωπικού. Όμως η προσπάθεια απέδωσε καρπούς κυρίως μέσω συντονισμένων ενεργειών του Γραφείου της Προγραμματικής Σύμβασης, στον τομέα της επιμόρφωση σε παραδοσιακά επαγγέλματα. Προσλήφθηκαν νέοι με μεράκι και όρεξη να μάθουν τα μυστικά της κάθε ειδικότητας και κάθισαν δίπλα σε παλιούς μάστορες που γνώριζαν τις παραδοσιακές τεχνικές, είτε στη Ρόδο είτε σε άλλα μέρη (Άγιο Όρος). Για την υλοποίηση του προγράμματος υπήρξε χρηματοδότηση από το Κοινοτικό Ταμείο, μέσω της Νομαρχιακής Αυτοδιοίκησης. Επίσης υπήρξε συμμετοχή σε Ευρωπαϊκά προγράμματα όπως το Euromol που σκοπό είχε την κοινή προσπάθεια και την ανταλλαγή εμπειριών για την αποκατάσταση ανεμόμυλων στην Ισπανία, τη Βρετανία, την Ελλάδα, τη Σουηδία και τη Δανία. Με την πάροδο των ετών το Γραφείο είναι σήμερα σε θέση να κατασκευάσει σύνθετα τεχνικά έργα χρησιμοποιώντας παραδοσιακές τεχνικές.

Το επιστημονικό προσωπικό αναλαμβάνει πέρα από τη δική του εκπαίδευση και το μεγαλύτερο βάρος της εκπαίδευσης άλλων κοινωνικών ομάδων, όπως είναι οι μόνιμοι κάτοικοι, οι επισκέπτες, οι κάτοικοι της νέας πόλης, κλπ. Η ενημέρωση για το έργο που επιτελείται, η παράδοση των έργων αυτών σε χρήση, η διενέργεια εκπαιδευτικών προγραμμάτων, οι δημοσιεύσεις στα μέσα μαζικής ενημέρωσης, το κυκλοφοριακό και το πρόβλημα των κανονισμών λειτουργίας των καταστημάτων, είναι ζητήματα που απασχολούν μερίδα του επιστημονικού προσωπικού, σχετίζονται άμεσα με την εκπαίδευση των πολιτών και θα σχολιαστούν στη συνέχεια.

Όταν ιδρύθηκε το Γραφείο Μεσαιωνικής πόλης, στην κοινή γνώμη της Ρόδου επικρατούσε η άποψη ότι η Παλιά Πόλη είναι αρκετά υποβαθμισμένη, ότι υπάρχει μεγάλη φτώχεια και μιζέρια ενώ δεν ήταν λίγοι οι Ροδίτες που θεωρούσαν την Παλιά Πόλη ένα «γκέτο» ανθρώπων με δικούς του κώδικες ηθικής. Όπως σημειώνεται στην κοινωνιολογική μελέτη που εκπονήθηκε τρία χρόνια αργότερα «ο Δήμος Ρόδου με τα προγράμματα πρόνοιας που διαθέτει (π.χ. Συσσίτιο του Δημοτικού Οργανισμού Πρόνοιας) και με τις προγραμματικές συμβάσεις που έχει υπογράψει είναι σήμερα ο μόνος κρατικός φορέας που δείχνει να ενδιαφέρεται για την Παλιά Πόλη και τα προβλήματα της», ενώ συμπλήρωνε ότι «ο λόγος που η ποιότητα ζωής θεωρείται χαμηλή είναι η κακή κατάσταση πολλών κατοικιών». Ενδεικτικά ήταν τα ποσοστά μετοίκησης των παραγωγικών ηλικιών που αντιμετώπιζαν στεγαστικά προβλήματα στην Παλιά Πόλη, μια πόλη που δεν προσέλκυε ούτε τους νέους που μεγάλωσαν σ' αυτήν.

Ο φόβος να χάσει η πόλη τον οικιστικό χαρακτήρα που διατηρούσε για αιώνες και να μετατραπεί σε ένα νεκρό μουσειακό έκθεμα, ή ένα προϊόν προς τουριστική εκμετάλλευση οδήγησαν στη λήψη των απαραίτητων μέτρων ώστε ο γηγενής πληθυσμός να παραμείνει στις εστίες του. Το Γραφείο κινήθηκε προς την εξυπηρέτηση των άμεσων αναγκών των μόνιμων κατοίκων επιδιώκοντας τη συναίνεση και τη συμμετοχή τους. Λειτούργησαν σε αποκαταστημένα κτίρια δημοτικό ιατρείο, βρεφονηπιακός σταθμός, Κ.Α.Π.Η. (Κέντρο Ανοιχτής Προστασίας Ηλικιωμένων) και Κ.Ε.Π. (Κέντρο Εξυπηρέτησης Πολιτών). Συντηρήθηκαν υποδειγματικά μνημεία και λειτούργησαν ξανά κτίρια όπως ο ξενώνας της Αγ. Αικατερίνης (βραβεύτηκε

από τη EUROPA NOSTRA το 1997), εκκλησίες, τζαμιά, αλλά και κοινόχρηστοι χώροι όπως πλατείες και πάρκα. Το Παλιό Συσσίτιο παραδόθηκε σε χρήση ως παράρτημα της πινακοθήκης, αναψυκτήριο και εκκλησία, καθώς και τα λουτρά με την αρχική τους χρήση. Η μεταμόρφωση κτιρίων και κοινόχρηστων χώρων έδωσε στους μόνιμους κατοίκους την ελπίδα ότι οι συνθήκες διαβίωσης τους μπορούσαν να αλλάξουν με τρόπο συμβατό προς τη μνημειακότητα του χώρου.

Σημαντική βελτίωση στην ποιότητα ζωής πρόσφερε η εγκατάσταση των υπογείων δικτύων των κοινωφελών οργανισμών. Πρόκειται για ένα ολοκληρωμένο πρόγραμμα εφαρμογής δικτύων ύδρευσης, αποχέτευσης, τηλεφώνου, καλωδιακής τηλεόρασης και αποκατάστασης οδοστρωμάτων σταδιακά σε όλη την πόλη. Είναι προϊόν της συνεργασίας του Δήμου Ροδίων, της Δ.Ε.Υ.Α.Ρ., του ΥΠ.ΠΟ. και της Δ.Ε.Π.Ο.Σ. Όταν η α' φάση του έργου ξεκίνησε πιλοτικά το 1994, η δυσπιστία και η βαρυθυμία των κατοίκων ήταν έντονη για την αναστάτωση που προκαλούνταν. Όμως το αποτέλεσμα αποζημίωσε και τους πιο δύσπιστους, ορισμένοι από τους οποίους κατέληξαν να συμμετέχουν ενεργά φυτεύοντας στα παρτέρια και τους κοινόχρηστους χώρους. Εν ολίγοις έγινε αντιληπτό από τους πολίτες ότι η Παλιά Πόλη της Ρόδου έχει εκτός από παρελθόν, παρόν και μέλλον.

Παράλληλα, με ευθύνη της 4ης Ε.Β.Α. λειτούργησαν εκπαιδευτικά προγράμματα στον αποκατεστημένο ιπποτικό ξενώνα της Αγίας Αικατερίνης για παιδιά του μοναδικού (10ου) δημοτικού της παλιάς Πόλης. Το πρόγραμμα που περιλάμβανε συναντήσεις σε μηνιαία βάση είχε θέμα «οι εκκλησίες της μεσαιωνικής πόλης» ώστε τα παιδιά να γνωρίσουν καλύτερα τα μνημεία του ζωτικού τους χώρου. Παράλληλα λειτούργησαν και προγράμματα που αναφέρονταν σε παιδιά εκτός Μεσαιωνικής Πόλης. Εκτιμάται ότι από το 1997 και μετά περίπου 6000 μαθητές δημοτικού και γυμνασίου έχουν παρακολουθήσει τα εκπαιδευτικά προγράμματα «...Στην πόλη των Ιπποτών» και «Ρόδος: Η απόρθητη πόλη».

Όσο η Παλιά Πόλη προσελκύει όλο και περισσότερους επισκέπτες, τα οικονομικά συμφέροντα μεγαλώνουν και η επιβολή περιορισμών και κανόνων γίνεται ολοένα και πιο δύσκολη. Για την καλύτερη συνεργασία με τους κατοίκους και τους καταστηματάρχες της Παλιάς Πόλης, ξεκίνησε, ήδη από το 1985 ένας διάλογος ώστε να γίνει κατανοητό ότι η καθολική συμμόρφωση στους κανόνες που τίθενται από τις αρμόδιες Υπηρεσίες αναδεικνύει την πόλη ως μνημείο και αποβαίνει προς όφελος των κατοίκων και των επιχειρήσεων. Το 1993 εκδόθηκε από το Τεχνικό Επιμελητήριο Ελλάδας τεύχος με τίτλο «Αρχές και κανονισμοί επεμβάσεων» που περιέγραφε λεπτομερώς τις επιτρεπόμενες επεμβάσεις αλλά και τις αρχές που διέπουν τη συντήρηση των μνημείων και του περιβάλλοντα χώρου τους. Όσον αφορά στο εμπορικό κέντρο, θεσπίσθηκε κανονισμός έκθεσης των εμπορευμάτων, και με απόφαση του Δημοτικού Συμβουλίου συντάχθηκε ειδικός «χάρτης χρήσης κοινόχρηστων χώρων» που διατίθενται πλέον προς ενοικίαση από το Δήμο Ρόδου. Δυστυχώς οι παραπάνω προσπάθειες δεν απέδωσαν τους αναμενόμενους καρπούς εξαιτίας της συναρμοδιότητας πολλών φορέων.

Φυσικά τα προβλήματα δεν εξαντλούνται στις προσόψεις και τους κοινόχρηστους χώρους. Επιτακτική είναι η ανάγκη για θεσμοθέτηση μιας ολοκληρωμένης πολεοδομικής μελέτης που να ρυθμίζει την εξάπλωση των εμπορικών και οχλουσών χρήσεων σε βάρος των περιοχών αμιγούς κατοικίας, τα ζητήματα ρυμοτομικού σχεδίου κλπ. Το 1960 η αντίθεση της

Αρχαιολογικής Υπηρεσίας να υλοποιήσει προτεινόμενο Ρυμοτομικό Σχέδιο, που προέβλεπε ευθυγράμμιση και διαπλάτυνση των υπαρχουσών οδών έσωσε το μνημειακό σύνολο από μεγάλες καταστροφές. Ο Δήμος Ρόδου κινείται προς την εκπόνηση νέας πολεοδομικής μελέτης για την αποκατάσταση και διαχείριση του πολεοδομικού συγκροτήματος της Παλιάς Πόλης και των περιμετρικών πάρκων αφού ειδική μελέτη που εκπονήθηκε από ιδιωτικό γραφείο το 1987 στα πλαίσια της Επιχείρησης Πολεοδομικής ανασυγκρότησης (Ε.Π.Α.) δεν κατέστη δυνατόν να εγκριθεί μέχρι σήμερα. Ο έλεγχος των αδειών οικοδομής στα όρια της τειχισμένης πόλης που εφαρμόζει η 4η Ε.Β.Α., ακολουθεί άτυπα ένα σχέδιο χρήσης γης, παρότι δεν έχει εκδοθεί ακόμη το σχετικό διάταγμα.

Η επαφή του ευρύτερου κοινού με το μνημείο επιτυγχάνεται με ποικίλους άλλους τρόπους. Η Παλιά Πόλη αποτελεί μοναδικό σκηνικό για να φιλοξενήσει διαφόρων ειδών πολιτιστικά γεγονότα. Δρώμενα όπως θεατρικές παραστάσεις, συναυλίες, εκθέσεις ποικίλου περιεχομένου, θρησκευτικές εκδηλώσεις, έχουν οργανωθεί κατά καιρούς στο Παλάτι του Μεγάλου Μαγίστρου, την τάφρο, τις οχυρώσεις, τις αποκατεστημένες εκκλησίες και τα τζαμιά, τις πλατείες και τους υπαίθριους χώρους της Παλιά Πόλη Φαίνεται ότι η αντίληψη της εντός των τειχών περιοχής ως εμποδίου για την ανάπτυξη της νέας πόλης έχει ανατραπεί. Η «Παλιά Αγορά» της Ρόδου, όπως ήταν γνωστή η Παλιά Πόλη στους ντόπιους μέχρι πρόσφατα, χρησιμοποιείται κατά κύριο λόγο ως κέντρο αναψυχής. Αν και τα μπαρ, εστιατόρια και καφετέριες που λειτουργούν μπορεί, υπό προϋποθέσεις, να θεωρηθεί ότι συντελούν στην αποκατάσταση της επαφής του κοινού με την Παλιά Πόλη, το πρόβλημα της επέκτασης παρόμοιων χρήσεων πρέπει να ελεγχθεί, στα πλαίσια των στόχων της πολεοδομικής μελέτης που αναφέρθηκε παραπάνω.

Επισκέπτες και κατοίκους της πόλης αφορά και ο περιορισμός της κυκλοφορίας τροχοφόρων οχημάτων στην Παλιά Πόλη, τουλάχιστόν ορισμένες ώρες την ημέρα. Για την κυκλοφορία των οχημάτων εντός των τειχών της μεσαιωνικής πόλης έχει θεσπιστεί πρόγραμμα από το Δήμο Ροδίων που ρυθμίζει την κίνηση κυρίως κατά τη διάρκεια της τουριστικής περιόδου οπότε παρατηρείται και η μεγαλύτερη προσέλευση επισκεπτών στην περιοχή. Οι κυκλοφοριακές ρυθμίσεις και τα μέτρα στάθμευσης προτάθηκαν το 1993 ύστερα από συνεργασία του Γραφείου Προγραμματικής Σύμβασης, του Τ.Ε.Ε. και άλλων φορέων και τέθηκαν σε εφαρμογή ύστερα από απόφαση και έγκριση του Δημοτικού Συμβουλίου και της Συντονιστικής Επιτροπής Κυκλοφορίας Νομού Δωδεκανήσου. Στόχος των ρυθμίσεων ήταν η «μείωση του αριθμού των αυτοκινήτων που κινούνται και σταθμεύουν στην μεσαιωνική πόλη, αλλά και η εξυπηρέτηση των κατοίκων». Οι τελευταίοι εφοδιάζονται ατελώς κάθε χρόνο με ειδικό σήμα. Οι χώροι στάθμευσης είναι συγκεκριμένοι, κυρίως κοντά στις πύλες εισόδου, για να καλύπτουν τις ανάγκες των κατοίκων και των επισκεπτών. Η είσοδος των οχημάτων γίνεται σε συγκεκριμένες ώρες του εικοσιτετραώρου και από ορισμένες εισόδους. Παρά τους περιορισμούς, το μέτρο έχει γίνει αποδεκτό από το σύνολο των κατοίκων και επισκεπτών της Παλιάς Πόλης. Το ζήτημα της κυκλοφορίας οχημάτων θα επανεξεταστεί σε συνδυασμό με το κυκλοφοριακό ολόκληρης της πόλης σε μελέτη που εκπονεί ο Δήμος Ροδίων με τη συνδρομή ειδικών συμβούλων από το Ε.Μ.Π. και το Α.Π.Θ.

Τέλος, μεγάλη σημασία δίνεται στον τρόπο με τον οποίο παρουσιάζεται η πόλη και τα μνημεία της σε μόνιμους κατοίκους και επισκέπτες. Διανέμονται

ενημερωτικά φυλλάδια, γίνονται δημοσιεύσεις, προτείνονται μέσω ενημερωτικών πινακίδων και βιβλιογραφίας εναλλακτικές διαδρομές, τοποθετούνται ενημερωτικές πινακίδες. Ο σεβασμός και η κατανόηση του μνημείου είναι συνάρτηση της κατάστασης στην οποία βρίσκεται αυτό και το περιβάλλον του.

Το έργο που επιτελέστηκε την τελευταία εικοσαετία στην Παλιά Πόλη είναι σημαντικότατο. Η αίσθηση παρακμής και υποβάθμισης που υπήρχε μέχρι τότε έχει ανατραπεί. Η παρουσία των αρμόδιων φορέων σε ότι αφορά τόσο στη συντήρηση των ακινήτων του Δημοσίου, όσο και των κοινόχρηστων χώρων είναι έντονη. Πέρα από τις αποκαταστάσεις και τις ρυθμίσεις που έγιναν σε όλους τους τομείς, δημιουργήθηκε το απαραίτητο υπόβαθρο για διαρθρωτικές επεμβάσεις σε υψηλότερο επίπεδο. Ωστόσο, τα προβλήματα είναι ακόμη πολλά. Οι χρήσεις γης, οι κανονισμοί λειτουργίας των καταστημάτων, ο έλεγχος της ιδιωτικής πρωτοβουλίας και εν γένει η εφαρμογή ειδικής πολεοδομικής μελέτης, είναι τα σημαντικότερα. Μετά από τόσα χρόνια λειτουργίας, πρέπει να γίνει κατανοητό από όλους ότι, για την αποτελεσματική αντιμετώπιση των προβλημάτων του μνημείου και των κατοίκων είναι απαραίτητη η συνεργασία πολλών κρατικών φορέων και οργανισμών. Η Προγραμματική Σύμβαση ΥΠ.ΠΟ. - Τ.Α.Π.Α. - Δήμου Ροδίων ήταν το πρώτο σημαντικό βήμα προς την κατεύθυνση αυτή. Σήμερα με την προϋπόθεση αυτή, είμαστε ανοιχτοί σε προτάσεις και κριτική, αλλά και σε θέση να απαντήσουμε με πρότυπο και αποτελεσματικό τρόπο στην πρόκληση της συνολικής διαχείρισης της Πόλης - Μνημείου Παγκόσμιας Πολιτιστικής Κληρονομιάς.

UNIVERSITY TRAINING FOR PROFESSIONALS IN CULTURAL HERITAGE FIELD

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Abstract

The cultural heritage is a “witness with value of civilization". It is of fundamental importance from the humanistic and the historical-artistic point of view and also for its economical value: its safeguard and exploitation, together with a prudent management, can be not only motive for ample economic relapses in the sector of the cultural heritage but also in those connected to it.

The knowledge of the typologies of the constituent materials, of their origin and of their properties is essential for recovery of the works of art.

A technical and specialistic approach to the world of the culture is necessary, so that the maintenance and the management of such important works of art are not left to the improvisation, as it often happens, but is result of planning, study and research.

It is therefore necessary the training of qualified professional figures, of experts in the sector of the cultural heritage that can answer to the real demands of the market.

Introduction

The rise of problems related to the characterization of the cultural heritage has brought to the definition of a market with supply and demand, where:

- the market is represented by Institutions appointed to the safeguard, that is, by public and private organizations;
- the demand consists in preparing, when exercising the safeguard, qualified personnel professionally and adequately equipped to face the innumerable problems rising by variable typologies of works of art;
- the supply is represented by the organisms appointed to the education, that is by the university, as also by other academic Institutions.

The creation in Italy of the Ministry for the Cultural and Environmental Heritage in 1975 - currently Ministry for the Cultural Heritage and Activities - has represented a stimulus for the university, in the sense that has become clear the necessity of new professional figures, technically prepared to answer a great deal of specific articulated and complex questions in relationship to the different problems related to the safeguard and to the exploitation of the cultural and environmental heritage (Lorusso[1], Lorusso[2]).

The Italian situation related to the training of the experts in the sector of the cultural heritage is described on the basis of the recent university reform.

The training of experts in the field of cultural heritage

The professional of the expert in the field of cultural heritage must possess, together with a basic humanistic background, the ability to critically interpret and to historically appraise the artistic phenomena and the effects of the human presence in the natural environment.

Insofar, the salient lines of the disciplinary curriculum of the "conservator" have to be:

- humanistic background and historical-philological understanding;
- knowledge of the different typologies and chemical, physical, structural, morphological characteristics of the constituent materials of the works of art in relationship also to the variety of the techniques of intervention;

- knowledge of the new technologies and of the scientific methodologies that can be of aid in the action of maintenance and safeguard and of maintenance and restoration;
- attitude to manage the scientific methods of diagnostic investigation;
- ability to plan the legislative, administrative and bookkeeping tools of a modern juridical-administrative-managerial management.

Unfortunately, previously to the realization of the university reform, the proliferation of the academic courses in "Safeguard of Cultural Heritage" has merely brought to vain expectations of job, because of the great difficulties that the young graduates have met having to face the insertion in the employment with their own curriculum studiorum, not in conformity to the demands of the market and not in condition to assure precise professional results (Liberti[3]).

The problem is of great interest and of extreme urgency for the society, for the students and for the modernization of the structures and of the technological and didactic organizations, in any university centre, with the purpose to find an educational form tailored to the necessities of the employment.

The problem is particularly serious in some economic-productive sectors (and the sector of the cultural heritage is certainly one of these); the discrepancy supply-demand is very meaningful: excessive the demand, scarce the supply.

The fundamental reason for such discrepancy is to be related to the inadequacy of the training. Therefore, it is necessary to re-think the training system, particularly in the universities, to create centres of excellence and to do so that the regulation between market and education is realised in real time. The training of the "new economy" has to be characterized for themes, effectiveness, speed, integration and must be supported by the " mass media" (radio, television, newspapers, internet).

The Italian university reform and the new professional figure of the expert in the field of cultural heritage

The reform of the university system is a radical reorganization of the didactic arrangements that, according to the expectations, will have important repercussions on the cultural and professional training of the new generations of students.

Among the objectives of the reform, there is to harmonize the Italian cultural and scientific training to the European reality and to make the university a dynamic system, also through the expansion of the didactic autonomy of the athenaeums.

The reform of the university system

The first step of the reform has ended with the emanation of the ministerial decree of the MURST (Ministry of University, Scientific and Technological Research) "Regolamento recante norme concernenti l'autonomia didattica degli atenei" (Norms on the didactic autonomy of the athenaeums" (D.M. 3 November 1999, n. 509, published in the G.U. n.2 of 4th January 2000), in which the base new concepts are introduced (1st and 2nd level degrees, specialization diploma, master, philosophical doctorate, classes of courses, objectives and training activities) and, in completely innovative way, the system of the university training credits is introduced (Carile[4]).

The main definitions that emerge from the Italian university reform are the following:

- 1st level degree

  The course has the objective to assure a suitable mastery of methods and general scientific contents to the student, as well as the acquisition of specific professional knowledge; it has a triennial duration (proportional to the total number of 180 credits, with 60 credits a year) and it is concluded by a final exam;

- 2nd level degree
  The course has the objective to give the student an education of advanced level for the exercise of activity of elevated qualification in specific areas; to be admitted to the 2nd level is necessary to possess the 1st level degree; the normal duration of the course is of two years (proportional to the total number of 300 credits, inclusive of those already acquired by the student with the 1st level degree); the course is concluded with the discussion of a thesis;

- Specialization Diploma
  The course of specialization has the objective to give the student the knowledge and the ability for the exercise of particular professional activities and can exclusively be founded in application of specific norms of law or directives of the European Union; to be admitted to it, at least the 1st level degree is needed;

- Master
  It is a course of scientific improvement and high permanent and recurrent education, following to the 1st level degree (master of 1st level) or to the 2nd level degree (master of 2nd level); its duration is of one year;

- Philosophical Doctorate
  The course is finalized to the acquisition of the necessary competences to practice activity of research of high qualification; to be admitted to the course it is necessary to possess the 2nd level degree; the courses of doctorate last not less than three years;

- University formative credit
  For university formative credit (denominated credit) it is intended the measure of training, inclusive of the individual study, request to a student in possession of a suitable initial preparation, for the acquisition of knowledge and ability in the formative activities of the didactic arrangements of the courses of study; each credit corresponds to 25 hours of job for the student;

- Formative objective
  The formative objective is the whole knowledge and ability that characterize the cultural and professional profile to the attainment of which the course of study is finalized;

- Formative activity
  The formative activity is every organized activity realised by the universities to assure the cultural and professional education of the students;

- Curriculum
  The curriculum is the whole system of the university formative activities specified in the didactic rule of every course of study.

The training of the expert in the field of the cultural heritage and the university reform

The D.M. 4/8/2000 "Definitions of the classes of the university degrees" singles out two separate classes in the sector of the cultural heritage: "Sciences for cultural heritage" (class XIII) and "Technologies for the maintenance and the restoration of cultural heritage". The formative heritage objectives of the two classes are reported in table 1 and 2.

In the field of cultural heritage it is necessary to intervene by means of the contribution from the various sectors of the sciences, both historical-humanistic and technical-experimental. These last ones intervene with methodologies, methods and, therefore, with specific analytical techniques, in

the respect of the individuality of the material of which the work of art is constituted. The purpose is to reach the knowledge of the system work of art- environment. The technical-scientific attention must be devoted to the characterization of the constituent materials and of the techniques of construction, representing a valid, and sometimes conclusive, integration to the traditional methods of study and research of the humanistic disciplines. The aspects related to the knowledge of the material, of its origin and of its qualities are essential for the following study for the recovery of the artefact. A scheme of the principal problems faced in the study of the cultural heritage and the corresponding techniques employed is reported in table 3.

Table 1. Formative objectives for the class XIII - Sciences for the cultural heritage

Class of the degrees in Sciences for the cultural heritage Formative objectives
The graduates in this class of degree must: - possess a good basic education and a suitable range of scientific knowledge and humanistic competences in the various sectors of cultural heritage; - possess suitable competences related to the legislation in the field of cultural heritage; - possess the mastery of, at least, one modern language of the European Union; - be able to use the main computer tools, possess ability in the data management and in the telematic communication. The graduates of the class will develop professional activity working in local organizations and specific institutions, that is, for instance, museums, libraries, archives, natural parks, botanical gardens, etc., as well in firms and professional organizations in the field of the safeguard and fruition of cultural heritage and of the environmental recovery. The athenaeums will organize, in collaboration with public and private organizations, the stages and the most opportune apprenticeships to achieve the attainment of the requested credits for the other formative activities and can subsequently define, for each course of study, the specific formative objectives, also with reference to the correspondent professional profiles. At least the 55% of the work is reserved to personal study or to other formative activities of individual kind.

Table 2. Formative objectives for the class XLI - Technologies for the maintenance and the restoration of cultural heritage

Class of the degrees in Technologies for the maintenance and the restoration of cultural heritage Formative objectives
The graduates in this class must: - be able to intervene on work of art and to guarantee its maintenance, knowing the structural characteristics of it, as well as the characteristics and the properties of the materials that compose it; - possess suitable competences to carry out interventions in one or more than the following sectors: definition of the projects of intervention aimed to arrest the decay phenomena degrade and disarrangement of the historical architectural work of art, of those historical-artistic, archivistical, musical, theatrical, cinema; study of the ways for the removal of the causes of the decay; maintenance of the environment and the demoetnoantropological heritage, relatively to the technological aspects of the problem; - possess suitable technical-scientific knowledge, also operational, on the morphological-structural characteristics of the work of art, on the characteristics and properties of the materials that compose it, on the possible technologies of intervention for restoration and maintenance, on the archaeometric aspects in the different fields of interest; - be able to operate in institutions appointed to the management and the maintenance of the cultural patrimony and in private professional organizations in the sector of the conservative restoration and the environmental recovery; - be able to effectively use, writing and oral, at least one language of the European Union, within the specific field of competence and for the general information interchange; - possess suitable competences and tools for the communication and the management of the information ; - be able of to work in group, to operate with defined degrees of autonomy and to quickly be inserted in the job. The graduates of the class will develop professional activity working in local organizations and specific institutions, that is, for instance, museums, libraries, archives, natural parks, botanical gardens, etc., as well in firms and professional organizations in the field of the safeguard and fruition of cultural heritage and the environmental recovery. Particularly, they will deal with the restoration of books and paper, of leather and parchment; of paintings on different supports; of wooden sculptures; of stones and mosaics; of metals; of textile; of ceramics and of similar materials. The athenaeums will organize, in collaboration with public and private organizations, the stages and the most opportune apprenticeships to achieve the attainment of the requested credits for the other formative activities and can subsequently define, for each course of study, the specific formative objectives, also with reference to the correspondent professional profiles.

At least the 55% of the work is reserved to personal study or to other formative activities of individual kind.

Table 3. Scheme of the main problems in the study of works of art and corresponding techniques to be employed

PROBLEMS	ANALYTICAL TECHNIQUES
- DOCUMENTATION: accurate examination of the aspect of the object and of the particular features on which to deepen the attention for further examinations; cataloguing	- Visual examination (stereomicroscopy, colour measurements, etc...), Photo (visible, infrared, ultraviolet), Photogrammetry, Digitalisation of the images
- EVALUATION OF THE CONSERVATION STATE: preliminary diagnostic	- Reflectography, Endoscopy, Termovision
evidence of characteristics, structural defects, deformations	- Radiography, Gammagraphy, X Ray Fluorescence, Acustic Emission
study of the defective state of metal objects	- Ultrasonic analyses, Induced Current, X Ray Fluorescence
survey of biological attack in action and recognition of the species*	- Optical Microscopy, Scanning Electronic Microscopy
recognition of botanical kind *	- Optical Microscopy, Scanning Electronic Microscopy
- CHEMICAL-PHYSICAL CHARACTERIZATION OF THE MATERIALS (stones, metals, glasses, ceramics, porcelains, pigments, material of organic origin) * knowledge of the origin of the materials; individualization of the process of manufacture of the objects.	- X Rays Fluorescence, Magnetic Resonance, Auger Spectroscopy, Atomic Absorption Spectroscopy, Mass Spettrometry, Neutron Activation Analysis, Chromatography, Inductively Coupled Plasma - Atomic Emission Spectroscopy, Thermogravimetry,
mineralogical analysis	- Optical Microscopy, X Ray Diffraction
characterization of materials containing iron	- Mössbauer Spettrometry
microscopic characterization and microstructural analysis	- Optical Microscopy, Scanning Electronic Microscopy, + X Rays microanalysis
- DATING	- Radiometric, Geological, Geophysical, Biological, Chemical
verification of authenticity	- X Ray Fluorescence, X Ray Diffraction, Electronic Microscopy, Neutron Activation Analysis, Atomic Absorption Spectroscopy
- ELABORATION OF DATA	- Statistic Analysis, Graphics, Model Construction

* Chemical analysis can be made in parallel.

Facoltà di Conservazione dei Beni Culturali, University of Bologna (Ravenna)

At the Facoltà di Conservazione dei Beni Culturali, University of Bologna, where since years ago there were degree courses in "Conservation of Cultural Heritage", the degree class XIII was activated in 2001 through the following 1st level degree courses:

- Archival and Library Conservation;
- Archaeological Heritage Conservation;
- Historical-artistic and musical works of art Conservation;

Together with the basic historical disciplines and specifications for single curricula, disciplines are present facing more tightly the problem pertinent to the knowledge and to the maintenance of the works of art.

This is accompanied by the presence of laboratories and by the employment of appropriate instrumentation finalized to the specific diagnostic problems, to the characterization, analysis and quantification of the decay of materials as well as to the analysis micro aspects - and macro-environmental of maintenance.

The whole knowledge, of the new professional figure that is so outlined, constitutes a factor of innovation in comparison to the traditional profiles of experts in the theoretical area (historians and theorists) or in the pratical area (restorers).

Critical discussion

Considering the problem of the training and the didactic-scientific content in the field of cultural heritage, the matter concerns:

- the methodological approach;
- the purpose that this particular field of studies has to gain.

Consequently, arises the problem of the "bipolarity" of the formative process that refers to:

- the moment of the preliminary cognitive experience founded in the disciplines related to the humanistic training

together with

- the moment of the intervention and application planning with technical-experimental knowledges.

The activation of the degree courses in field of cultural heritage: "Sciences for cultural heritage" and "Technologies for the maintenance and the restoration of the cultural heritage" implies the necessity to delineate the corresponding professional figures of the "conservator" and of the "technologist", so that they can respond to specific demand of the market of the job in the sector.

The formative routes presented here conduct to the training:

- of the "conservator", with historical-humanistic and technical-experimental education, what coordinator of the knowledge related to the system: work of art-environment;
- of the "technologist", with predominantly technical-experimental education, whose function is directed to the knowledge of the work of art through the employment of analytical techniques.

The "conservator" trained with a preparation both historical-humanistic and technical-experimental, together with the "technologist", whose knowledge have to result more specifically technical-analytical, they have to constitute a complete picture of competences, every needy of the others and however completing among them.

In conclusion, it is opportune to underline the fundamental points to keep in mind in the imminent future:

- the importance of the contribution of the teachers of the Faculty of "Conservazione dei Beni Culturali" in reference to the training of the technologist;
- the importance of the contribution of the teachers of the Faculty of "Scienze Matematiche, Fisiche e Naturali" and the Faculty of "Chimica Industriale" in reference to the training of the conservator;
- the contents of the disciplines object of formation have to constitute the result of the exchanges and the sinergies of the cultural strengths of the mentioned Institutions, in order to completely establish the correspondent - although diversified - disciplinary curriculum and to allow so the attainment of the professional figures previously delineated.

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Key words
University training, conservator, technologist, cultural heritage

THE 7th INTERNATIONAL SYMPOSIUM OF THE OWHC IN RHODES

Theme 2	*Education and training for the protection of cultural heritage*

Emerging technologies and professional profiles for the protection of cultural heritage

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Abstract

Information Communication Technology (ICT) is an engine of growth and change for the world economy. If this technology is to be harnessed to enhance democratic principles, it must contribute to the creation and enrichment of an educated, informed citizenry; it must incorporate the accumulated knowledge and creativity of the past; and it must anticipate and enhance creativity for the future.

The Information Communication Technologies are transforming our way to work and to live. Their social and economical impact represents a key opportunity for new development in every field of knowledge.

In addition the awareness of the importance of cultural heritage, and the needs of exploit and manage it: the number of visitors to museums, historical monuments and archaeological sites, grows day by day. From these bases the objective is to merge the phenomena and give students and young researchers the opportunity to explore the use of advanced technologies for access to, understanding, preservation and economic promotion of cultural heritage.

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The European Market for Education & Culture

Thanks to the work carried out care of the European Commission both in the field of ICT for cultural heritage (e.g. DIGICULT framework) and educational multimedia (eg. Multimedia Educational Task Force) there is a good visibility on the overall scenario. In addition the European Information Technology Observatory (EITO) is to be considered as a reference for European market definition. The first condition for the development of such a market is a close and effective co-operation between those actors who are custodians of the cultural heritage - mainly of course museums, galleries and archives - and those actors who provide the means for ICT dissemination mainly commercial companies operating in the fields of information technology, telecommunications, broad casting, etc.

This is a major challenge, given the completely different business cultures in which these two sectors lie and their different knowledge background and expertise. Historically, museums have been suspicious of industry - fearful of a vulgarisation of the heritage and of being commercially exploited; while industry in turn accuses museums of being impractical and out of touch with harsh commercial reality.

Trying to summarise the potential educational market in Europe we can say that: 350 millions people; 4,7 millions teachers; 350.000 schools; 67 millions pupils; in addition we have: 15 countries speaking 12 languages and three different cultural models (Mediterranean, German and Nordic).

On the Cultural Heritage side, in the last years computer graphics, hypermedia and telecommunications were applied in exploitation of museums, art galleries, architecture and other kind of works of art. Network access to museums and galleries seems to offer both easier access to cultural heritage and new revenue for its preservation and display. Many relevant players both in the Museums and ICT communities invested time and resources creating pilot projects and applications ranging between 3D reconstruction, image based rendering and virtual museums.

We are now in a position to consider if such investments are effectively useful and really increase and diffuse knowledge in the arts, sciences, and history and if they satisfy users' requirements.

Do virtual museums really provide added value to end-users? Museums, content providers and users are ready and willing new technologies for cultural heritage?

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One of the usual tests is to evaluate the follow up of a visit to a museum (real or virtual); exiting the museum do we own "something" more than before the visit. One of the possible "catalysers" in order to ensure an added value is related to educational applications. Such services should be used both at home and on site. So far up until now there are many digital cultural data repositories, usually Web sites potentially suitable to join an aside Educational service. One of the key points is enjoy a set of methods and tools in order to select a limited amount of artefacts to be used in order to create a "learning path".

The communication process devoted to cultural heritage reflects a reasonable degree of complexity. We can present a work of art and propose an interpretation established in advance or try to offer to visitors all the necessary elements in order to evaluate autonomously the work of art. Some of the main difficulties inherent in the communication process regarding cultural heritage arise from the fact that usually the work of art pertains to a different historical and cultural context and it is nowadays probably situated in a different place and the original place is no more accessible. One of the main attentions that the communication manager must take back is the rebuilding of the original context, in such a way that it is possible to 'communicate' the work of art together with all such elements that may render an objective evaluation. Information science, specifically hypermedia and computer graphics should offer a fertile ground to develop such applications. In the rebuilding of the typical context of the work of art another important aspect specifically linked to computer graphics and 3D models is represented by "space contextualization" which means the possibility to place the digital 3D object in the right location preserving the full set of spatial relations amongst the model and all other objects available on the scene. Advanced telecommunications applications provides some of the answers to the new education and training requirements: educational information (educational structure description, entrance requirements, curricula and syllabi, etc.), information on the use of education software materials, access for persons geographically, socially or professionally isolated, provision of "just in time" training which adapts itself to the needs of employment, improving employees flexibility, new teaching and learning methods which are more interactive and more customised to individual needs. In order to make possible the successful development of this market a number of conditions have to be fulfilled. Potential investors need to understand the

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potentiality of the return on investments. Companies should look at their investments in the field of art not only as philanthropic programmes but also as multiplier for potential market actions. While indeed many museums and galleries in Europe operate on a non-profit basis this is obviously not true for the companies which develop and market the technology necessary for the multimedia exploitation of European cultural heritage. These companies must be assured that a fair return on investment can be made.

Advanced distance education and training services should then be made accessible to individuals, schools, colleges and cultural institutions. Training centres with special multimedia and virtual reality equipment should be set up and made readily accessible across countries in order to provide courseware and training services for museums, education systems and public administrations.

Market and new professional profiles

The end-goal of economic promotion means creating conditions for the development of new economic activities, which are able to bring to a new fruition the cultural heritage, and to create new employment opportunities in relevant sectors.

In order to reach this goal the cultural heritage evidently needs to be made available, in a sustainable way, to the greatest extent possible, both in a real or virtual format. Of course any form of economic exploitation must fully take into account the primordial need for preservation of the cultural heritage, for future generations. Education and training are basic steps in order to understand and protect cultural identity and heritage. A true commitment to preserve cultural assets comes from knowledge and understanding. Furthermore, in order to fully enjoy the opportunities unleashed by technology a fruitful cooperation has to be established between technologist and experts from the cultural heritage side.

Today, the preservation and revitalisation of the cultural heritage acquires major significance, and this aim, at least in a pan-European context, will be characterised by the use of our cultural heritage. On this regards there are number of powerful indicators:

- Culture is an essential element of the now ongoing trend in use of leisure time;
- Cultural Tourism is a relatively stable sector of Tourism, characterised by high quality and largely independent of unpredictable climatic conditions, expensive wage costs in Europe, or low transport costs to international destinations.

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- In a worldwide context, culture is one of the most powerful resources within Europe.
- Our cultural heritage is the basis for regional identity in the European Union, enabling not only sustained socio-economic use, but also, particularly within the framework of the economic unification of Europe, countering the destabilising effect of this process on regional identity.
- Within the fairly sizeable niche market for sustained use of our cultural heritage, almost the entire spectrum of information technologies can be used in a productive manner.

A strategic issue for the take-up of the market of ICT and emerging technologies applications and services for the Cultural Heritage sector is the availability of persons with specific professional profiles; within the contribution particular attention will be given to the identification of these profiles and the definition of suitable study curricula at various levels. In particular curricula of humanistic and classical studies have to be considered, in order to promote the use of ICT for innovative research in these areas.

HMG Lab and MEDICI Framework experiences and projects

HMG Lab and MEDICI Framework are committed to advanced education and training projects. Education and training are one of the three main action lines of the framework together with knowledge sharing and research & development. There is a high level of synergy amongst the lines with a continuous assessment of achievements.

Some of the most recent university and training courses, in charge to HMG laboratory are listed here under.

University courses

"ICT Systems & Tools For Monument Conservation And Management" - Civil Engineering Faculty; "Virtual Prototyping Laboratory" - Industrial Design Faculty; "Multimedia publishing" - Information Science Dept. State Owned University.

Post graduate courses / ESF

"Communication, interaction and new media"; "Sustainable exploitation of cultural heritage in the Information Society: innovative learning tools";" Design of hi-tech cultural services"; "Art, exhibits and communication in the Information Society".

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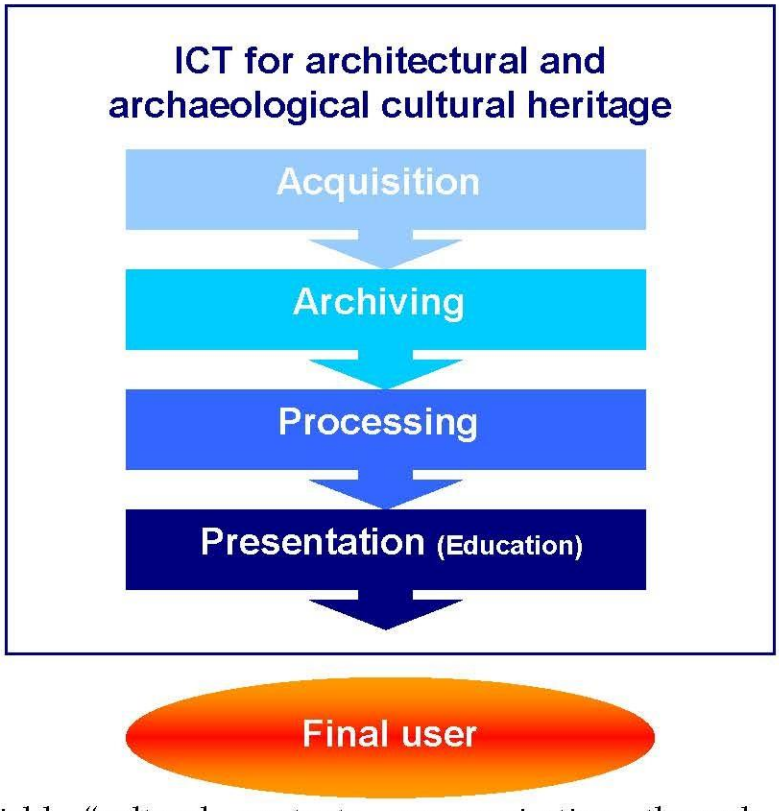
As a follow up of university and training courses a couple of years ago a more ambitious project was launched, a European training and research network named Cassiopeia.

Cassiopeia Network

The main idea of the Cassiopeia project is to set up a research & training network developing innovative ICT tools for cultural heritage. Potential participant institutions are universities/research centres, which are excellent in one or more sectors of this wide domain of knowledge. The training research objective is to improve university students and young researchers expertise in the field of Information Communication Technology for cultural heritage. The goal is to catalyse synergies between experts in specific domain of knowledge thanks to a common base of understanding.

The new profiles will be able to manage major innovative tools and improve the research and the development of new services and solutions in this field.



The specific field "cultural contents communication through new information technologies" is strongly based on multidisciplinary: basics of computer science, multimedia, computer graphics, data acquisition, legal aspects and IPR, visual communication, inventory and archiving tools, conservation, semantic aspects, education

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and training systems, quality control etc., this complexity is the reason for a well constructed consortium of partners.

The collaborative research project consists in the development of applications and tools for an "added value" management and exploitation of monuments and 3d objects. The system develops all process from the architectural/archaeological real object to the virtual object system, including virtual object reconstruction and a full set of related information. All object considered are included in a distributed database system, information is structured in order to be available to different kind of users (users profiling).

Each partner focuses on a specific part of the process, starting from common standards and protocols and develops software and tools for his specific competence field. All results will be homogenised and the general research result will be a complete system for the presentation and education of cultural contents.

In this way, the general research of Cassiopeia network is structured into different sub-research areas, where groups of partners can co-operate:

1. **Acquisition:** the research project's objective is to set up methodologies and tools for the acquisition of monuments/objects from existing remaining and the creation of models (e.g. knowledge models, 3D models, metadata schema) in Internet compatible formats and with the possibility to show multiple levels of detail.
2. **Archiving:** the research project's objective is to set up methodologies and tools for archiving and retrieving of metadata for the description of objects within diverse domains of cultural heritage and complex multimedia data using agreed standards (e.g. CIMI-SPECTRUM-DTD, VRML, RDF). The keywords are: interoperability, interaction with distributed database systems, XML, ontologies and semantic Web, user profiling and cultural heritage metadata schemas.
3. **Processing:** the main objective of this area is the creation of 3D virtual worlds and accompanying metadata and knowledge models, eventually mixing real images with synthetic ones (augmented reality) and using the usual computer graphics techniques to create virtual worlds with several illumination models (radiosity to start with and ray tracing to improve quality of detail in different lightning conditions) and to hide objects and reduce processing complexity. A further focus will be put on technologies to access the repositories by appropriate middleware to retrieve, select and compose

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multimedia objects and documents and to restructure them for the presentation component.

4. **Presentation:** development of on-line and off-line products exploiting heritage. The main field of research includes cognitive science, communication techniques for cultural topics, human-computer interaction, user interfaces, advanced interaction systems. Research will be oriented towards educational aspects and innovative techniques such as "Edutainment" (i.e. the possibility to virtually navigate in real-time, into the "monuments" and to interact with 3D objects in there). Other aspects considered will be Intellectual Property Right protection and legal aspects, quality control of multimedia for cultural heritage products and the renderings of multimedia documents pre-composed by the processing component and deliver the results to the end user.

The scientific originality and innovation is linked to the worldwide dissemination of information on Cultural Heritage at top-quality level demands high tech solutions. Interoperability of existent European technical data banks devoted to monuments and sites is one of the basic issues of the project in order to offer network access to info systems devoted to Europe's heritage. Research will validate and demonstrate access, delivery and personalisation of heterogeneous assets in large distributed, and multi-owner collections related to historical monuments and sites.

This includes the development and integration of automated content packaging and presentation systems, tailoring, Web-based and agent-based services (like the maintenance and management tool based on Bayesian network), unified interfaces and search facilities across different information resources.

In addition a comprehensive solution for sustainable exploitation will be developed and implemented covering both information to be stored in data banks and visualisation and communication tools.

The technological focus within the sustainable exploitation phase will include rich representations; powerful immerse features such as 3-D visualisation, real-time virtual object manipulation and group interactivity, whether for multimedia retrieval and virtual galleries. The research activities need to embrace the integration of a variety of different media, including video, photography, drawings, text and or voice and audio in order to

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fully acquire, archive, process and present an architectural/archaeological object, i.e. an historic building and its setting in virtual terms.

Related profiles

The market in ICT field, and in particular in IT for cultural heritage, is growing up. The EITO reports 2001-2003 confirm the trend and the creation of new market and employment opportunities. The young researchers, after their training in the network, will have excellent job opportunities, because they have strong knowledge and they are aware about what means to work in a multilanguage team, furthermore they should enjoy a network of international contacts that are fundamental for their future career.

Young researchers should be included in the existing teams both for training and research, and have two different profiles:

Young pre-doctoral researcher: the work of this profile will concentrate in more fundamental issues. Young researchers will learn basic issues of the overall knowledge domain: the ICT for cultural heritage. They will participate in meetings and seminars with other team young researchers and will learn from all network partners. Then they focus on the specific topic of their research team and share their knowledge with other teams young researchers. A tutor will organise their work and help them to contribute to the research project. The typical training period will be multiple of 12 months.

Young post-doctoral researcher: the work of this profile will concentrate in integration aspects and in more innovative research tasks, considering the better experience of those involved. Also for post-doctoral research the mechanism of information sharing among network partners is valid. Participants are required to contribute more directly in research development and will issue publication and papers to be presented in most relevant international conferences and events. A tutor will help researchers in their work organisation. The typical training period will be multiple of 6 months.

ARS EDU Project

Switching to projects more addressed to on line education and digital learning objects let us consider the ars.edu idea. Learning paths (lessons) are mainly built picking up and collecting a set of *learning objects* in order to transfer focussed information and knowledge

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to the student. Starting from the assumption that high quality Digital Learning Objects (DLO) requires multidisciplinary skills and a considerable amount of resources why do not share, at different content and complexity levels, such assets? DLO should be published on specific network nodes called Learning Objects Repositories (LORs) clearing IPRs and ensuring both compatibility and quality. Bringing together major Cultural Heritage LOR players in Europe to create an open infrastructure for linking interoperable LORs delivering images, animations, computer applets or textual content which could be used in the processes of education and training. Centralized digital (LORs) evolved as a means of collecting and cataloguing these assets with hopes of reducing the redundancy of development and enabling others to build on the aggregated ideas and designs. Unfortunately, a single centralized repository is unlikely to be of sufficient size to accommodate all of the web-based learning objects that have or will be created.

The aim of this project is to provide a strong link between Culture and Education through the establishment of a trans European network of Cultural Heritage Education Centres (LORs) delivering digital educational objects specifically designed accordingly to different user profiles ranging between pupils, students, mentors and tourists. Education institutions and professionals should be taken into account as well.

Spreading knowledge, popularising the Cultural Heritage (both tangible and intangible) is the duty of all humanity. Developing a system that will achieve this task will have a big social impact; it will preserve natural and cultural properties of outstanding universal value and will improve the quality of life. Digital educational objects should even help in preserving cultural diversities. In education, teachers can have all needed supports for their teaching tasks, on the other side students can found all the required help that will allow them to participate and to have more active role in the learning processes.

The reference model inspiring the current project was originated some years ago on the occasion of the development of the educational web site named [louvre.edu]. The basic idea of this service, addressed to the French market, was to provide copyright free customised content suitable for scholars and tutors. Comments, texts were expressly written for this purpose. Additional features such as the "Buro" concept were implemented as well. [ars.edu] will expand and extend the basic concept of [louvre.edu].

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Reference Scenario

The starting point of the [ars.edu] system is [Louvre.edu] and other similar experiences recently carried out at local level. [Louvre.edu] (http://www.louvre.edu) is an educational on line web, launched in 1999 from Louvre Museum, Ministère de l'Èducation Nationale de la Recherche et de la Technologie and Oda Èdition, which makes available exceptional cultural contents copyright free. The main features of [Louvre.edu] that will be kept and reviewed are:

- Museum and library guided tours
- Iconographic and textual resources access
- Guided and free search
- Creation of user "personal gallery" (Bureau)

Which Operative Model for On Line Educational Services?

The efforts to be spent in order to set up valuable educational application are usually considerable. In addition access to relevant content, IPR clearance and, some time, ex-novo creation of additional content such as 3D reconstructions or computer-generated animations implies costs and efforts exceeding the aim of the application. On the other side, cultural community is interested in accessing some "objects" in order to further investigate or suggest new theories. Developing educational content we do not need to deal with interoperability of huge data sets spread worldwide, we just need a mentor who picks up or create reference objects (texts, images, 3D models, etc) addressed to the definition of "educational paths". Creation, publication and sharing of "digital educational objects" as a common platform for educational application in the field of cultural heritage are the scope of [ars.edu]. In order to achieve this goal [ars.edu] will create an on line "base of publication" for cultural services. The heart of the project is based on the presentation of the principal "foyers de création" which have marked the history of art and architecture in Europe. The concept of "foyers" at the same time usual and powerful is, in our opinion, the best to let people understand the peculiar nature of the European identity.

The full implementation of [ars.edu] project foresees the set up of collections of digital cultural objects related to a list of "Foyers Artistiques" selected as representative of a specific "learning path" in order to give a view on the European Culture.

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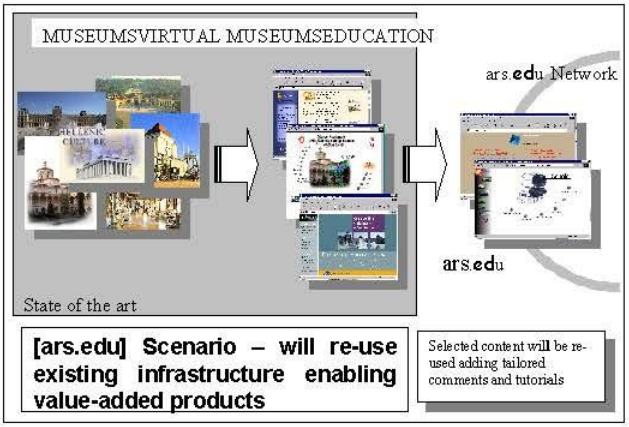
The project is aimed to extend and upgrade at European level local experiences. The main features to be developed should be:

- Definition of methodologies and solutions in order to exploit the application to different environments and contents;
- Educational supports for developers and customises, pedagogical issues, learning paths;
- Methods and tools addressed to select and exploit training and educational contents from content repositories;
- Definition of authoring systems addressed to mentors (wizards, templates, etc);
- Management of different users profiles;
- User tracking tools and techniques;
- Adaptive multimedia (topics, format, level of detail, media, hyperlinks, etc);
- Content repackaging on different media (video, paper, presentations, etc);
- Education and training results assessment;
- Extension of the Bureau-personal gallery concept (authoring tools, intranet publication, content repackaging, etc).



Description of some additional services

One relevant concept is the development of tools & methods addressed to let the mentor choose relevant "digital cultural objects" and create an effective "learning path". There is no need to create or access huge digital archives in order to implement educational content, in addition major content exchanges between content holders and the educational environment are performed once. Upgrade and integration, of already existent application, will mainly conceive user profiling, adaptive multimedia and content

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repackaging on one side and the creation of physical Education Centres in order to complement the network via specific facilities and human interaction.

So far the system will be exportable and compatible with several typologies of museums and archives. Applications will be interoperable and based on accepted standards and protocols for digitisation and data exchange and allow a global and multilingual access to cultural heritage educational contents. Legal constraints affecting the exploitation of applications (copyright, licensing) will be considered as well and the final goal is, of course, to provide copyright free content on the web (for educational purposes only).

Typical implementations of the system, in addition to the usual one, should be:

Small / medium sized collections to be exploited or promoted even creating a network of related cultural contents. E.g. Museum of pottery in Germany chooses this solution in order to implement an educational Web site outlining historical production processes, crafts and skill. If there is any similar collection/tradition in Italy ars.edu should emphasize the relation, establish and manage information exchange.

Small collection of heterogeneous objects not so relevant as a whole to be visited frequently should be made available and shared. This will multiply the opportunities to be included in "learning paths" enhancing the visibility and public interest for the collection.

There are some "artefacts" not easy to exploit or even communicate, portions of the landscape such as "Les chateaux de la Loire" or the "Via Francigena". Using ars.edu it will be possible to create an educational service exploiting the content, the context and logical/spatial relations. So far it will be possible, for territorial cultural institutions (landers, regions, provinces, etc) to balance and distribute the number of visitors on several different sites enhancing the "cultural visibility" of hidden sites through a set of communication/education services provided by [ars.edu].

An Instrument for Pedagogic and Cultural Projects

As an educative and cultural site, [ars.edu], offers to colleges and schools, but also to private people, a collection of visual, textual and sound resources of great artistic foyers which marked the artistic history of Europe.

It will propose in different languages a detailed documentation about essential works and important monuments: a pedagogic instrument rich of images together with a collection of documentaries which group together biographies of artists, information about the works

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and the presentations of great artistic foyers, of syntheses about different periods of history of art and architecture. It allows to develop an educative research giving to everyone the means to collect, choose, personalize and communicate freely.

Information may be accessible in multiple ways; you can search by theme, work, or starting from the artistic foyers and arte facts, monuments, which are related to it. At any moment you can relate the work to its historic context or, starting from a foyer, reach a particular object. Users can on the other hand personalize a selection that they will find every time they repeat the consultation to the site, or page and edit their research.

After inserting access code on the identification screen, the user arrives on a welcome page where lies the summary. The site is divided into four parts: Europe, Art and Architecture, Bibliotheca and Personal Gallery. A presentation text describes their content.

The part called Europe presents an historic and cartographic landscape of the main artistic foyers of Europe from the ancient times. From every foyer, we can assist to a presentation of the most important works and monuments related to this artistic centre.

The part called Art and Architecture, in which the most important action is the research of images, offers a visual thesaurus of works and spaces of architecture. This way a work becomes accessible beginning from its denomination, but also from its techniques, or also from its period and its author.

The selection of images is related to information about the work and historical presentations of artistic foyers.

On the other hand a direct access to the texts thanks to the space called Bibliotheca, which groups together all the texts of the site: information, biographies of the artists, synthesis of the different periods of the history of art, of the schools, of the great civilizations.

Technological Highlights

Every day the population of the Internet community is expanding. On the other hand Cultural Organizations and Content Owners present a slow rate of adaptation to the new technologies mainly for two reasons:

- Scepticism for the case of electronic theft.
- Lack of Infrastructure for the appropriate presentation of the sensitive cultural topics.

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This project's goal is to provide participants with the necessary common software infrastructure to:

- Maintain all content available to end-user and value-added applications / services. This will provide a uniform way (instructions and tools) for content providers to digitise / author, organize, maintain and make available content both for re-use and enhancement;
- Provide transparent access to content and content integration;
- Provide for the management and protection of intellectual property rights, especially for digitised cultural content of high value made available on-line;
- Support the operation and collaboration within the human resources network established through the project;
- Perform the actual content acquisition.

Applications that integrate all content provided by content providers in a format that can be reusable through value-added applications. Each repository functions autonomously. All content is in a presentation independent format – to the highest extent possible. Leading edge technologies (XML, XSL, RDF and so on) will be extensively employed. Main services that will be provided in the repositories are: querying (e.g. for HTMLs, via the Harvest systems, for XMLs, via Visual XML Query, for DBs, via standard SQL interfaces), data processing (e.g. Visual XML Tree, Visual DTD, HomeSite, native DB tools), other content conversions (e.g. Visual XML Creation, FOP, Xsplit, Versioning (e.g. RCS), Access Control (e.g. WWW server security rights), learning object repositories (LOR).

The Metadata (MD) layer acts as the "glue" or the common denominator (abstraction layer) among our different underlying repositories, by having all repositories "export" or publish the metadata related to their resources. This use of metadata to enhance the discovery of electronic resources is widespread. Metadata can be navigational, schematic and associative (descriptive, restrictive, supportive, etc.) and are arranged within metadata sets. A well-known, domain-independent set, which is actually a standard, is the Dublin Core (DC), with 15 elements for abbreviated descriptive cataloguing. DC is, however, not enough to offer an integrated and more complete view into our resources. We further need our own metadata sets, with the following functionalities:

- application domain – specific content description;

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- More consistent content description (using auxiliary sets such as glossaries, thesauri).

The ontologies examined are pertinent to the domain of Culture, and included ICOM/CIDOC International Guidelines for Museum Object Information. Research on cultural metadata included the results of several cultural projects (e.g. Aquarelle). The metadata sets designed to be implemented in a database repository include:

- Dublin Core
- Culture-specific (materials, artistic, glossaries of terms, keywords)
- Schematic (classes of XML content, elements of DTDs, database tables)
- Geographic-position related

Since metadata are stored within a relational database, it is easy to support features such as multiplicity of metadata fields and qualifiers (e.g. the LANG qualifier of Dublin Core). This also reduces data redundancy and improves integrity, as often-occurring text (e.g. keywords, locations) can be kept in separate sets and re-used by being linked to metadata fields, instead of being repeated in each metadata record.

Authoring systems addressed to mentors

The authoring system is designed to meet the need for a consistent and effective automation of the production of interactive multimedia titles of structured type, in which the behaviour of the user interfaces, the modes of navigation and interaction, the visual and media effects and the access to the information contained in the electronic book can be handled analytically and structured into a system of relational databases. The resulting data structure provides opportunity of sharing the project between several authors making in this sense possible the development of multimedia products in an enterprise context, which will rely itself on a common base of code sources and on a replication, on server or local, of the complete general project. The multimedia data, described in XML will be, as soon they'll be instanced, stored in the object oriented RDBMS. Highly innovative will be the definition of a DTD for the description of multimedia products considered as a set of media sounds, video images, text and the interactions ad actions that bind them together. The authoring system, developed on an object oriented RDBMS, permits the guided insertion of data in several tables by the use of elaborate multi-component forms.

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User tracking and profiling

The system is able to extract user's preferences and to catch his level of interest among the different contents, thanks to a careful analysis of his behaviour during the navigation. Users are classified on the basis of similar choices and expressed interests, in this way enabling, automatically or semi-automatically, the system administrator to propose information, matters and navigation personalized guided tours according to the needs and the level of experience demonstrated through the navigation modalities. Contents and proposed services adaptation to user's needs is a fundamental factor to favour an easy and personalized access to a complex information archive. On a parallel side there is the requirement to adapt pages information to user's navigation ability and to his knowledge level on the treated subject matters. The automatic ability of grouping and cataloguing users can suggest the implementation of services perfectly responding to the user needs in term of quality and quantity of information contained, so he won't be tired and leave the navigation. The project purpose is not only to realize a software platform perfectly corresponding to the above cited exigencies, but also flexible and customisable by the mentor himself.

The system must permit to analyse the navigation parameters (such as currently opened page identifier, session time, access time, banner utilization, stay on page time, search form…) which are contained in the web server log files and to relate them to a Data-base of proceeding registered data regarding each page. The realization techniques will be based on taxonomic trees describing the existing links among the several classes of contents assumed for user profiles definition. The system must be able to extract, starting from incomplete indications, a range of indicators, which describe the overall behaviour of each user and characterize his interests' profile. The semantic hierarchy embedded in taxonomic trees permit to overcome a mere statistic approach, while the hierarchic link among contents classes permit to have an indicative general picture just starting from the first data analysis. The final user profile determination will use advanced fuzzy logic technologies enabling the identification of each user level of interest starting from the elementary parameters memorized in the logging database. Fuzzy engine is of an adaptive kind in fact the parameters which regulate its functioning are extracted from an automatic analysis of historical data to adapt the system to extremely differentiate contexts, reducing difficulties and insertion time in different operating environments.

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Adaptive Multimodal Interaction

The adaptive multimedia can be activated by user profile module or by user choice. The Automatic content generator is the result of other pages abstract and result of user search. The user can set the level of detail of the proposed document: general, tutorial and detailed. General is only a survey of the topic, tutorial is a complete course, detailed shows a detailed information set. Adaptive Information Visualization comprehends all techniques, which manage visualisation settings of contents, i.e. graphic layout. The user can set the kind of page presentation and navigation model: Simple, Expert and Master. Simple is simple pages presenting only few relevant information, Expert is a rich abstract and Master is a portal-like model, containing a large mass of information from several sources. The navigation model set up can be defined into user profile or can be chosen from the user himself. Another kind of information visualization can include the creation of user-adaptive functional layouts i.e. tourism, learning, research, news, others: the user defines the objective of the navigation and gets the specific page. For example: if the user choose "tourism", in his page there will be a geographic map showing where he is; if the user wants to learn, the page will show a logical map of the contents. Etc. The last sector of adaptive multimedia comprehends all techniques for the development or management of navigation-help tools.

Monuments and Education Entertainment Applications

As a follow up of the management & training system a derived product of historical and architectural information should be an edutainment application aimed to promote, exploit and finance monuments. Edutainment is potentially a new field of development for software. Such kind of "value added" games will substitute common "shot & kill" games adding some useful content like historical background to the entertainment. This approach will be also useful in the field of cultural heritage promoting edutainment applications linked with artworks or archaeological sites. Such experiments will bring the monument back to life meant redecorating rooms and re-installing paintings and furniture at present scattered around different museums. Paintings are placed in their original locations and textiles are fully restored in order to reconstitute the monument as it was at the time.

One of the first examples in this direction has been showed on the occasion of Imagina INA 97 in Monaco. The application is called "Versailles 1685: A game of Intrigue at the

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Court of Louis XIV". The application is mainly based on a digital 3D reconstruction of the palace of Versailles as was in the XVII century fitted with original paintings and furniture. This game presented one major challenge: how to reconcile imperative game requirements and the constraints of historical fact, or, how to keep an attractive game form while still communicating historical data which is, by nature, rigid and unwieldy. These two imperatives had to be combined without allowing either one to cancel out the other. In this game is an incredibly effective means of reconstructing a Versailles that no longer exists. It enables us to explore the chateau exactly as it was in 1685, to infuse our often-ponderous documentation with new life and to put the hum and throb of life back in the chateau. New technology enables us to make Versailles better known to the public by leading them away from the beaten track. For the chateau is not very well known, apart from the State Apartments and the Hall of Mirrors. Given that the game takes place in 1685, locations had to be reconstituted exactly as they were at that time, whereas the chateau and the gardens were permanently being modified. In such historical reconstruction the documentation, in the form of engravings, paintings, architectural elevations, memoirs etc., is sometimes contradictory or incomplete and require rigorous collation.

The player has to solve a plot to kill the king taking part to the main ceremonies and events linked to the king's everyday life. QuickTime VR™ – like environment let the user walk through the palace looking at frescos and asking for further information about artworks and architecture. The king's day regulated life at the Court so it naturally came to underlie the way the game unfolds. As a result, the historical reality of life in the chateau at the time is intimately interwoven into the game. Similarly, anecdotes recounted by chroniclers of the time have also been integrated into the story.

This application enables us to rediscover Versailles and provides an astounding confrontation between the reality of still existing places and the reconstitution of those that have disappeared. The reconstitution provides detail, allowing us to contemplate the variety of the décor, its beauty and its quality. The user can also discover astonishing things, which we would otherwise not imagine at Versailles, such as the spiral staircase.

Such experiments will bring the monument back to life meant redecorating rooms and re-installing paintings at present scattered around different museums. Paintings are placed in their original locations and textiles are fully restored in order to reconstitute the monument as it was at the time.

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In addition to Egyptian archaeological sites and Chinese Forbidden City of Beijing another interesting example of SOHO market application devoted to cultural heritage is, no doubt, "Roma", a full three-dimensional interactive application rebuilding the ancient Imperial Rome with palaces, houses, monuments in the original "coloured" aspect.

Future works

Emerging technologies are re-shaping our every day life and society, creating new job opportunities and professional profiles. There is a continuous shift from reality to virtuality; technology is enabling new services and processes. This trend is evident even in the field of cultural heritage usually linked to tradition. Job market is asking for new professional profiles merging together traditional competencies in humanities with solid knowledge in ICT and emerging technologies. Our future work will be addressed to both the empowerment of educational activity promoting European networks of competence in ICT for cultural heritage, promoting knowledge sharing and cross sector curricula, and the implementation of an updated version of digital learning object and repositories in order to deliver proper content to students and young researchers.

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PLACE AND SCOPE OF SCIENTIFIC INVESTIGATION IN TRAINING FUTURE CONSERVATORS AND RESTORERS

by

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1. Introduction

The discipline *„Scientific Investigation for the art works"* is to be found in the educational planning for the conservation-restoration universitary sections, in the second module (years III and IV), alongside the special and workshop practical disciplines.

During the first module, concerning the fundamental disciplines, among which one can find Chemistry, Physics, Biology, Art History and Chromatology, where the students acquires useful information about special materials science, traditional art techniques and about some analyses used for their study, is set the fundamental basis for the initiation in the domain in scientific and artistic examinations.

The scientific investigation for the art works is an interdidciplinary domain, which implies methods and techniques used in Chemistry, Physics, Biology, Geology, Archeology, Chromatology, Computers and least but not last Art History, respectively in the historiographical and artistic analysis.

Any intervention which is made in order to valorize an artwork is done only after a detailed, intrinsic comprehension of the respective object or piece. That means the artistic technique and the technology to put into practice, the conservation-restoration subsequent interventions, especially for those who are inadequate, thus indicating the incompatibilities which led to degradation and deterioration effects.

The known stages and directions used to valorize a cultural heritage object:

- Discovery;
- Protection;
- Documentation and scientific investigation, along with the analysis of the conservation status;
- Conservation and restoration;
- Display or deposit;

Considering this aspects, in this paper we present a series of features concerning the place and the function of the discipline in the context of an actual

educational plan, which is also flexible and covers all the specializations tied to the conservation and restoration.

2. The place and the function of the discipline in the formation of new specialists

We can talk today about the *science, technique, and the art of conservation and* restoration, as an interdisciplinary domain, where *the scientific investigation and the science of the* materials detain a particular place, where from comes the role and the involvement of the exact sciences (Chemistry, Physics, Biology, Mathematics through its informatics aspect, Geology, etc.) in the comprehension of *the composition* (nature) and the evaluation of *compatibilities* in the interventions of active conservation and restoration (structural and respectively chromatic integration).

Concerning the scientific investigation we must underline its five purposes, respectively its areas, *the examinations concerning the authentication, the establishment of paternity, the determination of the cultural heritage value (stock exchange or catalogue quotation), the evaluation of the conservation status, the compatibility of the new materials and intervention methods with the ancient traditional techniques and the monitoring of the behavior of conservation interventions.*

The knowledge about the materials and the elucidation of the traditional techniques, with their specific elements differing from an age to another, from one school to another and from one province or nationality to another, is the first concern of the investigator. During this analyses he can imply destructive, paradestructive or nondestructive methods, the last ones being the most recommended. One analysis must offer *multiple information* about the materials and the artistic techniques: information concerning the dating-authentication, the establishment of the paternity, the heritage value evaluation, the determination of the conservation status and the realization of the compatibility studies. The analysis would not be made just for the sake of detaining an extra document for the evidence analytic file or the conservation-restoration file. The analysis, even if it is instrumental, that offers maximum of information is to expensive and could affect, in the case of sampling, even for microprobes, the work as a whole. In this context, depending on the conservation status and on the importance of the object would be established a *protocol* concerning the ongoing of the scientific investigation, respectively the type of the examinations alongside with their objectives and the methods to be used [1-9].

An exhaustive scientific investigation comprises many examinations, that solicits through diverse analyses the achievement of some objectives, respectively of some casuistic. The implication of some examinations is imposed by the object type, by its heritage value, by its conservation status, its age and so on.

This discipline, due to its primordial role in the comprehension of the cultural heritage goods, under all structural-functional aspects, has an important place in the module II of the high education, with a bisemestrial distribution, with two lecture classes and three hours practical applications per (2C x 28 = 56 lecture classes and 3L

x 28 = 84 hours of laboratorial practice). Its number of credits is the maximum allowed, as well as for the other special disciplines. After the covering of all the forms of promotion inside the discipline, the students must know how to take the samples and to employ them, how to perform the analyses, especially those who are common to all the objects and pieces belonging to the cultural heritage, and how to interpret the experimental data and to evaluate the work out the objectives that the examinations solicites. They must have the necessary knowledge about the investigation methods and techniques, the involved instruments, devices, installations and tools, and their manipulation.

3. Examinations Typology

The scientific investigation has two aspects:

- ***Documentary and artistic investigation***, which comprises *plastic and historiographical examinations*;
- ***Technical-scientifical investigation***, which comprises a vast number of examinations, imposed mainly by the complexity of the involved in the operations of conservation and restoration.

Among the examinations necessary in the technical-scientifical investigation, we recall: experiment

a. ***Chemical or microanalytical examinations*** (trace analysis) concerning the nature of the materials;
b. ***Microbiological examinations*** concerning the nature of the biotical attack (fungical, xylophagical, etc.);
c. ***Physical-chemical*** (instrumental), concerning the structure and the composition of its constitutive elements, the incompatibilities between materials, previous interventions and so on;
d. ***Graphologycal examinations*** (grafism analysis);
e. ***Stratigraphycal and topographical examinations*** (usually at micro level);
f. ***Reflectografycal examinations*** in UV, visual and IR;
g. ***Colorimetrical examinations;***
h. ***Morphological*** examinations (for instance: the analysis of wooden essence);
i. ***Petrographycal or mineralogical examinations as well as others.***

In practice we operate besides the ones above with another series of complex examinations, that involve a large number of analysis. Among these we recall:

a. ***Authentication examinations,*** including among others the ***dating examinations***;
b. ***Heritage evaluation examinations*** through stock exchange or catalogue quotation;
c. ***The examinations of the conservation status*** (degradation and deterioration analysis);
d. ***The examinations for the establishment of the compatibility*** of the ancient traditional techniques with the new materials and intervention methods;

4. Investigation methods

The presentation of the investigation methods begins always with the most simple ones, easy for anyone to perform, finishing with the modern and very expensive ones. Thus, an artwork is first of all visually analyzed, in order to determine its conservation level, then it is analyzed using the instrumental methods. In this context, we present in the next section the classification of the investigation methods from the common ones to the ones less known:

- ***Optical, electronic and nuclear methods to visualize the surfaces*** (manual magnifier, binocular magnifier, stereoscopic magnifier, optical microscope, stereomicroscope, electronic microscope, topography, photogrammetry, reflectography in UV, visual and IR, emisiography, fluorescence in UV and X, colorimetry, leucometry, metallography, morphological analysis and so on);
- ***Methods of analysis of internal structures*** (radiography, endoscopy, stratigraphy, etc.);
- ***Spectral methods of emission and absorption*** (spectroscopy in UV, visual and IR, including Raman, spectroscopy de atomic absorption);
- ***Magnetic nuclear resonance*** (MNR) and ***electronic spin resonance*** (RES);
- ***X ray diffractometry or röentgenography;***
- ***Thermal analysis in the static and dynamic regime*** (thermal derivography and differential calorimetry);
- ***Chromatographic analyses,*** on board or paper, in column or liquid chromatography and in the gas phase or gas-chromatography;
- ***Histochemical and microanalytical analyses*** (qualitative and quantitative and on phase analysis, trace analysis);
- ***Magnetic and nuclear methods*** **(**isotopic dilution, carbon 14 dating, thermoluminescece, thermoremanence, paleomagnetism, archeomagnetism);
- ***Computational methods***;
- ***Specific methods*** (dendrochronology, palinology, oxydians hydration, FUN method, aminoacids racemisation, determination of the ionic exchange ratio, the paleontological method, archaeological-stratigraphycal method, and so on).

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EDUCATION AND TRAINING FOR THE PRESERVATION AND MANAGEMENT OF CULTURAL HERITAGE

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Abstract

The main purpose of this paper is to highlight joint actions taken by teachers, educators, students and community to facilitate preservation of our cultural heritage. A background of the status of educational system in the Indian state of Rajasthan is provided. An approach is defined that will facilitate in imparting relevant education to students, resulting in increased appreciation and preservation of the cultural heritage. Some efforts in this arena, undertaken by specific schools are mentioned. Finally, we mention some of the works undertaken by a voluntary organization, United Schools Organization (USO), to enhance such education in India. An important aspect of good quality management of cultural, social and natural heritage is to work with team spirits.

Introduction

School education is an important phase of life, as it nurtures a child into a good human being. A school is not merely a building of four walls but an environment to discover, define & refine the hidden talent of the child & to provide a stage to convert talent in to skill and then to make him/her achiever. It not only imparts theoretical knowledge on various subjects to the students but it also instills basic human values like punctuality, giving respect to others, obedience, generosity, self respect, moral values, self reliance and respecting one's cultural heritage. Schools education and training imparted by educators play a vital role in the process of socialization of a young child. However, the teaching methods must always be updated to adapt to the current needs of the society. Presently, more attention needs to be given to the increase appreciation of the cultural heritage by the youth.

It is necessary to preserve our cultural heritage. Teachers and educators should be involved in implanting creative thoughts, new visions, higher beliefs, positive attitudes and good behavior amongst the students. To do so, some reforms are required in the education system. We must make it more practical in its approach. One of the ways of doing that is to utilize tourism as a method of teaching. Tourism and sight seeing promote first hand knowledge about culture and heritage. In school curriculum we should encourage the teachers to provide a "heritage kit", containing relevant maps & colored photographs that portray our cultural heritage. Emphasis should be given to enable better comprehension by students through practical demonstrations, live programs, teaching with the help of multi-media aids such as TV and LCD projectors etc. The curriculum must incorporate educational tours to local museums, libraries and monuments.

Educational training must be organized in different segments, depending upon the objective for which they are intended. One such segment could be promotion and

preservation of cultural heritage. Professional should be involved in it and joint actions involving professionals and students could be organized. This way, we can preserve our heritage for future generations.

Present educational status in state of Rajasthan.

Below are listed some of facts [1] about education in the state of Rajasthan, in India.

Table 1. Schools and their enrollment

School Level	Number of Institutions		Enrollment (in thousands)	
	2000-2001	2001-2002	2000-2001	2001-2002
Pre-Primary & Primary Schools	34,173	33,509 (P)	7,651	8,104 (P) @
Middle Schools	16,984	22,433 (P)	2,355	2,509 (P) #
Secondary / Sr. Hr. Secondary Schools	6,650	7,434 (P)	2,569	2,836 (P)
General Education	280	291	239	246

(P) - Provisional
@ - Age group 6-11 & Class I-V
# - Age group 11-14 & Class VI to VIII

Table 2. Number of Teachers

School Level	Year 2000-2001	Year 2001-2002
Pre-Primary & Primary Schools	95514*	92934
Middle Schools	120410	137908
Secondary /Senior High Secondary Schools	93307	96616 (P)
General Education (Arts, Science & Commerce College)	6171	6524

(P) Provisional
(*) Revised

Table 3. Education for Adults

Name of the programme	(Number in thousand) Year 2000-2001	(Number in thousand) Year 2001-2002
Total literacy Campaign	79.13	79.43
Post Literacy programme	47.03	49.71
Continuing education	9.32	12.32
Number of Neo-literates	60.28	62.27

Efforts undertaken by various schools / institutions

A lot of effort is underway to educate the adults. In India there is town called Tiloniya [3]. Tilonia acquired its fame because of its "barefoot school". Many poor people arrive in the school barefooted to study. This is a result of an initiative taken entirely by local people with little formal education. Night schools are the most exciting innovation in some places of India. There are more than 275 night schools in this country. We hope that in future, these schools will produce teachers, computer programmers, chemists, political leaders etc.

The Doon school is one of the finest schools in India. The school is trying to serve the society by managing quality education, arousing cultural consciousness and providing ideal citizen who are mentally alert, physically fit, academically excellent, emotionally balanced, spiritually enlightened and culturally conscious. The school has an active arts and music school, where students are taught classical Indian music and various art forms such as painting, traditional cloth printing, pottery etc.

Another school worth mentioning is MGD school. Their view is that education does not stop at school. In addition to regular education, students must be involved in different cultural activities like dances, drama, paintings, Choreography, traditional cooking etc. Recently, the school organized a painting competition in the City Palace, Jaipur.

Recently the students of Sawai Man Singh School were taken on heritage walk and shown the traditional crafts, hand block paintings and hand made paper industry.

Our Approach

We have adopted the following systematic approach to involve school children in various activities that will increase their appreciation of our cultural heritage

1. Laying of practical project guidelines
2. organizing a workshop and analyzing its results
3. Implementing them

Practical Project Guidelines

Educational work needs efficient project management and practical guidelines. An effort must be made to lay down guidelines on how to converse our heritage through education. It should address the objective, as well as methods to achieve a measurable goal. A method is proposed below:

Workshop

The first step should be to form a committee and ask what sorts of needs and concerns exist in the school. Is there a way where we should think globally while acting locally? Ask the members to make a list of ideas and bring it to the meeting.

Implementation

Local involvement As a result of the discussion a decision should be made on as what project(s) the committee wishes to work. While managing the project, school authorities and local community should be involved. This involvement will make it easier to secure funds and resources, such as utilization school's buildings, furniture etc. to carry out the project.

Funding Many of the projects require extra funds. Financial assistance in the form of sponsorships should be sought from external bodies that are sympathetic to our endeavour and are willing to fund the project.

Tours and Excursions In India, children need to be exposed to the India culture and heritage. This can be done by organizing regular, educational trips to the heritage sights where a child gets ample opportunity to realize the importance of his/ her cultural heritage and understand how to preserve it. So far, lack of knowledge and tours have made our important historical monuments lose their beauty. Many of them are in urgent need of renovation. Studies should be at conducted outdoors, as it becomes more realistic and practical in its approach.

Help through IT Sector These days, students are more inclined towards subjects that impart vocational training, like engineering and InfoTech. In schools, the students are inclined towards subjects like science that will help them realize their vocation. The importance of learning history, archeology and cultural heritage is lost on them. In my opinion using InfoTech, historians and archeologist can create awareness and interest in their subject so that the students are more interested in subject like history. They can use the internet and other available sources of information to present the importance of fine arts in a more compelling way. In this way, they will acquire relevant knowledge that will help them to love their cultural heritage.

Role of USO

United School Organization (USO) of India is a voluntary, non governmental, non political and non profit organization with aims of promoting teachings about United Nations, UNESCO Test, & General knowledge tests in schools to enhance the basic educational standards in schools in 2002 December total no. 27,61,490 students (including all three tests) from 32,543 schools have participated. To protect our cultural heritage through education and training USO organized and provides services to 766 UNESCO CLUBS in schools. They are playing a vital role as -

1. Training - youth camps (cultural activities).
2. Dissemination of information.
3. Action to promote development, literacy work.

The objective of the exam is to inculcate the habits of acquainting children with the current affairs, so that they remain aware of the national and international events. It also tries to stimulate their interest in the outside world.

India is a multi-cultural nation. USO also holds a national level festival in which the students and teachers from different part of country participate annually. In this way, students from different parts of India, come together under one platform and participate in festivities involving art, music, one act plays, folk dances; as well as literary activities like debate, essay writing and quiz competitions etc. This large gathering provides a unique opportunity to cultivate friendship and national integration. Our organization spreads the messages and objectives of UN among school going children. USO Regional center in the state of Rajasthan, organized a 51st annual national festival of USO, at Jaipur in October 2001. A large number of school student and teachers from different parts of country participated in the festival.

To stimulate student's imagination and creativity for heritage preservation, "social studies" and "history" teachers from various states of India, participated in a national workshop on heritage education. Each participant was given a "heritage kit". With the help of this kit the teachers were asked to make students aware of their natural and cultural heritage and make them feel responsible for its protection.

We have also organized seminars on the following topics:

1. Education in the context of social development.
2. Preservation and conservation of the environment.
3. The role of women in human rights.
4. Development of eco-tourism for the promotion of culture of peace.

Eco-life movement [4]

It is high time to create awareness about environmental degradation among masses. Eco-life movement propagates a way of helping the teachers and students to ensure healthy environment to preserve the educational, cultural and natural heritage. USO is affiliated with Eco-life movement. Teachers and students attached with Eco-life moment in India play an important role on this aspect that they have to convince the masses that we inherit a clean earth from our fore fathers similarly we have to handover it to our children in better form than we received. This is a joint action to protect our cultural heritage. Communication, cooperation across borders is the part of a new international and global society.

Regularly, we are also organizing the Eco-life foundation course by the USO of India proposal from external bodies and individual experts.

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NEW DIRECTIONS IN POSTGRADUATE TRAINING FOR HERITAGE CONSERVATION PROFESSIONALS IN NEW SOUTH WALES, AUSTRALIA

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Abstract

This paper examines curricular changes that have been developed by the principal author to address the diverse needs and differing educational and professional backgrounds of students enrolled the postgraduate degree Master of Heritage Conservation in the Faculty of Architecture at the University Sydney, Australia. Case studies are examined to demonstrate how the academic curriculum has been improved and enriched, firstly by the development and introduction of reality-based projects for 'real' clients (New South Wales National Parks and Wildlife Service and the Historic Houses Trust of New South Wales). Secondly, an assessment is given of the expansion of the scope of the Heritage Conservation Program undertaken by the authors to include an international dimension. Chief amongst this was an exhibition of measured drawings of traditional Turkish architecture and an academic exchange of lecturers between the postgraduate heritage conservation programs of Mimar Sinan University (Istanbul, Turkey) and the University of Sydney (Sydney, Australia). The paper concludes with an assessment of the value of these initiatives.

Historical Background

Undergraduate training for heritage conservation, the first such course of its type offered in Australia, began in the School of Architecture of the University of Sydney in 1974 in a program initiated by architectural historian Associate Professor Jennifer Taylor[1] and practicing conservation architect Howard Tanner.[2] Under the course title Restoration and Conservation Program, senior students enrolled in the degree of Bachelor of Architecture worked either individually or in pairs to prepare an Conservation Advanced Study Report (CASR) of a selected historic building, usually domestic in scale. The structure of the CASR involved the following content:

- Historical analysis of the locality of the area in which the building was located;
- Historical analysis of the selected building, identifying where possible the date of construction, the name(s) of the architect/designer, and chronology of subsequent alterations and additions to the building;
- Documentation of the physical fabric of the building, including measured drawings, photographs and description of the fabric;
- Analysis and diagnosis of the deterioration and damage that the building fabric had suffered; and

- Conservation policies and strategies for the repair and conservation of the building.

In 1979 a one-year full-time or two-year part-time research degree, Master of Science (Architecture)(Conservation) was introduced in the School of Architecture by Howard Tanner. Entry to the degree was open to graduates with a bachelor's degree in Architecture, Planning, Arts or related cognate degree. In this course students were required to develop a topic, undertake research and complete their thesis within the allotted time span of candidature.

After the principal author[3] took direction of teaching of undergraduate and postgraduate conservation courses in 1981 it became apparent that a serious lack in the curriculum existed, requiring the need for practically-based lectures involving actual projects and clients in addressing many of the problems that arose in the conservation of buildings.

In 1992, after the completion rate of the research degree of Master of Science (Architecture)(Conservation) was found to be inadequate to satisfy changes to Federal Government postgraduate education policy, the degree was replaced by a full-time and part-time coursework degree of Master of Heritage Conservation. The new degree is composed of a number of core and elective subjects intended to address the diverse backgrounds of students entering the degree.

Some of the core and elective courses were subsequently developed to address a wide range of problems and issues that need to be addressed when conserving historic buildings and places. The courses under the direction of the principal author are primarily concerned with the documentation and analysis of historic buildings, particular building materials and finishes and the preparation of appropriate conservation policies and strategies. The courses are called respectively:

- Conservation Methods and Practices (core course);
- Traditional Building Methods and the Conservation of Materials (elective course); and
- Conservation of Finishes and the Introduction of Modern Services (elective course).

Australia ICOMOS Burra Charter

On 19 August 1979 the newly-established Australia ICOMOS met in the South Australian former mining town of Burra Burra to adopt the first version of the Australian adaptation of the Venice Charter. Called the Australia ICOMOS Burra Charter for the Conservation of Places of Cultural Significance,[4] in practice this cumbersome mouth-full is widely known more simply as the Burra Charter. An evolving document, it has been revised in 1981, 1988 and most recently in 1999, the last version superseding all earlier versions. The Burra Charter "sets a standard of practice for those who provide advice, make decisions about or undertake works to places of cultural significance,[5] including

owners, managers and custodians",[6] and is accepted throughout Australia as the basis of good and acceptable conservation practice. The widespread acceptance of the Burra Charter as a basis for conservation practice is not reflected in the international acceptance of the Venice Charter. Writing two decades ago Professor Cevat Erder,[7] then newly appointed Director of ICCROM, made an observation that in many countries still appears to be true:

> " When it is necessary to resort to the [Venice] Charter for implementation be viewed as a reference point. Among current training programmes for the protection of historic monuments it may be employed as a basic educational tool … If otherwise left to patching, revision and repair it will eventually resemble little more than a sorely patched sock."

The Conservation Plan

Since its publication in 1983 *The Conservation Plan* by J S Kerr[8] in conjunction with the Burra Charter, has provided the basis of accepted professional conservation practice in Australia. Kerr[9] describes its purpose as:

> "… a process that seeks to guide the future development of a place through an understanding of its significance, the objective is to evolve policies to guide the work that are feasible as well as compatible with the retention, reinforcement and even revelation of significance. These twin concepts of compatibility and feasibility are the bases on which policies are built."

The Conservation Plan methodology is essentially a two-step process where the first the cultural significance of the place is assessed and determined as the basis for developing appropriate policies for the conservation of the place. The precepts of the Burra Charter and Conservation Plan are decidedly Ruskinian and seek to avoid the extreme view of nineteenth-century English "restoration" practice advocated by the most extreme "scraper", Sir George Gilbert Scott, according to Niklaus Pevsner,[10] who argued:

> "But taking the more correct view of a church as a building erected for the glory of God and the use of Man (and which must therefore be kept in a proper state of repair) and finding it in such a state of dilapidation that the earlier and later parts - the authentic and the spurious - are alike decayed and all require renovation to render the edifice suitable to its purposes, I think we are then at liberty to exercise our best judgement upon the subject parts are found to be 'precious' and the late insertions 'vile'. I think we should be quite right in giving perpetuity to the one, and in removing the other."

Student Educational Backgrounds

When training professionals to undertake conservation on the fabric of existing buildings of recognized cultural significance there is no substitute for working on real projects consisting of actual building fabric on actual sites. John Harvey[11] has reminded us of the importance of understanding the dimensions of craftsmanship and traditional

means of building are critical in developing a thorough understanding of why and how a building should and could be conserved. Recent experience of new postgraduate students enrolled in the degree of Master of Heritage Conservation at the University of Sydney indicates a great diversity of educational and professional backgrounds. For example, in the past four years a clear minority of the student intake has been drawn from the disciplinary area of architecture, ranging between a high of 37% (2003) to a low of 25% (2001) (see Table 1). This trend has been typical of the experience of students attracted to the course over the previous decade.

Learning by Reality-Based Projects

Pilot Program

Experience drawn from the diversity of student educational and professional backgrounds and the wide variation in student skills has led the principal author to revise the curricula. As a consequence a series of assignments based on the twin principles of real projects and carefully balanced individual and group work for the purposes of academic assessment were introduced. The first course in which this new approach was trialed as a pilot program was Conservation Methods and Practices. Here students were required to learn and use the methodology and concepts of the Conservation Plan and the Burra Charter on a series of buildings under the ownership and management of the New South Wales Parks and Wildlife Service (NPWS). In 1996 an agreement was entered into between the Faculty of Architecture and the NPWS whereby selected sites within some of the National Parks in a close geographic ambit of the University were used as a basis for student projects. In that year, from a total student enrolment of 16 students, three groups[12] were formed, each with a designated study area within Nielsen Park, Vaucluse, a major component of the Sydney Harbour National Park.

Table1: Educational Background of Postgraduate Heritage Conservation Students.[13]

Educational Background	2000	2001	2002	2003
Architecture	4 Students (≈29%)	3 Students (≈25%)	4 Students (≈36%)	7Students (≈37%)
Planning		3 Students (≈25%)	2 Students (≈18%)	
Interior Design	2 Students (≈14%)	1 Student (≈8%)	2 Students (≈18%)	2 Students (≈11%)
Archaeology	2 Students (≈14%)			
Geography				1 Student (≈5%)
Marketing				1 Student (≈5%)
Property Management			1 Student (≈9%)	1 Student (≈5%)
Building	1 Student (≈7%)			1 Student (≈5%)
Corporate Finance	1 Student (≈7%)		1 Student (≈9%)	1 Student (≈5%)
Law		1 Student (≈8%)		
Theology				1 Student (≈5%)
Health Sciences				1 Student (≈5%)
History	4 Students (≈29%)	4 Students (≈33%)	1 Student (≈9%)	2 Students (≈11%)
Stone Masonry				1 Student (≈5%)
Total New Enrolments	**14 Students**	**12 Students**	**11 Students**	**19 Students**

The projects were conducted under the overall supervision of the principal author, with periodic input from a Client Reference Group comprised of members of the Head

Office, and local staff of the Sydney Harbour National Park.[14] Three groups prepared Conservation Plans of the Gardener's Cottage, the Main Dressing Pavilion Precinct and the Steele Point Battery within the context of Nielsen Park. The major outcomes can be summarised as follows:

1. Completion of three Conservation Plans, including detailed historical research, measured drawings, photographic record, survey of physical fabric, conservation policies and strategies;

2. Successful achievement of educational objectives of developing students' understanding and application of Conservation Plan and Burra Charter methodology;

3. Preparation of Conservation Plans to a high level of professional quality of content and presentation;

4. Development of students' professional skills to a readily employable level within the conservation practices of Australia; and

5. Successful conservation of documentation and analysis of highly significant, government-owned properties that would not otherwise be undertaken and funded at full professional rates of fees.

The pilot program was deemed a great success by the postgraduate students, University of Sydney academic staff and the National Parks and Wildlife Service. In each succeeding year collaboration with the NPWS has been continued with highly satisfactory outcomes for all involved parties.[15]

Later Collaborative Initiatives

In the wake of the success of the pilot program the principal author initiated another collaborative program in 1998. Here an agreement was negotiated between the Historic Houses Trust of New South Wales (HHT)[16] and a private firm of conservation architectural consultants, DESIGN 5 Architects.[17] Using the course Traditional Building Methods and Conservation of Materials[18] as a suitable vehicle, the project required postgraduate heritage conservation students to carry out the documentation, analysis and formulation of conservation policies for a series of wooden fences at Rouse Hill Estate.[19]

In this project students were formed into groups of two or three to undertake a three-part assignment comprised of the following elements:

Recording of Fabric (Assignment 1) The recording of the type and configuration of each fence and its component parts:

- Record the configuration of the whole fence including location of each fence post and other components;
- Record the location and configuration of the fence and its component parts including height and lean of each fence post, construction and materials (Figs 1, 2);

- Record condition of all fence elements;
- Record context of fence and any factors or elements which may affect its survival; and
- Record photographically the overall fence, typical and selective fence elements.

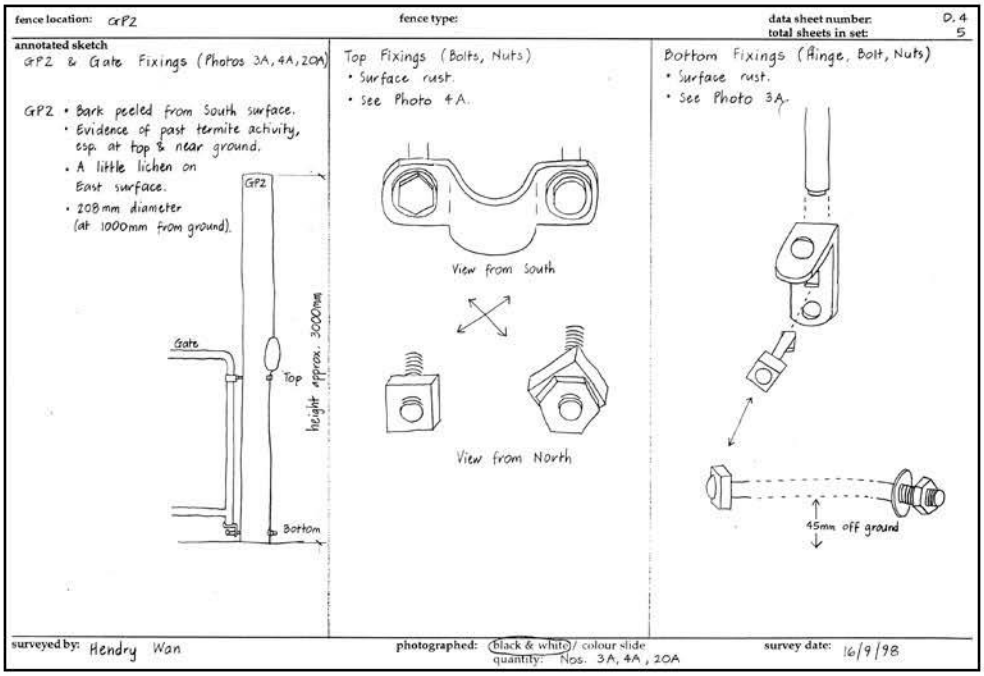

Figure 1: Example of typical drawings of fence details, Rouse Hill Estate Fences Study 1998.

Analysis of Fabric (Assignment 2) The preparation of a written analysis of the area of fencing studied in Assignment 1. From documentary and physical evidence, the students were required to conduct research to determine the historical development of the particular fence and any changes that have occurred over time.

Fabric Conservation Policies (Assignment 3) The preparation of detailed conservation policies for each of the major element of fabric of your fence study area as well as a general conservation policy for the study area. The formulation of policies was based on the Australia ICOMOS *Burra Charter* and J S Kerr's *Conservation Plan*.[20]

Each of the student group projects was edited by Alan Croker[21] DESIGN 5 Architects into a single volume to form the basis of an on-going maintenance and conservation program of the Rouse Hill Estate fences. The project has proved to be an outstanding success since its inception and has achieved similar educational, professional and practical outcomes to those of the pilot program for the preparation of Conservation Plans for the National Parks and Wildlife Service. This project is currently nearing its end and the expected completion date is Semester 2, 2004.

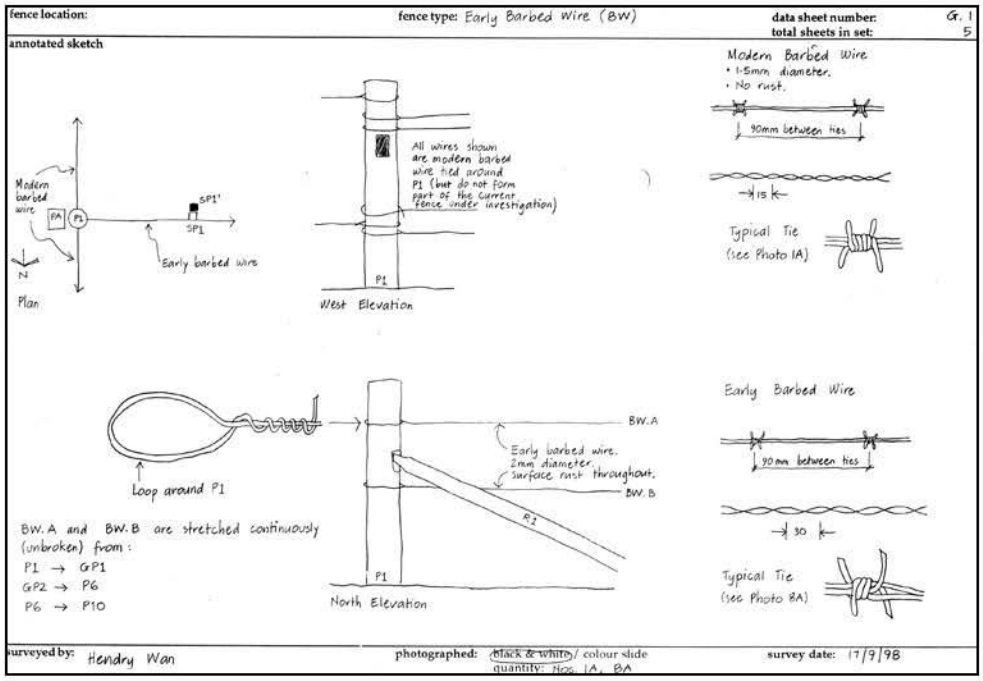

Figure 2: Details of wire fixings, Rouse Hill Estate Fences Study 1998.

An International Experience

In 2002, the Heritage Conservation Program at the Faculty of Architecture decided to undertake a collaborative project with the Restoration Department of Mimar Sinan University of Istanbul. In this regard an exhibition of students' measured drawings of Turkish vernacular and monumental architecture, *Traces of the Past*,[22] was organised at the Faculty of Architecture, University of Sydney between 22 October and 13 December 2002. Additionally one academic from the Faculty of Architecture of the University of Sydney travelled to lecture at Mimar Sinan University and three senior members of academic staff from the Department of Restoration of Mimar Sinan University reciprocated, travelling to Sydney to give several lectures to the postgraduate students of the Heritage Conservation Program at the University of Sydney.[23]

Osman Hamdi Bey, a celebrated Turkish painter, archaeologist and art historian established Mimar Sinan University in 1883 as the first school of art and architecture in the Ottoman Empire. It was initially named as the School of Fine Arts (Sanayi-i Nefise Mektebi), and following the establishment of the Republic of Turkey its name was changed to the Academy of Fine Arts in 1928. This distinguished institute gained its current name in 1982 honouring the legendary 16th century Turkish architect Sinan (1490-1588).

The history of heritage conservation at Mimar Sinan University goes back to the 1930s. A research institute named the National Architecture Seminary (Milli Mimari Semineri), founded by Prof. Sedad Hakki Eldem, at the Fine Arts Academy played an important role in the conservation of Turkish vernacular architecture, and this institute

formed the roots of the Restoration Department of Mimar Sinan University. Since the 1930s the Restoration Department of Mimar Sinan University has established an archive of measured drawings of vernacular and monumental Turkish architecture. Today heritage conservation occupies an important place in the curriculum of the Faculty of Architecture at Mimar Sinan University. Preparation of archival records and measured drawings is taught as a core subject to undergraduate students of architecture. Additionally another undergraduate core subject called Restoration comprises several major themes of heritage conservation such as conservation techniques, national and international heritage conservation legislation, adaptive re-use of old buildings and new designs in old settings. In addition to undergraduate programs the Restoration Department of Mimar Sinan University also offers extensive research-based heritage conservation postgraduate degrees in two major areas; Conservation and Renovation, and Assessment of Historic Environments.

Figure 3: An example from exhibition catalogue *Traces of the Past.*[24]

It is considered that the exhibition of student works of Turkish architectural heritage and the lectures given by the Turkish academics opened an international perspective for the Australian heritage conservation students. This series of events is seen as the beginning of the establishment of a joint exchange program between the academic staff and postgraduate students of the two oldest architectural schools in Turkey and Australia.

Conclusion

The curriculum developments of the teaching of courses in the Heritage Conservation Program using reality-based projects and real clients has proved to be highly successful in terms of pedagogic value and the development of specialised professional skills in Australian conservation theory and practice. The mounting of the exhibition, international lecturers and lecture content have proved to be a valued addition to the curriculum for an Australian postgraduate course in heritage conservation geographically remote from the rest of the world. It is expected that the success of these initiatives will form the basis of further developments of a similar kind.

[1] Professor Jennifer Taylor is currently Adjunct Professor of Architecture at the Queensland University of Technology, Brisbane, Queensland, Australia.

[2] Howard Tanner is currently the principal of the Sydney-based architectural and conservation firm that practices under the name Howard Tanner Associates.

[3] Trevor Howells undertook and completed his postgraduate training, a Diploma of Conservation Studies, at the Institute of Advanced Architectural Studies, York University, 1979-80 under the direction of Dr Derek Linstrum, Radcliffe Reader in Conservation.

[4] See *Australia ICOMOS Burra Charter for the Conservation of Places of Cultural Significance*; http://www.icomos.org/australia/ (30 May 2003).

[5] *Australia ICOMOS Burra Charter for the Conservation of Places of Cultural Significance,* Article 1.2: "*Cultural significance* [a term synonymous with heritage significance or cultural heritage value] means aesthetic, historic, scientific, social or spiritual value for past, present or future generations."

[6] Preamble, ibid.

[7] "The World of Conservation: An Interview with Cevat Erder", *Monumentum*, Vol 26, No 3, September 1983, p 207.

[8] James Semple Kerr, *The Conservation Plan*: *A Guide to Preparation of Conservation Plans for Places of European Cultural Significance,* 5th edn Sydney: National Trust of Australia (NSW), 2000.

[9] Ibid, p 3.

[10] Nikolaus Pevsner quoting George Gilbert Scott, (*Personal and Professional Recollections*, London, 1878, pp 400ff), "Scrape and Anti-Scrape" in Jane Fawcett, ed, *The Future of the Past: Attitudes to Conservation 1147-1974*, New York: Warson-Guptil Publications, 1976, p 44.

[11] John Harvey, "Craftsmanship" in *Conservation of Buildings*, London: John Baker, 1972, pp 81 et seqq.

[12] Group 1 consisting of Janice Cave, Jim Espie, Douglas Gordon, Clara Luxford, Hassan Nowrouzi and Hendry Wan studied the Gardener's Cottage, Group 2 consisting of Libby Bennett, Rachel Jackson, Lucy Kreller, Caroline Lawrence and Julie MacKenzie examined the Main Dressing Pavilion Precinct and Group 3 consisting of Samantha Biggs, Claire Manefield, David Parker, Nicola Staimond and Anna Wong investigated the Steele Point Battery.

[13] Figures are based on new enrolments in the degree Master of Heritage Conservation supplied by the Student Services Office, Faculty of Architecture, University of Sydney.

[14] The National Parks and Wildlife Service Client Reference Group was made up of Miriam Stacy, Conservation Architect, Head Office, NPWS, Jennifer Carter, District Manager, Sydney District, Dave Monohan, Area Manager, Sydney Harbour South Side, and John Poleson, Senior Ranger/Neighbour Relations, Nielsen Park.

[15] In 1997 Shark Island, Harbour Master's Cottage, Goat Island and Rodd Island (Sydney Harbour National Park) were studied; in 1998 Wharf Precinct, Hospital Precinct, Isolation Ward Precinct and Doctors' and Nurses' Precinct, North Head Quarantine Station (Sydney Harbour National Park); 1999 Captain Cook's Landing Place and Alpha Farm Precinct (Botany Bay National Park); 2000 Former Audley Post Office, Audley Boatshed and Gogerley's Cottage (Royal National Park);); 2001 Laperouse Monument Precinct and Laperouse Cable Station (Botany Bay National Park); 2002 Former Farm Precinct, Hut Precinct and Quadrangle Precinct; and 2003 Superintendent's Cottage, Bobbin Inn, Orchard Park Precinct and Gibberagong Precinct, Bobbin Head (Ku-ring-gai Chase National Park).

[16]The Historic Houses Trust of New South Wales is a statutory authority within the New South Wales Ministry for the Arts. It is one of the largest state museums in Australia and is entrusted with the care of key historic buildings and sites in New South Wales. The Trust was established in 1980 to run Vaucluse House and Elizabeth Bay House and has now grown to manage 13 diverse sites and properties including houses, public buildings, a farm, gardens, parklands, a beach and urban spaces. The Trust holds extensive collections in each of its properties and conducts a dynamic range of programs and activities attracting over

two million visitors to our houses and museums each year. Its mission is to conserve, interpret and manage places of cultural significance in the care of the Trust with integrity and imagination and in doing so to inspire an understanding of New South Wales histories and diverse cultural heritage for present and future audiences. See http://www.hht.nsw.gov.au/about_us.

[17]Alan Croker is the director of DESIGN 5 Architects Pty Ltd, a Sydney firm specialising in conservation work and related new work. His present and recent involvement is primarily with conservation work to significant 19th and early 20th century structures. Projects include conservation works to a broad range of buildings including advising Historic Houses Trust at Rouse Hill Estate; completion of works to the Dairy Precinct (winning an RAIA Award for Architecture, Conservation and Adaptive Reuse in 1999); conservation and refurbishment of the Argyle Bond Store complex in The Rocks in 1993-95; and as part of a team for design of the development proposal for the Jones Bay Finger Wharf at Pyrmont. Involvement with new work includes a new Caretaker's Residence and Visitor's Centre at the Rouse Hill Estate within a highly sensitive and significant setting. The ongoing advice at the Rouse Hill estate has included the stabilisation of some of the early timber farm structures on the site as well as stabilisation of a range of other structures. See http://www.icomos.org/australia/bio24.htm (30 May 2003).

[18] The elective course is offered on alternate years.

[19] Rouse Hill Estate is one of Australia's most culturally important historic properties, not only for its artefacts, furnishings, buildings and gardens, but also because it is the most complete document of continuous family occupancy of a country house in New South Wales. Rouse Hill was established by Richard and Elizabeth Rouse in 1813 and has been in use by six generations of the one family.

[20] *Traditional Building Methods and Conservation of Materials Course Outline*, February 1998, p 1.

[21] Alan Croker, ed, *Rouse Hill Estate: Fences Study 1998,* Research Project Carried out as part of the Master of Heritage Conservation Program, Faculty of Architecture, University of Sydney in conjunction with DESIGN 5 Architects for the Historic Houses Trust of New South Wales, unpublished report, 1998.

[22] Mehmet Murat Gül and Trevor Howells curated the exhibition with the assistance Leman Figen Gül. See Murat Gül and Trevor Howells, *Traces of the Past, Measured Drawings Traditional Turkish Architecture*, exhibition catalogue, Boral Timber Gallery, Faculty of Architecture, University of Sydney, 22 October-13 December 2002, 24 pp.

[23] Trevor Howells delivered a lecture, *Heritage Controls in Australia* at the Department of Restoration, Mimar Sinan University in September 2002. Professor Ilgi Aşkun, Associate Professors Demet Binan and Tülay Çobancaoğlu from the Department of Restoration, Mimar Sinan University gave lectures to the postgraduate students of the Heritage Conservation Program of the University of Sydney in October 2002. The subjects of their lectures were respectively: *Conservation Principles, Conservation of Traditional Masonry Vernacular Architecture* and *Conservation of Traditional Timber Turkish Architecture*.

[24] Source: Mimar Sinan University, Department of Restoration Archive.

LEARNING TO PRESERVE OUR CULTURAL HERITAGE

RESTORATION COURSES HELD IN SCHOOLS

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Maria Di Chiara, Istituto Statale d'Arte di Torre Annunziata (Napoli)

Abstract

It is one of school's fundamental tasks to equip young people with tools for the comprehension and manipulation of social reality, as well as the capability to make operational choices for their future. This is all the more true in a territory like the Vesuvian hinterland, which combines environmental degradation with a condition of permanent social emergency.
The presence in this territory of an extraordinary historical and artistic heritage could provide new occasions for the cultural enrichment of young people, as well as new professional opportunities.
The experimental program illustrated in this article was carried out at the Istituto Statale d'Arte di Torre Annunziata (Napoli) in the years 1999-2001. During that period the students studied restoration at school, along with their regular curricular subjects, and did four weeks of actual field work in the archaeological site of Pompeii, where the technical and scientific personnel of the Soprintendenza Archeologica di Pompei assisted them.

The project

The "Restoration Theory, History and Technique" project lasted two years, from 1999 to 2000. It involved several teachers of the Istituto Statale d'Arte and 20 students from the third, fourth and fifth year of the Graphics and Interior Decoration Unit. University teachers (Università degli Studi di Napoli Federico II, Istituto Universitario Suor Orsola Benincasa, Accademia delle Belle Arti di Napoli), personnel from the Soprintendenza Archeologica di Pompei (archaeologists, site directors, laboratory responsibles and restorers), besides I.C.R graduated restorers, assisted the students. The principal aim of the course was to put the students in touch with the complexity of issues concerning cultural and artistic heritage and its preservation. Methodology, advanced technology, the qualifications of professionals, and the training of operators were discussed. Special attention was devoted to territorial cultural heritage needful of preservation from oblivion and ruin, to the necessity of careful planning policies, of environmental awareness, and protection of the local heritage. The aim of the project was to promote an organic approach to learning, rather than a sterile rote learning, unconnected to vital needs and every-day experience.

The course

The main objective of the course was to introduce the students to the many aspects involved in the conservation of heritage. The lessons, integrated with excursions and field work, dealt with archaeological restoration - which the proximity of sites like Pompeii, Herculaneum and Oplontis made particularly interesting - architectural restoration - especially the restoration of the decoration of buildings - and the restoration of paintings and sculpture. Well known professionals assisted the students and provided them with a first-hand experience of restoration ateliers and field work. Besides, the Institute equipped a laboratory with all the necessaries to make the practice of work possible also inside the school.

An experience in the restoration of a painting

Figure 1,2 The painting during the intervention; detail of the support structure on the back of the panel

Thanks to the commitment of a prominent restorer, Bruno Tatafiore, the students had the opportunity to experience directly the methodology and technique of conservation on a nineteenth century oil panel painting. The painting showed St. Gennaro with, in the background, the famous reliquary containing his blood, an object of great devotion for the Neapolitan people. The state of preservation was poor, mainly because of the warping of the wood support, which had resulted in the detachment, fall and loss of parts of the color layer. Besides, woodworm had weakened the structure of the wood. The students, divided in groups, took part to all the different stages of the intervention, which consisted in: facing of the painting recto with fine pure cellulose paper and synthetic resins; disinfestation of the woodworms (by impregnation); consolidation of the wood by impregnation with synthetic resins; construction of a supporting structure ("parchettatura") after levelling the back of the panel, with wood bridges supporting mobile crossbars, to to keep the surface of the painting level while allowing the wood fibre to retain its natural movement; filling of the missing parts with plaster, protected with varnish; pictorial integration with watercolours, in fine successive strokes superimposed according to the "chromatic selection" principle, to get to a reconstruction of the missing parts without risking arbitrary interpretations or, worse, plain imitation or faking.

Field trips

Figure 3,4 Visit to the Bruno Tatafiore's atelier; explanation of the technique of cast-making by Michele Pelly, of the Soprintendenza Archeologica di Pompei

The students made several visits to restoration laboratories to approach the different realities of the conservation work. To start with, Bruno Tatafiore showed his atelier to them, and the important works of art there to be restored. Among the others, seventeenth century masters' paintings, like Fracanzano, Stanzione or Luca Giordano, in occasion of the imminent exhibition dedicated to the latter (figure3). In the Soprintendenza Archeologica di Napoli the students were assisted by the technical staff, which explained the work in progress on the precious Greek and Roman pieces coming from the adjoining Museo Archeologico Nazionale. In Pompeii three laboratories were visited: Mario Spera showed the intervention on archaeological materials such as glass, metals (bronze, iron, copper), terra-cotta, and, on the other end, Michele Pelly explained the technique of cast-making (figure 4). The experience at the Fresco Restoration Laboratory is described with more details below.

Figure 5 In S.Chiara cloister

The field trips had different destinations, chosen because of their value as examples of the problems of conservation.
In S.Chiara, Naples, the students examined the restoration of the famous Majolica Cloister, in particular of its eighteenth century frescoes, carried out under the direction of the Soprintendenza ai Beni Artistici e Storici
(Figure 5).

In S.Gregorio Armeno, Naples, the restoration of the beautiful wooden ceiling, carved in lacunars, was explained by its author, Bruno Tatafiore, and a whole day of studies was dedicated to the methodological and technical problems of the intervention. Dr.Fergola, from the Soprintendenza Archeologica di Pompei, talked to the students about the magnificent Oplontis "Villa Imperialis" and the history of its excavation (Figure 6).

Figure 6 Visiting Oplontis

In Gragnano (Na) Bruno Tatafiore described his intervention on an important eighteenth century altarpiece in the Corpus Domini Church.
Pompeii offered several chances of learning to the students: Prof.Antonio Varone leaded the visit to the Domus dei Casti Amanti explaining the modern archaeological excavation techniques and confronting them with the earlier ones, in particular with the tunnel digging of the Bourbons. Dr. Ernesto De Carolis escorted the students along several buildings in the ancient town to show them the differences and the evolution of the four fresco painting styles. Dr.Cinzia Lamberti talked about the frescoes from Morecine and their complex restoration, which required the detachment of the very large paintings from the wall figures, due to the impossible conservation conditions of the original site.
Back in Naples, Bruno Tatafiore explained his intervention on a large canvas painting in S.Giorgio Maggiore, with the invention of a mobile support to allow the important frescoes behind to be seen as well.

The visit to the Frescoes Restoration Laboratory of Pompeii

The students were allowed to visit the Laboratory under the supervision of its Responsible, Dr.Stefano Vanacore. Here, they witnessed the preliminary stages of the restoration of archaeological fragments: the spotting of previous restoration work, the analysis of the state of preservation, of the technique and of the constituent materials of the colour and plaster layers. The method for detaching a fresco from a wall was also illustrated, and the possible reasons justifying such a traumatic action discussed. The necessity for a careful full-size reproduction of the painting was also stressed. Besides, the students witnessed the assembling of scattered fragments, the first stage of cleaning and the first treatment of the colour layer, the facing of it, the consolidation of the original plaster and the definitive fastening. Finally, the principle of the "sacrifice layer" was explained, as well as the function of aluminium honeycomb supports and the different techniques for cleaning paintings and integrating missing parts.
(Figure 7,8).

Figure 7,8 The visit to the Frescoes Restoration Laboratory of Pompeii

The fieldwork

The two years course in Restoration Theory, History and Technique was concluded by fieldwork sessions organized in collaboration with the Restoration Laboratory of the Soprintendenza Archeologica di Pompei. The students thus had the opportunity of verifying their theoretical learning on the objects themselves. The methodological principles they had learned were now applied to the direct examination of an archaeological site. To attain this result methodological indications were applied to the exam of the archaeological site, by the compilation of tests and of intervention hypothesis, to arrive to a full conscience of the excursus of a restoration project.
The fieldwork lasted for four weeks, one week for each group, and involved only twelve of the nineteen students of the course, since seven, for various reasons, declined. The twelve students were divided into groups of three, each with a working schedule of one week: this organization allowed the students to be assisted individually by the Pompeii restorers, without detracting too much time from their regular school lessons.

Figure 9 Examining the wall together with the the Soprintendenza's restorers

The work schedule was the same for all the groups: the restoration of an *opus incertum* wall delimiting the garden of the Casa del Principe di Napoli (reg. VI - ins. XV), opposite the lararium.

Figure 10,11 Students at work

The restoration

A general exam of the state of preservation of the wall preceded the intervention . Even though the wall carried no valuable painted work, it still retained plaster layers and some colour, and was hence perfectly suitable for the experiment. The condition of the wall inner structure was good, but there were several and extensive detachments between the stone substratum, the inner and the outer plaster layers. The more exposed areas were covered with weed, moss and lichens, and wetted by infiltrated water. The plaster had been integrated in places in the course of past restorations, but using a high percentage of concrete mortar, a material which today is regarded as unsuitable because of its chemical and physical properties. It was hence necessary to remove these integrations.

Figure 12 Mechanical cleaning and grouting

The first stage of the restoration was the cleaning of the wall surface and the removing, by chemical and mechanical means, of biologic weathering agents. This was achieved by cleaning the surface with soft brooms to remove loose dirt accumulated over the years, and then impregnating the wall with a low-percentage solution of Preventol R80, a strong disinfesting agent. The dead moss and lichens were removed with scalpels, taking great care not to scratch the surface. Successively, the whole area was washed with water and 5% New Des (detergent), and rinsed with fresh water to remove any residues of the solution.

The following stage was the consolidation of the wall plaster, after locating detached areas by beating lightly on the surface of the plaster itself. Through small holes drilled into the plaster, alcohol and water first, then grout, were injected to fill gaps between the inner layers. (Figure 12).

Finally, the plastering from the earlier restoration was removed, as it was unsuitable for the preservation of the original, and even potentially harmful. Then the students integrated the missing parts using a sand and lime mortar which was shown by several tests to be perfectly compatible with the ancient plaster. All the stages of the restoration were documented photographically.

It is important to stress that the technical staff of the Soprintendenza indicated all the materials to be employed and the method to be adopted for the restoration.

Conclusion

Thanks to their field work in Pompeii, the students have come into touch with highly qualified professionals (two of them with a I.C.R. degree), and had a direct experience of actual conservation work, with its rules and regulations. of which they had never before had any experience.

The final evaluation of the experience considered the capability to comply with the organization of the intervention, the students' behaviour making it possible, the regularity of their attendance (achieved at 100%), and their attainment of learning and skill (variable because of the students' different individualities) as responding to the graduality and propaedeutic progress criteria. A short report on the work was produced. It records the students' achievements, and indicates the most interesting technical and methodological aspects of the work done.

Paper photographs are by Edoardo Scotti, teacher of the Istituto Statale d'Arte di Torre Annunziata.

ΚΑΤΑΡΤΙΣΗ ΤΩΝ ΕΚΠΑΙΔΕΥΤΙΚΩΝ: ΤΟ ΠΡΩΤΟ ΒΗΜΑ ΓΙΑ ΤΗΝ ΔΙΑΤΗΡΗΣΗ ΤΗΣ ΚΛΗΡΟΝΟΜΙΑΣ

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Περίληψη
Το πρώτο βήμα για το σεβασμό και τη συντήρηση του μνημειακού πλούτου σε μια χώρα, είναι η προσέγγισή του μέσα από την εκπαίδευση, που καλό είναι να ξεκινά από την παιδική ηλικία. Για τον σκοπό αυτό, εκτός από την προσπάθεια που καταβάλλεται εκ μέρους των μουσείων με πολύμορφες εκπαιδευτικές δράσεις που απευθύνονται στο σχολικό κοινό, χρειάζονται και εκπαιδευτικοί, όλων των βαθμίδων, με συνείδηση της αξίας του μνημειακού πλούτου και ενημερωμένοι σε θέματα παιδαγωγικής αξιοποίησης της πολιτισμικής κληρονομιάς. Παρουσιάζονται τα βήματα που έχουν γίνει προς την κατεύθυνση αυτή στην Ελλάδα σε επίπεδο κατάρτισης και επιμόρφωσης των εκπαιδευτικών και προτείνονται τρόποι με τους οποίους οι ιστορικές πόλεις μπορούν να συνεργαστούν για να υποστηριχθεί και ενισχυθεί ο διαμεσολαβητικός αυτός ρόλος των εκπαιδευτικών ανάμεσα στα παιδιά και τα μνημεία.

THE TRAINING OF TEACHERS: THE FIRST STEP TOWARDS HERITAGE CONSERVATION

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Abstract
The first step towards a society that respects and cares for its Heritage is formal and informal education on the matter, that starts from early childhood. This kind of education is provided not only from museums offering educational services addressed to schools and families, but is highly dependent on teachers' attitudes and competences to deal with Heritage issues and the learning potentials offered by museums and historical sites. This paper presents all efforts made so far in Greece for the education of teachers of elementary, primary and high schools, on this subject, during their initial training in the Universities or in in-service seminars provided mostly by museums and museum organisations. At the end, special recommendations are addressed concerning ways of collaboration in the field of facilitating and encouraging the teachers' task as "cultural workers".

1. Εισαγωγή

Τις τελευταίες δεκαετίες οι άνθρωποι των μουσείων και γενικότερα όσοι άλλοι ευθύνονται για την διαχείριση και την διατήρηση της πολιτισμικής κληρονομιάς, έχουν προχωρήσει σε έρευνες, δράσεις και ευρύτατο διάλογο με σκοπό το άνοιγμά της σε όσο το δυνατόν ευρύτερο κοινό, με όρους δημοκρατίας και ισότητας στην πρόσβαση, αναγνωρίζοντας τόσο το δικαίωμα των ανθρώπων στην γνώση και την πληροφόρηση, όσο και την δύναμη που προσκομίζει η γνώση αυτή στην κοινωνία των πληροφοριών. Η γενικά πια αποδεκτή διαπίστωση ότι η διατήρηση της πολιτισμικής κληρονομιάς διασφαλίζεται, μεταξύ άλλων και από τις σωστά ενημερωμένες κοινωνίες (Smardz & Smith [1]) έχει οπωσδήποτε παίξει το ρόλο της στις νέες αυτές πολιτικές. Θα υποστήριζα μάλιστα ότι το ενημερωμένες δεν αρκεί, γιατί η απλή ενημέρωση είναι μια μάλλον επιφανειακή λειτουργία που δεν επηρεάζει βαθύτερα το υποκείμενο εαν δεν υπάρχει πίσω του το υπόβαθρο μιας μακροχρόνιας, κατάλληλης για κάθε ηλικία, και ουσιαστικής εκπαίδευσης για τα μνημεία [2]. Αυτού του είδους η εκπαίδευση είναι η μόνη που μπορεί να διαμορφώνει στάσεις, να εμπνέει δράσεις, επιλογές και συμπεριφορές, τόσο του νέου ανθρώπου όσο και στη συνέχεια του πολίτη μιας χώρας.

Ξεκινώντας από τη βασική παραδοχή, που προκύπτει από την μέχρι τώρα εμπειρία και έρευνα, ότι η θετική στάση απέναντι στην πολιτισμική κληρονομιά είναι αποτέλεσμα εκπαίδευσης και μπορεί να καλλιεργηθεί από την παιδική ηλικία, θα εξετάσουμε τους δυο κύριους φορείς αυτής της εκπαίδευσης, τα μουσεία και τα σχολεία, επιμένοντας στα σχολεία και τους εκπαιδευτικούς που τα στελεχώνουν, επειδή ο ρόλος τους έχει γίνει σε εμφανώς μικρότερο βαθμό αντικείμενο έρευνας και ενδιαφέροντος από όσο ο αντίστοιχος των μουσείων, και το τόσο καίριο θέμα της κατάρτισής τους στο πλαίσιο της τριτοβάθμιας εκπαίδευσης, έχει όπως θα δούμε μόλις αρχίσει να κερδίζει έδαφος. Θα επισημάνουμε τέλος τον ρόλο της τοπικής κοινωνίας, και ιδιαίτερα αυτής των ιστορικών πόλεων, στην ενίσχυση και στήριξη των εκπαιδευτικών, προκειμένου να επιτελέσουν τον ρόλο της διαμεσολάβησης ανάμεσα στους μαθητές τους και το ιστορικό περιβάλλον.

2. Σχολείο και Πολιτισμική Κληρονομιά

Είναι γεγονός ότι στην Ελλάδα πρόσφατα, όπως και σε άλλες αναπτυγμένες χώρες νωρίτερα, οι οργανωμένες ενέργειες για την προσέγγιση της πολιτισμικής κληρονομιάς από τους μαθητές, προήλθαν κυρίως από τον χώρο των μουσείων και των σχετικών με αυτά οργανισμών, και όχι από τα σχολεία. Αυτό οφείλεται σε διάφορους παράγοντες που δεν είναι της στιγμής να συζητηθούν. Αυτή η κινητικότητα των μουσείων, η ανάγκη για επαναπροσδιορισμό της φυσιογνωμίας τους και ο τονισμός της εκπαιδευτικής τους λειτουργίας, προκάλεσε και τις ανάλογες ανάγκες για έρευνα και εξειδίκευση των εργαζομένων στα μουσεία, με αποτέλεσμα να έχει ανοίξει μια πλούσια συζήτηση τις τελευταίες δεκαετίες για τις σχέσεις μουσείων και κοινού, μεγάλο μέρος της οποίας αφιερώνεται στη σχέση με το σχολικό κοινό. Αρκετοί παιδαγωγοί στο παρελθόν διακήρυξαν την ανάγκη για προσεγγίσεις της τέχνης και των μνημείων στο πλαίσιο της σχολικής εκπαίδευσης και προχώρησαν σε καινοτόμες εφαρμογές, δεν συνάντησαν όμως πρόσφορο έδαφος ώστε αυτές να επιβιώσουν και να επιβληθούν σε ευρεία κλίμακα. Μήπως κάτι τέτοιο πρόκειται να συμβεί στην εποχή μας; Θα λέγαμε ότι αυτήν την στιγμή το κίνημα προσέγγισης μουσείου και σχολείου μοιάζει να εξυπηρετεί βαθύτατες κοινωνικές, εκπαιδευτικές και ψυχικές ανάγκες, με αποτέλεσμα να εξαπλώνεται με γοργούς ρυθμούς, να κατακτά έδαφος και να υποχρεώνει τελικά όλους τους εμπλεκόμενους παράγοντες να ανταποκριθούν

επανεξετάζοντας το ρόλο τους, και τους όρους αυτής της συνεργασίας. Οι ήδη υπάρχουσες μελέτες έχουν αναδείξει την πολυπλοκότητα των σχέσεων μουσείου και σχολείου (Buffet [3], Ζαφειράκου [4]). Στον κοινό τους στόχο για να φέρουν τα παιδιά κοντά στην πολιτισμική κληρονομιά κάθε τόπου, υπάρχει αλληλεπίδραση, αλλά ο προσδιορισμός του ρόλου του καθενός στην εκπαιδευτική και μαθησιακή διαδικασία, οι επί μέρους στόχοι που θέτει ο κάθε θεσμός από την πλευρά του και που, όπως είναι φυσικό, δεν συμπίπτουν αλλά μάλλον είναι συμπληρωματικοί, απαιτούν διερεύνηση και συζήτηση.

Δυο από τα κύρια συμπεράσματα μιας αξιόλογης έρευνας (Κουβέλη [5]) που πραγματοποιήθηκε στην Ελλάδα το 1995, σε μαθητές της περιφέρειας της Αθήνας και σε μαθητές του νησιού της Ικαρίας, είναι ότι, πρώτον η στάση των μαθητών απέναντι στο μουσείο είναι αδιαμφισβήτητα θετική, αν και δεν διερευνήθηκε το γιατί, και δεύτερον, ότι «η επίσκεψη στο μουσείο, φαίνεται να έχει πλέον, υπεισέλθει στις αρμοδιότητες του σχολείου. Το σχολείο αποτελεί τον αποφασιστικό παράγοντα για τη γνωριμία του μαθητή με το μουσείο και την εγκαθίδρυση της σχέσεώς του με τον χώρο αυτό» (Κουβέλη [6]). Είναι χαρακτηριστικό στις απαντήσεις των συνεντεύξεων το ότι η δραστηριότητα «μουσείο» εγγράφεται στα βιώματα των μαθητών σαν ενταγμένη στο χώρο του σχολείου και δεν κατατάσσεται στις εξωσχολικές δραστηριότητες ή στην έννοια του ελεύθερου χρόνου τους (Κουβέλη [7]).

Κατά την ίδια έρευνα, μια βασική παράμετρος της σχέσης του παιδιού με τα μνημεία και τα μουσεία είναι η συμμετοχή του ή όχι σε Εκπαιδευτικά Προγράμματα Μουσείων [8]. Στην Ελλάδα, τα Εκπαιδευτικά Προγράμματα των μουσείων ξεκινούν ουσιαστικά σε μουσεία των Αθηνών από την δεκαετία του 1980, με πρώτο χρονολογικά ένα πρόγραμμα του Μουσείου Μπενάκη το 1978, ενώ από την δεκαετία του 1990 και ως σήμερα παρουσιάζουν μια εντυπωσιακή αύξηση και διάδοση σε πολλά σημεία της Ελλάδας [9]. Η δυνατότητα όμως που αυτά προσφέρουν για γόνιμη επαφή με το μουσείο, δεν θα πάρει σάρκα και οστά αν ο δάσκαλος δεν το επιδιώξει. Και δεν θα το επιδιώξει αν δεν εχει ενημερωθεί, επιμορφωθεί και τελικά πεισθεί ο ίδιος για τη σκοπιμότητα και τα οφέλη παρόμοιων δραστηριοτήτων (Βέμη [10]).

Ένα κοινό στοιχείο όλων των Εκπαιδευτικών Προγραμμάτων των μουσείων είναι η έμφαση που δίνεται στην προετοιμασία των παιδιών πριν τα παρακολουθήσουν (Hooper – Greenhill [11], [12]). Για το σκοπό αυτό σχεδιάζονται, από τους φορείς που τα οργανώνουν, ενημερωτικά φυλλάδια και άλλο εποπτικό υλικό, που να χρησιμοποιείται από τους εκπαιδευτικούς για να προετοιμαστούν οι ίδιοι και οι μαθητές πριν την επίσκεψη. Έχει όμως παρατηρηθεί, ότι οι εκπαιδευτικοί που δεν είναι οι ίδιοι καταρτισμένοι με κάποιον τρόπο, και άρα δεν έχουν προσωπικό ενδιαφέρον αλλά και δεν διαθέτουν την ανάλογη εξοικείωση και μέθοδο, δεν προετοιμάζουν καθόλου τα παιδιά αλλά βρίσκουν στο εκπαιδευτικό πρόγραμμα την ευκαιρία να εμπιστευτούν σε κάποιον τρίτο, τον μουσειοπαιδαγωγό, τους μαθητές ενώ οι ίδιοι παραμένουν παθητικοί θεατές (Δάλκος [13]).

Το ίδιο φαινόμενο παρατηρείται και σε σχέση με τα φυλλάδια και βιβλία που κυκλοφορούν σε πολλές ευρωπαϊκές χώρες και στην Ελλάδα και απευθύνονται κυρίως σε εκπαιδευτικούς, στους οποίους παρέχουν ιδέες για το σχεδιασμό και την εφαρμογή εκπαιδευτικών δραστηριοτήτων σε μουσεία και το ευρύτερο πολιτισμικό περιβάλλον. Η αποτελεσματικότητα της χρήσης τέτοιου τύπου βιβλίων από εκπαιδευτικούς που δεν έχουν σχετική κατάρτιση και δεν υποστηρίζονται στο έργο τους από την ευρύτερη σχολική νοοτροπία, μπορεί να είναι πολύ περιορισμένη, καθώς τα βιβλία από μόνα τους δεν τους βοηθούν να πλησιάσουν το περιβάλλον του μουσείου που είναι πολύ διαφορετικό από του σχολείου (Νάκου [14]).

Συμπληρωματικά με τα πιο πάνω, πρέπει να λάβουμε υπόψη ότι σύμφωνα με τη μέχρι σήμερα εμπειρία στην Ελλάδα και σε όλες τις άλλες χώρες, τα υπάρχοντα

Εκπαιδευτικά Προγράμματα στα μουσεία και κυρίως οι άνθρωποι που τα διεκπεραιώνουν, δεν είναι αρκετά για να ανταποκριθούν στη συνεχώς αυξανόμενη ζήτηση (Ψαρράκη-Μπελεσιώτη [15]). Μια λύση θα ήταν να αυξάνονταν το προσωπικό των εκπαιδευτικών τμημάτων των μουσείων και φορέων, αλλά ούτε κι αυτό αρκεί. Ανάλογο πρόβλημα παρατηρείται στη διάθεση μουσειοσκευών και δανειστικού υλικού από τα μουσεία και λόγω μεγάλης ζήτησης αλλά κι επειδή υπάρχουν πολλά απομακρυσμένα σχολεία που δεν έχουν πρόσβαση σε τέτοιο υλικό. Ωστόσο, ένας εκπαιδευτικός κατάλληλα εκπαιδευμένος, μπορεί όπου και να βρίσκεται να αξιοποιήσει τον μνημειακό πλούτο της περιοχής του οργανώνοντας ο ίδιος δραστηριότητες, χωρίς την συνδρομή άλλων παραγόντων. Ορθότερη αντιμετώπιση λοιπόν, θεωρείται από τους ανθρώπους των μουσείων η εκπαίδευση των ίδιων των εκπαιδευτικών (Κουβέλη [16]).

Στο μουσείο Victoria & Albert του Λονδίνου, η συστηματική έμφαση στην εκπαίδευση των υποψηφίων δασκάλων και των εν ενεργεία εκπαιδευτικών ήταν από πολύ νωρίς (δεκαετία του 1960) θέμα πολιτικής του μουσείου. Όπως σημειώνει η Marcousé [17]: "Η προσωπική πείρα δείχνει ότι ο μουσειοπαιδαγωγός του μουσείου έχει έναν ουσιαστικό άλλά περιορισμένο ρόλο να παίξει στις επισκέψεις των παιδιών στο Μουσείο. Δεν είναι αυτός που θα προετοιμάσει την επίσκεψη, ή θα αξιοποιήσει την εμπειρία του μουσείου στην συνέχεια της σχολικής χρονιάς. Το σημαντικό που μπορεί να κάνει ο μουσειοπαιδαγωγός, είναι να εξασφαλίσει στα παιδιά όσο περισσότερο χρόνο μπορεί σε απευθείας επαφή με τα εκθέματα στις αίθουσες. Αν όμως δεν υπάρχει προηγούμενη συμμετοχή του δασκάλου, θα υπάρχει και λιγότερη κατανόηση και λιγότερη ικανότητα για να χρησιμοποιηθεί με κατάλληλο κι έξυπνο τρόπο η ερεθιστική και ζωηρή εντύπωση του παιδιού από την επίσκεψη».

Σύμφωνα με τα παραπάνω, ο ρόλος του εκπαιδευτικού αναδεικνύεται σαν ο ρυθμιστικός παράγοντας για την επαφή, ή όχι, των παιδιών με τα μνημεία, από το νηπιαγωγείο ως και την τριτοβάθμια εκπαίδευση. Γίνεται φανερό επίσης ότι η καλή συνεργασία μουσείου - εκπαιδευτικών και η προετοιμασία των τελευταίων από τις σπουδές τους, θα ήταν ένα εχέγγυο και για την αποτελεσματικότητα των εκπαιδευτικών υπηρεσιών των μουσείων.

Οι μέχρι τώρα επισημάνσεις προέρχονται κυρίως από τον χώρο των μουσείων και σχετίζονται με την δική τους εμπειρία και οπτική πάνω στο θέμα μουσείο και σχολείο. Ας δούμε ωστόσο και την πλευρά του σχολείου. Έχει το σχολείο τους δικούς του λόγους για να επιδιώξει τη σχέση με το μουσείο; Έχει το ελληνικό σχολείο αναγνωρίσει ποιες ανάγκες θα μπορούσε να καλύψει η συστηματική και όχι ευκαιριακή στροφή του προς το κεφάλαιο πολιτισμική κληρονομιά; Έχει τέλος συνειδητοποιήσει ότι είναι χρέος του να εκπαιδεύσει τους αυριανούς πολίτες για τα θέματα του περιβάλλοντος, της προστασίας του μνημειακού πλούτου και για το τί σημαίνει να ζεις σε μια χώρα όπως η Ελλάδα που τα μνημεία της αποτελούν όχι μόνο εθνική αλλά παγκόσμια κληρονομιά (Lowental [18]) και βρίσκονται διάσπαρτα σε κάθε γωνιά; Καθρεφτίζονται τέτοιου είδους προθέσεις στα Αναλυτικά Προγράμματα Διδασκαλίας (Curricula); Προετοιμάζονται τέλος οι εκπαιδευτικοί για το σκοπό αυτό και από ποιους και πότε;

Στο πρώτο ερώτημα, το οποίο δεν είναι δυνατόν να απαντηθεί εξαντλητικά στην παρούσα ανακοίνωνη, θα μπορούσαμε να αναφέρουμε λίγα μόνον, αλλά ουσιαστικά επιχειρήματα. Ένας από τους βασικούς παιδαγωγικούς στόχους του σχολείου είναι η συγκρότηση της ταυτότητας και η απόκτηση ιστορικής συνείδησης. Στόχος που ενυπάρχει και πραγματώνεται τόσο σε προγράμματα τοπικής ιστορίας, όσο και σε προγράμματα λογοτεχνίας, περιβαλλοντικής και πολιτισμικής αγωγής και μπορεί να επιτευχθεί κατά τον καλύτερο τρόπο μέσα από την αλληλοτροφοδότησή τους (Αποστολίδου & Τσαρμποπούλου [19]).

Η συνείδηση της ιστορικότητας διευκολύνεται από την εξοικείωση με της έννοιες της μεταβολής, της συνέχειας, της αλλαγής και των συντελεστών της αλλαγής. Οι έννοιες αυτές αποκτούν, ιδίως για την παιδική αντίληψη, ευκρινέστερη υπόσταση με την προβολή τους σε έναν συγκεκριμένο τόπο και ό, τι αυτός εξυπονοεί: το φυσικό και δομημένο περιβάλλον, τους ανθρώπους και τις μετακινήσεις τους, τα ιστορικά γεγονότα που συνέβησαν σ΄ αυτόν. Ο ιστορικός χώρος βιωμένος από τα παιδιά, ακόμη και του νηπιαγωγείου, χάρη σε μεθοδευμένους παιδαγωγικούς χειρισμούς (Δημητριάδου [20]), αποτελεί το μέσο για την εμπέδωση ιστορικών πληροφοριών, βοηθά τα παιδιά στη συνειδητοποίηση της συμμετοχής των προγόνων αλλα και των ίδιων στον πολιτισμό και τα δημιουργήματά του, μπορεί να οδηγήσει στη διαμόρφωση θετικής στάσης απέναντι στην ιστορία του τόπου και να συντελέσει στον αυτοπροσδιορισμό του παιδιού, την συνείδηση της ταυτότητας αλλά και τον σεβασμό για τον άλλο.

Ως προς τα πλεονεκτήματα των σχολικών επισκέψεων σε σχέση με τις ατομικές επισκέψεις ή και αυτές που ενδέχεται να γίνουν με την οικογένεια, μελέτες επισκεπτών έχουν δείξει ότι, όταν τα παιδιά συνεργάζονται στο μουσείο, δουλεύουν ομαδικά και μοιράζονται τις πληροφορίες και την επεξεργασία ένός θέματος με τους συνομηλίκους τους, τότε μαθαίνουν περισσότερο και καλύτερα (Hein [21]).

Σχετικά με το κατά πόσο έχουν γίνει κατανοητές όλες αυτές οι δυνατότητες από το ελληνικό εκπαιδευτικό σύστημα, θα υπογραμμίσουμε τρείς παράγοντες που κατά τη γνώμη μας δημιούργησαν τις προϋποθέσεις, από την δεκαετία του 1980 και μέχρι σήμερα, στην προετοιμασία ενός ανοίγματος του ελληνικού σχολείου στα μνημεία που το περιβάλλουν.

Πρώτον, το άνοιγμα των ίδιων των μουσείων και των αρχαιολογικών, κυρίως, μνημείων στο μαθητικό κοινό μέσα από τα Εκπαιδευτικά Προγράμματα που αναφέρθηκαν. Πρέπει να τονίσουμε εδώ τη φωτισμένη δράση μεμονωμένων και γνωστών σε όλους μας, ανθρώπων, αρχαιολόγων κατά κύριο λόγο και όχι αναίτια αφού η πλειοψηφία των ελληνικών μουσείων είναι αρχαιολογικά, που με την άδεια και τη συνδρομή επίσης φωτισμένων εφόρων αρχαιοτήτων και διευθυντών μουσείων, οργάνωσαν τα πρώτα εκπαιδευτικά προγράμματα στην Αθήνα, για να εξαπλωθούν στη συνέχεια σε όλη τη χώρα. Στο πλαίσιο αυτό ιδρύθηκαν και δύο σημαντικές για τη δράση τους υπηρεσίες του Υπουργείου Πολιτισμού, το Κέντρο Εκπαιδευτικών Προγραμμάτων (1985) και το Τμήμα Εκπαιδευτικών Προγραμμάτων Ακροπόλεως την ίδια περίπου εποχή, που ήδη έχουν γράψει ιστορία. Έπρεπε όντως και ήταν καιρός, να γίνουν φιλικοί όλοι αυτοί οι χώροι για το κοινό και ήταν φυσικό αυτό το έργο να ξεκινήσει από τους «ανθρώπους των μνημείων» που τα γνωρίζουν, τα φροντίζουν και ήταν σε θέση, όταν συνειδητοποίησαν την ανάγκη, να μοιραστούν τα μυστικά και τη γλώσσα τους με ένα πλατύτερο κοινό που ανταποκρίθηκε με ενθουσιασμό, εννοούμε εδώ τους μαθητές των σχολείων. Κοντά στους μαθητές βρέθηκαν οι εκπαιδευτικοί, άνθρωποι-κλειδιά στο θέμα όπως υποστηρίξαμε.

Πώς όμως θα γινόταν να συνεννοηθούν μεταξύ τους αυτές οι δυο ομάδες, οι εκπαιδευτικοί και οι άνθρωποι των μνημείων για να υπηρετήσουν τον κοινό στόχο της εκπαίδευσης των παιδιών; Διαφορετική η κατάρτισή τους, οι πρώτοι δεν είχαν μέχρι πρόσφατα στις σπουδές τους καθόλου μαθήματα σχετικά με την τέχνη και τον ύλικό πολιτισμό και οι δεύτεροι δεν γνωρίζουν παιδαγωγική και ψυχολογία Όπως εύστοχα επισημαίνεται από τη Βούρη [22], «οι νέες δυνατότητες του μουσείου προϋποθέτουν και επιβάλλουν συνάμα την ανανέωση του παραδοσιακού ρόλου του σχολείου στην προοπτική της συνεργασίας του με το μουσείο και της οργανικής σύνδεσης της σχολικής με την μουσειακή εκπαίδευση».

Χρειαζόταν πρώτα απ' όλα μια *κοινή γλώσσα* μουσείου και σχολείου, καθώς κι ένα πεδίο συνάντησης και κοινού προβληματισμού. Αυτά τα προσφέρει η «Μουσειοπαι-

δαγωγική» (Δεληγιάννης [23]), δηλαδή η παιδαγωγική που προσιδιάζει στο χώρο των μουσείων, δευτερογενής παιδαγωγικός κλάδος που στην Ελλάδα αρχίζει μόλις να αναζητά την ταυτότητά του. Μπορούμε ακόμη να χρησιμοποιήσουμε τον γενικότερο όρο «Μουσειακή Εκπαίδευση» (Hooper-Greenhill [11]), που περγράφει τόσο την εκπαίδευση *για* τα μουσεία, όσο και την εκπαίδευση *μέσω* των μουσείων. Και στην περίπτωση αυτή, η προφανής ανάγκη για μουσειοπαιδαγωγική κατάρτιση τόσο των εν ενεργεία εκπαιδευτικών πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης, όσο και των εργαζομένων στα μουσεία, επειδή μέχρι πρό τινος το ελληνικό πανεπστήμιο δεν παρείχε μαθήματα Μουσειακής Εκπαίδευσης, καλύφθηκε από τα δημόσια και ιδιωτικά μουσεία με την μορφή σεμιναρίων, ημερίδων, συνεδρίων κλπ, αλλά και από τη δράση του ελληνικού Τμήματος του I.C.O.M., που όχι μόνο συντόνισε τις πρώτες συναντήσεις των εργαζομένων στα Εκπαιδευτικά Προγράμματα, αλλά και πρωτοστάτησε σε μια σειρά περιφερειακών σεμιναρίων για τους εκπαιδευτικούς που οργανώνονται από το 1990 μέχρι σήμερα ανά δύο χρόνια σε διαφορετική κάθε φορά πόλη της Ελλάδας (Χατζηνικολάου [24]).

Δεύτερος ουσιαστικός παράγοντας και πραγματικό ορόσημο για την εισαγωγή ενός γόνιμου προβληματισμού στο χώρο της ελληνικής εκπαίδευσης, προβληματισμού και δράσεων που απαιτούσαν την συνεργασία πολλών και διαφορετικών ειδικοτήτων και έφερε κοντά τα Υπουργεία Πολιτισμού και Παιδείας, εκπαιδευτικούς παράγοντες αλλά και καλλιτέχνες, μουσειοπαιδαγωγούς και αρχαιολόγους, αποτέλεσε για την Ελλάδα το Πρόγραμμα ΜΕΛΙΝΑ-Πολιτισμός και Εκπαίδευση (1995-2001), που φέρει το όνομα της τότε υπουργού Μελίνας Μερκούρη η οποία και το εισηγήθηκε και το στήριξε, όπως και οι διάδοχοί της υπουργοί. Το Πρόγραμμα ΜΕΛΙΝΑ είναι ουσιαστικά ένα πρόγραμμα εμψύχωσης και επιμόρφωσης εκπαιδευτικών, που αποβλέπει στην ανάπτυξη της θετικής τους στάσης προς τη Τέχνη και τον Πολιτισμό και τελικά στην αναγνώριση της παιδαγωγικής τους σημασίας (Παΐζης [25]). Ένα «δασκαλοκεντρικό», πραγματικά, πρόγραμμα που κατανόησε ακριβώς τον θεμελιακό ρόλο του σωστά προετοιμασμένου δασκάλου για την εισαγωγή καινοτομιών στην εκπαίδευση και επιμόρφωσε στα έξι χρόνια της πειραματικής εφαρμογής του 2.500 εκπαιδευτικούς. Από το 2001 μάλιστα, ξεκίνησε και η πρώτη φάση της γενίκευσης του προγράμματος σε όλα τα Δημοτικά Σχολεία της πόλης των Χανίων. Η εφαρμογή του ΜΕΛΙΝΑ σε επιλεγμένα σχολεία της χώρας βασίστηκε στο τρίπτυχο: επιμόρφωση των εκπαιδευτικών που θα το υλοποιούσαν, στήριξή τους με τεχνική, υλική υποδομή και ειδικά προετοιμασμένο εκπαιδευτικό υλικό και τέλος, εξασφάλιση συνεργασιών σε τοπικό επίπεδο, με μουσεία, θέατρα και άλλους φορείς πολιτισμικής αναφοράς. Το σχολείο βγαίνει από την απομόνωσή του και διαλέγεται με την κοινωνία και την πόλη!

Οι διεθνείς επιστημονικές συναντήσεις [26] που πραγματοποιήθηκαν στα χρόνια της εφαρμογής του ΜΕΛΙΝΑ ανέδειξαν προβληματισμούς κοινούς σε πολλές ευρωπαϊκές χώρες και κατέγραψαν προτάσεις για αναθεώρηση των προγραμμάτων σπουδών (curricula) της υποχρεωτικής εκπαίδευσης προκειμένου να ενσωματώσουν σ' αυτά την τέχνη, τον πολιτισμό, το περιβάλλον, τις διαθεματικές προσεγγίσεις. Θα έλεγε κανείς, ότι η πολιτισμική κληρονομιά αποτελεί σημείο σύγκλισης και προνομιακό πεδίο εφαρμογής όλων των παραμέτρων αυτής της ολιστικής προσέγγισης της εκπαιδευτικής διαδικασίας, αφού χάρη στα μνημεία μπορούν οι μαθητές να μελετήσουν κατά τον καλύτερο τρόπο, ιστορία και τέχνη, τεχνολογία, τις επιδράσεις των ανθρώπων στο περιβάλλον και αντίστροφα, τις θετικές επιστήμες, αλλά και τις κοινωνικές, οικονομικές και τόσες άλλες σχέσεις που αντανακλώνται πάνω τους. Όλη η ανθρώπινη ζωή καθρεφτίζεται στα μνημεία, που με το κύρος της αυθεντικότητας που διαθέτουν, μας πληροφορούν, μας διδάσκουν, μας τέρπουν.

Τρίτος παράγοντας, ήταν η εισαγωγή της Μουσειακής Εκπαίδευσης στο ελληνικό

πανεπιστήμιο. Τα πρώτα μαθήματα με αυτό το περιεχόμενο διδάχθηκαν μόλις το 1985 στο Τμήμα Προσχολικής Εκπαίδευσης του Αριστοτέλειου Πανεπιστημίου Θεσσαλονίκης, και το 1990 στο Παιδαγωγικό Τμήμα του ίδιου Πανεπιστημίου, ενώ σήμερα δεκαοκτώ χρόνια αργότερα, μαθήματα όπως: *Μουσειακή Αγωγή*, *Η Αρχαιολογία στην Εκπαίδευση*, *Μουσείο και Σχολείο*, *Πολιτισμική Κληρονομιά και Εκπαίδευση*, εμφανίζονται στα Προγράμματα Σπουδών των δώδεκα από τα δεκαέξι υπάρχοντα Παιδαγωγικά Τμήματα της χώρας σε προπτυχιακό επίπεδο σπουδών. Στην εισαγωγή αυτών των μαθημάτων πρωτοστάτησαν τα Τμήματα Προσχολικής Εκπαίδευσης, ενώ τα τμήματα Δημοτικής Εκπαίδευσης αν και είχαν περισσότερους λόγους να τα συμπεριλάβουν στις σπουδές τους μια και οι δάσκαλοι του δημοτικού σχολείου είναι υποχρεωμένοι να διδάξουν εθνική ιστορία και τέχνη, γεωγραφία, μελέτη περιβάλλοντος, καθυστέρησαν και τα περισσότερα, ακόμη και σήμερα, δεν έχουν τακτικές θέσεις διδασκόντων για τα μαθήματα αυτά.

Στο Πανεπιστήμιο Θεσσαλίας λειτούργησε (1998) και το πρώτο στην Ελλάδα Τμήμα Μουσειοπαιδαγωγικής Εκπαίδευσης (Δεληγιάννης [27]), στο οποίο μεταξύ άλλων φοίτησαν και αρκετοί εν ενεργεία εκπαιδευτικοί της πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης.

Δεν έχουν αντίθετα εισαχθεί, παρά σποραδικά, ανάλογα μαθήματα στα Τμήματα Ιστορίας και Αρχαιολογίας, Φιλολογίας και άλλων Επιστημών που προετοιμάζουν τους καθηγητές της δευτεροβάθμιας εκπαίδευσης. Για όλους αυτούς, υπάρχει προς το παρόν η διέξοδος των επιμορφωτικών σεμιναρίων των μουσείων και η δυνατότητα μεταπτυχιακών σπουδών σε δύο πανεπιστήμια: στο Διατμηματικό Μεταπτυχιακό Πρόγραμμα Σπουδών Μουσειολογίας (έναρξη λειτουργίας 2002-2003) του Αριστοτέλειου Πανεπιστημίου Θεσσαλονίκης που περιλαμβάνει στις κατευθύνσεις του και την Μουσειοπαιδαγωγική και στο Μεταπτυχιακό Πρόγραμμα του Παιδαγωγικού Τμήματος του Πανεπιστημίου Θεσσαλίας που ξεκινάει τον Σεπτέμβριο του 2003 με τίτλο: «Σύγχρονα περιβάλλοντα μάθησης και ανάπτυξη διδακτικού υλικού» και δύο κατευθύνσεις, μια για τις θετικές και μια για τις ανθρωπιστικές επιστήμες. Στην δεύτερη αυτή κατεύθυνση περιλαμβάνονται και μαθήματα σχετικά με τη διδακτική της ιστορίας μέσα από τα μνημεία της πολιτισμικής κληρονομιάς και τα μουσεία.

Πρέπει να χαιρετίσουμε την εισαγωγή της Μουσειακής Εκπαίδευσης στους επίσημους φορείς κατάρτισης των εκαπιδευτικών, γιατί έχει αποφασιστική σημασία. Αν απο την αρχική τους κατάρτιση γνωρίζουν οι εκπαιδευτικοί μεθόδους για την αξιοποίηση των περιβαλλόντων μάθησης που αποτελούν οι ιστορικοί τόποι και τα μουσεία, θα μπορέσουν να προχωρήσουν σε διαθεματικές προσεγγίσεις και projects που να συνδυάζουν περισσότερα του ενός διδακτικά αντικείμενα με την πολιτισμική κληρονομιά σε όλη την σχολική χρονιά, και θα διευρύνουν τις γνώσεις τους χάρη στα προσφερόμενα από τα μουσεία επιμορφωτικά σεμινάρια αργότερα. Ας μην ξεχνούμε ότι η παρακολούθηση τέτοιων σεμιναρίων έχει προαιρετικό μόνο χαρακτήρα. Επίσης με την εισαγωγή των μαθημάτων της μουσειοπαιδαγωγικής στην τριτοβάθμια εκπαίδευση, σε προπτυχιακό και μεταπτυχιακό επίπεδο, θα δοθεί σημαντική ώθηση στους τομείς της έρευνας και των πειραματικών εφαρμογών, που είναι απαραίτητο να αναπτυχθούν σε κάθε χώρα όπως η Ελλάδα με σημαντικό μνημειακό πλούτο και επιτακτικές ανάγκες για την διαχείρισή του.

Διαπιστώσαμε επίσης ότι από την επόμενη χρονιά, το Υπουργείο Παιδείας, ανταποκρινόμενο στο κλίμα που έχει δημιουργηθεί χάρη σε όλους τους παράγοντες που προαναφέρθηκαν, θα στείλει στα σχολεία και τα γυμνάσια νέα βοηθήματα, σε έντυπη και ηλεκτρονική μορφή, καθώς και τις απαραίτητες οδηγίες, προκειμένου ο μνημειακός πλούτος να αντιμετωπιστεί σαν μέρος της εκπαιδευτικής υποδομής της χώρας (Falk & Dierking [28]).

3. ΣΥΜΠΕΡΑΣΜΑΤΑ-Η ΠΕΡΙΠΤΩΣΗ ΤΩΝ ΙΣΤΟΡΙΚΩΝ ΠΟΛΕΩΝ ΚΑΙ ΟΙ ΕΚΠΑΙΔΕΥΤΙΚΟΙ ΣΑΝ ΠΟΛΙΤΙΣΤΙΚΟΙ ΕΡΓΑΤΕΣ

Η κατάλληλη προετοιμασία των εκπαιδευτικών στις σπουδές τους και ο σωστός σχεδιασμός εκπαιδευτικών δραστηριοτήτων στα μνημεία και τα μουσεία της πολιτισμικής κληρονομιάς με την συνεργασία σχολείου και μουσείου, είναι τα στοιχεία εκείνα που αναμφίβολα μπορούν να αποδώσουν μακροπρόθεσμα καρπούς και στο θέμα της διατήρησης των μνημείων. Οι εκπαιδευτικοί βρίσκονται σε καθημερινή σχεδόν επαφή με τους μαθητές τους, γνωρίζουν τις ιδιαιτερότητές τους και μπορούν από κοινού να ανακαλύψουν τους θησαυρούς ενός μουσείου, ή μιας πόλης – μουσείου, και να γνωρίσουν την αισθητική απόλαυση και τη χαρά της δημιουργίας εφαρμόζοντας προγράμματα σχεδιασμένα είτε από το Μουσείο, είτε και από τους ίδιους. Οι εκπαιδευτικοί μπορούν να μετατραπούν, όπως τους οραματίστηκε ο Henri Giroux, σε πραγματικούς «πολιτιστικούς εργάτες». Τί μπορεί να κάνει η πολιτεία για να βοηθήσει; Ποιές συγκεκριμένες προτάσεις θα καταθέταμε στην περίπτωση των ιστορικών πόλεων;

Με μια φράση, θα λέγαμε ότι η ιστορική πόλη θα έχει πολλά να κερδίσει αν αρχίσει να βλέπει ήδη τους εκπαιδευτικούς σαν αυτό που, έτσι κι αλλιώς είναι, πολιτιστικοί «εργάτες». Όταν λέμε πόλη, εννοούμε καταρχήν τις αρχές και την Τοπική Αυτοδιοίκηση, αλλά και όλους τους δημόσιους και ιδιωτικούς φορείς που κινούνται στην δημόσια σφαίρα και έχουν τη δύναμη να παραδειγματίζουν με την στάση τους την υπόλοιπη κοινωνία. Στην πράξη αυτό σημαίνει ότι η ιστορική πόλη:

1) Υποδέχεται, όλους τους εκπαιδευτικούς, ιδίως κάθε φορά που έρχονται από άλλη περιοχή για να διδάξουν εδώ, και τους ξεναγεί στο χώρο της. Είναι αδιανόητο να στερούνται μιας σοβαρής και υπεύθυνης ξενάγησης στην πόλη όσοι διδάσκουν τα παιδιά μας και τους αυριανούς πολίτες, την ώρα που την απολαμβάνει και ο πιο απλός τουρίστας. Κάτι που μας έκανε εντύπωση παρακολουθώντας από κοντά τους εκπαιδευτικούς του Προγράμματος ΜΕΛΙΝΑ, ήταν το πόσο θετικά τους εντυπωσίασε το ότι οι οργανωτές του προγράμματος τους υποδέχονταν με κάθε τιμή σε ωραίους, καλαίσθητους χώρους και τους αντιμετώπιζαν με σεβασμό.
2) Φροντίζει ώστε όλοι οι εκπαιδευτικοί, όλων των βαθμίδων και ειδικοτήτων, να ενημερώνονται συστηματικά και με φροντίδα για τις δυνατότητες επισκέψεων σε μνημεία και μουσεία, ρόλος που μπορεί να αναληφθεί από ένα Γραφείο Διασύνδεσης σχολείου και πολιτισμικής κληρονομιάς. Για τον ίδιο σκοπό προσκαλεί και τους εκπαιδευτικούς μεταξύ όλων των άλλων επισήμων και σημαντικών παραγόντων, σε εγκαίνια εκθέσεων, χώρων, και πολιτιστικών εκδηλώσεων και τους διευκολύνει και ενθαρρύνει στη συνέχεια να οργανώσουν επισκέψεις σε αυτά με τα σχολεία τους.
3) Ενισχύει κάθε είδους επιμορφωτικά σεμινάρια που τους αφορούν. Συγκεκριμένα θα πρότεινα σε όλες τις ιστορικές πόλεις να ενδιαφερθούν άμεσα για την εφαρμογή του ΜΕΛΙΝΑ στην περιοχή τους, ακολουθώντας το παράδειγμα της πόλης των Χανίων. Οι μη ελληνικές πόλεις μπορούν να συνεργαστούν στην κατεύθυνση αυτή με την Ελλάδα.
4) Επίσης δεν ξεχνούν, ο δήμος και οι άλλοι φορείς, να στέλνουν δωρεάν και συστηματικά σε όλες τις σχολικές βιβλιοθήκες και, όταν είναι εφικτό, και *ατομικά* σε κάθε εκπαιδευτικό, εκδόσεις, λευκώματα, πρακτικά συνεδρίων ακόμη και εξειδικευμένων, σχετικών με την πόλη, τη ζωή και τα μνημεία της.
5) Τέλος, φροντίζει να τους συμπεριλαμβάνει, με αντιπροσωπευτικό τρόπο, σε επιτροπές και προγράμματα εθνικά και ευρωπαϊκά, που διαχειρίζονται θέματα της πόλης-μουσείου όπου και οι ίδιοι ζουν κι εργάζονται και τους δίνει την

ευκαρία της συμμετοχής σε αποφάσεις που την αφορούν. Η *συμμετοχή* είναι ο καλύτερος τρόπος για να νιώσουν υπεύθυνοι οι άνθρωποι για την πόλη και να περάσουν αυτήν τη στάση και στους μαθητές τους.

Ας μην ξεχνάμε ότι και στο παρελθόν, φωτισμένοι εκπαιδευτικοί διέσωσαν στοιχεία του αρχαίου και λαϊκού πολιτισμού, δημοσίευσαν με όποια στοιχεία διέθεταν Τοπικούς Οδηγούς, φιλοξένησαν στη στέγη των απομακρυσμένων σχολείων τους συλλογές υλικού πολιτισμού και μάλιστα σε δύσκολους καιρούς.

4. Βιβλιογραφία – Σχόλια

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Λέξεις-κλειδιά: **Εκπαίδευση εκπαιδευτικών, Μουσειακή Εκπαίδευση, Σχολείο και Μουσείο, Ιστορικές πόλεις και εκπαίδευση**

Key-Words: **Teachers' Training, Museum Education, School and Museum, Historical Cities and Education**

ORADEA – ROMANIA EN TANT QU'UNE DES CAPITALES EUROPEENNES DE « L'ARCHITECTURE 1900 »

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Résumé : Le travail présente une partie des résultats d'un programme de recherche universitaire qui se deroule en commençant par l'année 1971. L'un des objectif de ce programme est ciblé sur l'intérêt professionel que les étudiants peuvent découvrir en travaillant sur l'architecture du territorire environnant " leur " Université . L'autre objectif est constitué par l'étude de l' "Architecture 1900 " réalisé dans la ville d'Oradea .

La comparaison avec l'architecture " 1900 " européenne , l' analyse du processus de développement urbain - dans cette période - à Oradea et les dimensions qualitatives et quantitatives du phénomène " Architecture 1900 " dans cette ville , prouvent l'ampleur significative de cette réalité . Une des conclusions majeures de l'étude est que la valeur historique et architecturale-artistique de ce patrimoine dépasse les cas les plus connus des villes de l'Europe.

La dernière partie du travail est dédiée au Programme que la nouvelle Faculté d'Architecture et de Génie Civil a déjà commencé à deroulér , en vue de garder vivant le patrimoine culturel de cette ville .

CARTE D'IDENTITE DE LA VILLE D ' ORADEA

La ville d'Oradea se trouve à l'extrémité nord-ouest de la Roumanie, à 10 km de la frontière roumaine avec l'Hongrie (Bihor County Turist Office [1]). Cet emplacement a marqué son évolution moderne . C'est une ville " frontalière "; situation qui a favorisé le mélange des cultures et des facteurs qui – d'habitude – déterminent l'évolution économique et aussi celle de l'architecture . Un autre trait caractéristique de cette ville se trouve dans le fait qu' Oradea constitue le résultat de l'unification – au milieu du XIX-eme siècle de quatre établissements humains , historiquement développés sur le territoire de la ville actuelle . De dimensions variables, chacun d'entre eux possédaient son propre centre historique et une assez forte tradition d'indépendence (Borcea, Gorun [2]).

A présent, Oradea est la résidence administrative du Département de Bihor , son role étant décisif pour l'évolution de cette unité administrative.

Traversée par l'artère routiere européenne E 60 qui roule sur toute la Roumanie , Oradea se trouve dans la position d'une porte d'entrée dans le pays. Sa population varie autour de 240.000 habitants. Elle se trouve à 515 km de Vienne, à 1564 km de Rome, à 256 km de Budapest, etc [1].

LES PRINCIPAUX ACTEURS SUR LA SCENE DU PATRIMOINE ARCHITECTURAL - URBAIN DE LA VILLE D'ORADEA .

Pour mieux comprendre la structure du patrimoine culturel de cette ville nous sommes obligés de mentionner l'existence de deux autres centres monumentaux qui marquent la ville de leur présence : il s'agit de la grande forteresse à bastions de type Vauban dont les origines sont liées à la Renaissance et du centre baroque , le

siège de l'Evêque catholique , un des trois grands proprietaires historiques des terres de la ville actuelle . Tous les deux liés à des vieilles communautés médiévales qu'on connait sous le titre de " petites villes d'Oradea " . La forteresse se trouvant dans " Oradea – La ville dessous " sur la rive gauche et le siège de l'évêque (palais , cathédrale et bâtiments des moines) se trouvant dans " Oradea – Olosig " sur la rive droite de la ville [2]. Ces centres architecturaux sont bien connus dans le pays et – aussi - à l'étranger .

L'Architecture 1900 constitue – du point de vue architectural - l'expression de l'existence de la nouvelle " Grande Oradea " après l'unification du XIX-eme siecle .

LA PRESENCE DE L'ARCHITECTURE 1900 EN ROUMANIE DANS LA LITTERATURE INTERNATIONALE

Dans la base documentaire de notre travail on peut trouver les publications qui constituent "les classiques" de l'Architecture 1900 sur le territoire de l'Europe et celui des Etats Unis (Duncan[3], Fahr-Becker[4], Pevsner[5], Pevsner[6], Sembach[7], Tschudi-Madsen[8]). On met, évidemment, l'accent sur les artéfacts, mais sans exception, ces volumes commençent avec l'architecture – la première des arts qui a basculé les "habitudes" architecturales néoromaniques, néogothiques et néoclassiques " du XIX-ème siècle.

L'enseignement universitaire nous a obligé à parcourir attentivement ces publications. Le résultat ? Le patrimoine "Architecture 1900" sur le territoire de la Roumanie est totalement absent. Les spécialistes s'arrêtent à Vienne – au mouvement de la Sécession . Dans le meilleur des cas on a introduit, récemment, l'Italie et la Russie [4] .

La surprise vienne de deux chercheurs japonais qui, dans leur splendide volume « Architectures 1880 - 1920. Images de fin de siècle » (Tahara, Myiake[9]) font l'honneur à deux monuments se trouvant en Roumanie. Leur forte expression en langage «Architecture 1900» a attiré l'attention des japonais qui - de cette manière - ont démontré que l'architecture européenne « 1900 » ne s'est pas du tout arrêté à Vienne. Ils présentent de splendides photos en couleurs et des fiches pour le complexe du «Vautour Noir » à Oradea et du "Palais de la Culture' de la ville de Târgu Mureş [9].

L'ETUDE DE L'ARCHITECTURE ET DE L 'ART 1900 EN ROUMANIE .

Une vue globale, couvrant les dernières 30 années d'études en Roumanie ayant pour cyble ce sujet, permet le dépistage de trois directions de recherche par lesquelles on a accumulé des résultats – a voir :

a). Les publications avant 1990. Trois des volumes du professeur architecte P. Constantin [10,11,12] ont intégré le sujet. Surtout le premier a démontré l'existence de fortes expressions "1900" dans les domaines des arts plastiques et de l'architecture manifestées sur tout le territoire de la Roumanie. Un chapitre spécial est dédié à l'architecture 1900 à Oradea (pages 90-130). A la fin du volume [10], l'auteur propose une chronologie générale de l'art 1900 commençant par 1875 – jusqu'au 1914. Cette proposition a le mérite d'inclure – à partir de 1882 – les manifestations de cette expression artistique en Roumanie. Les deux autres volumes [11,12] contiennent une présentation concentrée du premier volume dans le contexte international, et le dernier

introduit, dans son dictionnaire, les biographies des architectes actifs à Oradea en "style 1900" - Jakab, Komor, Mende, Vago, Rimanoczy, etc .

b). La recherche universitaire.

Dans les années '70, l'architecture "1900 " se trouvait – en Roumanie - parmi les sujets délicats à aborder dans une université, qualifiée de manifestation décadente de la bourgeoisie. 1970 étant l'année de la fondation de l'enseignement universitaire d'architecture à Cluj – par la première Section d'Architecture et d'Urbanisme (1970-1983), on peut parler de l'étude universitaire du sujet commençant avec les années '70 . Deux ans seulement après la fondation de l'école, l'auteur fait sortir un petit volume (100 pages) (Berindan[13]) qui contenait déjà, sous la forme d ' un cours universitaire, les structures des leçons dédiées aux mouvements "Arts & Crafts », « Glasgow School » et à toutes les variations de l'architecture " 1900 " sur le territoire de l'Europe. En plus, profitant de l'intérêt des étudiants , on a mis en marche une large recherche concentrée sur le territoire de la Transylvanie. Pendant trois années universitaires les étudiants ont fouillés les villes de Cluj, Tg. Mures et Oradea et sous la direction du professeur de l'Histoire de l'architecture ont communiqués leurs résultats – riches et quelques fois, couvrant des aspects très peu connus jusqu'alors. Les programmes officiels des sessions scientifiques de l'Institut Polytechnique de Cluj en sont les preuves (Berindan[14,15,16]). En 1992 l'auteur - travaillant à l'Ecole d'Architecture de Grenoble a soutenu une leçon spéciale dédiée à "L'Architecture 1900 en Roumanie".

A partir de 1997 , à l' Université d'Oradea , cette recherche est passée à une nouvelle étape. On approfondit "l'Architecture 1900" dans cette ville. Les résultats des dernières années s'accumulent. Nous sommes - plus qu'avant - motivés de soutenir l'idée - que cette ville mérite le nom que nous avons mis en tant que titre de ce travail.

c). Par la " troisième direction " nous comprenons le travail de recherche réalisé après 1995 par l'Office du Patrimoine Culturel National Bihor. Les résultats ont été obtenus sous le patronage du musée régional " Du Pays des Cris ", qui fait partie du réseau des institutions du Ministère de la Culture et de Cultes. Ce travail de documentation et d'expositions publiques a été produit surtout par le conservateur général de l'Office du Patrimoine, Mme. Rodica Hârcă (Harca[17,18,19]). Il s'est exprimé, surtout, par la voie de la photographie des détails caractéristiques : décorations des façades , des murs en général, de la ferronnerie des portes , portails et fenêtres et aussi des vitraux. Elles constituent le contenu des catalogues des expositions [17,18,19].

Mais ces résultats ne comptent pas des documents techniques à voir : relevés des façades , plans des batiments, sections, plans de situation , etc. On n'en trouve , non plus , l'approche des connexions de cette architecture par rapport à l'organisation de la structure urbaine et la constitution des ensembles urbains .

L'APPROCHE U R B A I N E .

C'est approche est essentielle en tant qu'expression d'une ville historique et représentative pour une certaine période de la ville en plein essor capitaliste .Pour réaliser ce type d'approche nous avons utilisés deux catégories de plans urbains a voir :

- des plans datés 1900, 1929 et 1986 publiés dans "L'Histoire de la ville d"Oradea'' et réalisés par des historiens [2];
- des détails du plan général de la ville contemporaine – qui font partie du Plan général de la ville c'est à dire le plan technique opérationnel utilisé - chaque jour - par les architectes - urbanistes, professionnels de la Mairie.

En étudiant les emplacements des plus connus bâtiments « 1900 » - à Oradea nous sommes arrivés à deux formules opposés qui expriment – d'après nous – les « Images urbaines 1900 » de la ville : l'agglutination et la dissémination .

L'AGGLUTINATION DU PATRIMOINE 1900 DANS L'ORGANISME DE LA VILLE D'ORADEA

En ce qui concerne cette formule , ce que frappe le visiteur de la ville c'est - surtout - la concentration des monuments " 1900 " au centre ville . Il s'agit d 'une suite de quatre ensembles urbains, des places et des rues ayant comme axe de composition la rivière du Cris . Dans une telle structure urbaine on comprend pourquoi nous mettons un tel accent sur l'absence , dans la littérature internationale, des réalisations "1900" sur le territoire de la Roumanie .

Pour confirmer la situation du cas étudié nous avons cherché un instrument d'analyse de cette réalité architecturale et urbaine. On a trouvé que la comparaison avec la ville de Bruxelles peut constituer une correcte évaluation des réalités architecturales de la ville d ' Oradea . Nous nous sommes servi - attentivement - du document que l' ARAU de Bruxelles (ARAU[20]) a publié en 1993 . On propose 58 d ' objectifs " 1900 " trouvés dignes d' être visités par les étrangers. Parmi ces objectifs on peut voir de nombreux pièces mineures comme : une plaque commemorative , un socle de statue, cinq vitrines de magasins et deux marquises en fer forgé , etc. On nous propose cinq travaux de Victor Horta , le nom des autres architectes mentionnés ne depassant pas les frontières de la Belgique .

Proportions gardées, on peut bien soutenir que le patrimoine " 1900 " de la ville d ' Oradea est – vraiment - consistant pour une ville qui comptait – en 1900 – un peu plus de 40.000 habitants Les composants forts de ce patrimoine sont assurés par :

- **Le nombre des bâtiments** entiers qui s' expriment par une architecture d'une forte personnalisation " 1900 " . Jusqu'à présent nous avons un premier inventaire de 31 batiments publics ou privés .Dans les rues entourant le centre de la ville , il y a encore des habitations familiales s'exprimant de la meme manière . D' habitude il s s' agit des maisons traditionnelles ayant une cave profonde et un rez de – chaussée dont la façade " 1900 " fait le charme des fronts de la rue.
- **L 'évantail des programmes** d'architecture équivalant n'importe quelle ville importante d 'Europe du commencement du XX –ème siècle : des hotels, des magasins , des restaurants , des salles de spectacles .
- **La valeur urbaine des ensembles** constitués à Oradea autour du seuil entre les deux siècles . Comme nous avons dit , il s'agit du processus d'agglutination des investissements capitales au centre ville .Ce centre est – encore aujourd 'hui – organisé par l'existence de 1 ' axe que la rivière Cris représente et qui traverse la ville du sud –est au nord –ouest .

Sur la rive gauche , la Place de 1 ' Union ou du " 1 Décembre " est soutenue par le front du plus interessant et plus connu des monuments " 1900 " de la ville - le Complexe commercial et culturel Le Vautour Noir remplaçant une vieille auberge " Le Vautour ". Le concours d'architecture organisé a permis à deux jeunes architectes Jakab et Komor de s 'affirmer avec un projet qui leur a apporté un grand succes professionnel (Komor, Jakab[21]). Les plans du " Vautour Noir " montrent la galerie

commerciale en tant que " passage couvert ", solution qu ' on trouve aussi dans d'autres pays de l' Europe contemporaine . Cette galerie réalise la liaison de la place avec les rues voisines. Par ses dimensions l'effet est impressionant . Malheureusement , sauf la verrerie qui garde l'original du vitrail du " Vautoir Noir " les details intérieurs du rez-de-chaussée se trouvent bien transformés par l'écoulement du XX – eme siècle. La salle de spectacles possède des décorations que Myiake [9] qualifie comme "sophistiquées" . Et les deux façades - l'assymetrique vers la place et la plus longue orientée vers la rivière constituent de vrais " monuments urbains de l ' architecture 1900 " .

Les rues de l 'Indépendence et V. Alecsandri sont articulées à la place , assez proches du « Vautoir Noir » . Elles possèdent – aussi - de remarquables bâtiments " 1900 " comme les palais Fuchsl (1904), Moskovitz (1912), le magasin connu sous le nom de « Gulliver » (1906 – 1910), en rénovation - et le bâtiment de la Caisse d ' Epargne Bihor .

Le front opposé de cette place centrale de la ville est constitué par deux immeubles importants : la Mairie de la ville et le siège de l' Evêque gréco – catholique – tous deux des monuments éclectiques. Ils portent - aussi – des éléments " 1900 " comme, par exemple, les vitraux du siège de l ' Evêque .

Trois importantes lieux des cultes chrétiennes complètent ce centre urbain d'un caractère ouvert et accueillant - auprès duquel se trouve l' une des deux grandes synagogues de la ville .

A l'aide d'un grand pont, cet ensemble est articulé à l'autre place centrale - à présent - Place du Roi Ferdinand (ex Place du Théâtre, ex Place dela Reine Marie) . En contrastant avec le néoclassicisme du théâtre , les autres bâtiments du milieu expriment - fortement – leur appartenance à l' " Architecture 1900 " : les palais « Adoryan I » et « Adoryan II »(1903 - 1907) , lies aux rues des Patriotes et de Moscou et, dans l 'autre coin de la place , le palais « Poynar » (1911) . Ce dernier est, à son tour , articulé à la longue axe piétonnière que nous avons - déjà – mentionnée : rue de la République (ex rue du Roi Ferdinand) . Cette axe piétonnière est fameuse dans la ville et dans la region en raison de son caractère monumental [2]. Sur les fronts de cette rue on peut, vraiment, parler d' " agglutination " des bâtiments tout à fait remarquables par leur architecture et - aussi – par leurs dimensions, les palais : Stern (1908 – 1909), Moskovitz (1905), Apollo (1912 – 1914), Darvassy , l'hotel Parc (ex Weiszlovitz 1911), etc.

Une étude récente - commmandée par la Mairie - ayant pour but la réhabilitation architecturale et fonctionelle de la rue Republicii (PRO-ARH[22]) relève la liste des monuments classés et des bâtiments à valeur " culturelle – ambientalle " qui ensemble, constituent sur une distance de 600 m, le fond d'expression monumentale de la rue . Ce projet est soutenu par une étude de "management urbain " (HIS+UDS[23]) qu'on espère valoriser dans les années à venir .

LA DISSEMINATION

Le programme d'architecture qui est caractéristique pour la dissémination de l'architecture " 1900 " dans le tissus de la ville c'est l'habitation familiale. Qu 'il s'agit des familles riches qui peuvent se permettre de payer un architecte de renom pour une résidence élégante ou qu 'il s ' agit de la couche de la population ayant des revenus moyens qui se fait construire une simple maison d'habitation - l'essentiel

est que la plupart des utilisateurs préfèrent avoir, au moins, la ferronerie de " leur" bâtiment travaillée en fer forgé avec des motifs végétaux ou geométriques qui les rapprochent de l'aspect général des palais contemporains de la ville.

En suivant les publications présentées à la fin du travail on peut parler - au moins - de 17 habitations ayant de telles caractéristiques. Certains de ces cas possèdent, non seulement des détails isolés , mais une conception architecturale originale complète - qui peut concurer n 'importe quelle " villa " des grandes auteurs de l'ouest européen . Exemplaires - de ce point de vue – sont les deux villas des frères architectes Laszlo et Jozsef Vago : la résidence de la famille Vago (1905) et villa « La Roche ». Le dernier – emmigré à Paris – est le père du Pierre Vago le fondateur et futur président de l'U I A (l'Union Internationale des Architectes). A ce tableau, on peut ajouter deux autres programmes isolés - le siège du Barreau des avocats (1909) et l ' Ecole des Gendarmes .

A la fin de cette analyse un premier set de conclusions s'imposent à voir :

- **en depit** de l'existence d'une ville de la Roumanie fortement marquée par de nombreux bâtiments divers appartenant à l'architecture " 1900 ", cette réalité ne se retrouve point dans les publications internationales sur le sujet ;
- **la valeur** urbaine des ensembles et des rues dont ces bâtiments constituent les composants majeurs a obligé la Mairie de leurs accorder une certaine attention ;
- **la valeur architecturale et le nombre significativement grand** des bâtiments complètement utilisables qui représentent une vraie « griffe « de la ville demande des travaux de recherche plus poussées qu'à présent .

LE PARTENARIAT " MAIRIE - ECOLE D"ARCHITECTURE ".

Après la révision des possibilités réelles – capables d'aider la sauvegarde et la mise en valeur de ce patrimoine - l'auteur propose un partenariat visant **:**
l'appui de la Mairie par l'accès aux archives propres et aux projets qui interessent les zones visées (Arhivele Nationale [24]) .

LE PROGRAMME DE LA FACULTE D'ARCHITECTURE ET GENIE CIVIL POUR EDUQUER ET FORMER EN VUE DE LA PRESERVATION ET DE LA GESTION DU PATRIMOINE CULTUREL .

Le programme mentionné plus haut comprend des études à caractère continue et des manifestations professionnelles visant :
A / l'organisation d'un « Cercle de recherches 1900 » où les étudiants en architecture intéréssés puissent approfondir ce domaine . Utilisant l'experience accumulée [14,15,16] le "Cercle" aurait pour but un inventaire complet et une étude approfondie des aspects historiques, urbains et architecturaux spécifiques.
B / la constitution d 'un Corp d' étudiants volontaires -formés en tant que **guides** – pour la présentation de cette architecture aux habitants de la ville et aux touristes roumains et étrangers ;
C / l'organisation alternative tous les deux ans des symposiums nationaux pour les scientifiques et des camps d'été pour les étudiants arrivants de toutes les écoles d'architecture du pays sur deux sujets : la Forteresse médievale et l 'Architecture 1900 à Oradea.

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ORADEA – ROMANIA EN TANT QU'UNE DES CAPITALES EUROPEENNES DE « L'ARCHITECTURE 1900 «

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Key words : architectural european capital, « 1900 Architecture », city of Oradea - Romania

Une initiative privée alliant protection du patrimoine et culture: l'expérience de la Fondation Marc de Montalembert à Rhodes

par Marc René de Montalembert

Exposé pour le 7ème Colloque International de l'Organisation des Villes Patrimoine de l'Humanité, Rhodes, septembre 2003

Les contributions d'initiatives privées à la conservation et à la valorisation du patrimoine culturel sont insuffisamment connues même si elles font aujourd'hui l'objet d'une plus grande attention. Ces contributions sont souvent marquées par une flexibilité et une diversification majeures en comparaison avec les institutions officielles dont le rôle demeure toutefois essentiel. Les initiatives privées représentent une masse d'efforts considérable mais leur potentiel est souvent peu connu et mal compris.

La présentation qui suit porte sur l'expérience de la Fondation Marc de Montalembert à Rhodes, ville du patrimoine mondial. Elle a pour objet d'apporter des informations et quelques réflexions sur la contribution de cette Fondation dans le contexte de la ville médiévale de Rhodes – celle d'une initiative privée d'origine franco-italienne dans cette ville grecque. Cette origine traduit bien la vocation d'une Fondation qui souhaite encourager le dialogue inter-culturel dans la région méditerranéenne plus particulièrement parmi les jeunes générations. Les fondateurs sont convaincus en effet que l'acceptation des diversités et des différences de cultures est une condition nécessaire pour l'instauration d'un climat de tolérance, d'acceptation des altérités et en dernier ressort de paix dans cette région si tourmentée.

Après un bref rappel de l'initiative de la Fondation dans le contexte de la ville de Rhodes nous indiquerons les cinq lignes d'action de la Fondation qui à travers la vocation culturelle donnent vie à l'effort de conservation.

L'initiative de la Fondation Marc de Montalembert[1] à Rhodes

Elle naît en 1995 avec la donation par les fondateurs à la Ville de Rhodes d'un jardin situé sous les remparts dans la ville médiévale. Ce jardin occupe une position particulière puisqu'il est situé au centre d'un ensemble architectural comportant à l'est une église et au sud un monastère byzantins, à proximité d'une grande demeure ottomane, et à l'ouest le rempart médiéval. Ces différentes constructions faisaient l'objet d'un programme de restauration important de la part du Ministère de la Culture. Par contre, le jardin – propriété privée, et trait d'union et élément de nature situé au cœur de cet ensemble – était exclu de ce programme : en état avancé de dégradation, c'était un terrain vague, et son pavillon central était en ruines. Jardin et pavillon risquaient de disparaître emportés dans une spéculation immobilière commerciale.

La donation a permis le transfert de propriété du terrain à la Ville de Rhodes. L'acte de donation à la Ville de Rhodes comporte trois conditions précises : la conservation à jamais du jardin en tant que tel, l'ouverture de ce jardin aux personnes qui participent aux activités

[1] La Fondation Marc de Montalembert, en l'absence d'un droit européen des fondations, est une fondation privée de droit français sous l'égide de la Fondation de France. Une présentation détaillée de la Fondation est accessible sur son site internet : www.fondationmdm.com

culturelles organisées dans l'église de Saint Marc[2] ou dans le monastère de Saint Georges, l'utilisation du jardin et du pavillon situé en son centre pour des activités culturelles, la Fondation prenant en charge les travaux de restauration. Ces conditions étaient essentielles pour **assurer la pérennité du lieu** – qui figure déjà sur les miniatures de Caoursin de 1490 – et **garantir son intégration dans l'ensemble architectural constitué par le jardin et les monuments voisins, dans le cadre d'une vocation culturelle affirmée**.

L'initiative de la Fondation a donc été conçue et conduite avec un objectif culturel précis en étroite association avec la Ville de Rhodes, dépositaire du lieu, et le Ministère de la Culture dans des conditions de coopération spécifiques. Dès le départ cette initiative se voulait strictement complémentaire du programme officiel de restauration conduit par le Ministère de la Culture. L'initiative de la Fondation devait apporter l'élément paysager et environnemental qui n'était pas prévu dans le programme de restauration et qui devait replacer dans un contexte harmonieux les monuments restaurés par le Ministère de la Culture. Réciproquement la conduite simultanée des travaux de restauration des monuments et du site de la Fondation a valorisé l'initiative de la Fondation en favorisant une intégration qui donnait tout son sens au jardin et qui permettait une mise en valeur réciproque du jardin et du complexe architectural qui l'entoure. Cette complémentarité était dès le départ une condition essentielle sans laquelle la Fondation n'aurait pas pris cette initiative; elle a ensuite stimulé une fructueuse collaboration qui ne s'est jamais démentie.

<u>Les cinq lignes d'action de la Fondation sur le site de Rhodes</u>

Les cinq lignes d'action suivantes illustrent les orientations culturelles que la Fondation applique à l'initiative de conservation du site de Rhodes pour le faire vivre.

- **la restauration du jardin et du pavillon a été conduite par la Fondation avec le souci de respecter l'histoire et la succession des cultures** qui ont marqué ce lieu. Il ne s'agissait pas de privilégier une époque particulière, par exemple l'époque médiévale des chevaliers, ni de recréer à l'identique un jardin médiéval qui aurait été un essai de reconstitution théorique et figée, ignorant les effets du temps qui passe et de la vie qui change. Bien au contraire, le travail de restauration a systématiquement respecté les interventions qui se sont succédées époque après époque. Ceci conduit parfois à de véritables énigmes qu'il faut avoir la modestie de reconnaître : c'est ainsi que le bassin ottoman au centre du jardin de la Fondation est inscrit dans des arcs médiévaux - plus anciens - dont certains éléments datent de l'époque byzantine et d'autres de l'époque des chevaliers, ce qui rend particulièrement difficile la lecture de l'histoire et de la fonction de cette construction. Nous avons pensé que la restauration devait avoir la modestie de ne pas réinventer ou interpréter ce lieu, mais d'accepter l'étroite imbrication des interventions des cultures qui s'y sont succédées, ces mêmes cultures qui avaient assimilé et intégré les interventions qui les avaient précédées.

  Quatre années de travaux ont été nécessaires à la Fondation pour restaurer le pavillon central du jardin[3]. Les éléments de construction de différentes époques ont été mis à jour au fur et à mesure que les travaux progressaient : le pavillon s'est développé par interventions qui se sont succédées et superposées depuis six siècles au moins à en juger par l'appareil byzantin des murs et du puits au niveau inférieur. Les trois arcs

[2] L'idée de la donation est née tout d'abord de la volonté d'offrir à l'église de Saint Marc le jardin qui lui est mitoyen.

[3] La restauration du pavillon a été effectuée sous la conduite de l'architecte Antonio Barrile assisté par l'architecte Mihail Zerledis, une belle collaboration italo-grecque.

d'époque médiévale autour du bassin central ont été dégagés. Les espaces intérieurs du pavillon ont été aménagés dans le respect de leur typographie ottomane originale afin de servir de lieu de rencontre. Ces éléments ont été mis en évidence dans leur diversité. Ils ont été conservés et restaurés en faisant appel aux matériaux et techniques traditionnels.

Quant au jardin, en l'absence d'indication spécifique sur le terrain, et après une recherche approfondie, son dessin a été élaboré comme une interprétation moderne, une évocation du jardin médiéval et du jardin ottoman. La forme carrée y est utilisée de façon répétée avec des dimensions qui sont des multiples de celle du bassin carré central. Cette répétition agit comme un jeu de miroirs : carré de plantes, carré de pierres, carré plein, carré vide souligné par sa bordure. Le tout joue sur les différentes teintes et couleurs et privilégie les plantes méditerranéennes dont on connaît l'existence avant la découverte de l'Amérique – ceci afin d'éviter les plantes introduites et acclimatées plus récemment. Un jardin n'est jamais achevé et son développement se poursuit dans ce même esprit.

C'est une leçon d'acceptation des différences et de tolérance interculturelle à laquelle est invité le visiteur qui observe le travail de restauration et de conservation du site qui a été réalisé. C'est avant tout une atmosphère d'harmonie et de paix que l'on voudrait que le visiteur ressente en ce lieu, une invitation à la contemplation extérieure de l'ensemble architectural à l'entour et à celle intérieure que suscite la perception de l'harmonie.

- **Le jardin et son pavillon sont offerts à la vue du public lors de l'ouverture annuelle et à l'occasion des activités culturelles réalisées dans les monuments voisins**. La fête de Saint Marc est chaque année le jour de l'ouverture à tous - la journée « portes ouvertes » - durant laquelle tous les habitants de Rhodes peuvent connaître ou reconnaître ce qui a été donné à leur patrimoine communautaire par une initiative privée. Par ailleurs, et en accord avec le Ministère de la Culture, le jardin est ouvert aux participants des activités culturelles - concerts, conférences, expositions, etc. - organisées dans les monuments voisins ou à l'occasion d'événements culturels importants comme des colloques ou des manifestations culturelles majeures. Dans un cas comme dans l'autre l'objectif est celui de la sensibilisation culturelle en montrant un exemple de restauration d'un jardin et son intégration au milieu d'un ensemble architectural exemplaire de la ville médiévale de Rhodes.

  Le nombre de visiteurs ainsi que l'intérêt qu'ils expriment, le respect qu'ils manifestent pour le lieu et son histoire, pour les plantes et leur floraison traduisent l'impact du jardin et l'effet de sensibilisation obtenu à l'occasion de ces ouvertures. On peut espérer que ce jardin serve d'exemple et qu'il inspirera d'autres initiatives similaires, publiques et privées, dans la ville médiévale – les miniatures de Caoursin montrent en effet que la ville de Rhodes à la fin du XV ème siècle était pleine d'arbres et de jardins.

  Par ailleurs, tout au long de l'année, des groupes nombreux de visiteurs font le tour de la ville médiévale en marchant sur le rempart qui borde le jardin à l'ouest : ils profitent de la vue plongeante sur le jardin qui s'offre à eux. C'est aussi l'occasion d'élargir la sensibilisation grâce à une autre vision du jardin et du cadre médiéval qui l'entoure.

- **La Fondation offre chaque année l'hospitalité à Rhodes à des jeunes originaires d'un pays riverain de la Méditerranée**. En effet la Fondation attribue une bourse annuelle, parfois plusieurs, à des jeunes de moins de 30 ans pour la réalisation d'un projet culturel lié à la découverte de la diversité et à la connaissance des richesses des cultures de la région méditerranéenne : un voyage hors de son propre pays est un élément essentiel, obligatoire du projet. Les lauréats de la bourse sont invités dans le cadre de leur projet à séjourner à la Fondation pour une période maximum de six mois.

  L'hospitalité offerte aux boursiers est pour eux non seulement l'occasion de séjourner dans un lieu privilégié, favorable à l'approfondissement de leur projet et à l'élaboration de ses résultats. Cette expérience constitue aussi une invitation à connaître en profondeur la ville de Rhodes, les conditions de vie et les relations humaines dans le contexte particulier d'une ville au patrimoine historique et pluri-culturel aussi remarquable.

- **La Fondation met à disposition le site de Rhodes pour des rencontres à caractère interculturel**. Les espaces restaurés, en particulier dans le pavillon au centre du jardin, ont été aménagés de façon à accueillir des rencontres de dialogue informel. Dans ce but, l'aménagement interne vise à stimuler les échanges entre participants souhaitant dialoguer sur des thèmes d'intérêt commun. La Fondation privilégie les thèmes à caractère culturel sur lesquels peuvent se rencontrer des jeunes provenant de plusieurs pays ou cultures de la région méditerranéenne. Ces rencontres doivent faciliter la connaissance et la reconnaissance mutuelles toujours dans le but de mieux accepter les différences et de reconnaître la richesse de la pluralité et de la diversité culturelles.

  L'hospitalité donnée au Forum des jeunes dans le cadre de ce 7ème Colloque international de l'Organisation des villes patrimoine de l'humanité constitue un exemple de ce que la Fondation souhaite faire. La tenue d'une telle rencontre dans un lieu paisible et harmonieux, restauré et profondément intégré dans le cadre même de la ville médiévale devrait encourager les participants à exprimer leurs attentes et leurs expériences ainsi que les façons dont ils peuvent envisager leur propre participation à la conservation et à la mise en valeur culturelle de leur ville d'origine.

- Enfin **des visites de groupes intéressés**, d'étudiants ou même d'écoliers, peuvent être organisées à la demande **pour qu'ils observent la contribution du jardin à l'harmonie de l'ensemble du site** et à la restauration du complexe architectural au centre duquel il se trouve. C'est l'occasion de souligner l'importance du cadre naturel et de l'environnement dans la préservation du patrimoine culturel. Le parcours des visites consiste systématiquement en un passage à travers l'église de Saint Marc, le jardin et le monastère de Saint Georges ou vice versa : le lien paysager est ainsi mis en évidence – les monuments aussi beaux soient-ils ne sont pas faits seulement de pierres mais aussi du paysage dans lequel ils s'insèrent et de la nature qui les met en valeur.

  L'objectif est également de souligner voire de communiquer l'expérience acquise dans la mise en place de ce jardin : en particulier l'esprit qui a inspiré son dessin, l'importance des plantes traditionnelles de la région, les possibilités qu'offre leur utilisation pour restituer l'atmosphère du lieu et une harmonie de couleurs et de formes.

Quelques remarques en guise de conclusion

Une des caractéristiques originales de l'initiative de la Fondation Marc de Montalembert est d'agir dans le cadre d'une donation sous conditions. La donation ôte à la Fondation toute idée de possession et fait donc qu'elle agit gratuitement. Les conditions qui accompagnent l'acte de donation engagent la Ville de Rhodes dans la pérennité de la conservation du lieu en tant que jardin et établissent les conditions d'« utilisation culturelle », c'est à dire la libre initiative de la Fondation dans la mise en valeur culturelle du lieu. Simultanément un dialogue permanent avec le Ministère de la Culture a permis un développement et une exécution concertés des travaux de restauration des monuments avoisinants et du site proprement dit de la Fondation ; le résultat est un ensemble intégré dans lequel le visiteur fait difficilement la séparation entre les entités effectivement responsables.

Des conditions de coopération optimales avec la Municipalité de Rhodes et avec le Ministère de la Culture ont accompagné le travail de la Fondation Marc de Montalembert depuis le lancement de son initiative à Rhodes en 1995. Le dialogue, la confiance mutuelle et la coopération entre les responsables n'ont jamais manqué : dans cette mesure nous pensons que l'expérience de la Fondation Marc de Montalembert à Rhodes constitue une référence exemplaire de coopération entre une initiative privée et des institutions publiques en Grèce et à Rhodes en particulier.

L'un des aspects plus originaux de l'initiative de la Fondation est la restauration du jardin – action originale et délicate qui requiert protection et soin continu. Il n'y a donc qu'en apparence un paradoxe à ce qu'un lieu donné à la ville ne soit ouvert au public qu'une fois l'an. De plus on peut souligner la diversité des occasions pendant lesquelles cet espace est mis à disposition de visiteurs, de participants d'activités culturelles ou d'hôtes pouvant y séjourner des périodes relativement longues. Et, évidemment, les habitants de Rhodes sont toujours les bienvenus lorsqu'ils s'intéressent à la Fondation.

Les difficultés rencontrées dans la restauration du jardin constituent une expérience importante dont les leçons ont une portée plus large. On a privilégié systématiquement les plantes méditerranéennes. Quelques-unes étaient présentes à Rhodes à l'état sauvage; il a fallu importer donc la grande majorité de France, d'Angleterre et d'Italie. Il existait peu de savoir et d'expérience sur place au moment de l'installation du jardin et il a fallu peu à peu bâtir cette expérience et développer un savoir-faire. Un corps de personnel formé à l'entretien des espaces verts de la ville médiévale manque à Rhodes : tout effort pour insérer et préserver - comme il se doit - l'élément paysager dans les travaux de restauration de la ville médiévale exige la formation d'un personnel qualifié qui fait grandement défaut. Cela exige également un travail de sensibilisation et une incitation aux pépiniéristes locaux pour qu'ils produisent sur place les plantes méditerranéennes qu'il faut importer actuellement.

L'initiative de la Fondation Marc de Montalembert contribue de façon originale à valoriser le patrimoine de la ville médiévale de Rhodes : le jardin, espace de nature et de paix, lieu de mémoire vivante, se marie avec les pierres et les silhouettes de l'ensemble architectural qui l'entoure et qui témoigne de la richesse de l'héritage culturel. Les activités culturelles font vivre ce jardin et le mettent en valeur. L'expérience acquise est positive, en particulier en ce qui concerne le partenariat avec la Ville de Rhodes et le Ministère de la Culture. Il est important pour cette initiative privée comme pour d'autres qui pourraient la suivre que ce type d'action s'inscrive dans la durée sur la base de la confiance et d'un engagement partagé.

RECENT CZECH DEVELOPMENTS IN CULTURAL HERITAGE RESEARCH AND EDUCATION BASED ON A PARTNERSHIP WITH HISTORIC CITIES

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Abstract

Paper presents selected results of about eight years of co-operative and concerted activities developed in a close partnership with Czech World Heritage Cities and the Czech Academy of Sciences and oriented to research and education. An associated research centre investigating historic structures and sites was established in 1995 in Telč – a WHC – according to an agreement between the town's Mayor and the Academy of Sciences. The scope of activities and research grants quickly developed from local and national problems to all-European and trans-Atlantic projects. Presented cases cover research into problems of management and urban planning of historic cities, methods for involvement of citizens into process of environmental impact assessment, problems of tourism in relation to socio-economic issues, degradation of historic materials and structures and maintenance problems. Attention is paid to special cultural and natural heritage education needs in respect to both the historic city management and professional conservation activities. A country-wide questionnaire campaign on this problem is analyzed and a co-operation with under-graduate as well as graduate and post-graduate facilities, recently established in Telč, is discussed. This experience is completed with typical examples of joint European collaboration supported by an EC project "ARCCHIP – Advanced Research Centre for Cultural Heritage Interdisciplinary Projects" and performed in historic cities.

Introduction

Story

Let us start with a story: Telč - a Moravian World Heritage City – belongs with its 6000 inhabitants among the smallest in the family of UNESCO listed World Heritage. Despite of this, the city has regularly presented its achievements at all OWHC Congresses since the first one in Fes in 1995. One of the reasons for such an activity is connected with a tight and close co-operation in national as well as international research programmes. Shortly after the inscription of the city on the WHC list, the city was offered a Technical Assistance programme of the Council of Europe. The author of this paper, who was at that time more experienced in research rather than in cultural heritage city management issues, was charged as the Head of the Town Architect Office to materialize that programme and the subsequent follow-up programme on the Telč Municipality side. However, the resources in such a small city were and still are very limited and it was necessary to secure funds from other sources. Because the majority of problems which had to be solved had general characteristics, one of a very natural solution was their coupling with research. The results are then not only applicable in the city of Telč but have a wider validity and are useful for other historic settlements. The research co-operation with Telč and other historic cities was formalized in 1995 when an *Associated research centre for historic structures and sites* (ARCHISS) as a detached part of ITAM was established in Telč according to an agreement between the Mayor of Telč and the President of the Academy of Sciences of the Czech Republic. The ARCHISS has been deeply

involved in several national research projects and together with the Telč Municipality in a development programme of the Council of Europe "Telč XXI". The budget raised from almost zero to more than 100 000 Euro per year. A substantial feature of the "Telč XXI" Programme was involvement of three Czech governmental bodies – Ministry of Culture, Ministry of Environment and Ministry for Regional Development – and the State Institute for the Care of Monuments into the research and development projects. This, rather national, level of projects was substantially enhanced in 2000 when ITAM received a grant from the European Commission 5th Research Framework Programme and has been considered a European Centre of Excellence ARCCHIP. This *Advanced Research Centre for Cultural Heritage Interdisciplinary Projects* is the only one concerned cultural heritage and historic cities in the Central and Eastern Europe among 34 EC recognized research centres. At the beginning of the year 2003, there are three EC supported research and technological development projects being solved in ITAM, one US (NSF)-Czech project and two national projects oriented into cultural heritage problems. The budget per year increased nearly three times, new employment positions were created and the international co-operation involves tens of partners all over the world. Some useful results of the past seven years of activity of joint research with the city of Telč is presented below.

Dissemination of the achieved results
Research results without dissemination are not very useful. Therefore, the next logical step generated joint activities in the field of education, training and a rise of public awareness. The last item was a subject of the "Telč XXI" programme and brought about exhibitions, publications and video films. Training and courses on cultural heritage issues are carried out within the ARCCHIP programme and involve joint events with other bodies, as e.g. with the Getty Conservation Institute. In the field of educational activities, the ARCCHIP provides Czech schools with relevant research results and designs study programmes. Let us mention joint activities with a college level school for travel and tourism established in Telč in 1997, a new BSc course for the regional undergraduate university on cultural heritage engineering. Under a joint initiative of the city of Telč, the Academy of Sciences and two major Czech universities – Czech Technical University in Prague and the Moravian Masaryk University of Brno – new conservation oriented courses were opened in Telč starting the 2002/2003 school year. The city of Telč provides the universities with necessary premises on its famous square. (Some investigations relevant to the education problem are reported on in the second part of the paper).

Research partnership with historic cities

Urban planning and management tools
Results of a three years project on documentation, assessment and safeguarding and enhancement plans of historic cities was presented at the OWHC Congress in Evora 1999 and later in detail in (Drdácký [1]). Therefore, let us discuss rather the response of professional community to those results and opinions which were presented during discussions with main actors of the historic city planning and of the management process, which relate to educational needs.

Documentation systems The resulted scheme for a suitable documentation system for historic cities involves not only historical and conservation issues but also a quite large set of data necessary for urban planning, maintenance planning and socio-economic analyses. This

approach is considerably interdisciplinary and therefore difficult to be accepted by usually very narrow thinking professionals, mostly from the conservation field or by architects. Anyway, the positive reactions brought about a co-operation in the education of cultural heritage cataloguist in the framework of an international project RICU supported in Italy. The ever increasing development of IT technology hardware made it affordable even for villages all over the world and enables to collect and record data which are useful not only for the settlement management. They are of a great importance and value for history. Anyway, a considerable change of attitudes to a necessary interdisciplinarity cannot be achieved without a proper education.

Safeguarding and enhancement plans Briefly summarizing our results, the proposed methodology is based on a two step level or a two step approach. First, a general plan is created and accepted in order to identify and protect main conservation interests over a territory. Second, detail zone or even object oriented safeguarding plans are elaborated with necessary surveys and analyses. Such an approach on one side economizes and optimizes the planning costs, on the other side, it safeguards main cultural heritage assets over large territories in time and enables detailed surveys in a due time when necessary resources for a subsequent treatment exist and a more developed methodology and technology is available. While this approach has been widely accepted and its usefulness appreciated, some obstacles occurred during discussions about the contents and a basic background for safeguarding and enhancement philosophy. Three groups of potential planning tool users were invited to discuss the results: municipality officers, state heritage authority officers and architects – urban planners. All of them manifested strongly differential opinions. The most aggressive group were the architects who generally did not want to accept any constraints yielding from the safeguarding plans. They consider them as preventive measures against a free creativity. On the other hand, the governmental heritage protection officers feel themselves insufficiently competent to formulate in the planning documents a priori conditions concerning built heritage conservation, use and possible interventions. The municipality officers are mostly happy if they have clearly described guidelines and plans which do not need any further explanation or interpretation. Of course, in some situations they prefer to have "free hands" for arbitrary decisions. It is necessary to mention that any intervention project approval procedure in the Czech Republic usually never experiences a simultaneous negotiation of the building permission office, heritage officer, architect and client (the building owner). Therefore, the negotiation culture, preparedness and abilities are generally very weak and they should be most definitely improved by a proper education, too. Even though, this subject is frequently overlooked as marginal, (see educational part).

Involvement of citizens into decision processes
An international co-operation with one EC 5th FP supported research project SUIT (Sustainable Development of Urban Historical Areas through an Active Integration within Towns) enabled to apply and test in the Central European environment a developed methodology designed to measure the perception and attitudes of people using cultural and historic spaces. A total of 202 interviews were held in two selected historical spaces - historic square of the UNESCO World Heritage City of Telč in Moravia and the Old Town Square within the centre of Prague, another WHC in Bohemia, over two weeks in November 2002. The measures against seven indicators of perception and attitude were investigated (main dimension of experience in space, public's awareness of surroundings, mood, perceived quality of the environment, awareness of change, attitude towards change, confidence in

further consideration of opinion). The study helped substantially to discover weak and strong points of city management. A detailed analysis of the achieved results is out of the scope of this paper, nevertheless, let us mention some findings which call for a higher interdisciplinary knowledge by responsible city managers.

Tourism related problems

In the recent decade we are witnesses of a large travel and tourism "boom". Even though it is materialized rather in the area of recreational, entertainment and shopping tourism, it affects cultural tourism substantially, too. An increased number of visitors to historical sites have both positive and negative effects and their study is a subject of ever increased research. Some results were presented in (Drdácký [2]).

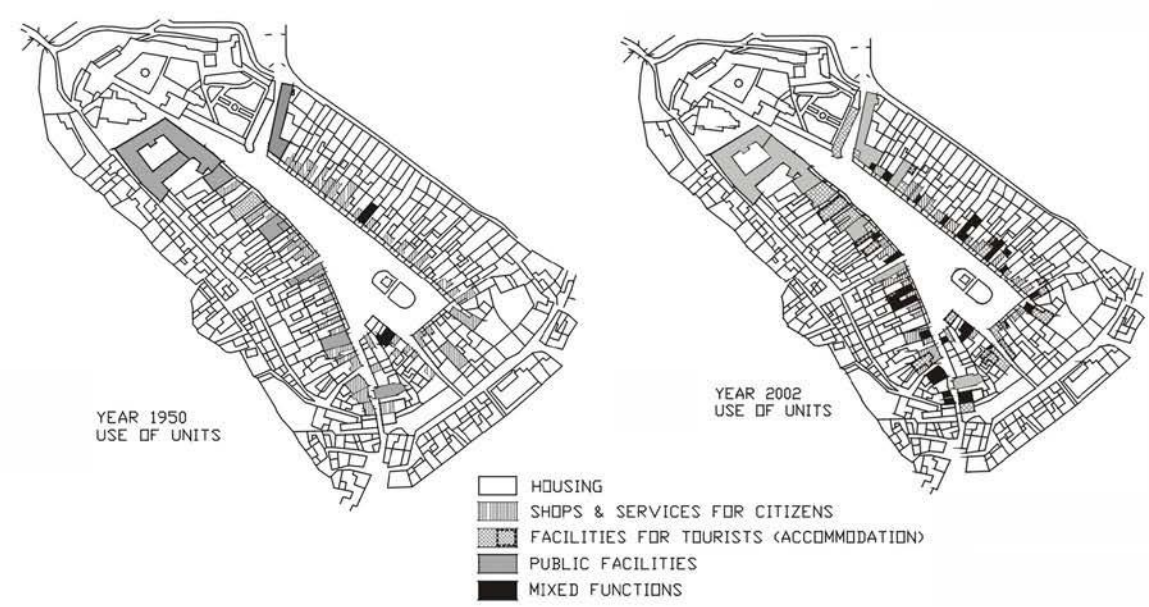

Figure 1. Functional changes of houses on the Telč square during last 50 years.

Besides wear and tear problems, environmental changes – mostly indoor – and vandalism, which all bring about physical damages and a gradual loss of our material cultural heritage, there exists also an important impact on socio-economic life of historic cities. In fact, the economic consequences are very hard to be followed. Nevertheless, we know that direct benefits from tourism measured by monetary meter and associated with a specific historic object are not sufficient to balance all costs necessary for maintenance and operation of the monument. The non-direct effects, especially an increased employment and trade in historic cities are beneficial but have also negative consequences, namely in the local cultural and social life. An example of danger from prevailing orientation to tourism in less developed societies has been published by (Yamamura et al. [3]). Nevertheless, the negative phenomenon concerned a social stability of the traditional society, which manifested itself in the Chinese town Li-Jiang within only three years after its inscription on the WHC list, have been recognized in Telč, too, (Drdácký [4] and the illustrative Figure 1). In this Central European environment, it is not so severe and well pronounced, but here no special support to tourism development has been adopted and, therefore, the process is much slower. Of course,

it exists, it is very natural and brings about an erosion of cultural heritage values of a historic city and a substantial lowering of richness of its local cultural life.

Safeguarding of material substance of cultural heritage

Four of our recent research projects focused on problems of historic material and structural degradation as well as to methods of their treatment. It is very surprising how many myths and false opinions can be found in expert reports concerning failure analyses of historic objects. The same is valid about differential remedy procedures and techniques which are recommended by construction companies willing to sell their products without a proper scientific justification for their applications. Some of them even have rather negative than positive impact. Unfortunately, a discovery of real causes of many failures and deterioration processes as well as investigations of long term behaviour of new conservation materials and technologies need time periods which must be counted in years. Therefore, a generalization of research results acquired during specific projects in historic cities is so valuable and desirable. The applied diagnostics and remedial techniques must be appropriate, reliable and sustainable. There is a need of a constant dissemination of the most recent research results by means of all life education and short courses, which is another important feature of educational systems. The effectiveness of those activities is again multiplied by co-operation with historic cities and is vital for a necessary feed back for planning a reasonable research.

Specific tasks

Historic cities enjoy special benefits from specific research projects which are oriented to development or testing by case studies new approaches and technologies. In the case of Telč, it was, e.g. a development of a GIS system over a large territory involving cultural heritage

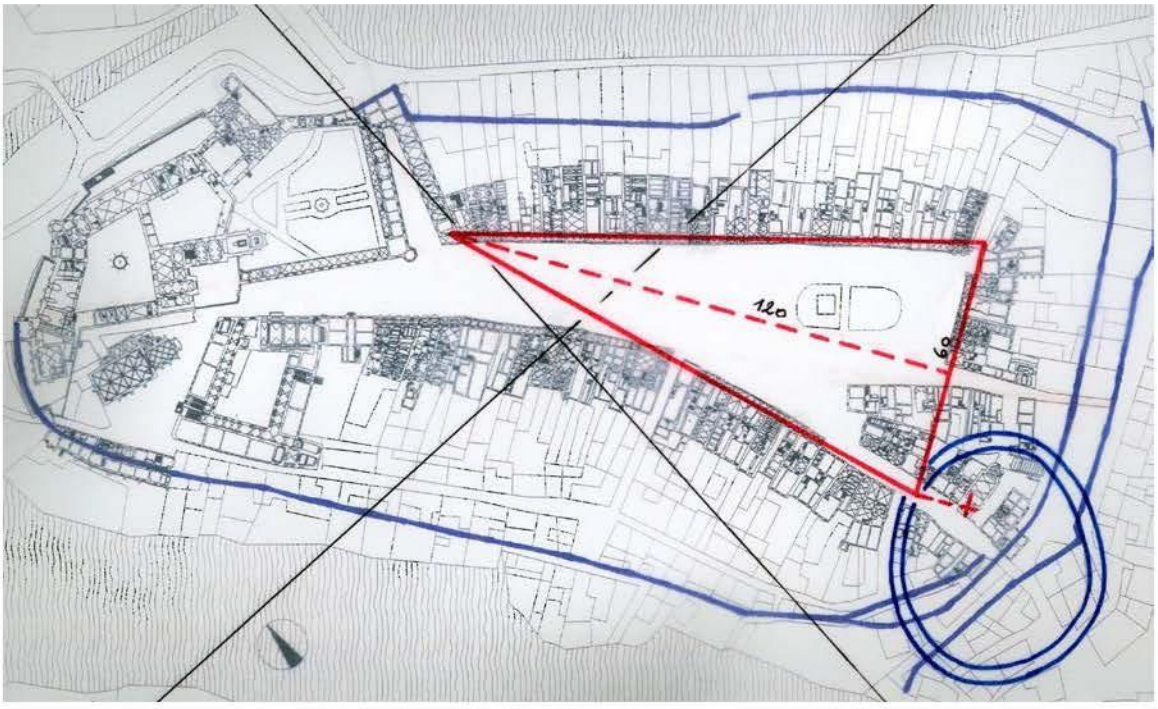

Figure 2. An illustration picture explaining the relation of the medieval market place to the contemporary shape of the Telč square.

issues. Among the ongoing projects, let us mention digital mapping and creation of a 3D digital model of the city or analysis of the medieval founding system of Czech walled cities. In the former task, the city of Telč benefited from resulting CAD plans of all historic houses in the listed and protected town centre. The 3D model has been further developed in the framework of post-graduate doctor studies.

The analyses of about 30 historical Czech medieval cities were carried out as one of the ARCCHIP supported international research activities. This project helped to identify important and meaningful layout characteristics of the investigated cities, including all WHC. For example, in Telč the original shape and dimensions of the market place have been thus determined.

Education for cultural heritage conservation and management

Any discussion about education and training in the field of management of cultural heritage must be based on an analysis of objective and societal needs. These needs depend on numerous factors and, moreover, they are very dynamic. Furthermore, it is very difficult to achieve a necessary objectivity because the data available and investigations are mostly biased by very narrow professional specializations of their providers or respondents to campaigns. Nevertheless, let us deal with some characteristics in detail.

View of heritage officers from governmental bodies

In the Czech Republic, the Ministry of Culture has supported a grant project which investigated and analyzed educational needs of professionals in the field of state care for monuments (Jesenský et al. [5]), 1999. The research concerns a rather small group of specialists, nevertheless a group which plays a very important role in management of cultural heritage. They evaluate cultural heritage objects intended for listing, issue all methodological opinions necessary for approval of protection and restoration measures and approve alterations and other interventions into built heritage.

Within the mentioned project a questionnaire campaign oriented to needs of education had been carried out among professionals working in the National Institute for Care of Monuments (formerly State Institute for Care of Monuments). There were questioned 222 specialists, mostly graduated of Czech Universities and obtained 175 responds (78,82 %). The gender ratio was in a good balance with 53,1 % of women and 46,9% of men. Young people of age under 35 years represented a good deal (36,6 %). Some interesting results are extracted into the following tables. The first one summarizes a share of universities which "supply" contemporary heritage professionals, (mostly without any special complete courses). Among "other universities" we can find, e.g. regional studies, garden architecture, library management, teacher preparation, economy and building management, theory of culture but also geotechnics and several others.

Table 1.

Field of study	Percentage
Architecture (mostly Faculty of Architecture of a technical university)	24,0
Civil engineering (mostly Faculty of Civil Eng. of a technical university)	13,7
History (mostly Faculty of Philosophy of an University)	18,9
Art history (mostly Faculty of Philosophy of an University)	24,0
Other (universities or high schools)	13,1
Not specified	6,3

The composition of professions is reviewed in the second table. It is worth to mention a lack of subjects related to intangible heritage and a very low share of respondents who consider themselves competent experts in historic urbanism (1,14 %). They are involved among the „other specialisations", together with documentation, presentation, interpretation and access to monuments, historical surveys (!), inventory (!) and concepts of a territorial protection etc.

Table 2.

Professional specialization in conservation	Percentage
Immovable heritage (monuments) including technical m. (mostly architects)	59,4
Movable heritage (mostly art historians)	16,6
Vernacular architecture (mostly architects)	3,4
Gardens and cultural landscape architecture	4,0
Archaeological monuments	4,6
Other specialization	12,0

Table 3 shows evaluation of educational level which were individual professionals accommodated during their graduate studies. The best situation is appreciated by specialists for movable heritage (museology), the worse marks were given by those specialized in vernacular architecture.

Table 3.

Quality of education in conservation subjects in the University	Percentage
Very good and deep	9,7
Good	26,3
Superficial	43,4
„I do not remember"	2,3
No information	18,3

A large group of respondents (54,3 % yes and 28,6 % rather yes) suggests to involve into graduate study programmes a full course on „conservation engineering". Only 11,5 % of professionals rejected such an improvement.

Very interesting information is presented in the Table 4. It is a review of professional shortcomings which are felt by the specialists at the beginning of their carrier. 72 % of the total number of respondents experienced some or several of the listed items which were considered the most serious.

Table 4.

	Problems	Percentage
1	Not specified	12,7
2	Technological issues, incl. materials (in combination with items 3 or 4)	35,7
3	Lack of practice, incl. procedures (in combination with items 2 or 4)	38,1
4	Lack of theoretical background (in combination with items 2 or 3)	61,9

Despite of problems, 74,3 % of the respondents are interested to continue in their heritage officer carriers. Moreover, 76,6 % want to enlarge or innovate their professional knowledge

or skills by an additional study (76,6 % yes plus 18,3 % rather yes), only 3,4 % of practicing heritage professionals refuse any further education. In the last table, there are summarized subjects of study which are of the highest interest for the active heritage administration workers.

Table 5.

Specialisation or subject of study	Yes	Rather yes	Not know	Rather no	No
Problems of conservation philosophy, theory, ethics, methodology, authenticity	29,7	42,3	8,0	14,9	5,1
History and history of art	61,1	26,3	8,0	3,4	1,1
Legislation and economy	18,3	46,9	10,3	17,7	6,9
Problems of technology	56,6	29,7	7,4	4,6	1,7
Socio-psychology, personal communication, negotiations, public relations	14,3	24,0	25,7	25,7	10,3
Other (very broad scope of problems)	60,4	5,7	17,0	5,7	11,3

Among the other subjects, let us mention namely architectural and historical surveys (including exchange of foreign experiences), information technology and new high tech based instruments, international context and aspects of cultural heritage protection (especially pan-European relations), cultural heritage management practice (including industrial archaeology, landscape and environmental problems), new technologies and modern materials (especially for restoration), historical crafts, historic materials and structures, new architecture in historic environment, methodology of team work, new approaches to cultural heritage safeguarding and involvement into society life, foreign languages (generally very poor knowledge – only 25,7 % of all respondents speak a foreign language besides 60,0 % of respondents declaring their passive knowledge of a foreign language).

It is also worth to mention that 51,4 % of respondents were engaged in some national or international research project.

Conclusions

The 21st Century is considered a period of a closer and tighter implementation of science and research into life of human society. There are few areas of such a high complexity of problems, influences and relations as the historic cities. Therefore, a possible impact of use of research results for management of historic cities towards their sustainability is enormous and beneficial as it has been proved during a co-operation between the Academy of Sciences of the Czech Republic and the World Heritage City of Telč. In this context, let us mention words by the President of European Commission, Mr. Romano Prodi, who declared in his speech two years ago in Brussels that there will be no "Knowledge Society without research as a source of new knowledge".

The effects are even multiplied when an international co-operation is developed. Our ARCCHIP project supported by the European Commission enabled recently to organize workshops on selected circles of problems connected to cultural heritage research. During the last year about hundred scientists from 15 EU countries and USA discussed with the same number of scientists from 16 Associated and Mediterranean countries 14 topics, such as Social and economic integration of cultural heritage, Cultural heritage in local and regional social and economic stability, Cultural heritage in urban areas, Vulnerability of cultural

heritage to hazards and prevention measures, Documentation, interpretation, presentation and publication of cultural heritage, Degradation of cultural heritage in surrounding environment, Indoor climate and tourism effects, Biodegradation of cultural heritage, Historic materials and their diagnostics, and New materials for conservation of cultural heritage, Salt damage in architectural heritage etc.

These workshops identified many problems of common worldwide interest as well as opportunities for collaboration and research in the respective fields. Our "shopping list" of research needs involve tens of very important, difficult and really international themes to be investigated. This task cannot be successfully resolved without historic cities.

Nevertheless, research itself is not enough. We should consider that there will be no excellent research without properly trained scientists. During our workshops, a need for an enhanced European PhD study programme has been discussed and some preliminary work on a possible model for such an international standard post-graduated curriculum already started and this issue should be further discussed on the relevant levels as another special cultural heritage education feature and need.

Moreover, even an excellent research will be ineffective without dissemination of results among properly educated cultural heritage planners, decision makers and mangers, who are capable to implement and critically evaluate necessary policies, methodologies and techniques. It is surprising that, to our knowledge, there does not exist any graduate course providing interdisciplinary and complex education to the professionals mentioned above. Such a painful lack felt at municipalities and local governing bodies should be also improved and the necessary study programmes may be advantageously elaborated in a broad international collaboration.

It is believed that a research potential for cultural heritage may be enlarged even among non-professionals to a limited and appropriately defined extent. Therefore, an involvement of children and youth is necessary, through which also elder generation may be included into a process of a more intensive increase of awareness about cultural heritage issues and into the world of modern information technologies.

Acknowledgement

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CAMBIOS EN EL USO Y PERCEPCION DEL CONJUNTO PATRIMONIAL EN LA CIUDAD DE CARTAGENA DE INDIAS. COLOMBIA.

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Cartagena de Indias. Colombia.
Agosto 02 de 2002

La ciudad de Cartagena de Indias, al norte del Colombia y sobre el Mar Caribe posee uno de los mas valiosos conjuntos históricos y monumentales, legado de mas de tres siglos de presencia Española. Elevado a la categoría de Patrimonio Nacional en 1963 y reconocido como Patrimonio Histórico y Monumental de la Humanidad por la UNESCO en Noviembre de 1985.

La ciudad y su conjunto amurallado fue objeto durante mas de cuatro siglos de distintos ataques, que con los mas dispersos motivos intentaron tomársela, como en efecto ocurrió en varias ocasiones, desde inicios de su existencia como ciudad, en 1574 hasta principios del siglo XX.

Los primeros cuatro siglos podemos denominarlos como el predominio de ataques bélicos, pero en el último siglo el conjunto patrimonial ha siglo objeto de lo que llamamos los ataques culturales.

Durante cuatro décadas, de 1890 a 1930 la ciudad fue objeto de un primer tipo de ataques al conjunto de sus fuertes, baluartes, murallas y construcciones militares, en buena medida originadas en los procesos de imitación de los cambios llevados a cabo en algunas ciudades europeas, que como símbolo de modernización, de crecimiento y cambio de sus funciones urbanas se desarrollo un proceso de destrucción de sus murallas, para darle paso a las nuevas dinámicas a las cuales debían responder dichas ciudades.

En nuestro caso se esgrimieron otros argumentos para demoler las murallas, como era la necesidad de resolver los problemas de flujo de aguas servidas y de alcantarillado sanitario, de adecuar la ciudad al tráfico automotor que ya empezaba a operar, de disponer de áreas urbanas para los nuevas demandas asociadas con las plazas de mercado, con los servicios portuarios, con la operación de terminales petroleros y en menor instancia para asemejarse mas al modelo de ciudad norteamericana, que ya empezaba a tener una fuerte influencia en nuestro medio.

En la primera década del siglo XX se promulgaron leyes que ordenaban la destrucción de las murallas lo cual se empezó a hacer contra muy pocas voces opuestas. Pero para fortuna de la ciudad, la crisis económica del país, después de la

primera guerra mundial y la pobreza en la cual entró la ciudad, no permitieron disponer de los recursos para completar la acción de la piqueta de la modernidad. Ello fue la razón por la cual tenemos hoy el conjunto monumental de carácter patrimonial más importante de América Latina.

Pero en las últimas dos décadas y con un inusitado crecimiento en recientes años, el conjunto histórico patrimonial se ha visto enfrentado a otro tipo de ataque que denominamos cultural, más por defecto o por oposición. Este último ataque se sintetiza en el uso de importantes y extensos sectores de fuertes y de murallas como letrinas públicas, como baños o sitios de disposición de excretas, y distinto tipo de basuras.

Los daños causados por este uso contra el conjunto patrimonial no sólo ha sido grave por los efectos corrosivos, deletéreos sobre las murallas, sino por su impacto visual, estético y ambiental, generando efectos negativos en aspectos de presentación de la ciudad, del uso por sus residentes y especialmente por su impacto negativo sobre el turismo que se ha convertido en una de las mas importantes fuentes de ingresos y de empleo para la población local.

En el fondo de esta problemática nos encontramos con una multiplicidad de factores que van desde una ausencia de políticas públicas sobre el uso, función y conservación de las murallas y baluartes, de ausencia de programas de educación masiva, de formación de una cultura ciudadana de protección y conservación del patrimonio, de su incorporación a la oferta de espacios públicos para usos recreativos y culturales, tanto de la población local como de los visitantes, de una precaria propuesta de construcción de identidad cultural, de autoestima y sentido de pertenencia.

A estos problemas se debe agregar la critica situación socio – económica de un elevado porcentaje de nuestra población, que se ve obligado a subsistir en una economía informal, con distintas formas de subempleo que se concentra dentro del conjunto histórico, sin ofrecer, por parte de ninguna entidad pùblica, a esos miles de vendedores ambulantes, las mínimas condiciones para satisfacer sus necesidades vitales. De hecho esta enorme población trashumante que usa el centro histórico para subsistir con jornadas laborales con un promedio de doce horas diarias resuelve sus necesidades fisiológicas en el único sitio disponible y este esta conformado por murallas, fuertes y baluartes.

Afortunadamente este problema se advirtió desde hace casi una década y se han propuesto diversas acciones. Una de ellas, coherente e integral lo constituyó el Concurso de Ideas sobre las Murallas, promovido por la Agencia Española de Cooperación Internacional, que proponía un tratamiento integral no solo al uso de las murallas sino a sus múltiples relaciones con el entorno, con sus usos y vocaciones.

Dentro de ese proyecto se planteó la construcción de baños públicos con el objeto de empezar a erradicar la mala costumbre de emplear las murallas como sanitarios y se

construyeron unidades de servicios en varios sitios como: Castillo San Felipe de Barajas, Baluarte de San Francisco Javier, Baluarte de Santa Catalina, Cuartel de las Bóvedas y Baluarte de Santo Domingo. Recientemente se inauguró la batería sanitaria ubicada en la Plaza Pareja, en el baluarte de San Juan Bautista, entre la torre del Reloj y el Baluarte de San Ignacio.

Así mismo se tienen proyectadas, dentro del mismo plan, la construcción de unidades de servicios sanitarios en los siguientes sitios: Baluarte de San Lucas, Baluarte de San Miguel de Chambacú, Baluarte de El Reducto, en la Puerta Piñeres, ubicada en los bajos de la Alcaldía de la ciudad y en la calle de la Ronda, ubicada entre los baluartes de San Ignacio y San Francisco, que prestaría un servicio a toda el área de la plaza de San Pedro Claver.

De esta forma quedaría un circuito completo que permitirá a todas las personas que viven y visitan la ciudad amurallada encontrar un sitio adecuado y equidistante en el cual satisfacer sus necesidades fisiológicas con toda comodidad y seguridad. Pero, desafortunadamente por razones de orden económico no se ha podido completar el circuito y más inquietante aún no se ha diseñado un programa ni se han empezado a ejecutar acciones de educación masiva, desde los niños los vendedores ambulantes, los visitantes y hasta los conductores para que se haga un uso adecuado, optimo y respetuoso de nuestro patrimonio monumental.

Pero si existen aun vacíos en cuanto a la cultura ciudadana y su relación con nuestro patrimonio, no podemos afirmar que esta situación es general, pues existen entidades privadas que han venido desarrollando una significativa y valiosa labor en los aspectos de protección, divulgación, promoción y protección de nuestro patrimonio. Me refiero a la Sociedad de Mejoras Públicas, entidad cívica, pionera en Colombia en la prestación de servicios mancomunados entre el Estado y la Sociedad Civil, que cuenta con ochenta años de existencia y que adelanta una labor dedicada a la conservación, restauración , mantenimiento y administración del cordón amurallado y de sus baluartes, así como del Castillo San Felipe de Barajas y las Fortificaciones de la bahía: Fuerte de San Fernando, San José, Betería del Angel de San Rafael y en general del parque arqueológico de Bocachica.

Solo describiré muy brevemente algunas de las acciones emprendidas para revalorizar, fortalecer propiciar el desarrollo cultural del Cartagenero y de los turistas con sus bienes culturales y especialmente con sus murallas, baluartes y fuertes.

FOMENTO AL CONOCIMIENTO DEL PATRIMONIO MONUMENTAL: esta es una acción que consiste en abrir al público sin costo alguno, el último domingo de cada mes, el Castillo San Felipe de Barajas, lo cual se complementa con presentaciones teatrales, que se han denominado Cuentos en el Castillo, para que las personas de escasos recursos económicos entren con su familia sin ningún tipo de limitación. Con esto se busca que los cartageneros conozcan su más importante fortaleza y a partir de allí, de su sensibilización lograr que lo quieran, lo conserven y valoren.

PROGRAMA DE DIVULGACIÓN DE LOS DERECHOS HUMANOS Y CULTURALES CON LOS NIÑOS DE LAS ESCUELAS DE LA CIUDAD: Partiendo de la certeza de que la educación y la cultura es el medio mas expedito para el desarrollo de los pueblos y en particular del pueblo cartagenero, se desarrolla este proyecto orientado a divulgar en los niños de las escuelas oficiales, los derechos humanos y culturales. La casi totalidad de las escuelas oficiales atienden niños del nivel socio-económico mas bajo. Para ello se programas los ingresos totalmente gratis quienes además reciben también totalmente gratis el libro denominado "Patrimonito", que enseña de manera didáctica a los niños los principales conceptos del patrimonio histórico y cultural.

PROGRAMA CON LOS TEATREROS EN EL BALUARTE DE SAN LUCAS: Para fomentar la actividad de los teatreros y el uso debido de las murallas, se está ejecutando un programa de sensibilización con obras de teatro al aire libre, permitiendo de estas manera que niños, jóvenes y adultos tengan alternativas de distracción en los monumentos, generando así proceso de valoración, uso adecuado y pertenencia.

PROGRAMA EN EL CASTILLO DE SAN FERNANDO DE BOCACHICA : Para fortalecer a la comunidad y elevar su autoestima y la sostenibilidad de la misma se lleva a cabo un programa para doscientos niños y jóvenes , convirtiendo el Fuerte en una escuela de danza, música, tradiciones culturales y fomento a las artesanías, programa que fue reconocido muy especialmente en la reciente visita que distinguidos profesionales de UNESCO hicieron a la población de Bocachica por la importancia social que reviste.

PROPUESTA ECOFEMINISTA: La entidad hizo un llamado desde una perspectiva de genero para que los hombres se abstuvieran de hacer uso indebido de las murallas, usándolas como baños, toda vez que las señales que en ella aparecen dan perfecta cuenta de que no son las mujeres quienes hacen uso de nuestros monumentos para sus necesidades fisiológicas.

CAMPAÑA DE EDUCACION MASIVA. CONSTRUCCIÓN DE CIUDADANIA RESPONSABLE: Para confrontar a la ciudadanía ante los problemas ocasionados por la mala utilización del cordón amurallado y sus baluartes, se inicio una campaña muy llamativa, que tuvo eco a nivel nacional. Consistió en la ubicación de vallas y pendones en los lugares mas afectados y que decían: "Esto no es un orinal. Es el Baluarte de San Miguel de Chambacu. Es Nuestra Historia. Es nuestro deber cuidarlo".

Creemos que esta confrontación, que fue registrada por la televisión y los medios masivos de comunicación locales y nacional, tuvo un profundo efecto, en parte como expresión del clamor y el grado de desesperación que la ciudad registraba por dichas practicas, así como también por el impacto generado en el diseño de los pendones (158 metros de largo por 1.50 de ancho).

Si bien no es función esencial de la Sociedad de Mejoras Públicas de Cartagena la educación masiva y formación cultural, esta se ha venido ejecutando como una acción de complemento a las labores de recuperación, protección, fortalecimiento y valorización de nuestro conjunto patrimonial de orden histórico y monumental, tarea que se ha venido ejecutando en forma incansable, con especial celo, compromiso y dedicación y ello es lo que nos ha merecido no solo importantes reconocimientos nacionales e internacionales sino un invaluable prestigio y solvencia técnica, profesional y ética en la conducción de nuestro legal histórico, de tal forma que las futuras generaciones puedan apreciar, en mejores condiciones que lo que hoy tenemos, la herencia colectiva de nuestros antepasados.

Por último y ante tan distinguido auditorio, ratificar que la entidad que presido trabaja incansablemente en la protección y consecución de ese patrimonio aún mayor, cual es la Paz, en el que todos los colombianos de bien estamos interesados, en el entendido de que nuestros valores culturales y patrimoniales sólo serán importantes si el disfrute de ella es posible.

MUCHAS GRACIAS.

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COMUNIDAD, EDUCACIÓN Y PATRIMONIO CULTURAL. Tres elementos en la constitución de un enfoque participativo para la conservación

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RESUMEN

La salvaguarda del patrimonio cultural de la humanidad implica un compromiso más allá de la restauración, legislación o transmisión de conocimientos dentro o fuera de los salones de clases. Las acciones institucionales no pueden garantizar la conservación del patrimonio sin la participación de la comunidad. En tal sentido, la educación por el patrimonio cumple un rol social que acompaña a los especialistas. Pero simultáneamente, puede integrar el patrimonio cultural al desarrollo y consolidación de las identidades locales, frente a la globalización y sus efectos. Así, las líneas de acción de esta educación se sustentan en un enfoque participativo que se dirige hacia la resignificación de los bienes y el compromiso compartido. Para ello, las estrategias educativas se deben originar en el imaginario colectivo y las distintas percepciones y culturas estéticas que conviven en los espacios o monumentos. Esto será el punto de partida para establecer una interacción entre los valores patrimoniales de una comunidad y los del especialista. Permitiendo crear un espacio de intercambio donde comunidades e instituciones gestionen el patrimonio de forma integral. En este contexto la educación trabajaría para incorporar nuevas significaciones que se integren a la vida cotidiana y al desarrollo sostenible del patrimonio y la sociedad.

COMUNIDAD, EDUCACIÓN Y PATRIMONIO CULTURAL.
Tres elementos en la constitución de un enfoque participativo para la conservación

La salvaguarda del patrimonio cultural de la humanidad implica un compromiso más allá de la restauración, legislación o transmisión de conocimientos dentro o fuera de los salones de clases. Las acciones institucionales no pueden garantizar la conservación del patrimonio sin la participación de la comunidad. En la actualidad, la acción de conservar involucra a profesionales e instituciones de distintas áreas y enfoques metodológicos que buscan acercarse, cada vez más, a una visión integral del problema. Estos enfoques abordan, en paralelo, las acciones restaurativas, museísticas y de animación socio-cultural. En tal sentido, los programas educativos deberán ir más allá de la simple transmisión de información. Estos requieren asumir las culturas locales y sus necesidades como parte de un proceso de apropiación social del patrimonio. Proceso que comienza, como lo señala el Convenio Andrés Bello, por el reconocimiento del otro, de la diversidad y la tolerancia (www.cab.int.co[1]). Es necesario reconocer que los bienes patrimoniales a nuestro alrededor son parte de la cotidianidad y en ellos convivimos diversas culturas, en diferentes espacios. Las personas les asignan nuevos sentidos y nuevos valores en su ejercicio diario.

En este contexto, la educación por el patrimonio cultural (PC) no ha tenido unos lineamientos muy claros. Si bien en la Convención sobre la Protección de Patrimonio Mundial, efectuada en París en 1970, se señala que los estados partes "... por todos los medios apropiados, y sobre todo mediante programas de educación y de información, harán todo lo posible por estimular en sus pueblos el respeto y el aprecio del patrimonio cultural y natural …". Sin embargo, las estrategias de los organismos nacionales e internacionales se han dirigido a la formación técnica y sus especializaciones. La participación comunitaria y la incorporación de criterios técnicos en los diseños curriculares de la educación formal o es un camino que está por construirse.

Los sistemas educativos nacionales, particularmente en América Latina, abordaron los bienes patrimoniales desde la historia universal y del arte. Muchos de los diseños curriculares se encuentran sustentados en la acumulación de conocimientos entorno a hechos y objetos, vinculados con la idea de una "identidad nacional". Identidad que requería ser representada a través de bienes que tuviesen su equivalente en el mundo occidental. De esta manera se podía legitimar las pirámides mesoamericanas, el arte hispano, las tendencias vanguardistas, entre otros, como un valor de las culturas locales.

Un tesoro que camina entre espacios que hablan

Hoy la noción de ciudad pareciese ser universal, pues, todos tenemos una imagen de nuestras ciudades. Ya sea porque vivimos en ella, porque deseamos vivir en ella o porque queremos conocerla. De todas maneras, cualquiera de estas nociones significa que se tiene, o se desea tener, una vivencia con un lugar, con un espacio cargado de vida. Sin embargo, hoy podemos hablar de ciudades con vida artificial. Su función se remite a la actividad turística y como centros de trabajos, especialmente, en las ciudades cargadas de historia. Decimos artificiales, pues, sus espacios han dejado de ser *cómplices* en la construcción del

imaginario simbólico de sus habitantes. Ciudades que unos pocos las hemos denominado ciudades monumentales y las elevamos al status de patrimonio. Nosotros, "los especialistas", las apartamos de la cotidianidad de sus habitantes para determinar sus usos y desusos.

La ciudad, tal como fue concebida por la modernidad, era un espacio para la convivencia ciudadana, un espacio para ser habitado y cuya imagen significaba un símbolo para sus habitantes y para el mundo. Actualmente, las ciudades se enfrentan a un proceso de globalización que poco le importa las percepciones locales aisladas, pues se sustenta en el carácter innovador y efímero de una oferta económica. En tal sentido, vemos la globalización como una interacción de actividades que responden a un mercado y a su consumo, sin importar los espacios geográficos. La globalización actúa en múltiples centros simultáneamente, disolviendo las diferencias entre lo propio y lo ajeno. Lo cual incide en la percepción que tienen los ciudadanos de su entorno, en el valor de sus bienes patrimoniales y en la manera en que los habitantes se apropian de los espacios.

En América Latina muchas ciudades realizaron grandes esfuerzos para lograr su modernización. En algunos casos, se diseñaron grandes proyectos urbanístico; verdaderas obras de arte como por ejemplo Brasilia. En otros, los antiguos centro históricos quedaron insertos en la construcción de las grandes metrópolis, como Ciudad de México, Lima o Caracas. Las consecuencias son desalentadoras, la destrucción parcial o total de las edificaciones, de los bienes muebles o la desaparición de patrimonios intangibles en pro del futuro. En el mejor de los casos, podemos observar centros históricos abandonados, cuyos habitantes deben emigrar hacia los centros económicos globales. Las megalópolis latinoamericanas, como ciudades globales, se han enfrentado a un desarrollo desigual cargado de pobreza, conflictos étnicos, ilegitimación de tradiciones, degradaciones constantes del ambiente y la calidad de vida. Esta situación nos coloca frente a "escenarios caóticos de mercados informales donde multitudes tratan de sobrevivir bajo formas arcaicas de explotación, o en redes de la solidaridad o de la violencia" (García Canclini [2]).

Para María Elena Bravo[3] (2001) la identidad, lo público, la ciudadanía y la pedagogía abren un espacio para la sostenibilidad del patrimonio. Aunque no se puede negar que es complejo articular estos conceptos en la actualidad, y desde qué perspectivas asumirlos, es necesario enfrentarlos si queremos detener la degradación del patrimonio. La dinámica cultural establecida por la globalización nos aleja, cada vez más, de una noción de identidad nacional y de un uso "documentalista" del patrimonio. Ya no se trata de investigar, restaurar o exponer para un selecto grupo, se trata de devolver los valores patrimoniales a la comunidad que se los otorgó durante siglos.

Esta situación nos coloca frente a escenarios determinados por la multiculturalidad, capaces de legitimar múltiples tradiciones y el ejercicio de la ciudadanía cultural. La cual actúa desde las *"... prácticas sociales y culturales que dan sentido de pertenencia y hacen sentir diferentes a quienes poseen una misma lengua, semejantes formas de organizarse y satisfacer sus necesidades"*. (García Canclini [4].). Estamos conscientes que ambos indicadores resultan extremadamente complejos de sintetizar para los fines de esta presentación. Sin embargo, creemos que mientras el ser humano pueda participar en la construcción de sus referentes de identidad, podemos hablar de un ciudadano cultural que

se reconoce ante la alteridad, construye lazos entre su presente, su pasado y su futuro. Este ciudadano ve su cultura y su PC como un capital cultural que se acumula, se reconvierte y es apropiado, según su cultura estética. En este marco de pensamiento, la selección de los bienes públicamente valiosos y su apropiación es una manera de integrarnos y distinguirnos dentro de la sociedad contemporánea. En definitiva, estos contextos permiten que el PC sea, como lo señala Carlos Guzmán[5], un "lugar de complicidad social", donde los agentes sociales (sector privado, Estado y ONGs) intervienen en los diversos sectores y logran involucrarlos a los intereses de cada agrupación. Lo cual implica una transformación en los niveles de participación y compromiso de los ciudadanos con su entorno y los bienes. En tal sentido, las prácticas pedagógicas dirigidas al patrimonio deben estar inmersas en una estrategia de desarrollo y sustentabilidad.

Un ejemplo de ello, son la experiencias presentadas en el concurso Somos Patrimonio, organizado por el Convenio Andrés Bello. Igualmente, documentos como *Nuestra Diversidad Creativa*, elaborado por Comisión Mundial de Cultura y Desarrollo de la UNESCO; así como el *Plan de acción sobre políticas culturales para el desarrollo*, producto de la Conferencia Intergubernamental sobre Políticas Culturales para el Desarrollo (1998) y la Cumbre de Río (1998). Todos ellos ponen de manifiesto la necesidad de incorporar a las comunidades a una idea de desarrollo sostenible dirigido a mejorar la calidad de vida. El patrimonio cultural se percibe como un vehículo para generar nuevos mecanismos de conservación, con actividades sociales y económicas que contribuyan al uso racional del patrimonio (natural o cultural). Este cambio de paradigma implica que los especialistas del patrimonio debemos aproximarnos a la salvaguarda desde la interdisciplinariedad de áreas no tradicionales como la sociología, biología, promoción cultural, educación (formal y no formal), publicidad, mercadeo, gerencia, entre otros.

A nuestro parecer, creemos que este nuevo paradigma debe partir del imaginario simbólico de los habitantes de las ciudades. Este imaginario no es más que un sinnúmero de referentes locales que adquieren sentido en la medida que identifican a las culturas y a la gente de un lugar. La interacción con los espacios y los elementos artísticos de la ciudad generan en las personas que las habitan actividades y sentimientos que delimitan su cultura estética. El estudio de dicha cultura podría proporcionarnos insumos para comprender los procesos de apropiación del patrimonio y por ende de sus referentes. Para ello se requiere, a nuestro parecer, utilizar un enfoque que perciba el patrimonio como parte de un capital cultural capaz de generar cambios en los procesos sociales. Esto implicaría generar un aprendizaje significativo dirigido hacia la resignificación de los bienes a partir de la percepción que tiene la comunidad.

¿Educamos y participamos para el desarrollo?

Al estudiar los procesos educativos en el sistema formal y su vinculación con el PC nos debemos enfrentar a varios cuestionamientos. En principio, qué tan próximos estamos educadores, padres y Estado de estos procesos. En medio de realidades globales y locales enfrentadas constantemente a grandes cambios. De qué manera, es abordada la diversidad cultural por nuestros alumnos, frente a la percepción de un mundo mediado por una cultura virtual (TV, cine, videos, internet, etc). Cómo visualizan las nuevas generaciones la destrucción del patrimonio natural y cultural a favor de intereses económicos, políticos o

religiosos. Cómo se apropia una comunidad de su patrimonio y para qué. Tales cuestionamientos no pretenden obtener una respuesta absoluta. No se trata de establecer grados de indiferencia o de conciencia frente a los acontecimientos de esta época, a veces llamada postmoderna. Pues, el ser humano contemporáneo se caracteriza por enfrentar simultáneamente múltiples diferencias; muchas de ellas vinculadas a la destrucción de bienes culturales.

Se trata de estudiar un proceso que va más allá de las aulas de clase, del hogar o de las políticas educativas de cada país. Hoy, más que nunca la tecnología le brinda al individuo la posibilidad de indagar en otras formas de apropiación del conocimiento y de los lugares. Ya sea a través de los medios de comunicación, las redes informáticas o los intereses públicos y privados de una comunidad. Lo cual permite ver el patrimonio como un conocimiento dinámico y transversal dentro y fuera de los sistemas educativos nacionales. Pero qué ocurre en regiones deprimidas, como América Latina, donde la mayor parte de la población no alcanza una educación de calidad. En este contexto la conservación del patrimonio pareciese ser algo poco prioritario para el desarrollo social. Por lo tanto, el aprendizaje de las ciencias exactas y naturales, la lengua y los oficios técnicos adquieren importancia en los diseños curriculares. El arte y las ciencias sociales, dentro de la educación primaria, se aproximan a los bienes patrimoniales desde de la historia universal o nacional, a partir de los grandes hechos que le dieron origen. Estas áreas reducen al PC a símbolos nacionales, dejando a un lado los patrimonios locales que les da sentido de pertenencia a sus habitantes.

Desde principios del siglo XIX América Latina se enfrentó a los procesos de independencia y a la construcción de un Estado unificado bajo los ideales de fraternidad, igualdad y libertad, pilares de la sociedad moderna. Esta idea de nación, tal como la expone Touraine, A [6] "... es la forma política de la modernidad, porque sustituye las tradiciones, las costumbres y los privilegios por un espacio nacional integrado, reconstruido por la ley que se inspira en los principios de la razón". Como podemos observar, este modelo político no admite un espacio para la diversidad, para la heterogeneidad de percepciones y culturas. Las consecuencias las vemos en la infinidad de planes urbanísticos, restauraciones de bienes (cualquiera que sea su tipología) o sistemas educativos que se diseñaron sin tomar en cuenta las características particulares de las localidades y de sus pobladores.

La sociedad moderna latinoamericana ha tratado de alcanzar el modelo de progreso propuesto por la Modernidad, en medio de estructuras coloniales. Tal modelo tenía la visión de una educación masiva como vía de superación y evolución del conocimiento; y por ende de la sociedad. Resulta contradictorio que este modelo lejos de aproximar a los habitantes a realidades locales, los alejara de los significados originarios de su patrimonio y su significación en la actualidad. Bajo este contexto se presuponía que la formación de un individuo era la vía para lograr el desarrollo del país; para ello la masificación de la educación era un elemento primordial, quizás, más allá de la calidad de los contenidos. Esto permitió unificar criterios educativos en función de una visión universal del hombre. La idea de desarrollo estaba relacionada con la economía, y por tanto, con el crecimiento industrial y la masificación de productos y servicios. (Hernández. F [7]).

Tradicionalmente, los sistemas educativos utilizaron los grandes monumentos, refiriéndose específicamente a edificaciones, cuya estructura fuese un símbolo de la historia del mundo (los templos griegos, castillos, pirámides, catedrales, entre otros). Los bienes muebles (obras de arte, mobiliario, herramientas, vestuario, entre otros) participaban en este proceso dependiendo de su importancia artística o histórica. Dejando a un lado las manifestaciones y procesos culturales insertos en la tradición y relatos de las historias locales; estos bienes culturales hoy en día son denominados patrimonios intangibles (UNESCO [8]).

De acuerdo a lo expresado anteriormente, podemos establecer que la educación por el patrimonio, de alguna u otra manera, siempre ha estado presente en la formación del hombre. Ya sea a través de la educación formal o no. O bien a través de los museos de arte, antropología, etnografía, historia, entre otros. Igualmente, se puede observar que en las últimas décadas del siglo XX se vislumbra un cambio significativo en la educación y particularmente en la relación patrimonio-identidad cultural, pues se trata de articular una *educación en valores*[9] que promueva el significado y valoración de la vida pasada, presente y futura.

Esta visión condiciona el paradigma en el cual se inserta la educación de cada país y la manera de abordar su identidad cultural. En tal sentido, se asoció PC con educación artística, los programas hacían énfasis en el estudio de cada pieza bajo sus características históricas, estilísticas, expresivas y simbólicas (dentro de su contexto de origen). Aunque en ningún momento se planteó de qué manera estos bienes formaban parte del presente y qué simbolizaban para los estudiantes y los miembros de la comunidad.

En la actualidad, existe la posibilidad de modificar esta percepción, pues la dinámica de los procesos educativos se orientan hacia un aprendizaje significativo. En Venezuela, desde 1996 se realizó una reforma curricular donde el *Currículo Básico Nacional* (CBN) está sustentado en la interrelación de los contenidos y experiencias; de tal manera que puedan ser significativos. Para lograrlo se establecieron cinco ejes trasversales (Lenguaje, Desarrollo del Pensamiento, Valores, Trabajo y Ambiente), cuya finalidad es "servir de herramienta didáctica que garantice la interacción o la interrelación de las diferentes áreas del currículo" (Currículo Básico Nacional. Ministerio de Educación[10]). Según esta finalidad cada eje transversal deberá ser desarrollado en todas las áreas y sus contenidos para luego ser vinculados con la realidad local. Así el tópico "patrimonio (natural y cultural)" puede ser utilizado para la valoración de los bienes locales y sensibilización de los educandos a través de diferentes áreas y contenidos según las características de la audiencia. En este caso los docentes deben diseñar y ejecutar proyectos que vinculen los contenidos de las clases con una problemática particular, en diferentes radios de acción. Por ejemplo, los Proyectos Pedagógicos de Aula (PPA) o los Proyectos Pedagógicos de Comunidad (PPC), pretenden relacionar al estudiante con su entorno inmediato, ya sea dentro de la escuela o en su comunidad.

Por lo tanto, no podemos pensar en una educación artística como sinónimo de una educación por el patrimonio. Pues no se trata únicamente de transmitir conocimientos, sino de buscar la resignificación del PC a través de la articulación de conocimientos, valores y estrategias. Para ello, la educación por el patrimonio deberá, tal como lo señala Álvarez y García[11], "... ayudar a la gente a interpretar su entorno natural y cultural. Interpretar será en

este caso la manera de descubrir el significado y las interrelaciones ecológicas, sociales y culturales existentes entre los componentes de su entorno". Es necesario construir un conocimiento con significado a través de las vivencias del educando; una educación para la comprensión y apropiación de los espacios apoyándose en los estudios especializados. Esta educación facilita que los estudiantes sean capaces de transferir el aprendizaje a otras situaciones, problemas y toma de decisiones que involucren acciones conservativas del PC.

Esto implica un gran reto para los especialistas del patrimonio, pues es necesario que éstos se involucren con los diferentes ámbitos del sistema educativo formal. Lo cual requiere intervenir en el diseño curricular, la formación y actualización de los docentes, la creación de material didáctico para docentes y estudiantes, traducir la información técnica en lenguajes accesibles a nuestros públicos, entre otros aspectos. Creemos que todo esto pueda dar como resultado procesos conservativos integrales donde los ámbitos educativos, las realidades locales y la participación de los habitantes contribuyan a la calidad de vida.

No hay conservación del patrimonio cultural sin participación ciudadana y educación

Para el Estado moderno el patrimonio era una estrategia dentro de las políticas culturales; hasta hace algún tiempo, las acciones se centraban en restaurar y administrar el patrimonio histórico acumulado en los museos o sitios. Este patrimonio era expuesto y el sistema educativo ratificaba su razón de ser. Se establecía así las diferencias entre lo culto y lo popular, se lograba una jerarquización de los bienes patrimoniales. No es lo mismo una iglesia colonial del siglo XVII que una casa popular del mismo periodo. Este criterio determinaba, en la práctica, la prioridad de conservación dentro del crecimiento de las ciudades.

Se creía en los especialistas como los únicos que podían determinar los valores patrimoniales y estos eran eternos. Hoy sabemos que no es así, los monumentos con valor son intervenidos y al poco tiempo se encuentran en un lamentable estado de conservación; a diferencia de otros sin valor aparente, pero protegidos por las comunidades. Dentro de las instituciones especializadas los criterios de valoración responden a las estructuras de áreas como: historia, arqueología, arquitectura, entre otras. Estas procuraron seleccionar los bienes más representativos de un pasado remoto, bajo el criterio fundamental de la antigüedad, como signo de la evolución humana (Riegl [12]). Por otra parte, estos criterios de valoración se están transformando, prueba de ello, son las nuevas tipologías como patrimonio intangible y paisaje cultural; cuyo valor se le adjudica a la relación del hombre con la naturaleza, sus mitos y creencias. Los bienes denominados paisajes culturales (Rössler, M y Cleere, H [13]) representan un cambio de percepción significativo dentro de las áreas técnicas, pues en ellos se reconoce la vinculación entre la cultura y la naturaleza como bienes integrados. Este cambio introduce las problemáticas patrimoniales en el ámbito del desarrollo social.

Según Kliksberg[14], están surgiendo nuevas visiones de desarrollo donde las complejidades, contradicciones e incertidumbres son el punto de partida en el establecimiento de conexiones sociales que contribuyan a encontrar posibles soluciones. A nivel mundial el debate entorno al desarrollo es fuerte y complejo; sin embargo, debemos destacar el papel que está adquiriendo la cultura y su gente como capital social. En la actualidad, las

demandas sociales entorno a los bienes patrimoniales son múltiples, ya sea por la masificación turística o por la necesidad de cambiar el uso de las edificaciones. Para ello, creemos que puede ser más efectiva la labor de conservar a través de proyectos que promuevan la sustentabilidad y su integración en la vida cotidiana desde un *enfoque participativo*. El cual se define, desde nuestra perspectiva, como una serie de principios que se apoyan en la diversidad, desterritorialización, apropiación, multiculturalidad y, particularmente, en la participación comunitaria.

Desde este enfoque, la educación por el patrimonio se concibe como una serie de estrategias que involucran a las comunidades en los programas y proyectos de desarrollo de cada localidad, donde la conservación del PC es un elemento integrador. En este contexto la educación se concibe desde dos grandes ámbitos:
1.- Incorporar la identificación, conservación y valoración de la culturas locales y su patrimonio a los diseños curriculares como una vía para la resignificación de los bienes patrimoniales. Simultáneamente, formar a los docentes en principios básicos que puedan ser manejados dentro y fuera del aula. La educación en valores nos permitirá interpretar el patrimonio desde las culturas locales y sus identidades para poder adaptar los contenidos según las características de cada región. Pero por otra parte, integrar a las comunidades educativas (padres, docentes y alumnos) a la gestión y defensa del patrimonio como vehículo de desarrollo sociocultural.
2.- Propiciar la participación comunitaria en la conservación del patrimonio y proporcionar herramientas para la toma de decisiones. Esto requiere estrategias educativas que formen a la población en procesos técnicos de conservación, áreas de gestión, difusión y sensibilización. Los ciudadanos deben participar en cada etapa de los proyectos y no como simples espectadores del producto final. La ejecución de programas y proyectos educativos no pueden estar alejados de las necesidades contemporáneas de los habitantes. La apropiación del patrimonio no puede estar desvinculada de las percepciones y consumos culturales (habitantes y visitantes), propios de la época y la región.

Cada uno de estos espacios implica sacar a los bienes patrimoniales de su "aura", de su espacio sagrado y ponerlo en contacto con las personas que lo habitan y con su cultura estética. Para García Canclini[15]los grupos se apropian en forma diferente y desigual de su herencia cultural. Según este autor, esto se debe a la desigual manera de participar en la formulación y mantenimiento del patrimonio. Pocas veces la comunidad participa en la designación del patrimonio y en su conservación. Por ende, el grado de compromiso queda reducido a la transmisión de información en relación al valor de los bienes para el arte o la historia. El patrimonio está vivo en la medida que adquiere nuevos y diferentes significados que ratifiquen su existencia entre las personas propias y ajenas. El resultado es proceso de resignificación del PC dentro de sus vidas y su identidad, que dan origen a acciones conservativas que se incorporan a la producción local; colocando al PC como vehículo para un desarrollo sostenible.

Ballart y Tresserras[16], ratifican estas ideas cuando sostienen que "la preservación y el uso creativo del patrimonio cultural en el desarrollo económico y social constituyen componentes importantes del desarrollo humano sostenible y debería utilizarse para mejorar la calidad de vida de los pueblos, particularmente en los grupos desfavorecidos, y sensibilizar a los jóvenes a través de la educación". A esto debemos añadir la importancia

de estudiar el capital social y su cultura; pues ello juega un rol relevante en la planificación y ejecución de este enfoque participativo. En él se debe fomentar la solidaridad, cooperativismo, construcción de redes, concertación, convocatoria de voluntades y recursos. Superar las fallas y hallar soluciones creativas que se articulen en la trama social es el gran reto. Los principales aliados para tal finalidad son los jóvenes y adultos sensibilizados ante el valor de su patrimonio y que conviven con los bienes en forma directa; así como las personas inmersa en los sectores públicos y privados involucrados en el uso y conservación . Existen experiencias de organismos internacionales como el Banco Mundial, el Banco Interamericano de Desarrollo o la UNESCO han estimulado la participación como estrategia de acción durante la ejecución de los proyectos. La intención es ejecutar proyectos con la participación de las comunidades, pero una vez concluidos ellas asumen la responsabilidad de sostenerlos, sin la dependencia de entes externos.

A través de esta presentación se asume el patrimonio como "... *parte de la riqueza social. Esto quiere decir que el patrimonio ha de ser generador de riqueza, no sólo en términos económicos sino como referente de identidad de individuo y de grupo social como constructor de nación.*" (Convenio Andrés Bello[17]), lo cual nos permite enfrentar su conservación integrada al desarrollo sostenible de una comunidad. Esta propone abordar la conservación del PC desde la participación ciudadana y la educación por el patrimonio. A través de un enfoque participativo que se nutra del capital social y estimule la resignificación de los bienes tangibles, intangibles y ambientales.

La instrumentación de dicho enfoque deberá tomar en cuenta tres grandes aspectos. En primer lugar, las características culturales y el capital cultural las comunidades. En segundo lugar, la estructura de los sistemas educativos locales y su vinculación con el entorno; así como la forma como las personas perciben el patrimonio (cultural o natural). Y en tercer lugar, la incorporación de la ciudadanía en la toma de decisiones y en la conservación de los bienes, conjuntamente con los entes encargados de custodiar y los profesionales. Todo ello en una visión holística de la gestión patrimonial donde el desarrollo sostenible del patrimonio cobra nuevas dimensiones dentro del desarrollo social y su actividad económica

Bajo el enfoque participativo la educación por el patrimonio, formal o no, se orienta hacia la participación ciudadana dentro de las economías locales y hacia la comprensión histórica, política y cultural que tiene los bienes para los habitantes de las comunidades hoy. Cuando hablamos de educación en esta área debemos hacer énfasis en la formación de los niveles básicos del sistema educativo, pues se refiere a una población nacida dentro de la cultura de los medios masivos de comunicación. Por lo tanto, ella se reconocen bajo signos de identidad muy diferentes, signo que se conocen en cualquier parte del mundo, pero que no fomenta ningún arraigo local. Si queremos lograr su participación en la conservación del patrimonio, se requiere que las nuevas generaciones se identifiquen y alcancen una calidad de vida alrededor de los bienes patrimoniales. Estos fundamentos nos permitirán establecer nuevos valores y una apropiación social que responda a la cultura estética de cada localidad y a sus modos establecer relación con el entorno. Así la identidad cultural pueden asumir un discurso propio capaz de dialogar con un mercado turístico masivo y sus estrategias de globalización.

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Indice

Por favor incluya dos o tres "palabras clave" en una hoja separada del texto del trabajo para uso del índice del libro. Estas pueden tener más de una palabra tal como Elementos Límite o Inteligencia Artificial.

Palabras claves

Educación por el patrimonio
Participación comunitaria
Apropiación

COOPERATION BETWEEN MUSEUM - CONSERVATION LAB AND UNIVERSITIES

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Abstract

Starting 1993, in Romania some institutions have organized the development of university level education for conservation of cultural heritage. In this respect the specialists from museums and conservation laboratories have been requested to cooperate.

The paper presents this cooperation between museums, conservation laboratories and those universities organising and/or improving the departments for the field of protection of cultural heritage.

Romanian universities and laboratories elaborated new educational programs ment to be developed in open workshops on sites.

In order to illustrate this cooperation, we will present the works from the sites of monuments included on UNESCO's World Heritage List.

Introduction

Since 1975, in Romania, the conservation training system have been developed by the Center for training, continuing education and management in cultural field, Bucharest, within the Romanian Ministry of Culture and Cult. There are three different programs: for conservators, restorers and investigators (conservation scientists). Based on few criterias such as: the background and level of education, the field of specialization, and the skills, the programs are of 18 months to 3 years. All programs have two parts: a theoretical one, held in the Romanian capital, and the practical stage, in different laboratories of conservation and restoration from Romania.

The curriculum, based on sciences, has the following topics:

- history of art, civilisation and technology
- history and ethics of conservation and restoration
- material science
- chemistry of conservation and restoration
- preventive conservation
- museology, museum environment, documentation
- restoration techniques of different objects.

At the end of the training period the fellow have a special examination consisting of a final project, and this gives him a basic level or a high level of calification. A special certificate issued by the Romanian Ministry of Culture and Cult is given.

The development of a new training system

Between 1991 and 1993 the universities and the Academy together with the Romanian Ministry of Culture and Cult, by the help of specialists from Conservation and Restoration Laboratories and museums, have been founded a new methodology. A unique training system for conservators and restorers at the university level, as well as a continuous training system for middle and senior career professionals have been organized.

An innovative curriculum has been elaborated for different fields of specialization in conservation and restoration: general conservation, preventive and active conservation of museum objects, restoration of paper and leather objects, restoration of polycromies on wood, restoration of icons, restoration of mural painting.

The following universities have now departments concerning the conservation and restoration of cultural heritage: "Al. I. Cuza" University in Iasi, Faculty of Orthodox Theology, Cultural Heritage Department; "G. Enescu" University of Fine Arts, Conservation and Restoration Department; the University in Bucharest, Faculty of Theology, Conservation and Restoration Department; The Academy of Fine Arts in Bucharest, Conservation and Restoration Department; "L. Blaga" University in Sibiu, Conservation and Restoration Department; the University in Oradea, Conservation and Restoration Department; "1 December 1918" University in Alba Iulia, Museology Department; the University in Suceava, Museology Department, the University in Targoviste, Museology Department.

Working together for safeguarding of cultural heritage

Some of the universities organized the inclusion and proper spaces for the new departments.

At the begining of these educational activities, most of the staff came from laboratories and museums and they covered the most part of the topics from curriculum. The seminars and laboratory training and the final project have been conducted and supervised in the laboratories of the universities and museums.

During the practical stages the students have been participated in specific training activities in museums and in cultural heritage sites.

The career profesionists have organized, outside of the university center, small „in situ" workshops.

Some of them have been organized on the sites of monuments inscribed on UNESCO's World Heritage List: Probota Monastery, Trei Ierarhi Monastery, Putna Monastery, Sucevita Monastery, Moldovita Monastery.

At the first stage, the students have been involved in preservation duties, different conservation activities have been done in the cultural heritage storages of monasteries.

At the high level they could work together with conservators and restorers from museums and they could also prepare their diploma projects.

For instance, at "Al. I. Cuza" University in Iasi, Faculty of Orthodox Theology, Department of Cultural Heritage, where specialists from Center for Restoration and Conservation of Cultural Heritage in Iasi teach, the students participated in the conservation and restoration works of rare and ancient Romanian books:

- "Cazania luiVarlaam (Varlaam's Homily)", dated 1643, from the museum of „Trei Ierarhi" Monastery in Iasi (UNESCO Cultural Heritage)
- "Vietile sfintilor (The Saints Life)", dated 1682, from the Romanian Literature Museum in Iasi
- „Ceaslov (Prayer Book)", 19th century, from the Romanian Literature Museum in Iasi
- „Mineiul lunii mai", dated 1893, from the museum of „Trei Ierarhi" Monastery in Iasi (UNESCO Cultural Heritage)
- Evhologhion, dated 1747, Ethnographical Museum in Iasi.

Icons from monasteries and museums were preserved and restored, too, under the supervision of specialists in restoring icons from the same Center:

- Iconostasis, 18th century, Probota Monastery (UNESCO Cultural Heritage)
- Crucifix, 18th century, „Trei Ierarhi" Monastery in Iasi (UNESCO Cultural Heritage)
- Iconostasis, 18th century, Putna Monastery (UNESCO Cultural Heritage)
- The Virgin Mary, 18th century, Golia Monastery in Iasi
- Iconostasis, 18th century, Moldovita Monastery (UNESCO Cultural Heritage)
- Iconostasis, 18th century, Sucevita Monastery (UNESCO Cultural Heritage)
- Bible thema, 19th century, the Art Museum in Iasi
- Pantocrator, 19th century, the Art Museum in Iasi
- Saints Paul and Matthew, 19th century, the Art Museum in Iasi
- The Virgin Mary and Arh. Gabriel, 19th century, the Art Museum in Iasi
- Saints Jacob si Iezechil, 19th century, the Art Museum in Iasi
- Saint Christoff, polychromy on wood statue, Spanish School, 18th century, „Vasile Parvan" Museum in Barlad

This fruitfull activity led to the rescue of many cultural objects from museums and monasteries, many of them are included in UNESCO Cultural Heritage.

The safeguarding of cultural heritage objects is a priority activity for both museums and universities.

The future is in our hands

The postgraduated level is already structured as master. In this respect, some of our universities have masters in conservation and restoration: "Al. I. Cuza" University in Iasi, Faculty of Biology, Master in Conservation of Cultural Heritage; "Gh. Asachi"

Technical University in Iasi, Faculty of Architecture, Master in Conservation and Restoration of Monuments; the University of Bucharest, Faculty of Architecture, Master in Conservation and Restoration of Monuments; the University in Cluj, Master in Conservation and Restoration of Monuments.

A Ph.D. level would be extremely useful but in order to achieve it a cooperation with other universities from outside Romania is necesary.

Cooperation between museum-conservation laboratories and universities consists mainly on workshop trainings now.

Many collections including cultural heritage need help and that is why is important to involve students, under specialized supervision.

Today career profesionists work together with future colleagues.

Research and conservation is a very present topic in the colloquiums and symposiums organized by the Romanian Ministry of Culture and Cult and universities.

The conservation and restoration projects of works of art and monuments imply, in the same degree, the educational system, the research system as well as the conservation and restoration practice.

Key-words:
New educational programs, new training system, curriculum, safeguarding of cultural heritage, postgraduate education

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THE COOPERATION OF A UNIVERSITY AND A LOCAL AUTHORITY FOR AN URBAN CONSERVATION

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Abstract

Umurbey is a small residential town that is located within the Marmara Region of Turkey, on the eastern coast of Gemlik (Kios, Ghio, Cius) Gulf, in the territory of the town of Bursa. The population is 3367 according to the census of 2000. The majority of the residents are involved in the agriculture and. especially in olive plantation and processing.

The town of Umurbey had been settled after the conquest of Gemlik by the Ottomans at the beginning of the 15th century. Umurbey has been considered as a municipality since 1952. Celal Bayar, the 3rd president of the Turkish Republic was born in Umurbey.

Umurbey has been declared as a historical village and a natural site that must be preserved, in 1990 by the decision of the government because of the great numbers of traditional civil architecture examples in the town.

The Mayor of Umurbey, Fatih Mehmet Guler, reached with the brochure of Umurbey that is accomplied by an explanation letter to Prof. Dr.Nur AKIN from Istanbul Technical University Faculty of Architecture, Restoration Program to create a method for the preservation of this cultural and natural heritage in 2001.

By the cooperation of Prof.Dr.Nur AKIN from Istanbul Technical University, Faculty of Architecture and the Mayor of Umurbey, Fatih Mehmet Guler, it is decided to prepare an urban conservation project for the town and a restoration project for the most important examples of traditional Turkish civil architecture as the master of science thesis of two graduate students at restoration program at the same faculty. Also a third project which is about the rehabilitation of a public open space in the town is prepared by those two young architects under the supervision of Prof. Dr. Nur Akın and with the support of the Municipality of Umurbey.

The main aim of these projects is to give the chance of bringing this cultural heritage with all of its original features to next generations and using the existing potential to the Town of Umurbey. The reasons and results of the cooperation of a university and a local authority should be examined carefully to clarify the future of this world heritage that is located in Umurbey.

THE COOPERATION OF A UNIVERSITY AND A LOCAL AUTHORITY FOR AN URBAN CONSERVATION

Fatih Mehmet Guler-Mayor of Umurbey Town/Gemlik/Bursa/TURKEY
Burce Ivedi-Architect, MSc. Istanbul Technical University

Umurbey is a small residential town that is located within the Marmara Region of Turkey, and on the eastern coast of Gemlik Gulf. It is in the territory of the capital town of Bursa. Umurbey, the hometown of Mr. Celal Bayar the third President of the Turkish Republic, is a modern and charming town in the middle of olive trees. It is a settlement in which the examples of traditional Turkish civil architecture are seen. The distance between Bursa and Umurbey is 34 km. and between İstanbul and Umurbey is 198 km. (Figure 1)

Figure 1. General view of Umurbey Town

The town of Umurbey had been settled after the conquest of Gemlik by the Ottomans at the beginning of the 15th century. Today Umurbey's economical sources are based on agriculture and especially olive and olive oil. Umurbey has 3 important characteristics:

First, it is the town of Mr. Celal Bayar, the 3rd President and the 1st elected civilian President of the Turkish Republic.

Second important characteristic of Umurbey is its architectural view which is very important for the historical and cultural heritage of Turkey. And Umurbey works for the preservation of these examples of Turkish architecture. (Figure 2)

Figure 2. A street, a traditional house and its user in Umurbey Town

The road from Gemlik to Umurbey is ended with a town square to where all the streets of the settlement are connected. The buildings in the town are adjacent to each other. In the traditional houses of Umurbey the places like stable, storehouses etc. are one storied buildings. The courtyards are rare whereas many houses have modest rear garden. In the town ramps are seen because of its rising topography (Figure 3). Sometimes these streets end in cul-de-sac. The traditional street pavement is stone in the town.

Usually the buildings have a ground floor, an intermediate floor and a normal floor. The building technique and the materials of the ground and first floors are different from each other. They are stone or adobe masonry at the ground floor level and timber frame at the upper floor levels. Brick or adobe is used as filling material. All of these traditional architectural features make Umurbey special. (Figure 4-5)

The third important characteristic of Umurbey Town is the olive production. Umurbey produces 20% of the olives called "Gemlik olive" of high quality. The economy of the town is based on olive and olive oil production.

We have prepared a brochure about Umurbey as the municipality of the town. This brochure has been sent to Prof. Dr. Nur AKIN from I.T.U. Faculty of Architecture, Restoration Department accompanied with a letter where the historical and cultural heritage of Umurbey and examples of traditional Turkish civil architecture are explaned. And an assistance about the ways of preserving of these buildings and the special architectural environment has been requested. Soon after, Prof. Dr. Nur AKIN and her team came to our town and started to work.

Figure 3. Traditional building system and ramps in the town.

The traditional civil architecture examples, "old houses" for us, were completely unnecessary things. Even if dangerous, you can not demolish them, because they are registered by the government. However in many countries those examples are preserved and re-used, it seems to be impossible in our country because of the unwilling attitude of the government about supporting the owners of those buildings. The number of people living in these houses are decreasing day by day, and while the structural condition of these houses worsens, they loose the chance of being restored and used.

The owners of these houses consider the municipality as the solution center for their problems about the houses. Unfortunately the municipalites are not free to act by themselves because they are dependent to the government for the sources and authority.

Under these conditions I.T.U. started to work in Umurbey. When this team started to work, our way to look at these buildings changed. After then we have recognised that those buildings are not only the cultural heritage of Umurbey and Turkey, but they also belong to the whole world. This heritage was left to us from our anceshors We have the choice between preserving them and leaving them to the next generation or to leave them with their own and watch them while they are demolishing. We have given our decision as the Municipality of Umurbey Town to preserve this world heritage.

Figure 4. A two storied traditional civil architecture example.

Since 1991 the development plan aiming at conservation has been prepared the decisions about the urban conservation area were taken according to this plan. During the preparation of this conservation plan 53 examples of traditional civil architecture were established and they were taken under protection. But as previously told nothing has been done to preserve and restore this cultural heritage. In the town, only the house in which Mr. Celal Bayar was born was restored (Figure 6). This restoration had been done years ago and it is not a good example because of its technical properties. As the Municipality we wanted to take a step in a good way and so one of the examples of traditional civil architecture has been bought in 2001 (Figure 7). This building is not the most important in Umurbey but being very close to the municipality building, it was chosen as the starting point.

Another aim of buying this house was to leave it safely to the next generations as one of the products of the common work of I.T.U. and the Municipality of Umurbey. Also this would make people sensitive to the preservation of these houses. The main purpose was to create a place where people would participate in social and cultural activities. The project for this house has been prepared. The approximate price for its restoration is about 50.000 $. But as it is seen at the table (Table 1) below, it is very hard to realize those projects with the restricted budget of the Municipality of Umurbey.

Figure 5. Traditional building system in Umurbey.

THE BUDGET SUMMARY OF THE MUNICIPALITY OF UMURBEY ($)			
		2001	**2002**
CURRENT HARCAMA	=	275.121 $	302.545 $
TRANSFER	=	15.804 $	7.919 $
INVESTMENT	=	54.353 $	59.996 $
TOTAL	=	345.278 $	370.460 $

Table 1. The budget summary of the Municipality of Umurbey

It would not be realistic to expect from the municipality for the restoration of a traditional house instead of making the investment of substructures like roads, electricity etc. Consequently, the support for the restoration of this building is requested from the Ministry of Culture. The correspondence continues but it does not seem to reach a positive result.

The Municipality of Umurbey works to make people become conscious about this item by the articles that are written in the local monthly newspaper. In the municipality building the old photographs of Umurbey town are being exhibited and the importance of the examples of traditional civil architecture are tried to be explaned. Although all of those activities attract people, it is not possible to preserve these houses with their own sources. The cost of restoration of a building is much more than the cost of a new construction

But in spite of those negative conditions someone must change the situation and be the leader on the way of preservation of these buildings and conservation of Umurbey town as a cultural heritage. This duty belongs to the Municipality of Umurbey.

From the team of Prof. Dr. Nur Akin, architects Burce Ivedi and Aysegul Ozer have prepared their master thesis for 1.5 years in our town. Ms. Ivedi and Ms. Ozer are accepted as "the daughters of our town". We have strolled through the town with them several times and learned new things from them. For example I was unaware of the "bird house" under the eaves of the house adjacent to the municipality building before they showed it.

Figure 6. The way goes to the house with "birdhouse" and the Museum of Celal Bayar House at the right side.

Every work we have done together, every day they have spent in Umurbey, have been an education about the importance of preservation of cultural heritage for us.

These two valuable young people have prepared 3 important projects with the support of their supervisor Prof. Dr. Nur Akin. Two of these projects are master of science thesis prepared in I.T.U Faculty of Architecture, Restoration Department Graduate Programme with the support of the Municipality of Umurbey. The other one is a common work of these two young architects and the Municipality for the rehabilitation of the Town Square of Umurbey.

The master of science thesis prepared by Architect Ayşegül Özer is entitled "Urban Conservation Project in Bursa, Gemlik, Umurbey". In this thesis the history of Umurbey, the physical and socio-economical situation and traditional civil architecture of town is studied. Inventorization of 620 building has been done (Figure 8-9), the conservation site, transpassing area to this restricted site and the parts of the town that are leaved out of these areas are

determined. Architectural details (doors, windows, etc.), façade orders, plan types are studied on the traditional buildings. In other words, Umurbey Town has been studied with its past, present and future as a whole.The rehabilitation and re-use projects for 7 blocks around the town square and mosque are prepared.

Figure 7. The house that is colored in red is bought by the Municipality

Figure 8. Examples of traditional civil architecture.

The other thesis that is prepared by Architect Burce Ivedi is entitled "Restoration Project For Çırganlar House (Figure 10) in Bursa, Gemlik, Umurbey". In this thesis, a restoration and re-use project has been suggested for the Çırganlar House, which is probably one of the most important examples of traditional Turkish civil architecture of our town with its history of about 250 years and its special architectural details. During the visit of Prof. Dr. Nur Akın and her team, it is decided to produce an architecturally, statically and technically applicable project without disturbing the integrity of the Çırganlar House; thus presenting an example for the conservation and functional continuity of cultural heritage.

Figure 9. The northeast side view of Cirganlar House from the courtyard of it.

Architect Burce Ivedi in the first stage of her research studied all documents, publications and archival material on the historical and morphological development of the town. The examples of traditional Turkish civil architecture in Umurbey and nearby towns were studied and a photographic archive was formed. Also the socio-economical situations of those settlements and Umurbey are examined. All of these studies are supported by the Municipality of Umurbey. In addition to the research phase, this thesis also includes a detailed analytical survey of the house at 1:50 scale and architectural details are documented at 1:10 and 1:20 scale, supported by photography and written discriptions.

For both the university and the municipality the main aim is to preserve and re-use the building without loosing the original features of it. To reach this aim, it is decided to change the building into a guesthouse for short visits to take place in the cultural tourism that develops in town.

We believe that Umurbey can take the chance of bringing this cultural heritage to next generations and use the existing potential with the help of those projects. Our works for this aim will continue by increasing.

As for the 3rd project supported by our municipality and prepared by these two young architects under the supervision of Prof. Dr. Nur Akin, this is the project for the rehabilitation of an empty area on the northwest part of the town square. Open coffee houses, vista terraces looking to the Gemlik Gulf are organised in this public open space. All of the city furnitures and details that are proposed conform to the traditional architectural details of the town.

We are convinced that these 3 valuable projects will shed light to the future planning of Umurbey as it is important to make plans for the future and to organize it well. But it is impossible to organize everything in the future. However the past has become true. The past is real, but the future is only an imagination. As we know the past well, we can make right plans to reach those imaginations.

The traditional civil architecture examples in Umurbey are the common heritage of the world. I.T.U. produces projects with its important studies to preserve those values. It is very important to apply these projects.

The economical sources are needed for the preservation of this common heritage. By this time there is not any example of traditional civil architecture which is restored and re-used in the town of Umurbey. All of these studies will be more meaningful if some of these projects can become true.

As the last word it can be said once again that we should preserve and bring this heritage, impossible to create again, to the next generations with all of its original features

HISTORICAL CITY AND CONSERVATION RESEARCH

Authors :

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Abstract:

In India where the heritage conservation movement is still in its nascent stages compared to the developed world, awareness needs to be created among the people and administrators and technical expertise developed among professionals. This paper is based on a proposal for the management of heritage in an historical Indian town through involving educational institutions.

Introduction:

Cultural heritage of a place or a people is the assimilation of the natural, physical, social, religious practices of a people over time. Traditionally, cultural practices get handed down from one generation to another and see natural changes and alterations in the process as per the state of flux of the society. But the physical built heritage is an indicator of the past and an asset of the future.

The object of conservation is to prolong the life of cultural property without the loss of authenticity.[1] Conservation cannot preclude change for change is inherent in development, but conscious change can maintain the urban continuity of a place without eliminating its identity. Conservation is not just preservation of monuments but an attitude towards positive revitalisation and rebuilding of a fine urban environment.

All conservation movements have seen the need for community awareness and participation. Conservation has to become to become a people's movement to really make people aware of the rich cultural heritage around them and help to keep it a part of our living environment. The environment conservation movement took root with the ills of pollution, afforestation hitting us physically. Conservation of cultural heritage is also a part of conservation of our environment.

Conservation in India:

India possesses such a vast cultural heritage that only a fraction can be protected through government machinery. Conservation remains a low priority agenda for the administrative bodies wherein resources are scarce even for other priority areas like water supply, power and communication. It is unrealistic to expect conservation to be the state's responsibility and needs public participation for its success.

Role of a historic city in conservation research:

Conservation studies involves basically live case studies. Hence historic cities are open laboratories for the subject of cultural heritage. Historic cities need conservation and conservation education needs these cities. Herein we take an Indian historic city as a case-study to illustrate- a tie-up of university programs and city heritage management programs to give heritage management a working chance in societies wherein resources for subjects like heritage conservation is a low priority over primary concerns such as water, power or health.

Case-study city :Gwalior

Gwalior is one of the major cities of the state of Madhya Pradesh in central India. The erstwhile capital of the royal family of the Scindias till mid-twentieth century, the city reflects its history in its urban fabric. The city today encompasses three distinct old settlements of Old Gwalior, Lashkar and Morar. Its origins can be traced back to the sixth century A.D. The hill fort was established and at its foothills developed the oldest settlement of Gwalior. The fort palaces developed in the fifteenth century under the Tomar dynasty marked the zenith of culture and architecture in this region.[2]. Lashkar, 3 kilometres south of Old Gwalior established around 1811 and built primarily as the military centre and capital of the ruling Scindias became an administrative and commercial centre. To date, Lashkar is the city centre of Gwalior city in terms of function. Its core is the Gorkhi Bada square with major commercial streets which are typical of a flourishing Indian urban centre in the nineteenth century. Morar the third settlement was set up by the British in early twentieth century as a cantonment. The new developments in the last three decades have made the three settlements into a contiguous urban structure though the three original settlements have their own characteristics.

Gwalior is one of the many cities of India where the historical heritage is an integral part of the current city. The majestic fort overlooking the city is an integral backdrop of the town. Its most populous and commercially active district is its original city core. Conservation is imperative for the city if it is not to lose this rich heritage within the next few years for growth and development are natural and will destroy the older built forms unless a conscious and pragmatic conservation policy is followed. While to retain all buildings or areas as it is not a feasible or realistic approach, positive conservation in terms of safeguarding an existing fine urban environment without excluding physical changes, modernisation and rebuilding is possible. Conservation of this town can have a positive commercial outfall in terms of tourism as a prime commercial activity. Conservation here will have to be for two basic categories: historically and architecturally important structures such as the fort, major palaces, temples and water bodies and secondly urban street forms and precincts, the methodologies for both of which will differ. In the first case technical and constructional aspects will be important, whereas in the second case social and urban planning and urban design concepts will play a vital role.

Today Gwalior is a million plus city with its primary function being an administrative and market centre for the region and an educational centre. It has emerged as a major educational center with three universities, over 10 professional education institutions in the field of engineering, management and information technology other than medical, paramedical and computer related institutes.

Conservation studies:

Conservation requires the ability to observe, analyse and synthesize using humanistic and scientific studies.[1]. A well-informed and educated professional is a catalyst to the process of instilling awareness and dissemination of information and concepts of cultural heritage to the community. Many fields such as history, sociology, architecture, art, craft skills, engineering, archaeology, research techniques, management and economic are involved in the study of cultural heritage. The conservation professional thus needs to be trained to assimilate the various subjects involved and analyse as a scientist and provide solutions as a planner. Conservation education typically has been limited to post-graduate studies in departments of archaeology, architecture and urban design.

Conservation studies cannot be compartmentalized into academic programs and action programs because herein we are dealing with the resource of a people, which is a part of their lives. Herein we are dealing with not only architecture of the buildings and their structural adequacies and construction methodologies, but with socio-economic needs, tangible and intangible aspirations of a group or community and the socio-economic effects of planning within a settlement.

Towards this process we need foremost a core group of knowledgeable and motivated people who can identify, document and mobilise local support for a heritage rich area. Professionals in the field of art, architecture and archaeology are the most suitably advantaged to adopt conservation education and form this core group to promote heritage conservation as an intrinsic part of the development of the city's built environment.

Educational programs :

A university serves as a nodal center for research in the region. Related to the subject of cultural heritage, Gwalior has the following educational departments which can be linked to education and training in this field:

1. Department of Architecture affiliated to the foremost technical University of the state
2. Departments of history, archaeological and ancient history studies, sociology, geography and tourism management at one of the established state Universities
3. National level Institute on tourism and travel management

Proposals: Herein is put forth a series of programs which can be developed to promote training and awareness building in the field of cultural heritage conservation through educational departments. Seminars, etc on cultural heritage will provide credible point of information and ideas to the professionals in the field as well as provide public and media exposure on the subject. Involvement of the educational institutions in the heritage program of the town will give a sustained impetus to the process of conservation and positive urban renewal within the city. Sustained studies will bring forth feasible implementation proposals and also give the opportunity for follow-up studies on projects undertaken.

1. Workshop/Seminars/lectures on conservation imperatives within the region to put forth needs of heritage management and the economic and social benefits of the same for:

-professionals

-administrators and allied public officers

-for corporate industry representatives and non-governmental organisations

2. Exhibitions/cultural programs - for the public – showcasing the heritage of the city and its environs and the merits and consequences of conservation
3. Inter-departmental/institutional programs on conservation and tourism planning for specific heritage precincts can be undertaken
4. Adoption of a heritage town by an educational department/institute to survey, document and study heritage values and its conservation. Such projects can tie up with the local administration unit to put forth awareness campaigns, dissemination programs, user-planner interface programs with possible corporate sponsorships.
5. Updating of undergraduate architecture program with a change in outlook in subjects such as architectural history and urban design through practical work.
6. Introduction of conservation courses and heritage management courses for professionals. Such courses can be at two levels:

   -Short-term course of 10 to 20 weeks

   -Post graduate full term research-oriented programme
7. Introduction of short term cultural heritage management course for architects/architectural students/archaeologists at the department of Architecture

   Conservation courses would need to cover basically three aspects:

   -documentation systems

   -construction technologies and craft skills involved in restoration or renewal

   -socio-economic studies and environment impact assessment

Conclusion :

Identifying heritage of a town is a path of discovery of the place, of its people, of oneself - a journey through time. To maintain a continuity in this heritage from the past to the future generation is the task for this generation. The settlements will continually change, societies will develop but the foundations of the past can be built upon for the future. Recognising this need we can use and conserve our historic cities to make better cities for tomorrow.

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Keywords:
Historic city, educational programs, heritage management

THE IRONBRIDGE GORGE WORLD HERITAGE SITE, A UNIQUE EDUCATIONAL RESOURCE

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This paper describes how, in the Ironbridge Gorge World Heritage Site, local organisations are working together to raise local awareness and understanding of the WHS through formal and informal educational projects. The Management Plan for the Ironbridge Gorge WHS provides the context and stimulus for this work.

The challenge that is highlighted in the paper is to increase the standard of care of the WHS by increasing community pride in the WHS, which can be achieved by increasing community awareness, understanding and appreciation of the WHS and its significance. The paper focuses in particular on the work being undertaken with local schools to help achieve this.

1. INTRODUCTION

Inscribed on the World Heritage List in 1986, the Ironbridge Gorge is widely recognised as the Birthplace of Industry. The Industrial Revolution that started in Britain in the eighteenth century and which later spread across the world had it roots in the Ironbridge Gorge. The area's rich mineral resources had supported a range of industrial activity in the area for many centuries, including coal-mining, ironworking, quarrying and brick-making. However, in the early eighteenth century, this picture was to change dramatically because of the technological innovation of people like Abraham Darby.

Darby's invention in 1709 of using coal (in the form of coke) instead of charcoal to smelt iron enabled, for the first time, high quality iron to be produced cheaply and in large quantities. This proved to be one of the key factors which led to the birth of the Industrial Revolution, Within a few decades, Coalbrookdale, (which is within the Ironbridge Gorge WHS), was transformed from a predominantly rural community into what was described as the "most important industrial area in the world".

Today, within the Ironbridge Gorge WHS, there is still much evidence of the area's important industrial heritage, not least, the Iron Bridge itself, the world's first bridge constructed of iron. It was built by Abraham Darby III in 1779 to demonstrate the potential and versatility of iron as a building material. The Iron Bridge is a powerful icon of the Industrial Revolution and an image that is recognised around the world.

Many years of growth and prosperity were followed by a gradual decline until by the mid-twentieth century, Ironbridge, Coalbrookdale and the surrounding area suffered from significant economic, environmental and physical problems. This was one of the factors that led to the Government's decision in 1963 to create a New Town, later to be called Telford, which would regenerate the communities of Ironbridge and Coalbrookdale.

During the early days of planning and building the New Town, the historical significance of the Ironbridge Gorge, which hitherto had been largely unrecognised, was now recognised as an important asset for the New Town. In 1967, the Ironbridge Gorge Museum Trust was established to help protect, restore and interpret the area's history.

From its early days, the Museum has sought to promote and use the Ironbridge Gorge and the numerous Museum sites within it as a resource for both formal and informal education. Educational visits by schools are encouraged and assisted by the Museum's Education Department and each year, over 60,000 schoolchildren visit the area in organised parties.

The industrial heritage of the area also provides the basis for post-graduate training courses run at the Ironbridge Institute, which was established in 1982 and is run jointly by the Ironbridge Gorge Museum Trust and the University of Birmingham.

Therefore, for many years, within the Ironbridge Gorge, the educational potential of the area's history has been recognised and much has been done to utilise that

potential. The publication of the Management Plan for the WHS marked a new phase locally in the links between education and heritage. The Plan recognised that education, in its broadest sense, should play a major part in "Keeping Heritage Alive", the theme of this Symposium.

2. IRONBRIDGE GORGE WHS MANAGEMENT PLAN

Although inscribed in 1986, it wasn't until 2001 that a Management Plan was published for the Ironbridge Gorge WHS. Following extensive consultation within the local community and key organisations, the Plan seeks to:-

- Safeguard the unique industrial heritage and character of the Ironbridge Gorge WHS for present and future generations
- Strengthen the WHS as a vibrant living and working community
- Interpret the WHS in ways which ensure its accessibility to all

The Management Plan highlights the importance of raising local, regional, national and international awareness of the significance of the Ironbridge Gorge. It also recognises the responsibility placed on Site owners and managers by the 1972 World Heritage Convention in relation to the presentation and interpretation of World Heritage Sites and the important role of education, in its widest sense, in achieving that.

This paper will focus in particular upon the steps being taken in the Ironbridge Gorge to raise local awareness, understanding and appreciation of the Ironbridge Gorge WHS and the principles of World Heritage and how education is being used to help achieve that.

3. THE CHALLENGE

The process of producing the Management Plan revealed that much more can be done to increase community awareness and appreciation of the WHS, that is, to educate and enthuse people about the WHS. Unless local people have an understanding of the area's significance and importance, they are likely to be less concerned about its protection.

The challenge we face is three-fold:-

- To increase **community awareness** about the significance of the WHS and WH principles
- To increase **community pride** in the WHS
- To increase the **standard of care** of the WHS

I believe that there is a strong connection between these three challenges and they reinforce each other. Greater community awareness and understanding of the area's significance stimulates community pride in the area, which in turn leads to improved

standards of care, but it doesn't end there. Improved standards of care and improvements to the historic environment stimulate community interest and awareness, and so the cycle continues.

How can we achieve this "virtuous cycle" across the community and throughout the WHS? I believe that the key to it is education, both formal and informal and for people of all ages.

4. MEETING THE CHALLENGE THROUGH EDUCATION

For the purposes of this paper, I am using the word education in its broadest sense to encompass anything that imparts information in order to increase knowledge, understanding and awareness. This obviously includes formal education with groups of schoolchildren and students, but also informal education, on-site interpretation, literature and web information.

Within the local community, we can identify numerous groups that can be recipients of this broad range of educational activity including schoolchildren, existing residents, potential residents, property owners, businesses and local organisations. As these groups are very different in many ways, there is no single method that we can use for increasing their understanding of the WHS and its historic significance. Rather, we use a range of initiatives and actions. The Management Plan lists a number of actions which focus on particular groups including:-

- WHS awareness raising within local schools
- Encourage greater usage of local museums by WHS residents
- Develop the internet as a source of accessible information about the WHS
- Improve interpretation within the WHS
- Information and directional signing within the WHS, including marking the WHS boundary
- WHS information pack for existing and potential residents
- Strengthen links with local libraries
- WHS newsletter
- Encourage community involvement in WHS projects
- Produce guidance notes for building works within the WHS

Together, these initiatives will help to increase community awareness about and community pride in the WHS. It is a gradual and continuous process as we use a variety of means to keep the WHS in the minds and awareness of local people.

5. WORKING WITH LOCAL SCHOOLS

I would now like to focus in greater detail on just one of these initiatives, working with local schools, and outline some of the work we have been doing in the Ironbridge Gorge with schools.

As the title of this paper states, the Ironbridge Gorge is a unique educational resource. It provides a superb outdoor classroom which for many years has helped children to understand more about history, geography, science, design and technology and english. It is also now being used to help schoolchildren learn more about one of the newest subjects in our National Curriculum, that is, citizenship.

However, this educational activity has focused primarily upon the Ironbridge Gorge itself - its history, geography, geology and so on. The area's status as a WHS and the principles of World Heritage have only received very limited attention. The Management Plan recognised the need for local schools to focus more directly on the fact that the Ironbridge Gorge is a WHS and the implications of that for the local community. The future wellbeing of our WHS is, to a large extent, in the hands of our young people. It is vital that they understand the significance of the WHS so that they can then play their part in helping to protect it, both for their own benefit and enjoyment and also that of future generations.

To address this issue, in March 2001, as Co-ordinator of the WHS I convened a meeting of representatives of the key local organisations to consider how we might raise the profile of World Heritage issues within local schools and colleges. That meeting included local educational institutions, the Ironbridge Gorge Museum, organisations involved in the management of the WHS and UNESCO.

Since that initial meeting, two conferences have been held in Coalbrookdale on the theme of World Heritage and Education, both organised jointly by the Borough of Telford & Wrekin, Telford College of Arts and Technology and the Ironbridge Gorge Museum Trust. All three organisations are committed to strengthening the links locally between World Heritage and Education and the organisations have developed a close and productive working relationship to help achieve this.

The first conference in May 2002 for local teachers aimed to help teachers become more aware of the significance of World Heritage status and the educational opportunities it presents. Then in March 2003, an event on a similar theme was held for representatives from some of the 24 UK World Heritage Sites, the aim of the event being to share good practice and experience on World Heritage and Education issues.

We have made some progress in getting the WHS onto the local educational agenda, but there is still much more to be done. School timetables are governed to a large extent by the demands of the National Curriculum. Therefore, we are exploring how we can use World Heritage issues, not as an additional and sometimes unwelcome addition to the school timetable, but rather as a practical, local, interesting and relevant tool to deliver parts of the National Curriculum.

My vision is to see all local children leaving school with a reasonable understanding of why the Ironbridge Gorge is a WHS, taking pride in the fact that

they live in an area of such universal importance and understanding what that means in terms of the responsibilities placed upon us as individuals and a community.

One particularly encouraging project that has come out of this work is the Telford Schools World Heritage Project.

6. TELFORD SCHOOLS WORLD HERITAGE PROJECT

Telford College of Arts and Technology is a Further Education College that runs courses in a wide range of subjects including Travel and Tourism. Over the past 2 years, the course tutors for Travel and Tourism have explored ways of integrating the Ironbridge Gorge WHS into the courses. It was recognised that the WHS, which is only a few miles from the College, is a superb educational resource which can be used to enrich the student's learning experience.

Therefore, 2 years ago, preliminary discussions took place between the course tutors, the Education Officer of the Ironbridge Museums and the Co-ordinator of the WHS. As a result a number of initiatives have evolved and developed which collectively, form the Telford Schools World Heritage Project.

Dave Askins, the Course Tutor will describe the project in greater detail, but first, it is worth highlighting the fact that the project has numerous wider benefits in addition to the obvious academic benefits for the students involved directly in the project.

The wider benefits relate to the point made earlier in this paper about the importance of raising community awareness about the WHS. The Telford Schools project is helping to achieve that objective as follows:-

- The project has received media interest and publicity which has helped to raise the profile of WHS issues locally

- The two World Heritage conferences that have been organised as part of the project have helped to raise awareness about World Heritage & Education amongst teachers and also share good practice between different UK Sites.

- The concepts of World Heritage are being more deeply embedded within the curriculum of Telford College and the numerous other schools that have participated in the project.

Dave Askins will now describe the Telford Schools World Heritage Project.

7. CONCLUSION

All World Heritage Sites are unique and each offers potential as an educational resource. At Ironbridge, the various partner organisations are exploring different ways of engaging local schools in the WHS and of enthusing young people with the WHS and what it stands for.

Our aim, through formal and informal education, is to increase pride in and "ownership" of the Ironbridge Gorge WHS which will then help us as a local community to more effectively play our part in fulfilling the obligations of the UNESCO World Heritage Convention and to secure the long term future of the WHS.

Through education, we are striving to "keep heritage alive".

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INDEX – Key words

Community awareness
Schools projects
Civic pride
Ironbridge Gorge WHS
Education and World Heritage

LA FORMACIÓN Y LA EDUCACIÓN: HERRAMIENTAS Y LÍNEAS DIRECTRICES PARA LA GESTIÓN CONSERVACIONISTA DE LA CIUDAD DE TRINIDAD.

Roberto López Bastida
Oficina del Conservador de Trinidad y el Valle de los Ingenios

Dentro de los valores reconocidos en el repertorio intangible de esta pequeña y hermosa villa del Patrimonio Mundial y en el fértil valle que le rodea, se hallan la autenticidad de su cultura local, el arraigo de sus pobladores y el sentimiento de apropiación y respeto de estos hacia su contexto arquitectónico y urbano.

Hoy, los "operadores" de este patrimonio, el grupo de "interventores del medio" y los "tomadores de decisión", tratan de conjugar la garantía de la pervivencia de estos valores heredados con los dinámicos procesos de revitalización y derrama económica por que atraviesa la ciudad, producto de su impacto con el turismo y las comunicaciones y bajo la influencia general de los fenómenos globales.

Por ello en Trinidad resulta imprescindible el establecimiento de estrategias de educación y formación y difusión de valores a diferentes niveles, plasmadas en su Plan Maestro.

Entre ellas el Programa Escuela-Museo, implantado desde los primeros años de la Escuela Primaria, hasta los grados medio-superiores. Otra labor es la de Atención y Acción Comunitaria, que establece mecanismos de consulta popular e instrucción interactiva con los pobladores en el contexto del barrio o la comuna rural, indispensables para la toma de decisiones sobre cualquier zona o sitio de valor.

A otros niveles, se desarrolla en la ciudad un serio trabajo de recuperación y transmisión de los oficios tradicionales, lo que se materializa en la Escuela de Oficios de Restauración, donde se forman cada año decenas de jóvenes carpinteros, herreros, albañiles canteros o yeseros.

Además, se incluye la formación de postgrado en convenio con la Universidad Central de Santa Clara que imparte una Maestría en Conservación teniendo a Trinidad como propio teatro de operaciones, taller, aula y escenario de esta preparación.

Introducción

Alentados por la iniciativa integradora y el esfuerzo común, Trinidad se inserta en la Organización de las Ciudades del Patrimonio Mundial con sus peculiaridades, una veces similares otras discordantes, pero siempre con el deseo de aprender, de reafirmar que estamos en el camino correcto.

Fig.1: Vista de la Ciudad.

El objetivo de nuestra ponencia es la valoración de una fase o de la unión de varias de ellas dentro del modelo de gestión conservadora actualmente implementado en el Centro Histórico Urbano de Trinidad: las estrategias de educación y formación. En otras palabras... ¿hacia dónde se encamina la estrategia para formar a los diversos actores y en especial a los tomadores de decisión que intervendrán en la salvaguarda de Trinidad? ¿Hasta que punto es eficaz la organización actual de su gestión para sensibilizar a la comunidad y a los grupos de interés? Declarado Monumento Nacional varias veces en su historia, la última de ellas en 1975, e inscripto en la Lista del Patrimonio Mundial en 1988, nuestro Centro Histórico fue pionero de la Protección al Patrimonio Cultural, desde los tempranos años de la Revolución, aún así, se impone un sistemático reciclaje valorativo de sus instrumentos de acción al nivel de todas las fases del proceso, comunitarias, sociales, metodológicas, y ejecutivas, sus vías y mecanismos para crear patrones formativos de una conciencia positiva hacia la conservación, así como de una excelencia de los operadores, ante las inevitables coyunturas por las que atravesamos.

La conservación en estos tiempos requerirá importante esfuerzos de "voluntad de masas", y esto solo se logrará a través de la promoción de los valores que se defienden, de la integración de los objetivos de la conservación con los "Objetivos Municipales" vinculados a la calidad de la vida con los "Proyectos de Desarrollo Humano Local" y...sobre todo, al constante control, apoyo y perfeccionamiento de la estructuras organizativas creadas para lograr con eficiencia la perceptividad y la atracción en todos los encargados de ejecutar, transmitir o apoyar las diferentes fases del Modelo de Gestión.

Diferentes niveles de las estrategias de formación y educación:

- Trabajo con la Escuela y el Museo
- Labor de Atención y Educación Comunitaria
- Formación en las Escuelas de Oficios
- Formación Especializada de Post-Grado

Trabajo con la Escuela y el Museo

En el origen de este proyecto ha estado presente el inconfundible sello del amor y el cuidado hacia los más pequeños, la impronta que solo deja en las cosas la maravilla de la relación diáfana y emotiva, el "querer para hacer entre todos"; en un coloquial encuentro entre artistas, creadores, promotores y profesionales de la gestión cultural, se acoge un proyecto que sigue la inspiradora política de masificación de la cultura hacia la que, tan acertadamente, enrumba su

estrategia el estado cubano, buscando vincular, de manera creativa tradición, modernidad y arte cubano con la más joven generación, la que tendrá a su cargo el futuro del país en los próximas décadas Se busca que en la obra que resulte de los talleres Escuela Museo haya una clara influencia del contexto histórico, arquitectónico, urbano y natural de Trinidad y el Valle de los Ingenios que resalte la importancia de nuestro Patrimonio tangible e intangible.

Fig.2: Concurso de Pintura Infantil.

La Oficina del Conservador de la Ciudad de Trinidad - en cuyo objeto social aparece claramente definido salvaguardar y difundir la cultura espiritual y material de los habitantes de la villa, así como el conservar su patrimonio intangible para las futuras generaciones -, entiende esta acción como un impacto positivo en términos de comunicación y difusión a nivel de la conciencia popular, por lo que abre a los niños y jóvenes, procedentes de la escuela primaria o de la secundaria básica, - en edades desde los cinco hasta los quince años- las puertas de Museos, Galerías, Plazas y parques e invita a artistas plásticos, narradores, músicos y otros promotores de la más genuina y autóctona cultura, interesados en el trabajo comunitario y la docencia, a trabajar de conjunto con las Escuelas dentro de las propias Instituciones Culturales o en los espacios públicos de la ciudad, para contribuir al enriquecimiento espiritual de la juventud.

Talleres de creación colectiva, debates, conferencias, eventos musicales, y encuentros con la vanguardia artística local y nacional, van llevando a la escuela comunitaria y en particular a los niños la comprensión y al amor hacia los valores de su patrimonio, haciendo de las antiguas calles trinitarias una gran aula para todos. Trinidad, con su profunda tradición y el arraigo por su identidad cultural, se convierte en ese museo vivo entre mar y montaña, escenario ideal para una experiencia de este tipo.

Labor de Atención y Educación Comunitaria

El trabajo directo hacia la comunidad es una de las estrategias vitales de la Oficina para poder de un modo interactivo y dinámico conocer, diagnosticar, evaluar y satisfacer en la medida que sea posible, las expectativas y oportunidades de los pobladores en términos de "calidad de vida", con una amplia concepción de este término. Una búsqueda de recuperar el significado cultural de la comunidad a través de programas que parten de estudiar las carencias y a la vez fortalecer las apropiaciones culturales, estéticas, o religiosas, trabajar sobre la insatisfacción de necesidades cognoscitivas o espirituales de determinados grupos, y aplicar en consecuencia programas de educación sociocultural y medioambiental, de revitalización de tradiciones, de formación de valores y todo lo que pueda ser protegido dentro de esa rica identidad que solo en los pueblos mestizos y auténticos por el "enclaustramiento histórico-social" en que se han desarrollado resulta aún tangible como "patrimonio cultural" y que a la vez requiere de intensos procesos de reanimación para no mutar irreversiblemente o generar fenómenos socialmente degradatorios.

Como ejemplos recientes de estos programas podemos citar:

- **El Taller Comunitario de Práctica Musical**

Este taller fomentaría la práctica e incluso la creación musical en niños y jóvenes de la comunidad, en su acto multiplicador, los resultados se convertirán en necesidad cotidiana para los pobladores de Trinidad, premisa que condicionará la importancia social de este trabajo.

El Proyecto se concibe para dos sesiones semanales de 1 hora y 30 minutos. Después de las 24 horas clases impartidas, estos niños contarán con un mínimo de conocimientos como para formar grupos artísticos y ofrecer presentaciones en la comunidad.

Objetivos.

- Perfeccionar una capacidad de apreciación musical cada vez mayor en niños y jóvenes.
- Lograr que desarrollen hábitos y rasgos de identidad con las diferentes actividades.
- Conseguir que los pobladores adopten una actitud cada vez más sensible ante el hecho artístico.

Fig.3: Actividad Cultural. Escuela Primaria "Eduardo García".

Resultados Esperados.

- Demostrar que la aplicación de estos talleres permite elevar el gusto estético además de fomentar determinados niveles de sensibilidad e identificación corpórea con las tradiciones e historia de la localidad, en los niños y jóvenes.
- La formación de una brigada de artistas y la presentación espectáculos.
- Pretendemos diseñar un programa radial de corte infantil donde trataremos de satisfacer las demandas gnoseológicas y de sana recreación de los niños de Trinidad y localidades aledañas.

- **El Taller de Bordados. Rescate de una labor artesanal.**

Existen referencias muy antiguas en la Ciudad de Trinidad sobre la realización de las labores manuales en la decoración de la lencería y bordados, (1520), inicialmente como un medio para el entretenimiento de las mujeres de las clases más poderosas económicamente y luego con la crisis que atravesó la ciudad, como medio de sustento de numerosas familias al comenzar la comercialización de las producciones que se realizaban.

Por el arraigo que tiene esta actividad dentro de la población de la ciudad, por la necesidad de mantener la huella de una época pasada, y por el valor artístico artesanal que posee la actividad, resulta prudente dedicar esfuerzos y recursos para la revitalización de esta labor manual.

Fig.4: Juego de Mantel y Servilletas.

Como una consecuencia del llamado "período especial" en Cuba, y como un medio de vida, las actividades de bordados, randas y otras las labores relacionadas con la decoración de la lencería ha resurgido con fuerza y vigor, en todo el país y muy especialmente en Trinidad, por el arraigo y la tradición en la población de la ciudad.

Objetivos.

- Realizar conferencias y seminarios sobre las actividades del bordado y decoración de lencería por parte de artesanos especialistas en el tema, nacionales y extranjeros.

Resultados Esperados.

- Evitar la pérdida de una forma de vida típica de la ciudad.
- Propiciar un movimiento social en aras del rescate de las tradiciones.

Escuela de Oficios

La Escuela de Oficios de Restauración es creada por la Oficina del Conservador de la Ciudad de Trinidad y del el Valle de Los Ingenios, mediante la autorización del Ministerio de Educación con un objeto social definida en tres misiones:

- Fomentar en los jóvenes las técnicas tradicionales de construcción, como una forma de vida laboral, competente y educativa.
- Garantizar la continuidad de los oficios tradicionales imprescindibles para la conservación y restauración de la Ciudad de Trinidad y el Valle de los Ingenios.
- Apoyar en la atención del desempleo y la marginalidad entre los jóvenes, en una ciudad impactada socialmente por el aumento del turismo internacional.

Es fundada, en marzo de 1998 en las ruinas de una de las casas palacetes, conocida como el palacio de Béquer, perteneciente a esta familia azucarera del siglo XIX, enclavada a pocos metros de la Plaza Mayor.

Se han impartido cuatro cursos de formación completa de una duración de dos años escolares, en los cuales se han graduado un total de sesenta y cuatro obreros restauradores, en las especialidades de carpintería, albañilería, forja, yeso, pintura mural, orfebrería y en conservación de bienes muebles, dentro de los que se cuentan los actuales estudiantes que ya realizan su trabajo de investigación de culminación de estudio.

La escuela imparte también cursos de recalificación a obreros restauradores de la Ciudad con el objetivo de perfeccionar su calificación. Se han recalificado un total de treinta trabajadores, en las especialidades de carpintería, albañilería y pintura de obra.

Por la especificidad del centro, se hace necesario realizar un proceso previo de captación y selección de los jóvenes interesados a realizar estudios en algunas de las materias impartidas, midiendo sus aptitudes, su vocación y un nivel cognoscitivo elemental. Es requisito para optar por la escuela tener una edad entre diecisiete y veinticinco años de edad y tener vencido el noveno grado de escolaridad.

La escuela se basa en un sistema de enseñanza práctica, donde se combinan las asignaturas teóricas, los talleres de cada especialidad y se complementan con la ejecución de prácticas en obra que se realizan en el propio período del curso escolar. Ejemplos significativos de "obras polígono" han sido la consolidación y readaptación de la propia casona palacial que sirve de sede a la Escuela, los trabajos en casas vernáculas del siglo XVIII construidas con la primitiva técnica del embarrado, un proyecto de experimentación con adobes de tierra cruda

comprimida para la construcción de nuevas viviendas en barrios populares y la restauración de yesería, cantería y herrería en los panteones y bóvedas del Cementerio Católico de la Ciudad.

Al mismo tiempo de cumplir su Misión Principal, la creación de la escuela persigue como metas esenciales estas estrategias:

- Concientizar y sensibilizar a los habitantes de los sitios patrimoniales con el sentido de pertenencia del patrimonio edificado y como signo de su propia identidad.
- Constituir a la propia institución en un agente promotor vivo social y culturalmente.
- Crear hábitos éticos - morales y culturales en los obreros calificados, artesanos, ejecutores y técnicos de la restauración que sean objeto de capacitación para propiciar su formación integral.

Una vez instaurada la Oficina se creó un equipo de trabajo de profesionales, tanto del campo de la docencia como de la restauración propiamente, con la misión de analizar los Planes de Estudio de las Escuelas de Oficios similares existentes en la Habana Vieja y en Camagüey, esta última también en proceso de creación.

Fig.5: Estudiantes de Albañilería.

Una vez analizados estos Planes de Estudio, y depurados en función de las necesidades y características propias del Patrimonio edificado de Trinidad y el Valle, se pasó a un segundo paso de conciliación con las Direcciones Municipal y Provincial de Educación, específicamente con las Direcciones de Enseñanza Técnica y Profesional.

En este sentido, se buscó un resultado coincidente de metas y objetivos comunes con el Ministerio de Educación, cuyas instancias a estos niveles mencionados nos han estado revisando y orientando en los proyectos de Planes de Estudio, así como de los Convenios de colaboración y supervisión en función de la creación de esta escuela.

Gracias a los propios Convenios de Colaboración establecidos por la Oficina del Historiador de la Habana con el Programa de Escuelas Taller en Iberoamérica, en mayo de 1998 se recibió para este Proyecto una importante donación en equipamientos de carpintería, herrería e insumos generales para la enseñanza, el cual ha servido de Base Material inicial para la implantación de la enseñanza teórica y práctica en esta Escuela de Oficios.

Para el desarrollo docente cuenta con un equipo de dirección de tres personas, y un claustro de nueve profesores que se dividen en dos grupos, unos dedicado a las asignaturas básicas y teóricas, y otros a la enseñanza práctica, estos últimos, personas de larga experiencia en los oficios tradicionales o maestros de obras.

La escuela se propone con los jóvenes, además de enseñarles un oficio tradicional, fomentar y elevar su nivel cultural e intelectual. Para ello realiza actividades extradocentes dentro de las que se encuentran: visitas a sitios arqueológicos, visitas a otras escuelas talleres, participación en exposiciones nacionales, realización de encuentros con personalidades de la

cultura local y nacional, realizan excursiones a lugares de interés histórico, entre otras actividades.

Una vez graduados se le oferta empleo a los egresados que pasan a formar parte de la plantilla de la Brigada Constructora de la Oficina.

Misiones futuras del centro:

- Crear nuevas especialidades: Pintura Mural, Cerámica, Orfebrería y Ebanistería.
- Crear Talleres de Aplicación y Prototipos que generen nuevos empleos a los graduados.
- Elevar el nivel de preparación técnica de los profesores.
- Lograr la cooperación de instituciones internacionales que puedan aportar sus experiencias en las técnicas artesanales.

Curso de Maestría en Conservación

El patrimonio inmueble de los países subdesarrollados ha sufrido una merma considerable a partir de la década de 1950, con el advenimiento y generalización de la influencia del movimiento moderno, que implicó la desaparición de edificaciones y áreas urbanas de grandes valores culturales. En gran medida, ello se debe a la asunción de patrones y estrategias equívocas de formación curricular en las carreras de Arquitectura, Urbanismo e Ingeniería Civil, copiadas a lo largo de muchos años de desiguales relaciones de cooperación con los países industrializados.

En contraposición a esta situación es necesario en nuestro medio, entre otras cosas, una nueva estrategia de formación de pre y postgrado, con una visión más regional y autóctona de la curricula universitaria, vinculada a la preservación del patrimonio inmueble, que no se genere como ocurre hoy, desde los centros docentes y científicos de los países desarrollados, sino que se acerque conceptual y físicamente a los escenarios objetos de atención,

A esta problemática pretenden contribuir la formación y las soluciones que se ofrecen en esta especialidad: desde el Sur, para el Sur y fundamentalmente con sus propias fuerzas, inteligencias y recursos.

Desde el punto de vista específico de la región central de Cuba, se propone la superación de los profesionales del territorio en una vinculación directa con los problemas de la preservación de los valores patrimoniales, tanto arquitectónicos como urbanos, que son especialmente importantes por la interrelación de obras de las últimas tres centurias. Especialmente importante es la recuperación del hábitat, que se constituye en uno de los déficits prioritarios, para lo cual se necesitan soluciones tecnológicas, materiales y proyectos que posibiliten un desarrollo sostenido, sobre la base de la interrelación armónica de las tradiciones y vertientes contemporáneas del diseño y construcción.

Este Master en Conservación Arquitectónica que comenzó en el curso 2001-2002 en Trinidad, impartido por la Universidad Central de las Villas en cooperación con la Oficina del Conservador de Trinidad se justifica teniendo en cuenta el elevado número de ciudades con marcado interés patrimonial que posee la región central, entre las que se encuentran tres de las ocho primeras villas fundadas en Cuba, además de que cuatro de los centros históricos de la región, poseen la categoría de Monumento Nacional.

En relación con la experiencia del centro se poseen más de 25 años vinculados a la formación de profesionales de las construcción, así como a la solución de problemas en el territorio, para lo cual cuentan el Centro de Investigaciones y Desarrollo de las Estructuras y los Materiales (CIDEM), que ha desarrollado soluciones tecnológicas que evitan las influencias negativas foráneas y potencian el desarrollo de la región. Además, se encuentran en funcionamiento proyectos de desarrollo, dirigidos por el CIDEM, en países del Tercer Mundo. Asimismo, la Facultad de Construcciones a través del tema de investigación "Conservación y Rehabilitación Arquitectónica y Urbana" ha desarrollado investigaciones encaminadas al análisis y valoración de nuestra arquitectura y urbanismo, efectuando también un número considerable de intervenciones a nivel arquitectónico y urbano, ejecutadas bajo la dirección de los profesionales de la Facultad de Construcciones de la U.C.L.V., las cuales han servido para la obtención de varios premios de la Academia de Ciencias del territorio, que brindan el potencial científico para poder llevar a efecto, de forma satisfactoria la especialidad solicitada.

Todo ello implica la posibilidad de una impartición de excelencia que es uno de los objetivos fundamentales del Ministerio de Educación Superior (MES) en la aprobación de nuevas Especialidades.

El curso esta diseñado para profesionales de la construcción, la arquitectura, el urbanismo y otros afines, así como para personal docente de dichas especialidades que el momento de su graduación serán capaces de dirigir grupos de profesionales, técnicos medios y otros trabajadores en la restauración y rehabilitación de edificaciones y de conjuntos de obras con valores patrimoniales; proyectar y ejecutar acciones de restauración y rehabilitación en inmuebles de valores patrimoniales; dirigir equipos de investigación para el análisis de las tipologías arquitectónicas, así como para la valoración e inventarización del patrimonio inmueble; realizar evaluaciones técnico-económicas; solucionar proyectos de inserción fundamentalmente de la vivienda y conjuntos urbanos, con adecuados parámetros funcionales, desde una óptica de desarrollo sustentable, utilizando tecnologías y materiales que posibiliten una correcta adecuación ecológico-ambiental, rescatando y fomentando la identidad cultural y los modos de vida no importados; impartir actividades docentes o de promoción del rescate y salvaguarda de los bienes inmuebles y escribir informes, artículos y ponencias relacionadas con su trabajo.

Fig.6: Clase Teórica. Salón de Conferencias de la Academia de Artes, Antiguo Cuartel de Dragones.

Objetivos:

- Brindar soluciones a los problemas específicos de la restauración y rehabilitación arquitectónica y urbana en los países en vías de desarrollo que garanticen a largo plazo, una preservación de la identidad cultural y una inserción ecológicamente armónica sobre la base de las limitaciones económicas de la región.
- Aplicar tecnologías y materiales que posibiliten el rescate del patrimonio regional, de forma sostenida económicamente, considerando los costos de la proyección, construcción y

explotación, con una adecuada relación entre la asimilación de las tradiciones y las tendencias contemporáneas de la intervención patrimonial.
- Desarrollar la capacidad de análisis y síntesis, de enfocar científica e interdisciplinariamente los problemas funcionales y la capacidad de autoformación permanente e independiente.
- Utilizar técnicas de gestión, organización y dirección de obras de restauración y rehabilitación del patrimonio inmueble.
- Desarrollar investigaciones vinculadas con el estudio y preservación del patrimonio inmueble de la gestión central del país, las que pueden extenderse a otras regiones.
- Efectuar acciones de inserción de nuevas obras en entornos patrimoniales que se integren armónicamente con altos valores artísticos.

Los principios técnico-metodológicos de la especialidad son los siguientes:

- Rehabilitar conservando al máximo los valores patrimoniales
- Construir con poco gasto de energía no renovable.
- Inserción ecológicamente armónica de las edificaciones en el contexto.
- Preservar la identidad cultural de las localidades.
- Empleo de tecnologías de construcción simples (blandas).
- Uso de materiales locales y tradicionales que se integren de forma armónica con los existentes.
- Utilización de fuerza de trabajo local.
- Construir con el mínimo de desperdicios.
- Reciclaje de los insumos empleados.
- Diseño de construcciones funcionales.
- Construcciones seguras.
- Construcciones duraderas con el mínimo de mantenimiento.
- Intervenciones de altos valores artísticos.

Conclusiones

Ante el desafío de la cultura despersonalizada y globalizadora a la que inevitablemente nos atrae la era del turismo y de las comunicaciones, el perfil institucional de la Oficina del Conservador se expande, reorienta y proyecta su acción y efecto, en esencia y resumen, hacia un objetivo social: **la comunidad y su cultura**.

Más allá de insertarse por modismos o oportunidades, el propósito es claro y definido, y es la meta orientada y definida desde todos los ángulos y latitudes; educar, sensibilizar y formar a esa comunidad para **la conservación integrada**.

En nuestro contexto urbano y rural, marcado por un significado de patrimonio, de herencia que es necesario conservar y proteger para las generaciones futuras es vital integrarse en objetivos comunes a los de la población que habita, usa y actúa en ese escenario patrimonial.

Se trata de buscar acciones que **impacten** sobre esas personas nacidas y criadas en las casonas coloniales, sobre esos bisnietos de negros *libertos* que hoy viven en nuestros bateyes, sobre todos nosotros mismos, que de una forma u otra todos caminamos sobre las ancestrales

piedras, y también todos hemos sentido el olor del café desde el umbrío rincón de un zaguán, o hemos esperado la madrugada apoyados sobre la verja de un parque trinitario.

Y ahora, hay que llevar a todos esa gestión comunitaria, esos objetivos de trabajo que deberán convertirse en saetas que ratifiquen la solidez de una identidad cubana, hay que buscar e integrar a los grupos más frágiles, a los niños, a los discapacitados, a los ancianos, hay que incorporar en los planes de la conservación la atención a estos grupos, se impone apoyarse en el Consejo de Vecinos, hay que buscar espacios urbanos para consultorios médicos, farmacias y mercados para la población.

Hay que mejorar las plazas, los parques, pero también hay que dar cobijo, sombra y educación a nuestro vecindario, **el único dueño y señor de nuestra cultura**.

Y buscar opciones de formación para los jóvenes del barrio, llámense Academias de Artes o Talleres donde aprender un oficio.

Hay que traer música popular, del valle a la montaña y llevar su sonido hasta el mar, demostrarle a la gente que se puede, mientras se canta, construir también viviendas populares, con materiales nobles, de tejas y tabla de palma, hasta con la misma tierra, y hacer escuelas para los hijos de aquellos que hoy, teniendo menos opciones tal vez, laboran de sol a sol en la dura faena de producir alimentos para el pueblo.

Y habrá que ayudar a reparar aulas y a montar salas de vídeo, gestionar televisores y computadoras, montar exposiciones por esos montes, para llevar, hasta el último rincón del valle trinitario, la imagen de un pueblo culto, sin refinamientos, pero instruido, conocedor de Portocarrero y de Lam, intérprete de Silvio y de Lecuona, critico de la obra de *Titón*, amigo de los juglares, parrandero y auténtico, pero feliz, sin limitaciones, orgulloso de haber nacido en un sitio patrimonial vivo y dinámico, habitado por hombres de su tiempo, conscientes de su raza y seguros de su historia.

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RESEARCH AND CONSERVATION IN ROMANIAN EDUCATIONAL PROGRAMS

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Abstract

An overview about the evolution of Romanian conservation training will be presented in this paper.

Cooperation among universities and research centers or partners on cultural heritage conservation will be presented bellow. Great experiences and achievements as well as specific problems will emphasize the link between research programs and detailed understanding of causes, mechanisms and consequences of damage to cultural heritage.

Distance learning, networks, training programs for trainers could improve performances in the field of cultural heritage conservation.

The future is based on the past

The concerns for protecting and safeguarding the cultural vestiges of the country have been materialized during the XIXth century. Prince Ghica founded the Bucharest Collections; Prince Al. I. Cuza organized the first Commission of Historic Monuments (1859) and the National Museum of Antiquities (1864). In Iasi, and a Gallery of Arts was established by the governor Gh. Asachi. The duties of Commission of Historic Monuments have been to inventory, to determine the state of conservation and to prepare a list of archaeological cultural heritage objects.

The strategic policies (in 1864 Regulations for National Museum of Antiquities, in 1871 and in 1881 Law Projects for Preservation of Monuments) sustained preserving, enriching and growing activities of collections. It was created and spread a new spirit concerning the public opinion: the ideas of safeguarding and enhancing, preserving the cultural heritage.

In 1881 it was created a special Commission that should have written the list of monuments restoration priorities.

In 1877 it was presented a Report, which had emphasized the richness of the cultural heritage, the existence of an immense archaeological material all around the country.

The Law, elaborated by the Commission of Historic Monuments in 1892, stipulated that one of the most important requests was to awake and to disseminate through the people the will and the understanding of preserving monuments. Thus, special materials about monuments and procedure of conservation were published.

In 1902, two circulars of the Commission of Historic Monuments (CHM) paid a special attention to conservation of the archaeological fund. For instance, the conservation of the "Cetatuia" ruins by the Danube River, and many other archaeological centers widespread in the country were protected and researched. In 1911 an important budget was allocated for protecting 60000 square meters of historic ground: the Roman Camp at Turnu Severin, Southwest of Romania.

The adopted law of preservation and conservation of public monuments (1892) was improved during 1913. CHM prerogatives were raised. They had to preserve and conserve all monuments, to supervise the archaeological excavations, new discoveries of objects and monuments, to inventory the objects from church and monasteries collections, to take care of arts and religious museums. In the mean time it was created the House of Historical Monuments.

The two world wars affected very profoundly the activities of assessing and deciding for preservation and management of cultural heritage. Many monuments and historic houses were destroyed or greatly affected.

A good start helps a lot

The fifties and sixties years were auspicious for collecting, inventorying, guarding, preserving, conserving and putting into evidence of cultural heritage. Many museums were organized, the collections were enriched and it has been continued the inventory of works of art.

Between 1972-1974, first Romanian conservation laboratory was built up 500 square meters, modern equipment, and investigation techniques (for physicist, biologists and chemists). Their specific professional training was achieved in different European Countries, after getting high diplomas on history, archaeology, and history of art, architecture, chemistry, biology, and physics in our country.

The No. 63 Law from 1974 set up new laboratories for restoration of metals, ceramics, textiles, rare books, documents, paleo-fauna, laboratories of investigations of works of art, new museums. It was a centralized professional training thus the graduates in their return becoming the future trainers. They were involved in preparation of the next generation of conservators.

After 1975 the very rich and important monasteries collections and museums were reorganized. Many objects were inventoried, preserved and conserved. Special books ("Research on preservation and conservation", 3 volumes, 1981, first edition), periodicals (Revue of Monuments, Revue of Museums) and journals (since the end of XIXth century Bulletin of Historic Monuments Commission) were published. Exhibitions about conservation of cultural heritage, symposiums, and colloquies were initiated and now they are traditional events that are held annually in another historic city of Romania. The development of today' education structure in order to keep heritage alive have all of these initiatives and actions as basis.

The training activities of preservation and management of Cultural Heritage have been centralized in Bucharest (Center for training, continuing education and management in cultural fields). At the same time the practical skills of new fellows have been conducted

and acquired in the regional laboratories of conservation of cultural heritage, spread up around the country. The scientists have worked as employees and sometime as voluntaries being directly involved in different activities: inventory and evidence, preservation, conservation of cultural heritage.

These scholars have been asked to accomplish specific eligibility criteria according to the future specialization. Most of them graduated faculties such as arts, history, archaeology, chemistry, physics, biology, architecture, civil engineering.

In the same time some universities have developed a new specialization: museology.

Since they have been founded, we should mention that, the faculties of art and of architecture have specific courses about preservation – conservation of paintings, wall paintings and respectively of monuments.

Some of the praiseworthy scholars of Ministry of Culture could participate into international events or become fellows of distinguished European institutions for cultural heritage.

Continuing and improving

Beginning with 1990 in Romania a new process of decentralization has been initiated. Different institutions have played a major role.

Till 1990 the training of the mural painting preservers, was possible only at the Fine Arts University from Bucharest where it was developed special courses of conservation and restoration. Within the "wall painting" specialties, the students participated at practical works. The number of students was small comparing with the specific field of activity, since only same number of students were interested to specialize in preserving domain, and other were remained in fine arts domain. This situation imposes in 1991 to found the first Conservation Department at Fine Arts University from Bucharest. This section had the wall painting conservation as specialization, and after a short period of time it was added a second specialization – "polychrome wood".

Universities, Ministry of Culture and Cults, Romanian Orthodox Church have agreed to enhance the cultural education, training and research links for better understanding, preservation and conservation of cultural heritage. Therefore, in 1993, Faculty of Orthodox Theology of "Al. I. Cuza University" Iasi created the first department of Cultural Heritage from Romania. The new fields of specialization have been designed to train professionals for object conservation: polychrome wood and icon conservation, document and rare book conservation.

In the next years a new comprehensive system for education and training has been developed. In Bucharest (1994) and Cluj-Napoca (1995) the Faculties of Orthodox Theology initiated new departments of icons and books conservation. Trying to meet the needs and the necessities of different kinds of professionals for enhance de value, preserving and conserving the cultural heritage other universities (from Sibiu, Alba Iulia, Oradea, Pitesti, Suceava, Târgoviste) have enlarged their fields of specialization too.

The next table presents the actual Romanian system of education and training for keeping heritage alive.

Table 1. The Conservation/Restoration Education System in Romania

Place	Institution	Specialization	Duration
Iaşi	„ALEXANDRU IOAN CUZA" UNIVERSITY - IASI Faculty of Orthodox Theology „GEORGE ENESCU" UNIVERSITY OF ARTS - IASI Faculty of Arts	Conservation and Restoration (icons, books; wall paintings and tempera on wood)	4 years
Bucharest	UNIVERSITY OF BUKAREST Faculty of Orthodox Theology NATIONAL UNIVERSITY OF ARTS FROM BUCHAREST Faculty of Theory and History of Arts "ALEXANDRU IOAN CUZA" POLICE ACADEMY - BUCHAREST Faculty of Archives	Conservation and Restoration Archives and History	4 years
Cluj-Napoca	„BABEŞ-BOLYAI" UNIVERSITY of CLUJ-NAPOCA Faculty of Orthodox Theology UNIVERSITY OF ARTS AND DESIGN CLUJ-NAPOCA Faculty of Fine Arts	Conservation and Restoration	4 years
Sibiu	"LUCIAN BLAGA" UNIVERSITY - SIBIU Faculty of History and Cultural Heritage	Conservation and Restoration	5 years
Alba Iulia	"1 DECEMBRIE 1918" UNIVERSITY - ALBA IULIA Faculty of History and Philology	Archives and Museology	4 years
Oradea	UNIVERSITY OF ORADEA Faculty of Arts Faculty of Orthodox Theology	Conservation and restoration	4 years
Suceava	"STEFAN CEL MARE" UNIVERSITY - SUCEAVA Faculty of History and Geography	Museology	3 years
Pitesti	UNIVERSITY OF PITESTI Faculty of History, Philosophy and Journalism	History – Archives and museology	4 years
Târgoviste	"VALAHIA" UNIVERSITY - TÂRGOVISTE Faculty of Humanistic Sciences	Conservation of archaeological heritage and collections	3 years

Since 1997, it was founded a second section of wall painting preservation at "George Enescu" University of Arts from Iasi. It is located in the Northern part of Romania – Moldova – a geographic area which owns a richly and amply patrimony, with pre-eminently outside and inside wall paintings the monuments being classified in UNESCO's World Heritage List. To encourage this opening of the new section, the Ministry of Education and the Office of Historical Monuments were supporting the idea of coaching some experts and with their help to create cultural heritage centers of conservation in each area of the country. Conservation and Restoration Department from Fine Arts University, Iasi has now two possibilities of specialization: "wall painting" and " icons - polychrome wood".

The structured programme of study includes a first year, as a commune background for both specializations. At the beginning of the second year, the student can choose between both of departments that the University from Iasi offers. It is a third specialization that is foreseen for the near future, but not before to solve all the conditions that are required.

The university study programmes are structured in relation with the profiles of the department. All of these courses are obligatory for students, but there are also optional and facultative courses: iconography, ethnography, European cultures and civilizations, paleography terms, etc.

The academic training programmes from all universities of Romania have the following aims: general training in conservation of objects or monuments, and one issue specialization. Generally, the university curriculum consists of: theory of conservation (history and ethics of conservation and restoration), history of art, history and practice of old techniques and technologies, natural sciences (chemistry, physics, biology), investigation techniques, ethiopathology: causes and mechanism of deterioration, diagnosis and treatment, environment, preventive and active conservation, drawing, painting, photo, documentation, preservation and conservation methodology of intervention on the fine arts work, etc.

The number of graduates varies according to the number of places and specializations.

The proportion between the number of theory and practice is 1 to 3.

The opportunity for students to participate into summer preservation and conservation activities on the in-situ workshops of monuments or collections is very useful and beneficial. Therefore, the link between research programs and detailed understanding of causes, mechanisms and consequences of cultural heritage damaging is clearly understood. The team of experts from universities, laboratories, and private partners provides the proper solutions, so students can learn them and understand the importance of the scientific approach.

Till 1990, all diploma works had a special research part. Today, project diploma on conservation keeps this compulsory target. From the total amount of works that are carrying out by the team, each student has his contribution to a specific topic.

E.g., there are three different institutions on the platform of Faculty of Orthodox Theology Iasi: department of conservation and restoration, research institute for technology of ecclesiastical works of art and conservation and the restoration laboratory.

All of them co-operate with other faculties, partners and with the Center for Conservation and Restoration of Cultural Heritage.

The students of the Romanian Universities graduate the university studies after a specific number of years, as it is showed in the presented table. The students of the Art Faculties from Iasi and Bucharest graduate the university studies after four years. They pass a university degree exam that consists of two written tests on two basic courses and a diploma work with a practical part (a intervention on a mural decoration or wooden painting decoration). They present the documentation of the research and practical works which were done: the written part about the investigations and the elaboration of conservation methodology which was used for the interventions related to the specific problems, and the second part – documentation file of the achieved work.

After graduation of faculties, advanced studies or master studies help the fellows to get cutting-edge skills and to go further deeply in the field of conservation. In Iasi, there are already two master courses organized by "Al. I. Cuza" University for object conservation and the other one by "Gh. Asachi" Technical University for conservation of buildings.

On the basis of new laws (adopted in 1996 and in 2000), the aims of the Romanian departments of conservation and restoration are to educate and to train:
- Professionals that will work in preservation programmes, in scientific research, to realize the specific work documentation and to make archives,
- Professionals that are involved in interventions of conservation and restoration of the cultural heritage, to stabilize it and to put it in value.

In the near future some of the graduates will be trained to organize and develop special programmes and projects for national cultural heritage conservation. These programmes will be concentrated on a specific class of objects or collection, thus it will be created regional expert centers (Centers of Excellence) for safeguarding and preservation of cultural heritage.

For the future experts, the practical periods of conservation spread during the years of training are a very important part of the curriculum because they are developing in work-shops, most of the time *in-situ*, on the historical monuments or collections.

There are research projects. Participants came from universities, research institutions, SME-s and end-users.

Many of these partners are coworkers in multinational projects, e.g. the well-known and recent one is the Probota monastery (UNESCO patrimony). There are many others, all of them inscribed on UNESCO's World Heritage List, other places as Sighisoara, the world heritage city of Romania, the castles from Transilvania, the Mogosoaia Palace. All these projects have not only the goal of monument conservation but also even the preservation of collections or to rebuild up these collections.

In the following list there are presented the most important workshops executed on historical monuments with Byzantine mural decoration. The students from Iasi and Bucharest faculties attended these summer workshop activities:

- The Church of Probota Monastery (XVI century) – UNESCO international project of preservation and conservation - restoration of outside and inside wall paintings:

"International support for the preservation and restoration of the Probota Monastery, Romania". The complexity of works involved architects, art historians, archeologists, scientists, conservators, and restorers. During 1997-2001 it was a collaboration work with schools from Germany, Italy, Cheek Republic, Columbia, Switzerland and England. It was an important training for the Romanian students. International and Romanian experts participated and transmitted the high level experience to the future conservators.

- Church of Popauti Monastery (XV century) – Research project with the Institute of Cultural Heritage Research from Bucharest, which has as subject "Stabilization and evaluation of the old decorated buildings". During one year (2001-2002) it was presented a part of the mural decoration of the monument (collaboration with experts: chemists, physicists, biologists, architects, building engineers, restorers).
- Church of Moldovita Monastery (XVI century) - 2002
- Church of Voronet Monastery (XV century) 1998 - 2002
- Church of Sucevita Monastery (XVIII century) 1997 - 2002
- "Arbore" church (XVI century) 2000
- "SF.Gheorghe" church – Suceava (XIII century) 1999-2003
- Preserving work on mural painting fragments that were extracted and exposed in the "Gothic Hall" of "Trei Ierarhi" Museum from Iasi
- The wood church of Radaseni (XVIII century) 1999-2000
- Church of Putna Monastery –iconostasis (XVII century) 2001-2002
- Church from Roman – iconostasis (XVII century) –1998

The collaboration among preservation and restoration departments and experts includes other institutes, such as:

- Art Museum of Iasi – laboratories, museographers, preservation and restoration experts;
- "Petru Poni" Macromolecular Chemistry Research Institute – Iasi;
- Zonal Laboratory from Suceava (Art Museum – Suceava).

To get better results they have demonstrated the necessity of preserving the intangible cultural heritage. Training and incentives for workers in traditional building trades have been done. Thus, small enterprises (family associations) have been developed. E.g., they execute the specific traditional wood structure from the North-West of Romania (Maramures). The wooden churches conservation works helped even to foster the local traditional techniques and materials.

Due to necessity of improving one's knowledge, often, advanced studies, courses and seminars, conferences or national and international symposia are organized. For instance "Monument – tradition and future" is the annual national symposium held in Iasi and the international conference on Theory and Practice of Rehabilitation of Historic Monuments is organized in Tusnad.

The research topics vary and they represent an interest now and the occasion of contacting professionals and going further in solving the problem. Such topics are: the research on theory and practice of preservation and conservation methodology, compatibility studies, research about new investigation methods, new tools and technologies, new studies for evaluation of air pollutants effects, identification of causes of deterioration and damage, research on new polymers for conservation practice,

monitoring the effects of conservation treatments, inventory and characterization the cultural heritage from a specific aria, etc.

Exhibitions on conservation and with objects are organized periodically.

The high level of education seams to be successful. But the education in the protection of cultural heritage need to follow the Bologna Declaration for European higher education and to establish real working contacts with the academic stuff. Clarification of conservation/restoration education at University level or recognized equivalent is necessary. In Romania, the education system as well as the research system is renewed. The Reform is working and will transform the present situation. Thus we should create a unity in the diversity of the existing departments. The competition among all of these centers is beneficial and requires an adequate attitude.

The performances in the field of cultural heritage conservation could be improved. Distance learning, networks of excellence, training programs for trainers are some of the appropriate tools of the future training.

Up to date, there are special educational programmes that rule in some schools for free time of pupils. Due to specific programs, financed by NGOs or by Romanian government, the institutionalized children have also the opportunity to know cultural heritage and to enjoy it. The high schools of art and the orthodox lyceums offer special classes where the young people learn about the importance of cultural heritage, they practice old techniques and resurrect the feeling of harmony and beauty, the respect for different traditions and cultures.

Sustainable protection of cultural heritage asks us to prepare widespread school educational programs. Firstly, in order to attain this aim, strengthening the link with educators by the means of common projects and of specific tools from the primary and gymnasium level is necessary (the continuing education of educators, the training of trainers, new books for pupils, etc.).

In Romania, this debate is doubtlessly the most interesting and useful one. Romania finances research programs of cultural heritage, but the founds are limited and insufficient. If "on the European level, financial and human resources within cultural heritage protection and research are very limited" it is clear the level of difficulties in a new associated country. Without the support of the Romanian government, of EC research founding and of specific international organizations for the preservation and management of cultural heritage the efforts would not have been successful.

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Key words

university curriculum, research topics, summer workshop

CUMBRE DE CIUDADES PATRIMONIO DE LA HUMANIDAD
RODAS,
GRECIA
SEPTIEMBRE DE 2003

PRESENTACIÓN:

RED DE HERMANDAD DE CIUDADES AMERICANAS PATRIMONIO DE LA HUMANIDAD
Y
OBSERVATORIO DE CIUDADES

A CARGO DE:
ARACELI MORALES LÓPEZ, DIRECTORA DE LA RED DE CIUDADES AMERICANAS PATRIMONIO DE LA HUMANIDAD Y OBSERVATORIO DE
CIUDADES

CARTAGENA DE INDIAS, COLOMBIA

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- Resumen Ejecutivo
- Presentación
- Conclusiones
- Bibliografía
- Anexo: Presentación Visual (en Power Point)

RESUMEN EJECUTIVO

El 11 de julio de 2002 con la colaboración UNESCO, PNUD y los gobiernos de varias ciudades, se creó la Red que hermanaría a las casi cuarenta ciudades declaradas Patrimonio Histórico de la Humanidad en América.

Para tal efecto, se establecieron compromisos con las sociedades, entre los que se incluyen:

•Promover proyectos y procesos conducentes al logro de ciudades sostenibles;

•Incentivar políticas de orientación de recursos en favor de la eliminación de la excusión social y el alivio de la pobreza,

•Reforzar los vínculos entre las ciudades, haciendo énfasis en el turismo y la vivienda;

•Estimular la experimentación e innovación en la prevención y cuidado de los patrimonios históricos de la humanidad, así como contribuir a la formación cultural y social de sus ciudadanos como tarea prioritaria de la Red.

PRESENTACIÓN

RED DE HERMANDAD DE CIUDADES AMERICANAS PATRIMONIO DE LA HUMANIDAD Y
OBSERVATORIO DE CIUDADES
- Un Proyecto De Desarrollo Humano Sostenible

JUSTIFICACIÓN
GENERAL

♦ Garantizar el cumplimiento de los programas y metas propuestos por la UNESCO;

♦ Proporcionar apoyo al desarrollo humano sostenible de la región;

♦ Propiciar un permanente diálogo intercultural entre las ciudades, y entre éstas y
otras regiones del mundo;

♦ Convertir al patrimonio cultural en el verdadero líder de los procesos de integración de las ciudades y regiones;

♦Fortalecer las instituciones democráticas, la creación y ejecución de procesos en pro de una mayor y mejor gobernabilidad.

ANTECEDENTES

♦ Convención UNESCO: Protección del Patrimonio Cultural y Natural. 1972

♦Encuentro internacional de alcaldes de ciudades históricas: Preservación de las Ciudades Patrimonio en tiempos de cambio, Quebec. Julio 1991

♦ Foro Urbano Mundial, Curitiba. Junio1992

♦ Conferencia de Desarrollo y Medio Ambiente. Río de Janeiro. Junio 1992

♦ Primera Reunión Técnica de Coordinación de la Red de Hermandad de Ciudades Americanas Patrimonio de la Humanidad. Cartagena de Indias. Julio 2002

OBJETIVOS GENERALES

♦Identificar experiencias exitosas en Ciudades Patrimonio y mejorar la calidad de vida de sus habitantes.

♦Mejorar las acciones preventivas de conservación del patrimonio histórico.

♦ Fomentar la productividad de las industrias culturales y el turismo en las ciudades declaradas Patrimonio Histórico de la Humanidad.

♦Articular programas para disminuir los índices de pobreza de estas ciudades históricas.

Otros:

♦Ampliar y reforzar vínculos, relaciones e intercambios entre los miembros de la Red.

♦Promover procesos, proyectos y acciones encaminadas al desarrollo sostenible de las ciudades.

♦Incentivar políticas de orientación de recursos para la eliminación de la exclusión social y el alivio de la pobreza en las ciudades.

♦Reforzar vínculos económicos, sociales, culturales, ambientales, científicos y técnicos, haciendo énfasis en el turismo y la vivienda.

♦Contribuir a la formación de líderes y gestores de proyectos y estrategias en beneficio de los Patrimonios Históricos.

♦Promover una educación para el desarrollo sostenible

♦Facilitar y fomentar el intercambio de experiencias e información entre las ciudades declaradas Patrimonio Histórico de la Humanidad, con el fin de efectuar una retroalimentación que beneficie el desarrollo de cada una de ellas.

♦Gestionar, asistir y contribuir en la formulación de proyectos, así como el diálogo con las instituciones financieras.

♦Comprometer a la UNESCO y al PNUD con el apoyo a la Red, a fin de lograr un desarrollo social y cultural en cada una de las ciudades Patrimonio Histórico de la Humanidad.

♦Comprometer a instituciones financieras y de fomento, en el establecimiento de líneas de crédito especiales para la ejecución de proyectos que beneficien a la Red de ciudades.

♦Crear las condiciones necesarias para el éxito de la Red, e incentivar a las

ONG para que hagan parte de la creación de estrategias y alianzas en beneficio de la humanidad.

OBJETIVOS INMEDIATOS

♦Poner en marcha la Red de Ciudades Americanas Patrimonio de la Humanidad.

♦Promover la construcción de alianzas estratégicas internas y externas dirigidas a fortalecer la cooperación técnica en el proyecto.

ORGANIZACIÓN

♦ Comités Técnicos Nacionales
♦ Comité de las Américas
♦ Unidad de Coordinación de la Red
♦ Secretaría Técnica
♦Comité de Coordinación de la Asistencia Preparatoria

LA RED

1. Situación actual de la problemática

Los centros históricos de las ciudades americanas comparten problemas de desplazamiento de los habitantes de los núcleos históricos hacia otras zonas (por renovación urbana, falta de oportunidad o economía).

2. Situación prevista al final del proyecto

♦La puesta en marcha de la red de ciudades americanas patrimonio de la humanidad con proyecciones financieras y estrategias que garanticen su sostenibilidad

♦Generación de alianzas estratégicas para movilización de cooperación horizontal entre las ciudades y cooperación internacional para proyectos transversales

♦Promoción y réplica de mejores prácticas en términos de gobernabilidad, transparencia y calidad de vida

♦La integración multidisciplinaria de sectores básicos del desarrollo con fines productivos

♦ Formular mediante la obtención de resultados y de forma planificada el documento de Proyecto de desarrollo de Ciudades Americanas Patrimonio de la Humanidad

♦Enfoques integrados sobre la gestión dela ciudad con vistas al desarrollo del turismo y de otros medios de vida sostenibles

♦Formular los mecanismos de articulación de las ciudades patrimonio como una estrategia puntual para la conservación de los centros históricos de las ciudades americanas

♦Estrategia para que las ciudades patrimonio se conviertan en instrumento para disminuir los niveles de pobreza de sus áreas circunvecinas

♦Intercambio de experiencias en el manejoe incorporación del patrimonio a la dinámica económica y social de las diferentes ciudades

3. Beneficiarios previstos

1. Área Andina: Colombia, Ecuador, Bolivia, Perú y Venezuela
2. Área Centroamericana-México
3. Área MERCOSUR
4. Área Caribe y Suramérica
5. Área Norteamérica

4. Lista de países y ciudades participantes en la red:

1. ANTILLAS HOLANDESAS
-Curaçao

2. BOLIVIA - Potosí, Sucre

3. BRASIL - Brasilia, Diamantina, Goiás, San Luis, Olinda, Ouro Preto, Salvador

4. CANADÁ - Lunenburg, Québec

5. COLOMBIA - Cartagena de Indias, Mompox

6. CUBA - La Habana, Trinidad

7. ECUADOR - Cuenca, Quito

8. EEUU (Puerto Rico) - San Juan

9. GUATEMALA - Antigua Guatemala

10. MÉXICO - Campeche, Guanajuato, México D.F., Morelia, Oaxaca, Puebla,
Zacatecas

11. PANAMÁ - Panamá, Portobelo

12. PERÚ - Arequipa, Cuzco, Lima

13. REP. DOMINICANA - Santo Domingo

14. SURINAME - Paramaribo

15. URUGUAY - Sacramento

16. VENEZUELA - Coro

España por su experiencia ha mostrado su interés desde la creación de la Red en trabajar mancomunadamente.

Promoción y constitución de alianzas estratégicas internas y externas dirigidas a fortalecer la cooperación técnica

1. Establecimiento Comités Técnicos Nacionales

2. Conformación Comité De Las Américas

3. Integración de Otros Aliados a la iniciativa

CONCLUSIÓN

Consideramos
que la Red se constituirá en un apoyo para el mejoramiento y conservación de las ciudades declaradas patrimonio histórico de la humanidad, así como de sus habitantes, obteniendo de ésta manera, un diálogo intercultural con el que se beneficien todos los integrantes y actores de este proyecto.
De igual manera, se espera que la conservación de estos patrimonios de la humanidad repercuta en la eficiencia y productividad de todos sus ejes articuladores, mitigando y creando estrategias preventivas para sus sistemas.

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Observatorio de Ciudades

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Historic Cities as Open Labs of Research and Postgraduate Education

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Abstract

"Keeping heritage alive" is a perception of sustainable cities, with the active participation of people in the development processes. In such a model of a city development, education becomes a necessity to keep societies informed and research becomes a tool to define new concepts and investigate effective, innovative and compatible planning techniques and materials for sustainable preservation of historic cities. Both, research and education provide sustainability to historic cities preservation and are enriched and developed in mutuality with cities development. In this framework, historic cities are being kept "alive" and functioning as open labs for research and education.

The evolutions in the field of Cultural Heritage protection demand validation of the newly developed concepts and strategies in situ. Historic Cities can and definitely should be used as open labs, transferring, applying and validating the knowledge produced. Historic City Mayors should realize the need for essential cooperation with all the relevant research and education carriers, in order to achieve the development of knowledge based decision – making systems and in order to offer the opportunity for education to their citizens.

As far as Universities are concerned, application should become a prerequisite for the social acceptance of research results and educational programs.

Universities, research and education institutes currently participating in the conference along with the coordinators of the organisation of the conference and youth forum are challenged to present in the next conference the pilot applications of this effort and evaluate them for a future action plan.

The historic City of Rhodes and historic ecistic cores in Halki can act as pilot open labs for the preservation of historic cities.

1. General Concept of Historic Cities as Open Labs

The cultural, historic and social value of Cultural Heritage renders nowadays Historic Cities to pilot workshops of cultural development and socio-economic integration. Within this framework, cultural development policies are redefined and integrated into strategies for sustainable development and preservation, responding to the new research needs and the relatively emerging professional profiles for the protection of Cultural Heritage.

Historic Cities require a global strategy, which disseminates and applies the recently developed know-how, evaluates the applied practices and demonstrates the best among them, as well as develops knowledge based decision – making tools for scientific support to policies. The adoption and promotion of these procedures is indispensable for the incorporation of historic cities into modern towns for the reconciliation of tourism and its development in compatibility with the protection of Cultural Heritage and the needs of local societies.

"Keeping heritage alive" is a perception of sustainable cities, with the active participation of people in the development processes. In such a model of a city development, education becomes a necessity to keep societies informed and research becomes a tool to define new concepts and investigate effective, innovative and compatible planning techniques and materials for sustainable preservation of historic cities. Both, research and education provide sustainability to historic cities preservation and are enriched and developed in mutuality with cities development. In this framework, historic cities are being kept "alive" and functioning as open labs for research and education.

2. Conceptual and strategic evolutions regarding the protection of Historic Cities in the international ambience

Decade 1970 – 1980

The environmental crisis defines the character of the problems and orientates accordingly the research of solutions regarding the protection of Cultural Heritage. Deterioration problems of Cultural Heritage are defined as interactions between

materials, structures and environmental relation to mass tourism and the super urbanization in cities' development. Environmental management integrates safeguarding interventions as tools for the preservation of cultural heritage.

The first concept and practice approaches to sustainability of development regarding cultural heritage are brought on to the scene by the radicals of '60s and '70s in order to face the environmental crisis. New social forces enter into the scene demanding environmental and cultural heritage protection. Cultural heritage is interrelated with local development, employment and education.

Decade 1980 – 1990

The economic crisis characterizes the approach of Cultural Heritage protection as a development problem. In particular,

- Heritage is envisaged as a potential source for economic development
- Questions are raised on how valorization and reveal of cultural values would comply with demands for citizens' quality of life and what model of economic development would be in compatibility with the Protection of Cultural Heritage
- New restoration concepts are evolved towards more soft interventions, i.e. of safeguarding type, less costly and of higher visibility and social accessibility to Cultural Heritage results
- New forms of tourism alternatives of mass Tourism, like eco, conference, cultural tourism, etc, are emerging reconciliating tourism development with the revitalization of Cultural Heritage

Decade 1990 – 2000

International awareness is motivated towards facing natural and anthropogenic hazards to cultural heritage. Risk assessment, techniques, methodologies and knowledge mechanisms of the decay are developed and applied to the protection of cultural heritage. During this period, scientific research in parallel with best practices emerging since '70s seem to mature and result in the development of know-how regarding the protection of

cultural heritage along with the invention of new high tech-measuring techniques, instrumental and non – destructive ones.

In the same period, new international bodies are founded like the ICOMOS International Committee on Historic Towns and Villages CIVVIH, 1990, and the Organisation of World Heritage Cities OWHC, 1993, strongly emphasizing the need for urban sustainability, while within E.U. the development of European Research Strategy for the "City of Tomorrow and Cultural Heritage" is bridging together the issues of sustainability and cultural heritage protection.

2000 – Today

Scientific support to policies by inventing and applying knowledge based decision – making for cultural heritage protection, becomes a new European research strategy promoting new forms of local government, based on informed societies and communities' participation.

In this direction, sustainability, impact assessment is instructed in Johannesburg Summit for the Environment. Meanwhile codes, rules, regulations, guidelines for strategical planning, as well as compatible materials and techniques for cultural heritage protection are developed to regulate best practices.

Emerging lifetime engineering, monitoring and control to face the problems of deteriorating built environment, provide new tools of in situ investigation for the preservation of historic cities, therefore establishing the concept of historic cities as open labs.

3. New Research Needs in the field of Conservation of Cultural Heritage

Research needs in the field of Cultural Heritage nowadays concern basically the following aspects:

Mitigation of environmental pressures on Historic Complexes (Buildings, Cities, Sites) – Real scale environmental impact assessment monitoring and control

It comprises estimation of critical thresholds of environmental factors and identification of pollutant sources, along with the estimation of decay mechanisms. The

interrelation between the causes and the environmental impacts on monuments and historic buildings leads after proper elaboration to methods and techniques of advanced diagnostics, permitting integrated management. Decision-making can be achieved on proper, effective and compatible urban planning, land use and re-use of monuments and sites, traffic regulations and measure tools, environmental management, conservation interventions, tourism development, leisure and cultural activities, in order to keep heritage "alive".

Sustainable – compatible materials and conservation interventions

Incompatible conservation materials and interventions represent the main deteriorating factor for the initiation or even acceleration of decay of structural materials, historic masonries and architectural surfaces. The development of criteria and methodology for new advanced compatible restoration materials regarding physico-mechanical (thermal expansion coefficient, static and dynamic modulus of elasticity), physico-chemical characteristics (water absorption, permeability to liquid/vapor), microstructural characteristics, which control the transfer of soluble salt solutions and resistance to the environmental loads of the monument (earthquake, microclimate, environment) is essential for the performance of successful conservation interventions.

Development of knowledge based decision - making tools for strategic planning of sustainable preservation to keep heritage alive

The main objective is the development of a multidisciplinary knowledge based decision-making system for strategic planning of conservation interventions and for support to community policies for sustainable preservation of historic cities and sites. This system allows for the spatial management of the attained information and data, in order to achieve strategic planning allocated to each point of historic cities and monuments. The decision-making system comprises data (environmental, materials, structural, functional, conservation, social data) deriving from monitoring and control techniques, vital for the surveillance of Cultural Heritage through time and allows for sustainable preservation of Cultural Heritage. The knowledge based decision-making tools perform environmental impact assessment on real scale.

4. Protection of Monuments and Historic Cities – A new emerging scientific and technical field

The new character of the scientific and technical field in the protection of Monuments and Historic Cities is characterized by:

- interdisciplinarity
- demonstrative character promoting validation of scientific and technological tools in situ, valorization of proposed strategies and evaluation of applied strategies in situ
- use of advance scientific and technological tools, permitting strategic planning, monitoring and quality control of systems and advanced diagnostics.

The new professional profile of scientists and engineers developed in the field of the protection of Cultural Heritage has to respond to the following needs:

- Advanced diagnostics and monitoring of deterioration
- Environmental impact assessment and mapping on real scale real time production
- Selection, application and evaluation of effective and compatible materials and techniques for conservation interventions
- Strategic planning of conservation interventions
- Environmental management for the protection of monuments and sites and historic cities more particular

5. Researh and Education for the Protection of Monumnets ant NTUA - Demonstration of Historic Cities as Open Labs

5.1. During the period 1974 – 1980 National Technical University of Athens presented remarkable initiatives in the field of the protection of monuments. The formation of the "Committee for the Preservation of the Acropolis Monuments" was the first step. During the same period distinguished professors emeritus today, like Professor Bouras, Zivas, Tassios, Skoulikidis et al. characterised personally NTUA's presence in research and education efforts for the protection of Cultural Heritage.

During the decade 1980 – 1990, NTUA actively supported youth initiatives for employment and training, alternative development, preservation of ecosystems management, cultural heritage and several relevant issues.

Since 1990, NTUA through its international cooperation and organisation of Advanced Study Courses introduces the meaning of interdisciplinarity *[COMETT II – ITECOM 1993, ITECOM 2003]*. In the same framework, in 1997 the multidisciplinary program of NTUA Postgraduate Studies in *"Protection of Monuments"* (Responsible: School of Architecture, Director: Prof. N. Kalogeras) initiates.

Through the Postgraduate program, a Master of Science and Engineering is obtained in the two following directions:

1. Direction A: *Conservation and Restoration of Historic Buildings and Sites* (Responsible: School of Architecture, Studies Director: Prof. Em. Biris)
2. Direction B: *Materials and Conservation Interventions* (Responsible: School of Chemical Engineering, Studies Director: Prof. A. Moropoulou)

The second direction "Materials and Conservation Interventions" covers a variety of topics, such as selection and preparation of restoration and conservation materials, examination of building materials' decay, diagnostic studies in situ by non – destructive techniques calibrated by analytical techniques in lab, assessment of applied conservation materials and techniques, protection of monuments and complexes from environmental loads, seismic risks, as well as architectural restoration and structural repair of historic structures and complexes.

Since 1988, NTUA Research Team in the Section of Materials Science and Engineering, School of Chemical Engineering, headed by Professor Moropoulou, participates in various European and National projects, such as regarding historic materials and structures suffering from sea salt decay in the Mediterranean Basin. European and Mediterranean Universities are acting together with local authorities to promote strategic planning for the protection of monuments in Historic Cities from sea salt decay *[ENVIRONMENT 1992 – 1995 and 1996 – 1999]*.

These research activities are accompanied by European Advanced Study Courses open to the public for the dissemination of results *[COMETT II – ITECOM 1993, ITECOM 2003]*.

In the same time, the research team is performing research projects with cities *[Medieval City of Rhodes, Corfu Fortress, Rethymnon, Kerkyra]* and stakeholders of historic buildings in historic cities *[Bank of Greece, Athens Academy, National Library of Greece, National Archaeological Museum]*.

These projects are interrelated with education through

- fieldworks and
- Master Thesis, thematic exercises, in situ lab exercises in the framework of the Master of Science and Engineering in the "Protection of Monuments"

A greater dissemination of the know-how produced is performed through seminars given in the Institute of Education for Engineers regarding Compatible Materials and Innovative Conservation and Restoration Techniques for Historic Buildings, Complexes and Sites.

Additionally, NTUA acts as an advisor to program agreements for the protection of historic cities (Rhodes, Kerkyra, Rethymno) or to local governments for the protection of Cultural Heritage (Kallithea Rhodes, Monastiraki Aetoloakarnania et al).

5.2. National Technical University of Athens has applied the above – mentioned methodology to characteristic Historic Cities. More specifically:

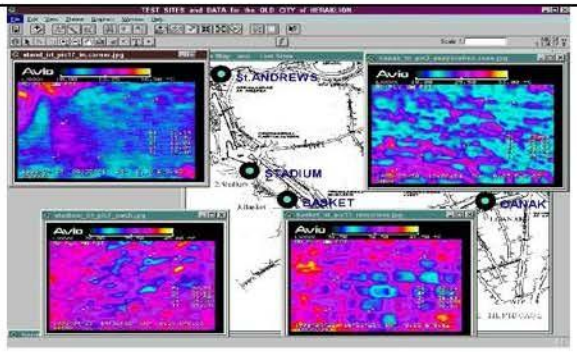
Medieval City of Rhodes

In the Medieval City of Rhodes environmental impact assessment has been performed, along with mapping and analysis of weathering and structural damage, in order to define the criteria for management of the environmental factors. Environmental management as a process of monitoring and control of soluble salts and humidity sources and as a vehicle of the development plan of cultural tourism through valorization, recuperation and reuse of cultural goods allows for protection and preservation of Cultural Heritage.

Medieval City of Rhodes – Non destructive techniques' application *[42]*

Venetian Fortifications of Herakleio in Crete

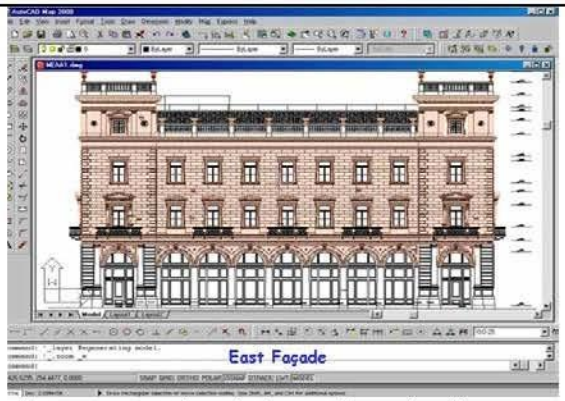
In the Fortifications of Herakleio environmental management was performed in order to achieve elimination of environmental loads along with development and rehabilitation by the introduction of new uses.



Environmental impact assessment by Infrared Thermography managed by GIS [*37*]

The Historic Centre of Athens

In the case of the Mela Palace Historic Building materials and decay mapping was performed through management of non – destructive techniques' measurements in AutoCAD Mapping, allowing for the strategic planning of conservation interventions.



Strategic planning for the conservation interventions by the management of AutoCAD Mapping results [*45*]

6. The active role of Youth initiatives, research and education in the international pilot projects for the revitalization and preservation of architectural heritage in Rhodes and Halki

Pilot Project for Halki's revitalization

The Greek Youth and UNESCO pilot project performed for the integrated development of Halki was based on an interdisciplinarity planning attempted by multicriteria analysis of counteracting strategies, concerning:

- natural, human and cultural resources conservation and upgrading
- water, liquid and solid waste management
- use of renewable energy resources
- conservation and rehabilitation of architectural heritage.

The plan for the integrated development of Halki proved that:

- it is not the shortage of funds responsible but the lack of innovative solutions and model management of development that keeps the small and isolated areas under the process of degradation and instability with no viability prospects.
- The best possible macro – economic management of an economy cannot bring the small regions out of the vicious circle of unbalanced development and that with structural invention on a local level, concerning proper management and preservation of natural, human and cultural resources such regions can survive.
- Fundamental political mechanisms such as informed communities participation, decentralization, support and upgrading of local government and initiation and

support for local initiatives in the private, public and social sectors as well as the development of new institutions are proved the only feasible and effective ways to carry out the revitalization of historic cities and through these the revitalization of local economies, in a sustainable way.

The basic challenge was the survival of a system, which has disintegrated with a cost not exceeding conventional levels. The program aimed to be transferable insofar as both the overall model for intervention and the technical and specific measures are concerned, thus contributing to a pilot method for an approach to development problems, particularly in isolated mountain and island areas presenting noticeable development potential in fixed capital like the architectural heritage comprising historic ecistic cores or cities.

The basic output of reversing the degrading of population and local economy was based on the revitalization of the historic City of Halki with rehabilitation and historic houses to host tourism developed to sustain local economy, as well as by the recovery and rehabilitation of historic buildings and sites to provide public spaces promoting new functions and services for the quality of life of the people.

Research and education of the local community played as active role to the success of the period. Today Halki is pacing its own road of sustainable development preserving its natural, human and cultural resources and primarily the historic ecistic core of Nimborio. Perspectives for the revitalization and rehabilitation of the historic Fortress and Village.

Pilot Project for the reveal, recognition and preservation of the historic City of Rhodes

Youth initiatives undertaken for the reveal, recognition and preservation of the historic (Medieval) City of Rhodes with UNESCO, OECD and E.E. participation and support aimed at :

- providing opportunities for cultural tourism as alternatives to the declining mass tourism, in order to sustain island's economic perspectives
- upgrading the quality of life in the City intra muros, in order to preserve and sustain social consistency and coherence
- revealing and preserving the historic and cultural values of the City

- disseminating these values and educating the people of Rhodes on their history
- developing new cultural, scientific and institutional tools for historic cities' preservation acting in favor of Rhodes as a pilot

The raise of the finance for the preservation and improvement of the integrated environment of the City became an interrelated purpose.

In order to implement the above mentioned goals, the Ministry of Youth in collaboration with the Municipality of Rhodes and with the active support of the Ephoriate of Byzantine and post-Byzantine Antiquities, performed the following initiatives:

- 1982 proposal to EU and 1983 proposal to UNESCO for the recognition of the Medieval City of Rhodes as a "Historic City"
- 1982-1984 pilot interventions for:
    - cleaning, landscaping and preserving the Medieval Moat of the City, constructing and launching an open air theatre to attract in international cultural events local community and tourism
    - reusing the Bastions of Caretto and St. George as exhibition halls and meeting places, as well as the Church of the Virgin of the Castle as music and exhibition hall, by their rehabilitation and the start of first safeguarding – conservation and restoration works
- 1983-1984: Initiation of new legislation framework and development of new institutions for the preservation and management of the Moat and the Fortress, as well as the medieval City of Rhodes, for first time ever, introducing local governments in this role. The relative Program Agreements signed between the Municipality of Rhodes, the Ministry of Culture, the Archaeological Resources Fund with the participation of the Ministry of Environment, Urban Planning and Public Works and the National Tourism Organization, provided the proper context for scientific and implementation studies, as well as technical interventions and construction works to take place towards integrated conservation of the Medieval City.

- 1984-1999: The Municipality Bureau for Conservation of Medieval City of Rhodes acted as the vehicle to coordinate private and public sectors' works for the preservation of the City
- 1999- today: The Fund established by the Ministry of Culture to coordinate the works regarding the Fortifications took over the venture of conservation - International symposium for the 15 years of Restoration in the Medieval Town of Rhodes
- 2004-:. At the end of the lifetime of the Program Agreement, is the Municipality of Rhodes going to be deprived of the rights to decide on the preservation of its own City?

  In this context:
- the introduction of the local community through culture into supporting the effort of the preservation of the City became the main strategy of its implementation
- Historic City of Rhodes acted as a field of interdisciplinary research performed towards all the multilateral aspects of the preservation of the City

Today the character of the Historic City of Rhodes as an open lab for Research and Education is strongly related to the institutional structure and the strategical planning for its preservation.

7. Conclusions and Perspectives

The evolutions in the field of Cultural Heritage protection demand validation of the newly developed concepts and strategies in situ. Historic Cities can and definitely should be used as open labs, transferring, applying and validating the knowledge produced. Historic City Mayors should realize the need for essential cooperation with all the relevant research and education carriers, in order to achieve the development of knowledge based decision – making systems and in order to offer the opportunity for education to their citizens.

Satisfactory funds should be searched at the European Union programs, the international organisations and the "industry", that is Ministries of Culture, manufactures,

stakeholders of historic buildings, allowing for the establishment of the cooperation between the relevant education and research carriers.

As far as Universities are concerned, application should become a prerequisite for the social acceptance of research results and educational programs.

Given the Symposium opportunity, the Organisation of World Heritage Cities should intensify the cooperation between local governments, international organisations and universities in order for the following to be accomplished:

- Pilot research programs and compatible studies within Cultural Heritage, employing international network of Universities
- Educational courses (Graduate and Master Thesis, National and International Advanced Study Courses, Thematic Exercises of Postgraduate Studies, Information Campaigns, Workshops for Citizens).

Universities, research and education institutes currently participating in the conference along with the coordinators of the organisation of the conference and youth forum are challenged to present in the next conference the pilot applications of this effort and evaluate them for a future action plan.

The historic City of Rhodes and historic ecistic cores in Halki can act as pilot open labs for the preservation of historic cities.

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ΟΙ ΑΡΧΑΙΟΛΟΓΙΚΕΣ ΖΩΝΕΣ ΤΗΣ ΚΩ, ΤΑ ΜΝΗΜΕΙΑ ΚΑΙ ΤΟ ΑΣΚΛΗΠΙΕΙΟ ΤΗΣ, ΜΙΑ ΚΛΗΡΟΝΟΜΙΑ ΥΠΟ ΠΡΟΣΤΑΣΙΑ ΚΑΙ ΑΝΑΔΕΙΞΗ. ΕΝΑΣ ΙΔΑΝΙΚΟΣ ΤΟΠΟΣ Ν' ΑΝΑΤΡΕΞΕΙ Ο ΣΠΟΥΔΑΣΤΗΣ, Ο ΜΑΘΗΤΗΣ ΚΑΙ ΝΑ ΔΙΔΑΧΘΕΙ ΤΗΝ ΙΣΤΟΡΙΑ, ΤΗΝ ΤΕΧΝΗ, ΤΗΝ ΑΡΧΑΙΟΛΟΓΙΑ.

ΕΙΣΑΓΩΓΗ- ΣΤΟΧΟΣ :

Ζούμε σε πόλεις και νησιά σε χωριά ή οικισμούς που σιγά –σιγά γιγαντώνονται , ενώ συχνά λέμε ότι κοντεύει να λείψει η σοφία του λαού και το χρώμα που εκείνος έδωσε. Συνέδρια σαν κι αυτό που οργανώνεται σήμερα, όπως και ΄αλλα που έγιναν στο παρελθόν ή θα γίνουν στο μέλλον καταλήγουν σε συμπεράσματα, που πρέπει με την ολοκλήρωση των εργασιών, αμέσως να προωθούνται δράσεις, όπως συχνά επιστημονικοί φορείς το επιδιώκουν σε Πανελλαδική εμβέλεια με ευαισθησία και όχι μόνο.

Επιδίωξη διά της παρούσης είναι να καταδειχθεί τόσο η διαχρονική παρουσία των ιστορικών συνόλων της Κω, όσο και να σκιαγραφηθεί η σοφία που περνούσε στις πόλεις και τις περιέλουε μ' ένα μοναδικό χρώμα. Το παράδειγμα της Κω, καθώς έχει μνημεία, ευρήματα κ.α., από την Προϊστορία, Αρχαϊκούς, Κλασικούς, Ελληνιστικούς, Ρωμαϊκούς, Βυζαντινούς, χρόνους Ιπποτοκρατίας, Τουρκοκρατίας, Ιταλοκρατίας, Λαϊκού πολιτισμού κ.α., είναι μια ιδανική περίπτωση διδασκαλίας και εμπέδωσης αυτής της Ιστορικής συνέχειας από τους σπουδαστές ή μαθητές, για να γνωρίσουν καλύτερα την Ιστορία, Τέχνη και Αρχαιολογία διαφόρων εποχών.

Είναι ανάγκη να σταματούμε στα στοιχεία της πολιτιστικής μας κληρονομιάς, γιατί αφενός καθορίζεται η ιστορική ταυτότητα ενός τόπου, ευαισθητοποιούμεθα σε θάματα Τέχνης- καλαισθησίας και αφετέρου μπορούμε να δούμε δι' αυτών των στοιχείων ανθρώπινες λύσεις –δράσεις για την ανάδειξη του τόπου, πράγμα που δεν στερείται οικονομικών μεγεθών και απολαβών. Ο στόχος ακόμη παρόμοιων δράσεων αποβλέπει στο να αναδείξει το σεβασμό στο δομημένο και αδόμητο περιβάλλον που δεν αφήνει μακριά την ανθρώπινη κλίμακα.

ΤΟ ΠΑΡΑΔΕΙΓΜΑ ΤΗΣ ΕΛΛΗΝΙΣΤΙΚΗΣ ΚΩ :

Αν θα θέλαμε να σταθούμε π.χ ,στο παράδειγμα της Κω των Ελληνιστικών χρόνων, βλέποντας τα μνημεία που διασώθηκαν και καθώς αντλούμε και απ' τις ΠΗΓΕΣ διαπιστώνουμε ότι το ιπποδάμειο σύστημα*(1), οι υποδομές σε δημόσια κτήρια κ. α.. είχαν και κατάλληλο χώρο και υλικό και μέτρο στις κατασκευές. Το συναντούμε στις πόλεις των διαδόχων του Μεγάλου Αλεξάνδρου. Για το παράδειγμα της Κω αυτών των χρόνων, η Αρχαιολογική έρευνα απέδειξε και αποδεικνύει ότι εφαρμόστηκε το ιπποδάμειο με αρκετή ελευθερία και παρεκκλίσεις από τον κανόνα και προσαρμόστηκε στις τοπικές συνθήκες. Είναι χαρακτηριστικό ότι ορισμένοι δρόμοι σημερινοί π.χ η Γρηγορίου Ε΄, περνά πάνω από τον Ελληνιστικό δρόμο*(2)*.Τα θέματα της Αρχ. Χωροταξίας της Κω μελετούν η ΚΒ΄Εφορεία προϊστορικών και Κλασικών Αρχαιοτήτων Δωδεκανήσου σε συνεργασία με την Ιταλική Αρχαιολογική σχολή (G. Rocco-M.Livadioti)*(3). Η έρευνα στην Κω δεν ολοκληρώθηκε και γίνονται μόνο σωστικές ανασκαφές σε μια σύγχρονη, κατοικημένη, κοσμοπολίτικη πόλη. Σήμερα είναι κτισμένη πάνω στα αλλεπάλληλα στρώματα κατοίκησης που άφησαν οι αιώνες. Η πρωϊμότερη κατοίκηση εντοπίστηκε στο λόφο των Σεραγιών (σημ. Παλιά πόλη), και ανάγεται στην πρώϊμη εποχή του Χαλκού (2300-2000 π.Χ).

Δεν είναι τυχαίο που ο Στράβων γράφει για την Κω <…κάλλιστα πασών συνωκισμένη και ιδέσθαι τοις καταπλέουσιν ηδίστη …>, δηλ. < ….από οικοδομικής

απόψεως είναι η πιο όμορφη απ' όλες και είναι ιδιαίτερα όμορφο να την κοιτούν όσοι έρχονται απ' έξω…>.

Καθώς περνούσε ο Περγαμηνός αρχιτεκτονικός ρυθμός στις Ελληνιστικές πόλεις της περιοχής, η Κως είναι έντονα επηρεασμένη απ' αυτόν. Στη μνημειακή αρχιτεκτονική των Ελλην/κών πόλεων με συγκεκριμένο παράδειγμα αυτό της Κω, βλέπουμε μορφικές και αρχιτεκτονικές ομοιότητες. Οι στωϊκοί σχηματισμοί, ο Δωρικός ρυθμός με την παρουσία του Ιωνικού μη αποκλειομένου και του Κορινθιακού δίνουν μορφή και χαρακτήρα. Ο Ηρώνδας, Κώος ποιητής του 3ου αι. π.Χ, υπαινίσσεται τη συγκατοίκηση των πολιτών σε ξεχωριστά και διπλανά σπίτια <..εν γαρ στόμα εστί της συνοικίης πάσης..>*(4).

ΑΡΧΑΙΟΛΟΓΙΚΕΣ ΖΩΝΕΣ, ΜΝΗΜΕΙΑ ΤΗΣ ΠΟΛΗΣ ΤΗΣ ΚΩ, ΟΙΚΟΔΟΜΙΚΕΣ ΦΑΣΕΙΣ, **ΤΟ ΑΣΚΛΗΠΙΕΙΟ ΤΗΣ ΚΩ :**

Το νησί της Κω ανασκάφτηκε συστηματικά μετά τον καταστρεπτικό σεισμό του 1933 από Ιταλούς αρχαιολόγους, ενώ πριν δεν ήταν άγνωστος ο πλούτος της ιστορίας της από τα μνημεία που ανέφεραν τα αρχαία κείμενα, οι διάφορες πηγές, οι επιγραφές και άλλα ευρήματα γλυπτά, κεραμικά νομίσματα επιγραφές κ. άλλα. ***(5)**.

Σήμερα οι **αρχαιολογικές ζώνες της πόλης της Κω** απλώνονται στην κατοικημένη πόλη, αυτήν που ανοικοδόμησαν οι Ιταλοί μετά το σεισμό. Στο ιστορικό κέντρο της πόλης προβάλλονται, και παρουσιάζονται διαχρονικά στοιχεία από την Προϊστορία μέχρι και τους Νεότερους χρόνους. α) **Ζώνη λιμένα**, δίπλα στο Μεσαιωνικό κάστρο, στο Ιταλικό Διοικητήριο, τον Πλάτανο του Ιπποκράτη, το Μουσουλμανικό τέμενος κ.α.. Περιλαμβάνει το αρχαίο τείχος, τη Στοά, την αρχαία Αγορά, τους ναούς του Ηρακλή και της Αφροδίτης, εκεί ακριβώς που σε άλλο στρώμα διαπιστώνεται η ύπαρξη παλαιοχριστιανικών κτισμάτων. Εκεί ακριβώς που ήταν αργότερα η Ρωμαϊκή και μετά η περιτειχισμένη πόλη κάτω απ' την οποία οι Ιταλοί βρήκαν μετά το σεισμό την Κλασική, Ελληνιστική και Ρωμαϊκή πόλη.

Οι οικοδομικές ανακατασκευές παρατηρούνται σε πολλά μνημεία και ξεχωρίζουμε διάφορες οικοδομικές φάσεις κατά την Ελληνιστική εποχή: α) της αμυγδαλόπετρας, όταν τα κτήρια κτίζονταν από ασβεστόλιθο που τον αποκαλούσαν αμυγδαλόπετρα. Το υλικό αυτό χρησιμοποιήθηκε τον 3ο αι.π.Χ. β) την εποχή του μαρμάρου, όταν χρησιμοποιήθηκε το μάρμαρο χωρίς να εγκαταλειφθεί και η αμυγδαλόπετρα. Πλούσια τα λατομεία του νησιού έδιναν την πρώτη ύλη *(**6**).γ) Στην εποχή ανακατασκευών του 3ου αι. μ.Χ., που χρησιμοποιήθηκε ένα είδος Ρωμαϊκού τσιμέντου με χυτή τοιχοποιία. δ)στη Χριστιανική φυσιογνωμία της Κω που παρατηρούμε πλήθος παλαιοχριστιανικών βασιλικών και άλλων κτισμάτων.

Μπορεί να δει και να θαυμάσει κανείς μνημεία με πλούσιο ιστορικό πλαίσιο τόσο από τη ζώνη του λιμένα, της αρχαίας αγοράς, του Ασκληπιείου και της ζώνης των Δυτικών ανασκαφών, όσο και από τους Ελληνιστικούς Δήμους του νησιού, όπως είναι των Ισθμιωτών, Αλασαρνιτών, Ιππιωτών, Φυξιωτών κ.α.

Εκτός από τα τείχη που εντοπίστηκαν στη ζώνη του Λιμένα, διασώθηκε η Στοά, ο ναός του Ηρακλή, ο ναός της Αφροδίτης κ.α.. Ο βωμός του Διόνυσου επίσης, είναι μέσα στο ιστορικό κέντρο της πόλης ***(7)**. **Απέναντι από την Κάζα Ρομάνα που κτίστηκε πάνω σε Ελληνιστική Οικία και το Ρωμαϊκό Ωδείο. ΄Αλλα μνημεία ΄οπως είναι το Αρχαίο θέατρο κ. α. δέχθηκαν καταστροφές και σε σχετικά νεότερες εποχές και παραμένουν απλά εντοπισμένοι αρχαιολογικοί χώροι στις τεράστιες Αρχαιολογικές ζώνες της Κω που θεωρούμε πως πρέπει να ερευνηθούν και ν' αναδειχθούν.**

Τα μνημεία μαρτυρούν τη δυνατή παρουσία του νησιού και τη σπουδαιότητά του , λόγω και της παρουσίας του σπουδαίου ιερού του Ασκληπιού, της ιατρικής σχολής και του Ιπποκράτη, κατά τους αρχαίους χρόνους..

β)**Ζώνη Δυτικών ανασκαφών** με τα δημόσια κτήρια τους δρόμους κ.α., της Ελληνιστικής, Ρωμαϊκής, Παλαιοχριστιανικής και Βυζαντινής εποχής. Του αρχαίου Σταδίου και Γυμνασίου με τις προσθήκες των κτιριακών συγκροτημάτων των Θερμών, μιλούν για μια κληρονομιά που αναδεικνύει επιπρόσθετα και χαρακτηρίζει την Ελληνοχριστιανική ταυτότητα.

γ)**Η κεντρική ζώνη** συμπεριλαμβάνει ναούς της Ελληνιστικής εποχής, το βωμό του Διόνυσου, το Ελληνιστικό και αργότερα το Ρωμαϊκό σπίτι, τις Κεντρικές Θέρμες κ.α..

δ) **Η Ανατολική ζώνη ,** Νανατολικά της εκκλησίας του Αγίου Νικολάου διατηρεί υπολείμματα ψηφιδωτών από τον $3^{ο}$ μέχρι τον $5^{ο}$ και $6^{ο}$ αι. μ.Χ, που στολίζουν τα περισσότερα, από το 1938 το αναστηλωμένο από τους Ιταλούς Παλάτι των Ιπποτών (Καστέλο) της μεσαιωνικής πόλης της Ρόδου.

ε) **Όχι μακριά απ' την πόλη κι εκεί που κατά το Μεσαίωνα ήταν η Παναγία του Άλσους εντοπίστηκε το Ασκληπιείο της Κω απ' τον Ι.Ζαράφτη και ανακαλύφτηκε μετά από Αρχαιολογική έρευνα του Γερμανού R.Herzok το 1902 *(8). Η ζώνη της περιοχής του Ασκληπιείου και του Διεθνούς Ιπποκρατείου ιδρύματος** προσφέρονται για μελλοντική ανάδειξη των ιδεωδών της Ιπποκράτειας κληρονομιάς . Η ανάδειξη του Ασκληπιείου , ως μνημείου Παγκόσμιας πολιτιστικής κληρονομιάς προτείνεται για τους εξής λόγους: 1) Γιατί διατήρησε τη ζωντάνια του ως λατρευτικός και θεραπευτικός χώρος κατά τη διάρκεια των κλασικών, Ελληνιστικών και Ρωμαϊκών χρόνων .2) Γιατί συνέδεσε την ιστορία του με άλλες πόλεις της αρχαιότητας, όπως διασώζουν οι επιγραφές. 3) γιατί υπήρξε το κέντρο της δημόσιας, πολιτικής και θρησκευτικής ζωής των αρχαίων χρόνων. 4) γιατί σ' αυτό το χώρο υπηρέτησαν οι Ασκληπιάδες το σπουδαιότερο ανθρώπινο αγαθό που είναι η ΥΓΕΙΑ.5) γιατί η αναγνώριση του απαραβίαστου του χώρου (ασυλίας), καλλιέργησε δεσμούς φιλίας με όλες τις Ελληνικές πόλεις και τις άλλες δυνάμεις και βασιλείς του αρχαίου κόσμου.6) Γιατί δεν αποκλείεται ο Ιπποκράτης να πήρε μαθήματα Ιατρικής από Ασκληπιάδες που ασκούσαν την Ιατρική σε διαφορετική βάση και όχι σε επιστημονική στο Ασκληπιείο.

7)γιατί μπορεί και σήμερα να παίξει το ρόλο που έπαιξε στην αρχαιότητα και έστελλε μηνύματα συναδέλφωσης και Ειρήνης σ' όλες τις πόλεις του αρχαίου κόσμου.8) γιατί η γειτνίαση με τη γείτονα χώρα και οι πολιτιστικές ανταλλαγές που μπορούν να επιδιωχθούν, μόνο καλό θα κάνουν και οι ιδέες που καλλιεργήθηκαν σε παρόμοιους χώρους, όπως και οι αξίες που υπηρετήθηκαν μπορούν συμβολικά να έχουν και συνέχεια.8) γιατί τα διάφορα έργα που κοσμούσαν σαν αφιερώματα (αναθήματα) το ιερό ήταν έργα υψηλής καλλιτεχνικής αξίας , όπως αναφέρουν οι διάφορες πηγές και απέδειξαν οι ανασκαφές που διεξήχθησαν στο χώρο τις αρχές του περασμένου αιώνα.*(9).

Θεωρούμε ότι τα άρθρα που διατυπώθηκαν στο Παρίσι από τα μέλη της επιτροπής της Ουνέσκο το 1972, μπορούν να καλυφθούν και να απαντηθούν επαρκώς με την περίπτωση του Ασκληπιείου της Κω. Δεν είναι δυνατή η κάλυψη διά της παρούσης ολόκληρης μελέτης που απαιτείται για να υποβληθεί στην αρμόδια επιτροπή, αλλά θεωρούμε ότι εκτός από τους παραπάνω λόγους, ολόκληρη η γεωπολιτισμική περιοχή, η αντιμετώπιση του θέματος από τους τοπικούς φορείς, η ξένη βιβλιογραφία, οι μελέτες γύρω απ' αυτό, οι αρχαίες πηγές που αναφέρουν τη σπουδαιότητά του, η απήχηση που έχει στις μέρες μας, τα μηνύματα που στέλλουν οι επιγραφές που βρέθηκαν εκεί, τα γλυπτά, ακόμη και για τις καταστροφές που υπέστη κατά την περίοδο της Ιπποτοκρατίας , της Τουρκοκρατίας ή τις φυσικές καταστροφές συνηγορούν, πως τέτοια μνημεία που αντέχουν στο χρόνο με διεθνή απήχηση είναι μεγάλης σπουδαιότητας και ξεπερνούν τα τοπικά όρια..

Τη Χριστιανική φυσιογνωμία της Κω έρχονται να σφραγίσουν οι 20 περίπου Παλαιοχριστιανικές βασιλικές που είναι διάσπαρτες σε όλο το νησί($5^{ου}$ και $6^{ου}$ αι. μ.Χ). Ο καταστρεπτικός σεισμός του 469μ.Χ έγινε αιτία ν'αλλάξει ξανά η εικόνα του νησιού. Η πόλη διατήρησε το ιπποδάμειο σύστημα στη ρυμοτομία της, ενώ τα αρχαία περίλαμπρα ιερά αρχίζουν να εγκαταλείπονται και τα δημόσια κτήρια να χάνουν την αρχική τους λειτουργία και χρήση .Παλαιοχριστιανικοί οικισμοί έχουν εντοπιστεί στο Μαστιχάρι, στην Καρδάμαινα και την Κέφαλο. Μέσα στην πόλη της Κω έχουν εντοπιστεί ιδιωτικά κυρίως κτήρια $5^{ου}$ και $6^{ου}$ αι. μ.Χ με θαυμάσια ψηφιδωτά δάπεδα. Σπουδαιότερες βασιλικές είναι του Αγίου Γαβριήλ, του Λιμένος, της Λάμπης, του Καπαμά, του Αγίου Παύλου, του Αγ. Στεφάνου, του Μαστιχαρίου κ.α..

Ο πλούτος των ψηφιδωτών μαρτυρεί την καλλιτεχνική παράδοση που υπήρχε στο νησί .Ήδη από την Κλασική αρχαιότητα υπήρχαν καλλιτεχνικά εργαστήρια και μάλιστα όπως μαρτυρεί ο Ηρώνδας($3^{ο}$ αι.π.Χ), οι γιοι του Πραξιτέλη φιλοτέχνησαν το γλυπτό διάκοσμο του βωμού του Ασκληπιείου. Τώρα μπροστά στον πλούτο των ψηφιδωτών της παλαιοχριστιανικής εποχής αποδεικνύεται, πως ντόπιο εργαστήρι άκμαζε στο νησί ($5^{ο}$-$6^{ο}$ αι.μ.Χ). Οι βασιλικές της πόλεως έχουν οικοδομηθεί πάνω σε άλλα κτήρια, όχι όμως πάνω σε ιερά και ενσωματώνονται στο γενικό ιπποδάμειο ρυμοτομικό της πόλης.

Το Μεσαιωνικό κάστρο και οι Μεσαιωνικές εκκλησιές πίσω απ' τη ζώνη αυτή και μέσα στο άλσος συνθέτουν το ιστορικά διαχρονικό ανάγλυφο στο κέντρο της σημερινής πόλης.

Ιδιαίτερης σημασίας ιστορικό και αρχαιολογικό σύνολο αποτελεί ο Βυζαντινός οικισμός στο **λόφο του Παλιού Πυλιού, ο μικρός Μυστράς**, όπως τον αποκαλούμε συχνά λόγω της σπουδαιότητάς του. Ο ερχομός του όσιου Χριστόδουλου τον $11^{ο}$ αι στην Κω και η εγκατάστασή του στα κτήματα του Αρσένιου Σκηνούρη, ο οποίος τον εκτιμούσε, είναι καθοριστικός. Διαλέγει το λόφο του Παλιού Πυλιού όπου κτίζει το μοναστήρι του. Διασώθηκαν ερείπια του οικισμού, λείψανα κελιών, η Παναγία των Καστριανών με τοιχογραφίες του 12ου και $16^{ου}$ αι. Εκτός από το κάστρο στο Παλιό Πυλί, η Κως διαθέτει άλλα τέσσερα: της Κεφάλου, του Περιπάτου, της Αντιμάχειας και της Νεραντζιάς. Το κάστρο της Αντιμάχειας αποτελούσε ένα ισχυρό και ασφαλή οικισμό. Στο εσωτερικό του υπήρχαν δυο εκκλησιές, του Αγίου Νικολάου και της Αγ. Παρασκευής. Το κάστρο της Κω, της Νεραντζιάς φαίνεται να οχυρώθηκε στα τέλη του $7^{ου}$ αι. Οι δύο οικοδομικές του φάσεις φαίνεται να ανήκουν στην περίοδο της Ιπποτοκρατίας. Ίσως κάτω απ' αυτό να υπάρχει και η Βυζαντινή οχύρωση. Μια πέτρινη γέφυρα συνέδεε το κάστρο με την πόλη. Σπουδαία μνημεία μέσα στη Μεσαιωνική πόλη είναι η Παναγία Γοργοεπήκοος και ο Άγιος Ιωάννης που διατηρούν ακόμη τμήματα του ζωγραφικού τους διάκοσμου και αποδίδονται επίσης σε ντόπιους καλλιτέχνες.

Ξεχωριστό κεφάλαιο μεγάλης σπουδαιότητας αποτελούν τα μεγαλοπρεπή κτήρια της Ιταλοκρατίας, που είναι καιρός να περάσουν για άλλη χρήση **Μουσειακού-πολιτιστικού χαρακτήρα ,** μετά την αναπαλαίωση και συντήρησή τους. Σήμερα και με σημαντικά στατικά προβλήματα στεγάζουν τα περισσότερα σχολεία και επί της οδού Ιπποκράτους το μοναδικό νοσοκομείο του νησιού των 35.000 κατοίκων και των διπλάσιων του καλοκαιριού.

Η πόλη πριν το σεισμό είχε τη μορφή μιας τυπικής , Μεσογειακής κοινότητας, που αναπτύχθηκε γύρω από το κάστρο. Ο οικισμός της μεσαιωνικής πόλης εντοπιζόταν μέσα στην περιτειχισμένη, ιπποτική πόλη και αποτελείτο από Χριστιανούς .

Ασφαλώς και δεν είναι δυνατόν να καταδειχθεί ολόκληρος ο αρχαιολογικός πλούτος της Κω, αλλά από τις παραπάνω ενδεικτικές αναφορές, διαπιστώνεται ότι η Κως αποτελεί ιδανικό τόπο μελέτης της Ιστορίας, Τέχνης και Αρχαιολογίας. Για τους

λόγους αυτούς και σε προηγούμενο συνέδριο του Πανεπιστημίου Αιγαίου προτείναμε την ίδρυση ανώτατης σχολής ΚΑΛΩΝ ΤΕΧΝΩΝ ή ΤΕΙ συντήρησης έργων Τέχνης. Θα μπορούν επί τόπου οι φοιτητές να διδάσκονται την τέχνη , ενώ θα ωφεληθεί τα μέγιστα ο τόπος, καθώς και η ΕΝΟΠΟΙΗΣΗ ΤΩΝ ΑΡΧΑΙΟΛΟΓΙΚΩΝ ΧΩΡΩΝ είναι ζητούμενο χρόνων και η επί τόπου συντήρηση και εργασίες έχουν το διδακτικό τους ρόλο*(10).

Προκύπτει η αναγκαιότητα ίδρυσης Νέου σύγχρονου διαχρονικού Μουσείου, ανάπτυξη και προώθηση της ιδέας του ανοικτού αρχαιολογικού πάρκου.

Η ΑΒΙΚΩ της Κω αποτελεί επίσης ζητούμενο και προτείνεται η αξιοποίησή της από τους τοπικούς φορείς, καθώς μας συνδέει με την Αγροτική εποχή της Κω, πριν ακόμη περάσουμε στην Τουριστική μετάλλαξη. Μέσα σε μια πολύ αναπτυγμένη τουριστικά ζώνη, θυμίζει την εποχή της καταπράσινης Κω και τους σωρούς τα καφάσια που δεν έφταναν να γεμίσουν τη μεγάλη σοδειά. Έτσι νομίζω πως κλείνει διαχρονικά η εικόνα μιας ιστορικής πόλης , με πλούσια μνημεία και που τώρα πέρασε στους ρυθμούς της Τουριστικής ανάπτυξης και ανήκει στους πιο δυνατούς τουριστικούς προορισμούς.

Είναι βέβαιο ότι οποιαδήποτε πρόταση Ποιοτικής αναβάθμισης της Κω, ακόμη και σαν τόπου Τουριστικού προορισμού, περνά μέσα από την ανάδειξη των συγκριτικών της πλεονεκτημάτων. Δεν είναι όμως μόνο αυτό, είναι και ένας προορισμός που προσφέρεται για ΔΙΔΑΣΚΑΛΙΑ ΤΗΣ ΙΣΤΟΡΙΑΣ και όχι μόνο της τοπικής λόγω της Γεωγραφικής της θέσης. Όλα είναι ΠΑΙΔΕΙΑ ΚΑΙ ΓΝΩΣΗ.

Τολμήσαμε φιλότιμα πιστεύω με την ευκαιρία του εορτασμού των '50 χρόνων Ελεύθερης Δωδεκανήσου και υλοποιήσαμε εγκύκλιο του ΥΠΕΠΘ, για να δώσουμε αυτή την πολύτιμη γνώση, της γνωριμίας του τόπου σε παράλληλη διδασκαλία με τη Γενική Ιστορία που διδάσκονται στα σχολεία.

Το θέμα της διδασκαλίας της Τοπικής Ιστορίας στα σχολεία δεν είναι άγνωστο στην εκπαίδευση . Σειρά εισηγήσεων και προτάσεων για την ωφελιμότητα και την αναγκαιότητα που προκύπτει έχουν δημοσιεύσει κατά καιρούς σπουδαίοι ερευνητές απ' το χώρο της Εκπαίδευσης, της φιλοσοφίας και της πρακτικής της Παιδαγωγικής Επιστήμης*{11}.

Αλλού πιλοτικά και αλλού μέχρι τέλους, όπως εμείς στα δεδομένα της Κω με όρεξη και όραμα, το πρώτο παράδειγμα στην Ελλάδα, μετά τη συνοπτική ιστορία της Κύπρου για τη χρήση μαθητών, που έχει σήμερα την άδεια εισαγωγής στα σχολεία της Κω, από το Παιδαγωγικό ινστιτούτο.

Όταν πριν 8 χρόνια περίπου είχαμε ξεκινήσει τη συγγραφή της Τοπικής Ιστορίας της Κω για τη χρήση μαθητών Μέσης Εκπαίδευσης, πρέπει να επισημάνω ότι συναντήσαμε δυσκολίες, όσο και συντηρητικές απόψεις. Οι δυσκολίες μπορούν να προσδιοριστούν στα εξής: 1.Στις δυσκολίες πρόσβασης του Βιβλιογραφικού υλικού, 2. Στην έλλειψη χρόνου των Εκπαιδευτικών, λόγω επαγγελματικών ή οικογενειακών υποχρεώσεων 3. Στην έλλειψη ξεκαθαρισμένου τοπίου, ως προς τις ώρες διδασκαλίας και της ένταξης του μαθήματος στο ωρολόγιο πρόγραμμα ,4.Στους δισταγμούς και επιφυλάξεις συναδέλφων για την έλλειψη συγγραφικής πείρας κ.α.

Η συντηρητική άποψη μπορεί να προσδιοριστεί στην υποβόσκουσα ίσως εντύπωση, πως τέτοιες πρωτοβουλίες αποτελούν έκφραση στείρας πατριδολατρείας. Φωνές όμως πολύ ελάχιστες που απομονώνονται, αν στην πορεία επιτευχθεί ο στόχος με σοβαρή δουλειά και επιστημονική-ερευνητική προσέγγιση του εγχειρήματος .Οι δυσκολίες ξεπεράστηκαν, γιατί ευτυχώς εκτός από μένα συστρατεύτηκαν και άλλοι εκπαιδευτικοί- φιλόλογοι, γιατί αυτή τη στιγμή δε θα μιλούσα για μια επιτυχημένη προσπάθεια με περηφάνεια -επιτρέψτε μου- και γιατί συνέβαλα πρωταγωνιστικά.

Για την επίτευξη του στόχου συμμετείχαν Καθηγητές από διάφορα σχολεία του νησιού *(12} .Στον Α΄τόμο που εξαντλήθηκε και πρέπει να προχωρήσουμε σε επανέκδοση, περιγράφονται τα γεγονότα από την Προϊστορική περίοδο , μέχρι και το τέλος της Ελληνιστικής εποχής. Διδάσκεται παράλληλα με τη Γενική ιστορία της Αρχαίας Ελλάδος στην Α΄Γυμνασίου. Για το Β΄τόμο , που περιλαμβάνει την ιστορία των Ρωμαϊκών χρόνων μέχρι το τέλος της Ιπποτοκρατίας, το μάθημα διδάσκεται επίσης παράλληλα στη Β΄Γυμνασίου.Ο Γ΄τόμος περιλαμβάνει τα γεγονότα από την Τουρκοκρατία μέχρι την ενσωμάτωση και διδάσκεται μαζί με τη Νεώτερη ιστορία της Γ΄Γυμνασίου.

Η πρόταση είχε έρθει σε μένα το 1997 *{13}να δώσω μια περίληψη ενός συγκεκριμένου καταξιωμένου βιβλίου για χρήση των μαθητών. Η πρόταση προήλθε από τον Πρόεδρο του Πολιτιστικού ομίλου Κώων ο <ΦΙΛΗΤΑΣ>κ.Ιωάννου , ο οποίος και με την ιδιότητα του προέδρου του Συλλόγου Γονέων και Κηδεμόνων του 1^{ου} Ενιαίου Λυκείου Κω θεωρούσε, πως μια τέτοια πρωτοβουλία θα ήταν απόλυτα χρήσιμη στους μαθητές. Παρόλο που κατά καιρούς έμπαινε το θέμα της διδασκαλίας της Τοπικής ιστορίας στα σχολεία με τη μορφή εισηγήσεων ή εγκυκλίων του ΥΠΕΠΘ, εμείς στηριχθήκαμε στην υπ' αρίθμ. Γ2/5942/10-11-94, που προέβλεπε και εξηγούσε τη σπουδαιότητα της γνώσης του τοπικού ιστορικού γεγονότος και τη χρησιμότητά του, ως μεθόδου ευκολότερης πρόσβασης στο γενικό ιστορικό γεγονός. Σημειωτέον ότι διάφορες εγκύκλιοι του Υπουργείου Παιδείας δεν αγνόησαν τις προσπάθειες σοφών παιδαγωγών και εκδόθηκαν αρκετές που άφηναν όμως ελεύθερο το χώρο της διδασκαλίας, μάλλον στο επίπεδο εκούσιας προσφοράς ή πολιτιστικού εθελοντισμού.*(14).

Είναι αυτονόητο ότι ο καθηγητής που διδάσκει Γ.Ι, θα κάνει αναφορές και σε τοπικά παράλληλα γεγονότα. Μ' αυτό τον τρόπο εντατικοποιείται το ενδιαφέρον.

Δε θα μπορούσε άραγε να σταματήσει κάποιος καθηγητής που διδάσκει Γ.Ι στην Κω στο ΑΝΑΓΛΥΦΟ ΤΩΝ ΧΑΡΙΤΩΝ του Αρχαιολογικού Μουσείου της Κω, όταν διδάσκει την τέχνη της Κλασικής εποχής; Δε θάταν ωφέλιμο ν' αναφερθεί κανείς στο ΔΙΣΚΟΒΟΛΟ της Κω ή στο ΑΣΚΛΗΠΙΕΙΟ ΚΑΙ ΤΟΝ ΙΠΠΟΚΡΑΤΗ; Όλα έχουν τη θέση τους και το μεγάλο ιστορικό ρόλο.

Αναλογιζόμενοι την ύλη της Γ.Ι δώσαμε πιστεύω τα αντίστοιχα Ιστορικά παράλληλα . Πρέπει βέβαια με σοβαρότητα, σωστή χρήση και κατανομή του χρόνου, ο καθηγητής να ωθήσει τους μαθητές στην αληθινή αναζήτηση κι ενδιαφέρον.Όταν περνάμε στη Νεότερη ιστορία δε μπορούμε που να μην αναφερθούμε και στα συλλεκτικά κομμάτια του Λαογραφικού μας Μουσείου, να πραγματοποιήσουμε μια επίσκεψη σ' αυτό και να γίνει ένα ερέθισμα αυτό για τη γενικότερη αναφορά μας στο λαϊκό πλούτο του Έθνους μας.

Πρέπει να επισημάνω το γεγονός ότι οι υπηρεσίες Πολιτισμού Δωδεκανήσου και η Αρχαιολογική υπηρεσία Κω , όπως και η Ιερά Μητρόπολη μας έδωσαν υλικό και πληροφορίες που μας ήταν απαραίτητες, ξεχωριστά για κάθε εποχή. Επίσης καθηγητές Πανεπιστημίων, αρχαιολόγοι, ιστορικοί, όπως ανφέρονται στους προλόγους των συγγραφέων στάθηκαν χρήσιμοι και συμπαραστάτες. Θέλοντας ο Φ. Βώρος να ενισχύσει από την αρχή την προσπάθεια μας, μας προσδιόρισε τηλεγραφικά και σημασιολογικά τα εξής: ΤΟΠΙΚΗ ΙΣΤΟΡΙΑ, ΠΡΟΣΠΑΘΕΙΑ ΟΡΙΣΜΟΥ- ΙΔΙΑΙΤΕΡΟΤΗΤΑ- ΓΟΗΤΕΙΑ- ΑΝΑΖΗΤΗΣΗ ΜΕΘΟΔΟΥ με την επισήμανση ΓΙΑ ΔΙΔΑΚΤΙΚΗ ΑΞΙΟΠΟΙΗΣΗ.

- ΣΥΜΠΕΡΑΣΜΑΤΑ: Η Τ.Ι είναι πιο κοντά στο μαθητή ή σπουδαστή της Ιστορίας και μπορεί να κατανοήσει τη χρησιμότητά της κι από κει και της Γενικότερης. Είναι ορατή, έχει παιδαγωγικό και διδακτικό χαρακτήρα. Μπορεί

να βοηθήσει στην κριτική σκέψη ερμηνεύοντας τα γεγονότα, συγκρίνοντας και θεωρώντας τόπο, χρόνο, χώρο και ψάχνοντας ακόμη για το αιτιατό των γεγονότων.

- Για την αξία της ανάγνωσης του έργου Τέχνης, έχουν ειπωθεί πολλά και παρατηρούμε ότι και στα πιο παλιά εγχειρίδια υπήρχε επιλεγμένο φωτογραφικό υλικό. Το κάθε αρχιτεκτονικό, γλυπτό, κεραμικό, για να πάμε και στην τοιχογραφία, τη Βυζαντινή εικόνα ή το ψηφιδωτό, παρατηρούμε πως χαρακτηρίζουν την κάθε εποχή και τα τεχνοτροπικά χαρακτηριστικά πολλές φορές εμπνευσμένα αποτελούν και στοιχεία που οδηγούν τους ειδικούς να προσδιορίσουν το χρόνο δημιουργίας τους. Θεωρούμε πως όποιος καταφέρει να αναγνώσει ένα εικαστικό έργο τέχνης, επικοινωνεί με το δημιουργό και την εποχή του. Είναι σαν ένα ποίημα ή άρτιο λογοτεχνικό είδος που συγκινεί και συνεπαίρνει με τις αξίες και τις ιδέες που εκφράζει}*(15).

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*(1) ΄Οταν κάθετοι και οριζόντιοι δρόμοι δημιουργούν οικοδομικά τεχτράγωνα

* (2)ΧΑΔ , τόμος 45 1990.

*(3)*ΠΡΑΚΤΙΚΑ Α΄διεθνούς συνεδρίου Ιστορίας, Τέχνης και Αρχαιολογίας της Κω, Αθήνα 2001* .

(4)*Ηρώνδα, μίμος ΙΙΙ στ. 47.*

(5) La presenza Italiana nel Dodecaneso tra il 1912 e il 1948, Edizioni del prisma, 1996.Laurenzi L.Sculture inedite del Museo di Coo,ASA (1955-56). Laurenzi L. Rilievo arcaico di Coo, Clara Rhodos 9. Herzok R.-Klaffenbach G. Asylieurkunden aus Kos, berlin 1952. Κάντζια Χ. Πάπυρος- Λαρούς , Μπριτάνικα και της ιδίας επίσης, Nev indications for the site of Cos- Meropis, Archaeology in the Dodecanese, 1988. B. V. Head, Catalogue of the Greek coinw, Cos,Rhodes e.t.c., in the British Museum, London 1897. B.V Head, Historia Nummorum, .,ed. II, London 1911. Β. Χατζηβασιλείου, ΙΣΤΟΡΙΑ ΤΗΣ ΝΗΣΟΥ ΚΩ (1991,. Paton – Hicks, The inscriptions of Cos,Oxford 1891.

*(6) Ζαράφτη Ιάκωβου, Κώϊα, Β΄μέρος, Ιστορία της Κω από των αρχαιοτάτων χρόνων, μέχρις ημών, Κως 1922

*(7) Ο βωμός του Διόνυσου στην Κω, συμβολή στη μελέτη της Ελληνιστικής πλαστικής και Αρχιτεκτονικής, Θεσσαλονίκη 1981.

(8) Herzok-Scazmann, Kos, Asklepieion, Berlin 1932, Ι Ζαράφτη, Το Ασκληπιείον της Κω 1912.

*(9) Στράβων, Γεωγραφικά ΙΧV,2,17,18 <… εν δε τω προαστείω το Ασκληπιείόν έστι, σφόδρα ένδοξον και πολλών αναθημάτων μεστόν, εν οις έστι και ο Απελλού Αντίγονος, ην δε και η αναδυομένη Αφροδίτη, η νυν ανάκειται τω θεώ καίσαρι εν Ρώμη του Σεβαστού αναθέντος τω πατρί την αρχηγέτιν του γένους αυτού. Φασί δε τοις Κώοις αντί της γραφής εκατόν ταλάντων άφεσιν γενέσθαι του προσταχθέντος φόρου, φασί δ' Ιπποκράτην μάλιστα εκ των ενταύθα ανακειμένων θεραπειών γυμνάσασθαι τα περί τας διαίτας. Ούτος Τε δή έστι των ενδόξων Κώος ανήρ…>

*(10) Με πρόεδρο τη γράφουσα συντάχθηκε η πρόταση ΚΩΣ-ΠΑ με αρίθμ. Πρωτ. 8259, 21/7/1999 και εισηγήτρια επίσης τη γράφουσα στο Δημοτικό συμβούλιο Κω. Σήμερα εντάχθηκε στο σχέδιο Περιφερειακής ανάπτυξης η ανάδειξη της ζώνης του Λιμένα και η συντήρηση του Επιγραφικού Μουσείου του Ασκληπιείου (Γ΄Κοινοτικό πλαίσιο στήριξης.

{11}.Γ2/734,1989. Η ομάδα ερευνητών περιελάμβανε τους :Φ.Βώρο, Διονυσόπουλο, Κατσουλάκο, κ.α..βλ. ακόμη Φ.Βώρου, Τοπική Ιστορία (μια πρόταση –απάντηση στο ΥΠΕΠΘ, <ΝΕΑ ΠΑΙΔΕΙΑ>τ.52, σ.176-78.

{12}) *Για τον Α΄τόμο Όλγα Ασπετάκη- Κυρίτση, Μαρία Τουλαντά-Παρισίδη Για το Β΄τόμο Χρυσάνθη Μανωλέρη –Κυρίτση, Ελένη Μαρσέλου και Μαρία Πανάγου. Για το Γ΄τόμο, Κίννα Ανθούλα, Κώστογλου Δημήτρης, Τουρκομανώλη Ολυμπία, Φάκκου Μαίρη, Χατζηνικολάου Καλλιόπη και Σοφού Δομνίκη, ενώ για την Ιστορία της Νισύρου ο Νικήτας Κουμέντος.*

**(13) Το 1997 η Δωδεκάνησος γιόρτασε σε επίπεδο Νομαρχ/κής αυτοδιοίκησης Κω τα '50 χρόνια ελεύθερης Δωδεκανήσου και συμπεριέλαβε και τη στήριξη αυτής της δραστηριότητας στις εκδηλώσεις της- προσφορά του Επαρχείου της Κω στους νέους, μαθητές ΚΩ-ΝΙΣΥΡΟΥ.*

**(14) βλ.Σχετική εγκύκλιο Γ2/299,1990.*

**(15)Η ανάγνωση της εικόνας στη διαδικασία της διδασκαλίας της τοπικής ιστορίας, ΣΥΓΧΡΟΝΗ ΕΚΠΑΙΔΕΥΣΗ, τ.16.Φ.Βώρου.*

Παρακάτω παρατηρούμε το ψηφιδωτό με την άφιξη του Ασκληπιού στην Κω($2^{ου}$-$3^{ου}$ αι μ.Χ) που τον υποδέχονται ο Ιπποκράτης και ένας Κώος της υπαίθρου. Αυτό και μόνο το ψηφιδωτό σε συνδυασμό με την ένδοξη ιστορία του Ασκληπιείου <..των πολλών αναθημάτων..>, του θεϊκού Ιπποκράτη, πατέρα της Ιατρικής επιστήμης κ.α., θα μπορούσαν να προσδιορίσουν την ταυτότητα και την επωνυμία του νησιού. Εξαιρετικής τεχνοτροπίας προέρχεται από Ρωμαϊκή οικία της Κω. Βρέθηκε σε ανασκαφή που έγινε το 1935 πλησίον του ναού της Αγίας Παρασκευής. (περιστύλιο Μουσείου Κω).

Ψηφιδωτό με την άφιξη του Ασκληπιού στην Κω.

THE NECROPOLIS OF HIERAPOLIS OF PHRYGIA: A LABORATORY FOR RESEARCH AND STUDY

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Abstract

Hierapolis of Phrygia is one of the principal archaeological sites in Asia Minor, modern Turkey, and was listed by the UNESCO as a human heritage not only because of its natural but also its material, artistic and cultural testimonies are unique and irreplaceable.
Since 1957, the Italian Archaeological Mission has launched an intense program of historical-architectonic studies, learning and protection which has privileged the extensive necropolis close to the main arteries to and from the city. In this investigation archaeologists, architects, anthropologists and epigraphists are flanked by young university students, in a continuous cultural debate.
The problems addressed by means of the excavations, relief and study of the materials are of :

- an urban planning nature: the urban plan which determined the organization, over time, of the sepulchral areas supplied by primary and secondary roads;
- an architectonic nature: the use, over time, of monumental typologies whose architectonic plan is re-proposed with variations in the tumulus projects, in the temple-monuments, in the building-chambers that sustains the sarcophagi;
- a constructive nature: the technical solutions adopted in the building sites of the necropolis were affected by the novelties of the great urban architecture;
- a historical nature: the necropolis and the burial monuments are a reflection of the society that ordered and paid for their construction.

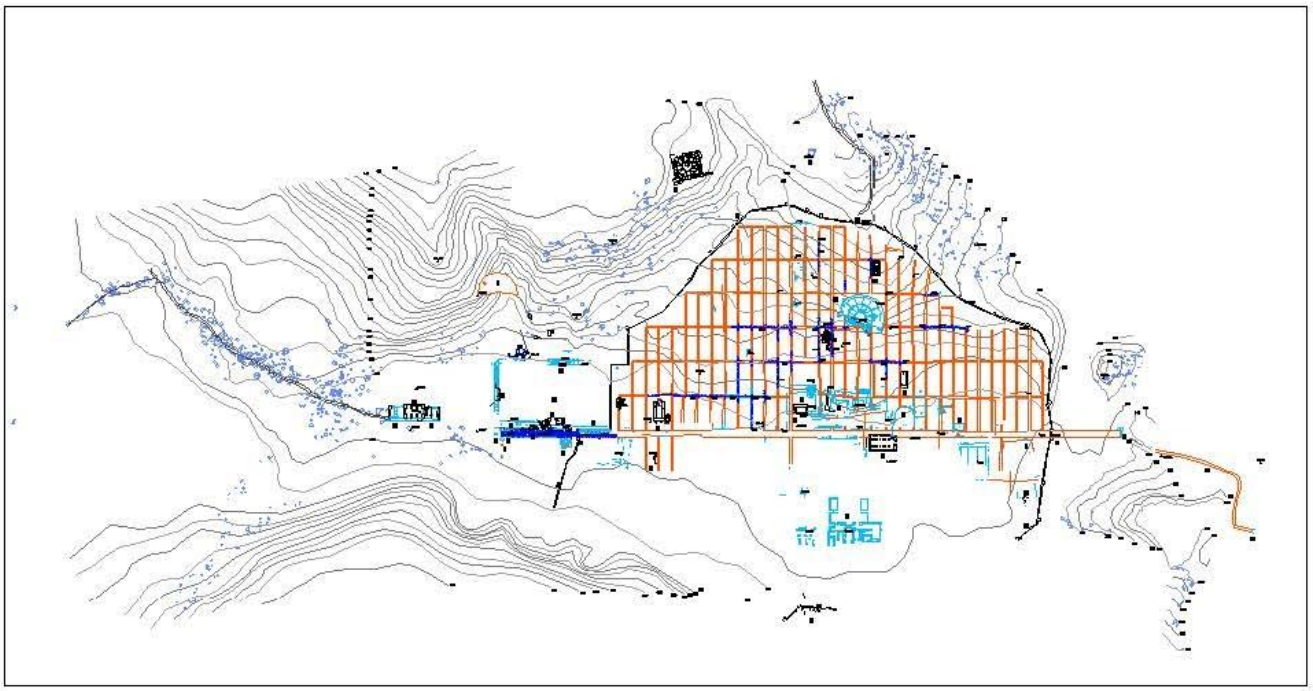
The Italian Archaeological Mission in Hierapolis of Phrygia

The Italian Archaeological Mission in Hierapolis of Phrygia was established in 1957 by Paolo Verzone, professor at Turin Polytechnic, and it has now been active for forty-five years at the site of the ancient city, now Pamukkale in Turkey.
The works of excavation, anastelosis, restoration and the study of the materials have proceeded with the disciplinary contributions from various fields of archaeology and restoration, with collaboration from numerous university institutes (Turin, Lecce, Naples, Milan, Venice, Bari, Genoa) who contributed with both professors and students from different university levels (undergraduate, postgraduate, PhD) to the excavation campaigns. Therefore, these become part of a formative period in which the theoretical notions acquired at university are put into practice, enriched by the daily scientific discussions between mentors and students. This experience leads to the in-depth study of the scientific subjects pertaining to the cultural heritage curriculum, a study that is finalized towards writing up a thesis for a degree, for a specialization or a doctorate, towards the preparation of a scientific paper or the launch of a professional career in the field[1].

Hierapolis of Phrygia

Hierapolis in Phrygia, the "holy city", constitutes an exceptional focus of interest, comparison and reference for studies dedicated to the history, architecture, history of art and material culture in the province of Asia.
Founded during the Hellenistic age on a limestone plateau which faces the valley of the Lykos, a tributary of the Meandros, with a urban settlement strictly of hippodamean style, the city underwent renovation and development during the Roman age, without disruption of the urban layout.
The renovations were first carried out in the wake of the devastating earthquake of 60 AD but also after periods of crisis and population decrease due to infectious diseases (mid-2nd century), and following periods of commercial, economic and social expansion, especially at the beginning of the 3rd century.

Table 1. Hierapolis, the City and Necropolis. 1999



These phases of the development and life of the city, which fell into a progressive decay at the end of the 4th century, were ascertained and brought to light by the archaeological investigations and research, and by the study of the structures and materials found during the excavations, within a historical context which is gradually reaching completion thanks to the synergy between the different fields of expertise that operate at the site.
The results obtained to date lead to the definition of the principles behind the guidelines of the archaeological research and restoration projects, past or in progress. The interest of the Italian Archaeological Mission in Hierapolis, both a historic record and area of naturalistic interest, has

produced fundamental scientific results and played a crucial role towards the inclusion, in 1988, of Hierapolis-Pamukkale in the list of cities of world heritage, under the auspices of the UNESCO.

The natural heritage

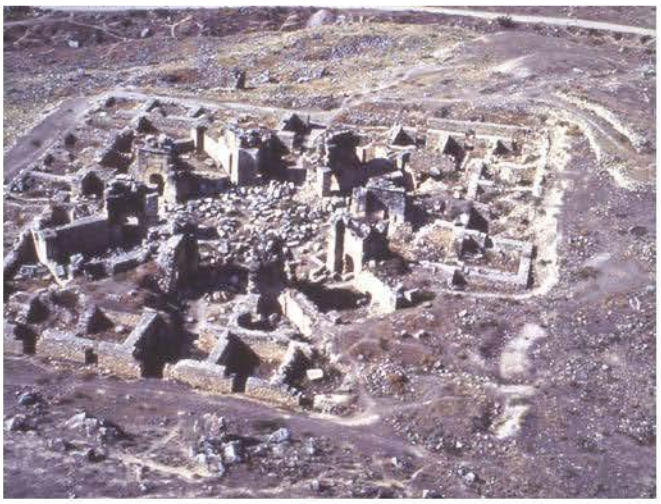
Like much of the Meandros basin, the territory where the Hellenistic city of Hierapolis is situated lies in an extensive and branched system of underground cavities through which hot, mineral-laden waters run and upon their emergence, these deposit thick layers of calcium carbonate. Over time, the deposits gave rise to a succession of candid basins which water runs through before reaching the Turkish village beneath the plateau on which the city was built[2].
Undoubtedly, almost all of today's visitors were induced to rediscover the remains of the ancient city by the extraordinary sight of the splendid limestone pools which have made the small village of Pamukkale famous all over the world; as early as 1775 Richard Chandler, after having pitched his tent close to the pools, contemplated the spectacle; William John Hamilton, in 1842, climbed the road outlined around the pools and described their "very strange and bizarre forms".

The archaeological heritage

The site where the settlement arose is still characterized by a series of peculiar morphological conditions which were certainly responsible for both the foundation of the greek city and its subsequent affairs. In fact, the first settlement is related to the presence of caves and canals filled with poisonous gases whose point of emergence was sensed, since the most ancient times, to be a place of worship.
The excavations of the Mission revealed the entrance to the mephitic *antrum*, the *Plutonion* (already described by Strabo in the 1st century), which was monumentalised in the Hellenic-Roman age in the belief that it represented the gateway to the underworld.

The excavations also identified the monumental structures above the *Plutonion* as the oracular temple of Apollo, the divinity that protects the *polis*. Next to these, the latest excavations are uncovering the remains of other buildings of worship.
The preliminary phase of extensive investigation of the site (which consisted in identifying the urban layout, establishing a first historical stratigraphy and highlighting the most

significant monumental complexes) was followed, during the various campaigns, by the excavation and systematic study of the Honorary Gate of the city (dedicated to Domitian), the oracular temple and a number of buildings of Christian worship among which the *Martyrion* of Saint Philip is the most outstanding because of the exceptional nature of its plan form.



Progress was made with the excavation and restoration of the great theatre of the Flavian age which revealed a very elaborate architectonic decoration of the *scaena frons* and two narrative cycles, dedicated to Apollo and Artemis, the principal deities of Asia Minor, which decorate the podium of the *scaena frons*[3].

The study further led to the identification of the commercial agora (located at the northern entrance of the city) and uncovered the remains of a magnificent *stoa* with stairway and entrance *propylaeum* along the eastern side of the square, surrounded by marble porticoes.

Thanks to the substantial work to free it of the thick layer of limestone, the *plateia major* was also restored with its shop fronts, dwellings and public offices of special architectural interest (the monumental latrine and Nympheum of the Tritons).

In the city centre, close to the theatre and the area consecrated to Apollo, we investigated a block containing two houses which revealed, despite the overlapping phases, the refinement of the models of living quarters of the upper class home[4].
Finally, the constant work in the vast necropoli that surround the city centre consented an in-depth study of the city's economic and political history since the numerous burial monuments can be interpreted as testimony of the social reality whose members commissioned them.
On the one hand, the activity of the Italian Mission, which to this day continues its efforts to restore and study the historical documents of the city, was essential in determining the response of UNESCO, which judged Hierapolis to be a special and privileged centre belonging to the cultural heritage of the past. On the other hand, this recognition stimulated the Mission to act further to increase, preserve and present the part of this heritage that it strived to have recognized.

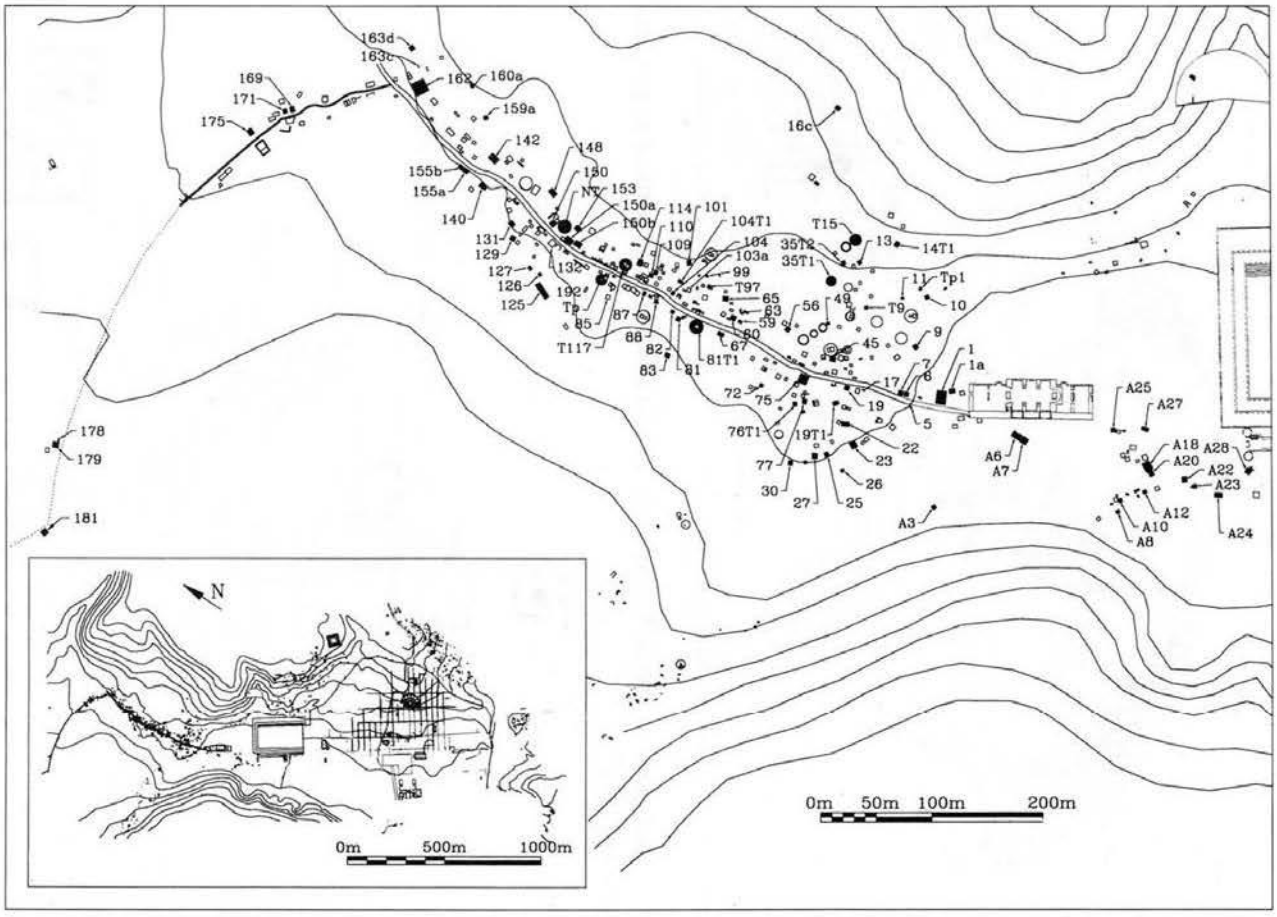
The study of the Hierapolis Necropolis

The Hierapolis necropolis, which extend along the roads that exit the city and on the slopes of the hill which surmounts it, display multiple architectonic and decorative solutions which evolved from the late Hellenistic to Christian ages.
Monumental buildings are present together with various types of preparations for burial, symbolic *stelae*, round marble altars and sarcophagi; although all these structures reflect, in their diversity, differences in the financial, social and cultural level of the client, they all reflect the same ideology of individuality and victory of the hero over death. The analysis of their plano-volumetric characteristics, the study of the materials and the building techniques, in parallel with the study of the elements of material culture supplied by the excavation and the abundant series of epigraphs, allow us to delineate, as said before, a more precise picture of the socio-economic situation of the city.
The investigation under way, which I have guided for many years following the principles of synergy between mentor and student which were mentioned above, raised the question of the chronological sequence of the typologies within which we focused on the possible economic evaluations (meaning, for example, in construction what materials were chosen, or the work methods, the formation of handicrafts, the organization of the local building sites) and on social evaluations, *i.e.* the roles and size of the classes, the dominant ideologies and subordinations.
The research, based on a work plan that lasts many years, has focused mainly on the northern Necropolis and has seen the works of excavation, relief and classification take place during the summer campaigns in the field while the scientific elaboration of the data occurs during the university semesters. We welcomed into the workgroup students of various levels, with diversified interests and involvement, who drew advantage from their experiences at the mission as they proceeded with their studies and professional career.

Research at the Northern Necropolis

The Northern Necropolis is the largest burial site, extending along the road that connects Hierapolis to Tripolis and the valley of the Meandros. It creates a monumental scenario at the entrance of the city which is re-proposed at the southern entrance to the city although here it is less striking because the buildings are in a poorer state.
The study of the urban planning and architectures of the Northern Necropolis, thanks to the vastness and typological complexity present, allows us to establish evaluation criteria which, although generic in terms, seem to apply by analogy or antithesis to other burial complexes in Hierapolis.
In recent years, the most consistent efforts were directed towards producing the final draft of the survey of the architectonic emergences, to build a framework of the burial structures: during this stage of definition and revision, the context of some of the debated problems became clear[5].

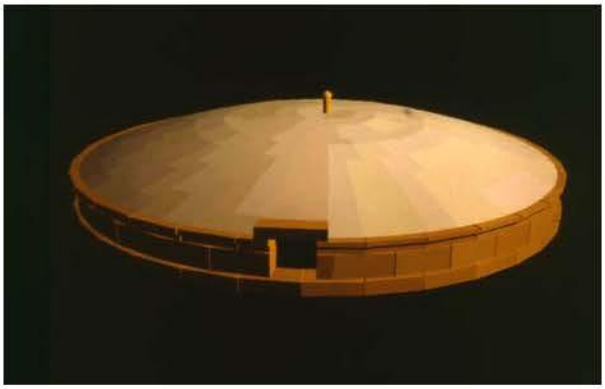
Table 2. Plan of Northern Necropolis. 1999



We clarified the questions concerning the order of the construction phases, from where the materials were obtained, how the projects were planned and carried out, to the organization and continual use of the burial sites and the identification of the typological models of reference.
The opening of the travertine caves on the hill close to the inhabited areas date back to the first phases of the urban centre's life; the construction activities make the most of this cheap material which is easy to find and manipulate, and is relatively light, depending on how compact it is. From the epigraphic records we know of the existence of trade corporations set up by expert craftsmen: in Hierapolis a local industry for the excavation and elaboration of travertine must have existed. This local stony material was used on a large-scale in all hierapolitan burial architecture, thus conferring uniformity to the walls, made of great square blocks of various length and height, placed uniformly

in regular courses connected by regular planes. Apart from the value of the material, wherever marble elements are present one supposes that the customer requested a more representative project in view of the superior richness and decorative perfection consented.
Without doubt, the hierapolitan burial buildings derive from a specific project connected to the material possibilities and desires of the customer, to the morphological characteristics of the site, to the ability of the workers, and the availability of the material. In the executive step, all these variables united to modify the construction rigor, the adoption of second-choice technical and formal solutions, producing either standardized or unique productions which also depended on the use of semi-processed elements rather than unique elements prepared for a particular project. The building sites in the necropolis reached high levels of ability and specificity to build structures which satisfied the cultural and celebratory aims, and also met the representative needs of the customer while guaranteeing functionality within the diverse economic means of each site, while respecting the models imposed by tradition and the times[6].

The area dedicated to the necropolis clearly stems from an urban plan based on the street grid map which, across the necropolis, reaches the gates of the city. Its outline is finalized towards the definition of a monumental passage formed by façades characterized by constant and significant decorative ornamentations, by the presence of important passages to the burial sites lying behind, passages which are openings in walled fences in turn characterized by a homogeneous and accurate wall texture, thanks to the presence, along the route, of areas for rest and prayer defined by seat-shaped exedra, with clear intentions of urban decor.
Concerning the internal routes, the studies carried out in recent years have allowed us to 'read' how the lots were set up through the formation of successive terraces, connected by small step paths. The secondary road axes, which run approximately parallel to the main one and served the various terraced levels, also presented monumentalised façades using staircases to solve the problem of the steep difference in levels.
With the intention of exalting the scenography of the sepulchred building complex, it is evident that the urban plan took advantage of the particular orography of the place, dominating the difference in height in order to create a more striking terracing. The same attention to the creation of linear perspectives and monumental water levels is evident also in the secondary street plan and can be particularly appreciated, for the first time, in the location of the tomb identified on the map as Tb163d. This acquired, in its first location, perhaps still in 1st century AD, the characteristics of a scenographic element at the end of the road which proceeds towards the northern hills, along the side of the hill. These considerations are also developed and investigated in depth in the case of other burial complexes and urban locations within the same necropolis with the scope of identifying the master grid of the urban plan which underlies the organization of the area, progressively occupied and re-occupied by the burial buildings and their annexes.
The identification of the most common burial buildings typology from 2nd century BC. to 4th century AD reached the complete definition by checking the repetition of a few elements which characterize these types[7].



In the earliest phase, the most common type of family tomb was a tumulus with the architectonic forms of the archaic models of Lycia and Caria, and the Asia Minor in general. It consists of a hypogean burial chamber with a square base and beds arranged on three of the sides. It is covered by a barrel vault which is preceded by an antechamber in turn covered by two flat slabs, accessed by means of a stepped *dromos* which is oriented S-SW. The tumulus emerges from the ground with a circular edge which restrains a cone of earth with a phallus-shaped sign. The construction shows signs that special attention was paid to the problem of the mound's movement: the project seems to take into consideration the differences in pressure acting on the walls. In the burial chamber, for example, we observed the perfect verticality of the longitudinal walls that support the barrel vault, surrounded by semi-circular openings, and this partly absorbs the upward thrust of the earth. The end walls instead converge slightly inwards to absorb the natural settling of the mound.
The inside walls are perfectly finished, with extremely accurate joints, perfect succession of the courses, and equal or multiples in height. The overall volume derives from proportionally defined relationships, satisfying architectonic and symbolic requirements. Also connected to the cultural tradition and microasian burial repertory of rock tombs are the types that come in the form of *heroon*, both in the variation shaped like a temple with a double slanting roof and the "architectonic façade" version, cut or set into the hillside.
The *heroon*-type buildings with façade and double slanting roof present in numerous examples studied over the years, are characterized by a podium which raises the structure and is exploited as a second, underground burial chamber beneath the main one. It is made by excavating the slab or the rocky prominences, or by construction with large travertine slabs. Both chambers present the three burial beds along the walls, in accordance with the standard disposition found depicted in the images of the *triclinium*. This typology was used especially from 1st century BC to 1st AD when, following the spread of the raised sarcophagus, together with the various types of bases supporting the sarcophagus (podium, stepped base, *hyposorion*), there appeared a model of a "chambered" monumental tomb, or *bomos*, whose flat roof constitutes the support for one or more sarcophagi.

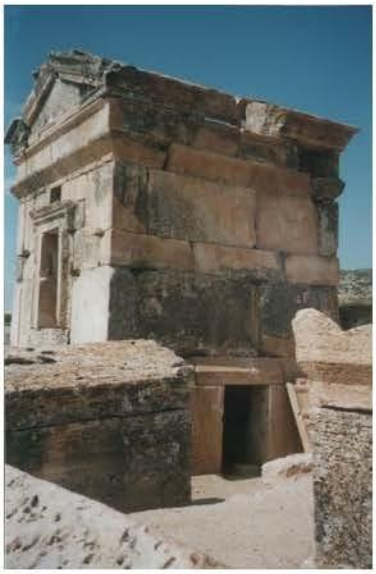
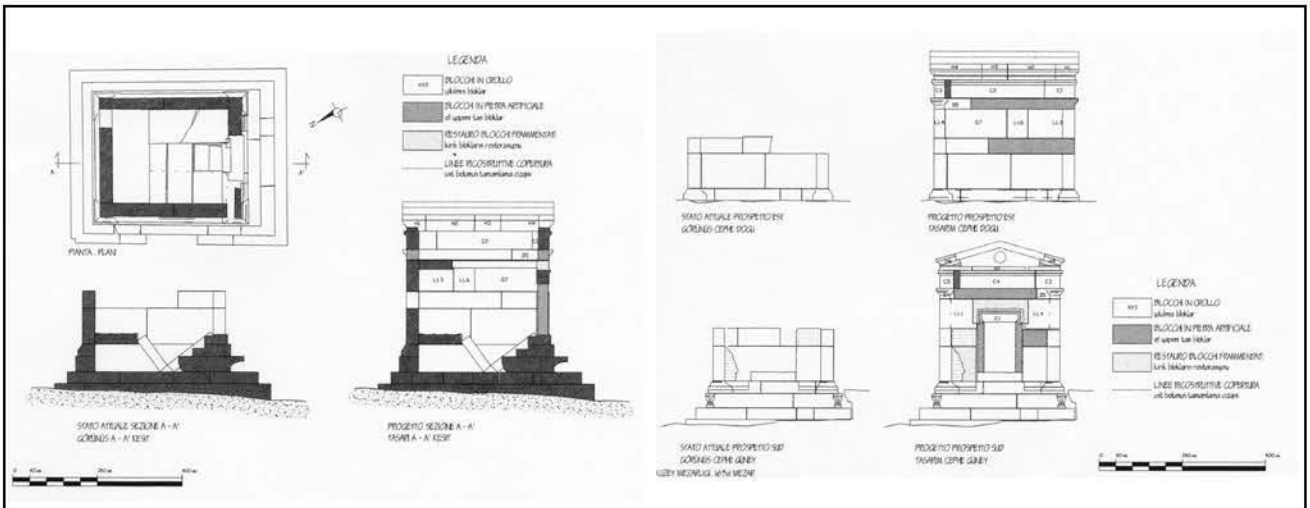


Table 3. Heroon Tb 163d: project of Restoration. 2001



The project doesn't show the underground chamber because it has been excavated in 2002

A *bomos* usually has a square base; inside it the burial beds are placed in one or two superimposed orders. It is distinguishable on the outside because of the absence of evident plastic elements. In creating the architectonic composition, the cutting of the masonry blocks assumed a special value of design in addition to the decorative elements proper, such as the piers, the architrave of the door, the pilasters that mark the corners of the building and the cornices that crown the sepulchre. The inner space, which accommodates complex requirements of symbolic and ritual nature, received special attention in the plaster finishing, even being occasionally painted with plant motifs[8]. However, the real protagonist of the monument is the sarcophagus, set aside for the head of the family and placed in a pre-eminent position on the roof, reached by a raising process that starts at the stepped base, the last step being forged into a burial stool. The burial typology of the *bomos*, whose symbolic meaning is "burial altar", was widespread in the hierapolitan necropolis in all the 3rd century, even attaining architectonic dimensions sufficient to be transformed into an authentic mausoleum, their meaning derived from other, most notably religious, places. For example, in the general uniformity of the hierapolitan scheme of the "chamber" typology, two buildings (TbA28 and Tb181) emerge because of their dimensions, architectonic and decorative value, and position - at the two ends of the area of the necropolis. They can be interpreted as mausoleums which signal, with their monumental form, the entrance to the road to the sepulchres, from the city or from the land.

It was Flavius Zeuxi who had the sepulchre identified as TbA28 built in the last two decades of the 1st century, to the side of the monumental gate of the city. The monumentalised of the building is due not only to the exceptional architectonic decoration by means of a doric frieze, but also to the presence of a hypogean chamber preceded by a stepped *dromos*.

During the last campaign, in tomb 181 (from the age of Hadrian), we established a fact of notable interest tied to the use and architectonic aspect of the building. It is the last monument of the Northern Necropolis on the road to Tripolis and presents a hypogean chamber with proportional dimensions to the ample superior chamber; the investigations under way will ascertain whether or not it was broken into, and may lead to possible anthropological research.

The monumentalised of this building, already evident in the imposing dimensions, in the perfect finishing of the walls and the presence of two orders of beds (the one above runs along all four walls) is underlined by the probable existence of a stepped podium upon which the nascent building was based, according to the canons of typology, a further characteristic which defines its complexity.

In a small number of monumental buildings, the indicated typologies are flanked by distinct typologies whose architectonic form is derived from other models and expresses itself with a language charged with special communicative value. Thus some tombs distinguish themselves from the general picture, resembling the layout of a house, divided into several spaces, and sometimes urban architecture is even re-proposed in the decorative work and in the insertion of windows for interior lighting. In a dominant position on the hill, above a small, triangular-based sepulchral chamber, in part cut in the rock, an obelisk was erected, formed of large blocks in the shape of a truncated pyramid. The celebratory and scenographic significance also appears in the large, barrel-vaulted buildings opening with a façade: spaces for funeral rites and, at the same time, spaces which exalt burial in a sarcophagus.

The analysis and study carried out to date have restored the general overview of the planning, project making and construction of the necropolis in Hierapolis.

The interpretation of all the emergent data and the clarification of the open historical questions, concerning our interpretation of the society which determined its appearance, are the subjects that the necropolis team is now facing and trying to elucidate.

We have seen how in the multiplicity of typologies that follow one another in the time span of six centuries, the general features are constant, with continual repetition of the defining elements. The interpretation which may be reached is that in the hierapolitan society there were no differences either financial or of class and therefore the society of the dead had no desire to show itself as belonging to a group having overtones of social or economic hierarchies.

Another aspect should be kept in mind. The heroic ideal which inspired the tombs of Hierapolis, according to the eschatological concept of the eastern world, forbids any allusions to daily life in order to tangibly underline the difference between the world of the hero, leaning towards *virtus*, and the world of the living. Nonetheless, the necropolis and the tomb are the points of contact between the world of the dead and of the living, worlds which, though apparently incommunicado, find a go-between revealed by the analyses and studies carried out. The hierapolitan tomb, enclosed by a gardened fence, is not isolated: it joins and is juxtaposed in series to other tombs organized, as we already noted, according to a town plan which is not only an abstract organizational principle but satisfies the need that the world of the dead should relate to the world of the living in a logic of its own, recreated in a structure organized like a true city.

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Η ΕΙΚΟΝΙΚΗ ΠΡΑΓΜΑΤΙΚΟΤΗΤΑ ΣΤΑ **ΥΠΑΙΘΡΙΑ ΑΡΧΑΙΟΛΟΓΙΚΑ ΜΟΥΣΕΙΑ** ΩΣ ΠΑΡΑΜΕΤΡΟΣ ΔΙΑΤΗΡΗΣΗΣ ΤΗΣ ΙΣΤΟΡΙΚΗΣ ΜΝΗΜΗΣ

Τέση Σαλή
Αν. Καθηγήτρια Μουσειολογίας
Ιονίου Παν/μίου

Μία προσιδιάζουσα στο χαρακτήρα της χώρας μας αρχιτεκτονική έκφραση αποτελούν οι ημιυπαίθριοι χώροι, που, καλυμμένοι μερικώς, βρίσκονται σε άμεση επαφή με τον περίγυρο τους σε ένα διαρκές παιχνίδι εσωτερικού και εξωτερικού περιβάλλοντος. Τέτοιας φιλοσοφίας χώρους συνιστούν τα «υπαίθρια μουσεία», που στην Ελλάδα είναι, ως επί το πλείστον, αρχαιολογικά.

Το ελληνικό τοπίο και από άποψη κλίμακας (απωθεί τις ογκώδεις μονολιθικές κατασκευές), και από άποψη κλίματος (εύκρατο), και από άποψη περιβάλλοντος (διαυγές και φωτεινό), αλλά και από άποψη χαρακτήρα (χαρούμενο και εξωστρεφές) προσφέρεται ιδιαιτέρως για την ανάπτυξη αυτού του τύπου μουσείων, των υπαιθρίων μουσείων.

Η εξωστρέφεια, λοιπόν, των ημιυπαίθριων αυτών μουσειακών χώρων προσιδιάζει, πάνω απ' όλα, στο χαρακτήρα των ίδιων των ανθρώπων του τόπου μας. Επειδή δε και η μουσειολογική διάρθρωσή τους εκφράζει όλα τα παραπάνω ιδιοχαρακτηριστικά, διερμηνεύει, όπως είναι φυσικό, τη νοοτροπία και της σημερινής κοινωνίας του τόπου όπου δημιουργήθηκαν εκ παραλλήλου με αυτήν της παρελθούσας. Κατ' αυτόν τον τρόπο οι εκφραστικοί ορίζοντες που παρέχονται στους μουσειολόγους από τα υπαίθρια αρχαιολογικά μουσεία, ως προς την αξιοποίηση των εμπεριεχομένων μνημείων, είναι πολλαπλοί και ενδιαφέροντες.

Ολόκληρη η Ελλάδα με τη μακραίωνη ιστορία της συνιστά ένα «υπαίθριο μουσείο», αφού κυριολεκτικά σε κάθε κομμάτι της ελληνικής γης υπάρχουν πολιτισμικοί θησαυροί που περιμένουν την αποκάλυψη και ανάδειξή τους.

Κατά συνέπεια η εξωστρεφής μουσειολογική διευθέτηση των υπαίθριων μουσείων συνιστά μία ευτυχή επιλογή, καθόσον διευκολύνει την ανάπτυξη μιας διαλεκτικής σχέσης ανάμεσα στα μνημεία που αναδεικνύονται και το ευρύτερο πολιτισμικό περιβάλλον, μέσα στο οποίο αυτά χωροθετούνται. Γι' αυτό και συνήθως οι προτεινόμενες μουσειολογικές διαδρομές επιλέγονται ούτως, ώστε να προσφέρουν τη

δυνατότητα της θέασης του συνόλου των αρχαιοτήτων από θέσεις ειδικού ενδιαφέροντος, όπως i) του μη στεγασμένου χώρου (πρανή) ii) του άμεσου περιβάλλοντος χώρου ή ακόμη iii) της πόλης και του πέριξ τοπίου.

Συστηματικά στους χώρους αυτούς οιαδήποτε προτεινομένη διευθέτηση, συνήθως προσανατολίζεται στην οπτική σύνδεση του μνημείου με τον εξωτερικό του περίγυρο, μέσω της δημιουργίας ελεύθερου πεδίου θέασης, μεριμνώντας όμως παράλληλα και για την αισθητική προστασία του μνημείου. Έτσι, επιτυγχάνεται η δυνατότητα επαφής του κοινού με το αξιοποιούμενο αρχαιολογικό περιβάλλον (και κατ' επέκτασιν την ευχερέστερη πρόσληψη της προσφερόμενης γνώσης), χωρίς να διαταράσσεται η γαλήνη του περιβάλλοντος αυτού. Συχνά στους χώρους τούτους ο επισκέπτης νιώθει την ανάγκη να έρχεται σε άμεση επαφή με αυτό που λέμε «αρχαία χώματα», ίσως εκδηλώνοντας μια εγγενή αταβιστική του τάση. Τη διάθεση όμως αυτή ο μουσειολόγος τη διαχειρίζεται μάλλον αποφατικά, για λόγους προστασίας των μνημείων, αποθαρρύνοντας την παρατεταμένη παραμονή των ανθρώπων μέσα στον αρχαιολογικό χώρο και υποστηρίζοντας μουσειολογικά μόνο τη διέλευση και τον περίπατο του κόσμου, ιδιαίτερα στο επίπεδο των αρχαίων λειψάνων.

Η σύγχρονη μουσειακή λειτουργία, όπως αναπτύσσεται στα "μουσεία ανοικτού χώρου", αναβαθμίζει το μουσείο από απλό θεματοφύλακα αξιών σε ζωντανό οργανισμό, που, μέσω της έντεχνης και αρμονικής τόνωσης ή και αποτόνωσης των εκθεμάτων του, προσπαθεί να συνδέσει οργανικά το προσερχόμενο κοινό με το αρχαιολογικό περιβάλλον της ανασκαφής. Ο στόχος τούτος συχνά επιτυγχάνεται μέσω της πολλαπλής χρήσης της σύγχρονης τεχνολογίας, ενώ διευκολύνεται ιδιαίτερα και από τη βιωματική εμπειρία, που εκπορεύεται από την in situ ερμηνευτική παρουσίαση των μνημείων, όπως αυτή με τρόπο άμεσο προσφέρεται στους επισκέπτες.

Κυρίως εκείνο που για έναν μουσειολόγο βαρύνει στη διαχείριση ενός υπαίθριου μουσείου, είναι η εγκατάσταση της επιζητούμενης διαλεκτικής σχέσης του παρελθόντος με το παρόν ούτως, ώστε μέσα από αυτήν τη διαδικασία να συντελεστεί η τελική ώσμωση ανάμεσα στον επισκέπτη και στο φορτισμένο πολιτισμικά χώρο που καλείται να αξιοποιήσει.

Πάντως υπό το πρίσμα της νέας Μουσειολογίας, και μέσα από το διαμορφούμενο μοντέλο της σχέσης «πολιτισμικό περιβάλλον – έκθεμα – επισκέπτης», επιδιώκεται η υπέρβαση του στενά εννοούμενου εθνικού χαρακτήρα των μουσείων αυτών.

Στο παρελθόν τα αρχαιολογικά μουσεία στην Ελλάδα βάσιζαν την υπόστασή τους στο γεγονός ότι συγκέντρωναν ευρήματα, που από μόνα τους είχαν τέτοια συμβολική σημασία για τους Έλληνες, ώστε να μη χρειάζονται οποιαδήποτε άλλη ερμηνεία και υποστήριξη. Οι επιμελητές, επομένως, όντας υπερεπαρκείς να διαχειριστούν και μουσειολογικά τους χώρους αυτούς, δεν χρειαζόταν να μπαίνουν στη διαδικασία ερμηνείας τους, η οποία θα τους ενέτασσε στο ευρύτερο πολιτισμικό περιβάλλον από το οποίο προέρχονταν και το οποίο μετεξελίχθηκε έκτοτε. Το εθνικό κριτήριο, όμως, σταδιακά υποχωρεί υπό το πρίσμα των αρχών της νέας Μουσειολογίας. Επιπροσθέτως, η ιστορική μνήμη στα υπαίθρια μουσεία είναι εναργής και παρούσα, εφόσον εκεί η μουσειολογία υποστηρίζει έναν φορτισμένο χώρο όπου ένας πολιτισμός ανελίχθηκε στο παρελθόν και μετεξελίχθηκε σε ένα παρόν, το οποίο υφίσταται ως φυσική παρουσία γύρω του.

Η πολιτιστική κληρονομιά, πλέον, δεν είναι αρκετό να αξιοποιείται μόνο ως αντικείμενο θαυμασμού των έργων των προγόνων μας, αλλά πρέπει να προσφέρεται και ως ιστορική διαδικασία και βεβαίως ως παιδεία, που μπορεί να δώσει απαντήσεις σε σύγχρονους προβληματισμούς. Γι' αυτό και τα in situ μουσεία, που λειτουργούν βάσει αυτής της αρχής, επαναφέρουν στο προσκήνιο αρχές, ιδέες και απόψεις που διαμόρφωσαν διαχρονικά τη φυσιογνωμία ενός τόπου κι ενός λαού. Άλλωστε, στην ερμηνευτική τους προσέγγιση οι σύγχρονοι μουσειολόγοι διευκολύνονται κατά πολύ από το αυθεντικό αρχαιολογικό περιβάλλον των υπαίθριων μουσείων που αναδεικνύουν.

Στα υπαίθρια μουσεία τα εκθέματα δεν αποξενώνονται από το ιστορικό και πολιτισμικό τους πλαίσιο για να εκτεθούν κάπου αλλού. Υπ' αυτό το πρίσμα η μουσειολογική διαχείριση των χώρων αυτών διαθέτει πρόσθετα περιθώρια ερμηνευτικών παρεμβάσεων εφόσον, εν προκειμένω, η συγκεκριμένη διαδικασία διευκολύνεται από το γεγονός ότι ως συμφραστικό περιβάλλον των εκθεσιακών συνόλων προσφέρεται ο τόπος που τα δημιούργησε.

Η in situ, λοιπόν, ανάδειξή τους, στο χώρο όπου γεννήθηκε ο πολιτισμός που αναδεικνύουν, αποτελεί το καταλληλότερο παραπληρωματικό υλικό τους και, όπως είναι φυσικό, η επίπονη μουσειογραφική υποστήριξη δεν είναι απαραίτητη.

Σύμφωνα δε με τις σύγχρονες μουσειολογικές απόψεις για την ερμηνευτική παρουσίαση των συλλογών, σήμερα δεν είναι δυνατόν να αντιληφθεί κανείς μία συλλογή ξεκομμένη από το άμεσο φυσικό περιβάλλον της, τόσο του παρελθόντος όσο και του παρόντος, στο οποίο εντάσσονται σήμερα τα αντικείμενα, και με το

οποίο ο επισκέπτης βρίσκεται σε άμεση φυσική επαφή. Η αρχή αυτή διέπει συστηματικά την ερμηνευτική παρουσίαση των in situ μουσείων, γι'αυτό και το κοινό έχει μια διαφορετική συμπεριφορά όταν επισκέπτεται τέτοια μουσεία, επειδή αναπτύσσει μια στενότερη σχέση με τα εκθέματα. Ταυτίζεται συχνά με τις πληροφορίες που του δίνονται και εμπεδώνει ευκολότερα τις νέες γνώσεις, ακριβώς γιατί η μουσειολογική μελέτη διευκολύνεται από μια ασφαλέστερη, και εκ των έσω, προσέγγιση και επικοινωνία με το ευρύ κοινό.

Ο πρώτος βασικός στόχος ενός υπαίθριου μουσείου είναι η ψυχική επαφή των ανθρώπων με τα αντικείμενα που εκτίθενται, και ο σκοπός αυτός καλύπτεται από την αυθεντικότητα του αρχαιολογικού περιβάλλοντος. Ο δεύτερος όμως στόχος, εξ ίσου σημαντικός, είναι η πνευματική επαφή του κόσμου με την ιστορικότητα των μνημείων αυτών. Εδώ η σύγχρονη τεχνολογία (π.χ. οθόνες αφής, σκόπευτρα ολογραμματικής ξενάγησης) διευκολύνει ιδιαίτερα τη συγκεκριμένη διαδικασία αναβαθμίζοντας την ερμηνευτικότητα των μνημείων και την αναγνωσιμότητα του αρχαιολογικού χώρου. Σταδιακά η σύγχρονη τεχνολογία καθίσταται αναπόσπαστο μέρος και των υπαίθριων μουσείων, διότι πλέον όλοι οι επισκέπτες απαιτούν να εξυπηρετούνται ηλεκτρονικά, όπως άλλωστε συμβαίνει και σε όλων των ειδών τα μουσεία.

Σήμερα πλέον, ο μέσος επισκέπτης αντιλαμβάνεται το μουσείο ως χώρο όχι μόνο προστασίας και διατήρησης του πολιτισμικού αγαθού αλλά και ως χώρο ανάπτυξης γνώσεων και πρωτοβουλιών σχετικά με το αγαθό αυτό.

Μέσω της τεχνολογίας, μεταξύ των άλλων, είναι δυνατή η μετατροπή της στατικότητας των μουσειακών εικόνων σε δυναμική πρόκληση, με την ένταξη των μνημείων στο πλαίσιο ενός διαδραστικού περιβάλλοντος. Η σύγχρονη τεχνολογία επιτρέπει σε όλους τους επισκέπτες (και σε καθένα ξεχωριστά) να προβάλλουν τις δικές τους αντιλήψεις σύμφωνα με το δικό τους υπόβαθρο προσωπικότητας και επιπέδου. Η σύγχρονη μουσειολογική συγκρότηση εν γένει των εκθεσειακών χώρων προτρέπει τον επισκέπτη να προσφεύγει στα διαθέσιμα τεχνολογικά εργαλεία, που εγκαθιστούν ένα ευανάγνωστο είδος επικοινωνίας μεταξύ επισκέπτη και παραπληρωματικού υλικού. Οι προσφερόμενες, μέσω αυτής της διαδικασίας, πληροφορίες γίνονται κατανοητές, επειδή σήμερα αποκωδικοποιούνται εύκολα από το ευρύ κοινό, το οποίο σε μεγάλη έκταση χειρίζεται με επάρκεια τα σύγχρονα τεχνολογικά μέσα.

Όμως, το μουσείο είναι εκεί για να μας διδάξει, για να μας εκπαιδεύσει, για να μας ψυχαγωγήσει και όχι για να μας διασκεδάσει ευκαιριακά ή να καλύψει τις προσωρινές ανάγκες πλήρωσης του ελεύθερου χρόνου μας. Είναι κυρίως η ουσία και ο σφυγμός μιας εποχής, στην οποία αναφέρεται το μουσείο, που ενδιαφέρει μια ερμηνευτική παρουσίαση και όχι μόνο η στεγνή και χωρίς επαγωγικό αποτέλεσμα γνώση.

Η τεχνολογία, πλέον, μπορεί να δημιουργεί, αζημίως για το μνημείο, το απαραίτητο συμφραστικό περιβάλλον, που θα ολοκλήρωνε με επάρκεια την ενδεχομένως ασαφή σημερινή εικόνα του μνημείου στην αντίληψη του θεατή.

Υποστηρίζουμε σταθερά την προσφυγή στη σύγχρονη τεχνολογία, που είναι θεμιτή, όταν οι δυνατότητες πρόσβασης στο αυθεντικό αρχαιολογικό αντικείμενο είναι περιορισμένες λόγω καταστροφής, απώλειας συντήρησης και εν γένει αδυναμίας έκθεσής του. Όπου δεν είναι δυνατή η άμεση επαφή, ας φθάνει τουλάχιστον η γνώση, δεδομένου ότι συχνά τα αρχαιολογικά κατάλοιπα στη χώρα μας εμφανίζουν αποσπασματική διατήρηση. Η αναπαράσταση της ελλείπουσας πραγματικότητας στις μέρες μας έχει πολλά να ωφεληθεί από τη λεγόμενη εικονική πραγματικότητα, στην περίπτωση που δεν απειλείται από αυτήν, και οι επιμελητές των αρχαιολογικών χώρων, καθώς και οι μουσειολόγοι, διαθέτουν σήμερα τη γνώση να αξιοποιήσουν τα σύγχρονα μουσειολογικά / μουσειογραφικά εργαλεία.

Η δυνατότητα ερμηνείας και προβολής των μνημείων μπορεί με ασφάλεια να αναβαθμισθεί μέσα από τη λελογισμένη χρήση της σύγχρονης ηλεκτρονικής τεχνολογίας, καθότι οι οπτικές αναπαραστάσεις του ελλείποντος περιβάλλοντος είναι χρήσιμες, εφόσον δεν βλάπτουν και δεν προσβάλλουν τα εκθέματα. Οι πάσης φύσεως προσομοιώσεις του περιβάλλοντος δημιουργούνται πάντοτε για να υποστηρίζουν το έκθεμα, χωρίς να το επισκιάζουν. Η δε μουσειογραφική λειτουργία μπορεί θαυμάσια να συνεπικουρείται και μόνο από την τεχνολογία, χωρίς να εκχωρεί τα ποιοτικά κεκτημένα της.

Με τη χρήση των πολυμέσων η σημειωτική του μουσειακού χώρου αναβαθμίζεται αισθητά και μάλιστα αβλαβώς για το μνημείο, εφόσον δεν χωρούν κανενός είδους αποκαταστάσεις επάνω στο ίδιο το σώμα του μνημείου.

Τα πολυμέσα αξιοποιούν την ανθρώπινη αντιληπτικότητα επιτυγχάνοντας την αρτιότερη, πληρέστερη και ευχερέστερα διαμορφούμενη από το μουσειολόγο της έκθεσης ποιότητα των προσλαμβανομένων μηνυμάτων.

Επιπροσθέτως, λαμβάνεται πρόνοια ούτως, ώστε οτιδήποτε θα μπορούσε ενδεχομένως να διαταράξει τη γαλήνη του αρχαιολογικού περιβάλλοντος, να μην βρίσκεται σε στενή γειτονία με τα αρχαία λείψανα. Για την τοποθέτηση των απαιτούμενων εγκαταστάσεων προτείνεται να χρησιμοποιείται το εσωτερικό πάχος του στεγάστρου (μη ορατό στους επισκέπτες), ενώ για το κοινό που θα επιθυμούσε τέτοιου είδους «ηλεκτρονική ξενάγηση» θα μπορούσε να διατίθεται ένας εναέριος διάδρομος (και σε ικανό ύψος από τα αρχαία λείψανα) εντός του στεγάστρου, σε τακτές και προγραμματισμένες ώρες. Όπως είναι φυσικό, για τον επισκέπτη που δεν θα επιθυμούσε παρά έναν ρομαντικό περίπατο με πανοραμική θέα της ανασκαφής, ο διάδρομος αυτός θα ήταν στην διάθεσή του όλες τις υπόλοιπες ώρες λειτουργίας του χώρου. Επίσης, ο εναέριος διάδρομος, και μόνο αυτός, θα ήταν χρήσιμο να προσφέρεται για τη φιλοξενία τεχνολογικού μουσειοδιδακτικού εξοπλισμού, όπως είναι οι οθόνες αφής, τα σκόπευτρα με χρήση πολυμέσων κ.λπ. Ο τεχνολογικός αυτός εξοπλισμός θα μπορούσε να είναι στη διάθεση του κοινού για ξεναγήσεις και προγράμματα παρουσιάσεων «εικονικής πραγματικότητας» και να διατίθεται είτε σε μεμονωμένους χρήστες είτε και σε ομάδες οργανωμένων επισκέψεων.

Η πρόταση αυτή θα μπορούσε να αποτελεί απλώς μια **δυνατότητα** στις παρεμβάσεις στους αρχαιολογικούς χώρους, καθότι λόγω της φύσεώς της η ολογραμματική ερμηνευτική παρουσίαση δεν είναι αναγκαστική. Δεν συνιστά κανενός είδους υλική υπόσταση, την οποία ο θεατής δεν θα μπορούσε να την αποφύγει, εάν το επιθυμούσε. Οι παρουσιάσεις αυτού του είδους αποτελούν μια εναλλακτική μουσειολογική πρόταση, που δεν αλλοιώνει καθόλου την προτεινόμενη κατά τα λοιπά συμβατική μουσειολογική λύση.

Άλλωστε, προσγράφεται στα θετικά τούτης της μουσειολογικής άποψης το γεγονός ότι η τεχνολογία αυτού του είδους επιτρέπει αφ' ενός την αξιοποίηση των σημερινών και αφ' ετέρου την αφομοίωση των μελλοντικών επιστημονικών απόψεων, που η αρχαιολογική έρευνα θα φέρει σε φως, ταχύτατα και αζημίως για το μνημείο. Όποιες, είτε ανασκαφικές είτε θεωρητικές, μελλοντικές προσεγγίσεις του συγκεκριμένου αρχαιολογικού θέματος υπάρξουν, θα μπορούν εύκολα να ενσωματωθούν στην εκάστοτε (up to date) ερμηνευτική παρουσίαση, που θα προσφέρεται στην εναέρια διαδρομή μέσω της τεχνολογίας.

Επιπροσθέτως, οι διαφορετικές ιστορικές φάσεις του μνημείου μπορούν εύκολα να ζωντανέψουν μπροστά στα μάτια του επισκέπτη, με όποια αξιολογική σειρά, χρονολογική ή άλλη, επιθυμεί ο μουσειογράφος.

Η εις βάθος γνώση του μουσειογραφούμενου αντικειμένου, που διαθέτουν πάντα οι ειδικοί επιστήμονες των μνημείων αυτών, είναι το απαραίτητο εφόδιο, το οποίο μπορεί να δώσει το μέτρο της επάρκειας σε κάθε είδους ερμηνευτική παρουσίαση ούτως, ώστε ο θεατής να φεύγει από μια τέτοια (virtual reality) παρουσίαση προβληματισμένος και όχι απορημένος.

Σε κάθε περίπτωση πάντως, τα χρησιμοποιούμενα τεχνολογικά μέσα πρέπει να λειτουργούν επικουρικά και να μην προβάλλονται εις βάρος των ίδιων των συλλογών, γιατί στις ακραίες περιπτώσεις, που πολυμέσα χρησιμοποιούνται καταχρηστικά και δεν συνυπάρχουν αρμονικά με τις συλλογές, προκαλείται σύγχυση και δημιουργούνται ψευδαισθήσεις στους επισκέπτες.

Η ερμηνευτική παρουσίαση των ελλειπόντων τμημάτων των μνημείων στο κοινό προϋποθέτει ιδιαίτερη μουσειολογική μέριμνα. Στις μέρες μας είναι πλέον δυνατό, αλλά με την πρέπουσα περίσκεψη, να προσφεύγουμε στην τεχνολογία για μια λελογισμένη υποκατάσταση της απωλεσθείσας πραγματικότητας των μνημείων ή χώρων που χάθηκαν ή αλλοιώθηκαν. Κατ' αυτόν τον τρόπο η διατήρηση της ιστορικής μνήμης είναι πολλαπλή:

i) δεν θίγεται κατ' ουδένα τρόπο η ακεραιότητα και η αυθεντικότητα της φυσικής υπόστασης των μνημείων.

ii) διατηρείται αλώβητη η ιστορικότητα των ερειπίων, την ώρα που μεταγγίζεται ταχύτατα και με σαφήνεια η ιστορική γνώση, ενώ όλοι μας προκαλούμεθα μέσω του εκτεταμένου διαδραστικού περιβάλλοντος των υπαίθριων αρχαιολογικών μουσείων να αξιολογήσουμε εκ νέου τη δημιουργία του παρελθόντος, δηλαδή την πολιτιστική μας κληρονομιά, να την επαναπροσδιορίσουμε στο παρόν και να βρούμε τρόπους μετατροπής της σε κινητήρια δύναμη για το μέλλον.

Πάντως, όπως και να έχουν τα πράγματα, ο κανόνας που πρέπει να ακολουθείται πιστά είναι αυτός της τήρησης του μέτρου, ώστε η πραγματοποίηση του διδακτικού και ψυχαγωγικού ρόλου της μουσειακής παρουσίασης να είναι επιτυχής και μέσα στο επιτρεπτό πλαίσιο της λειτουργίας ενός χώρου κύρους, όπως είναι τα μουσεία.

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Η ΣΥΝΕΡΓΑΣΙΑ ΑΝΑΜΕΣΑ ΣΤΑ ΕΚΠΑΙΔΕΥΤΙΚΑ-ΕΡΕΥΝΗΤΙΚΑ ΙΔΡΥΜΑΤΑ ΚΑΙ ΤΟΥΣ ΦΟΡΕΙΣ ΔΙΑΧΕΙΡΙΣΗΣ ΤΗΣ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ ΩΣ ΣΤΟΙΧΕΙΟ ΑΝΑΒΑΘΜΙΣΗΣ ΤΗΣ ΕΚΠΑΙΔΕΥΤΙΚΗΣ ΛΕΙΤΟΥΡΓΙΑΣ ΑΛΛΑ ΚΑΙ ΒΕΛΤΙΩΣΗΣ ΤΩΝ ΜΕΘΟΔΩΝ ΕΠΕΜΒΑΣΗΣ ΣΤΑ ΙΣΤΟΡΙΚΑ ΜΝΗΜΕΙΑ

Παναγιώτης Θεουλάκης

Περίληψη

Το επιστημονικό και τεχνικό πεδίο της Συντήρησης και Προστασίας των έργων της πολιτιστικής κληρονομιάς απαιτεί γνώσεις από διαφορετικούς τομείς των βασικών επιστημών και της τεχνολογίας, και η επιτυχής έκβαση της εφαρμογής της προϋποθέτει διεπιστημονική ερευνητική προσέγγιση.

Το νέο αυτό γνωστικό πεδίο στηρίζεται σε δύο μεγάλους πυλώνες:

- Στην αντίληψη ότι τα διάφορα φαινόμενα φθοράς δεν είναι παρά το αποτέλεσμα της αλληλεπίδρασης των υλικών με το περιβάλλον και,
- Στην παραδοχή ότι οποιαδήποτε προσέγγιση αυτών των προβλημάτων θα πρέπει να αναγνωρίζει και να σέβεται την ακεραιότητα κάθε έργου και ταυτόχρονα τη διττή του ταυτότητα ως φορέα ιστορικών και καλλιτεχνικών αξιών.

Ο ασχολούμενος με τη συντήρηση των ιστορικών μνημείων πρέπει να διαθέτει καλλιτεχνική παιδεία, γνώσεις θεωρητικών και θετικών επιστημών και τεχνολογική κατάρτιση προκειμένου να σχεδιάζει και να εφαρμόζει επεμβάσεις συντήρησης.

Η προστασία των μνημείων του πολιτισμού αποκτά στις μέρες μας επιστημονικό χαρακτήρα και μάλιστα σύνθετο, όπως περιγράφεται κατωτέρω, εγκαταλείποντας τη μορφή της «πρακτικής τεχνικής» από την οποία κατάγεται. Ο εμπειρισμός είναι άλλωστε η αρχή κάθε νέας επιστήμης.

Η εκπαιδευτική λειτουργία κατατείνει στο να καθίσταται ο εκπαιδευόμενος ικανός να μελετήσει και να κατανοήσει ένα έργο από υλιστική και τεχνολογική άποψη και, την ίδια στιγμή, να μπορεί να το αντιμετωπίσει ως πνευματική δημιουργία και να το εντάξει στο ιστορικό – αισθητικό του πλαίσιο.

Η υλοποίηση των καθαυτό εκπαιδευτικών στόχων αλλά και η συνεχής προσπάθεια για τη συγκρότηση του επιστημονικού υπόβαθρου του νέου αυτού χώρου θα ήταν αδύνατη χωρίς τη συνεργασία ανάμεσα στα εκπαιδευτικά ιδρύματα και τους φορείς που είναι υπεύθυνοι για την εκτέλεση των έργων συντήρησης.

Η ενίσχυση του ρόλου της εκπαίδευσης συμβάλλει, ώστε το σχήμα «μελέτη – συντήρηση - διαχείριση και αξιοποίηση των μνημείων», να αποτελέσει έναν αειφόρο κύκλο ανάπτυξης.

1. Η συντήρηση των έργων της πολιτιστικής κληρονομιάς

Η γήρανση και φθορά των υλικών αποτελεί φυσικό νόμο. Το δεύτερο θερμοδυναμικό αξίωμα δεν εξαιρεί, δυστυχώς, τα έργα μεγάλης ιστορικής και καλλιτεχνικής αξίας. Οι κίνδυνοι για τα υλικά των μνημείων έχουν, στις μέρες, μας αυξηθεί δραματικά εξ αιτίας της διόγκωσης και περιβαλλοντικής υποβάθμισης των αστικών κέντρων, της αύξησης της ατμοσφαιρικής ρύπανσης και της ανεξέλεγκτης τουριστικής

εκμετάλλευσης. Συχνά, τέλος, οι ίδιες οι επεμβάσεις συντηρήσεως, με ανορθόδοξα μέσα, απειλούν τη διατήρηση των ιστορικών μνημείων.

Αντικείμενο της συντήρησης είναι η προστασία των έργων από τους παράγοντες εκείνους του περιβάλλοντος που συνιστούν αίτια φθοράς, και η διατήρηση τους για όσο το δυνατόν μεγαλύτερο διάστημα. Ταυτόχρονα, είναι επιθυμητή η ανάδειξη των ιστορικών και καλλιτεχνικών αξιών τους, χωρίς να απειληθεί στο ελάχιστο η αυθεντικότητα και η σημασία τους.

Το έργο της συντήρησης, ανάλογα με το αν στρέφεται στα ίδια τα αντικείμενα ή στο περιβάλλον τους, διακρίνεται σε δύο κατευθύνσεις:

Επεμβατική συντήρηση:
Περιλαμβάνει όλες τις δράσεις, με άμεσο χαρακτήρα, που αφορούν στην αποκατάσταση των φθορών στα έργα και την αναστολή ή επιβράδυνση της διάβρωσης περαιτέρω. Οι επεμβάσεις αυτές ανάλογα με τους στόχους που θέτουν διακρίνονται σε εργασίες καθαρισμού, στερέωσης, αποκατάστασης της ακεραιότητας και προστασίας.

Προληπτική συντήρηση:
Πρόκειται για ενέργειες και μέτρα, έμμεσου χαρακτήρα, στο περιβάλλον των έργων που έχουν ως στόχο να προλάβουν τη φθορά δημιουργώντας ιδανικές κατά το δυνατόν συνθήκες διατήρησης γι' αυτά.

Η τροποποίηση του λεγόμενου μικροκλίματος των μνημείων δεν αποβλέπει, συνήθως, μόνο στην ρύθμιση της θερμοκρασίας και της σχετικής υγρασίας. Μπορεί να περιλαμβάνει ένα ευρύ φάσμα μέτρων, όπως για παράδειγμα μείωση της ατμοσφαιρικής ρύπανσης, περιορισμό της κυκλοφορίας των οχημάτων, έλεγχο του αριθμού των επισκεπτών, ειδικές κατασκευές (στέγαστρα) προσωρινού συνήθως χαρακτήρα, ύπαρξη σχεδίων διαχείρισης εκτάκτων αναγκών κλπ.

2. Η επιστήμη και τεχνολογία στη συντήρηση ή Ο νέος επιστημονικός – τεχνολογικός χώρος της συντήρησης

Συντήρηση και προστασία της πολιτιστικής κληρονομιάς, είναι, όπως θα μπορούσαμε να διατυπώσουμε εναλλακτικά, οι ενέργειες για την εξουδετέρωση του κινδύνου της φθοράς, αίροντας ή αδρανοποιώντας τα αίτια, επιβραδύνοντας την εξέλιξη των φαινομένων διάβρωσης και περιορίζοντας τις επιπτώσεις τους με τη βελτίωση της ανθεκτικότητας των υλικών κατασκευής των έργων.

Η μελέτη αυτών των προβλημάτων απαιτεί πριν απ' όλα τον ορισμό και την ανάλυση των πολιτισμικών αξιών (ιστορικών και καλλιτεχνικών) του μνημείου και βεβαίως την εξέταση των υλικών και των ιδιοτήτων τους καθώς και της κατάστασης στην οποία διατηρούνται.

Η διερεύνηση των αιτίων και η μελέτη και αποκάλυψη των μηχανισμών διάβρωσης των υλικών απαιτεί, με τη σειρά της, διεπιστημονική προσέγγιση που εμπλέκει διαφορετικές αναλυτικές τεχνικές και φαινομενολογικές μεθόδους από το χώρο των θετικών και φυσικών επιστημών.

Η ολοκλήρωση της διαγνωστικής φάσης αποτελεί, εκτός από απαραίτητη προϋπόθεση κάθε πλήρους μελέτης συντηρήσεως, και την ειδοποιό διαφορά ανάμεσα

στο παρελθόν του εμπειρισμού και το παρόν και το μέλλον της επιστημονικής μεθόδου.

Η εποχή που η χρήση ακατάλληλων μεθόδων και ασύμβατων υλικών, όπως: κοινός χάλυβας για συνδέσεις, οπλισμούς και ενισχύσεις, ευπαθή πολυμερή για στερεώσεις, καθαρισμοί με νερό ή ακατάλληλα μεταλλικά εργαλεία, επισκευές και συμπληρώσεις με ασύμβατα κονιάματα, ήταν συνηθισμένη υπόθεση, φαίνεται πως είναι οριστικά παρελθόν.

Υπάρχει, εντούτοις, δικαιολογημένα, σοβαρός προβληματισμός σχετικά με το επίπεδο στο οποίο βρίσκεται σήμερα, αλλά και τις προοπτικές της επιστημονικής μεθοδολογίας για την προστασία της πολιτιστικής κληρονομιάς.

Τα ερωτήματα που διατυπώνονται ακολούθως είναι, μπορούμε να πούμε, κρίσιμα για τις κατευθύνσεις και τους στόχους της έρευνας στη συντήρηση των έργων ιστορικού και καλλιτεχνικού ενδιαφέροντος:

- Είναι οι μέθοδοι που εφαρμόζονται για την εκτίμηση των ιδιοτήτων των διαφόρων υλικών (λίθων, κονιαμάτων, πλίνθων κλπ) πρότυπες και καθολικά αποδεκτές;
- Είναι απαραίτητη η διεξαγωγή ερευνητικού έργου για την καθιέρωση μεθόδων εκτίμησης και πρόβλεψης της ανθεκτικότητας και της μακροχρόνιας συμπεριφοράς των νέων υλικών που χρησιμοποιούνται στη συντήρηση και των κατεργασιών γενικότερα;
- Ποια είναι η πραγματική πρόοδος στην αποτελεσματική όσο και αξιόπιστη χρήση των λεγόμενων Μη Καταστρεπτικών Τεχνικών για την εκτίμηση τόσο του βαθμού φθοράς όσο και της κατάστασης μετά την επέμβαση;
- Είναι επαρκής η προσπάθεια που γίνεται στην κατεύθυνση της εξέλιξης υλικών και μεθόδων εξειδικευμένων για τις ανάγκες της πρακτικής της συντήρησης;

3. Η εκπαίδευση και κατάρτιση για την προστασία της πολιτιστικής κληρονομιάς.

Η συντήρηση των ιστορικών μνημείων είναι μια δραστηριότητα που έχει καλλιτεχνικό, επιστημονικό, τεχνικό και πρακτικό χαρακτήρα και κατά συνέπεια πρέπει να βασίζεται σε σπουδές με ανθρωπιστικό περιεχόμενο, στη συμβολή των φυσικών και θετικών επιστημών, στην ανάπτυξη σημαντικών δεξιοτήτων και τέλος στη συστηματική έρευνα.

Συνακόλουθα, η λογική βάση, η δομή και οι κατευθύνσεις κάθε προγράμματος με σκοπό την εκπαίδευση για την προστασία της πολιτιστικής κληρονομιάς θα πρέπει να καλύπτουν τις απαιτήσεις του γνωστικού πεδίου που περιγράφεται στις προηγούμενες ενότητες, υποστηρίζοντας ταυτόχρονα τη συνεκτική αρχή της διεπιστημονικότητας.

Επί πλέον, ένα ολοκληρωμένο πρόγραμμα εκπαίδευσης και κατάρτισης για τη συντήρηση οφείλει να θέτει προτεραιότητες όπως:

- Επικοινωνία και αλληλεπίδραση των διαφορετικών επιστημονικών πεδίων, στο επίπεδο της ανάλυσης και μελέτης των προβλημάτων, καθώς και συνδυασμός των τεχνικών κατά το σχεδιασμό των επεμβάσεων.

- Ανταλλαγή δεδομένων και πληροφοριών ανάμεσα στους διαφορετικούς τομείς, ώστε μέσα από την προσπάθεια αυτή να έχομε ως όφελος την καθιέρωση δόκιμης και κοινώς αποδεκτής ορολογίας.

- Δημιουργία δυναμικής για επιστημονική και τεχνολογική έρευνα υψηλού επιπέδου, αναφορικά με τις απαιτήσεις των διαφόρων επιστημονικών πεδίων που εμπλέκονται.

- Ενοποίηση των αποτελεσμάτων από τις δραστηριότητες στις τέσσερις βασικές θεματικές ενότητες, ιστορική – καλλιτεχνική δημιουργία – υλικά – περιβάλλον, που συμμετέχουν στη συγκρότηση του νέου χώρου.

4. Η συνεργασία των εκπαιδευτικών ιδρυμάτων με τους φορείς διαχείρισης των ιστορικών μνημείων.

Η πραγμάτωση των καθαυτό εκπαιδευτικών στόχων, αλλά και η συνεχής προσπάθεια για τη διαμόρφωση του νέου γνωστικού χώρου, θα ήταν αδύνατη χωρίς τη συνεργασία ανάμεσα στα εκπαιδευτικά ιδρύματα και τους φορείς που είναι υπεύθυνοι για την εκτέλεση των έργων συντήρησης και οι οποίοι, στην Ελλάδα, ανήκουν, στη συντριπτική τους πλειοψηφία, στο Δημόσιο Τομέα.

Η συνεργασία αυτή μπορεί να υλοποιηθεί πάνω στις ακόλουθες προτάσεις - ιδέες:

- Συστηματικότερη αξιοποίηση του θεσμού των Πρακτικών Ασκήσεων, που προβλέπεται στα περισσότερα ιδρύματα της Ανώτατης Εκπαίδευσης.
- Ανάθεση Πτυχιακών Εργασιών με αντικείμενο από την τρέχουσα θεματολογία των έργων αποκατάστασης.
- Υλοποίηση προτάσεων Ερευνητικής Συνεργασίας με αντικείμενο σοβαρότερα και διαχρονικότερα προβλήματα, που έχουν σχέση με τις, κατά τόπους, ιδιαιτερότητες των υλικών, των κατασκευών αλλά και των περιβαλλοντικών και μικροκλιματικών συνθηκών. Τα αποτελέσματα αυτής της δράσης μπορούν να οδηγήσουν στην εξέλιξη και καθιέρωση πρότυπης τεχνολογίας (Know How).
- Οργάνωση σεμιναρίων με ειδική θεματολογία μεταπτυχιακού επιπέδου, όπου στα εργοτάξια, εκτός από επιδείξεις, μπορούν να εκτελούνται και πιλοτικά προγράμματα.
- Από κοινού υλοποίηση και παρακολούθηση, σε πιλοτική κλίμακα, καινοτομικών εφαρμογών στον τομέα της συντήρησης.
- Διοργάνωση κύκλων συνεχιζόμενης εκπαίδευσης. Η δράση αυτή θα συμβάλει στην ταχύτερη διάχυση της εμπειρίας και της γνώσης που αποκτάται.
- Εκδηλώσεις ενημέρωσης και προβολής του έργου που επιτελείται στον τομέα της συντήρησης και των ιδιαίτερων χαρακτηριστικών του. Οι εκδηλώσεις αυτές μπορούν να απευθύνονται στο ευρύ κοινό με στόχο την ενημέρωση αλλά και σε εξειδικευμένο ακροατήριο με στόχο την επιμόρφωση.

Η αμφίδρομη αυτή σχέση λειτουργεί επωφελώς και για τα εκτελούμενα έργα, διότι βοηθά στην ταχύτερη και αποτελεσματική ενσωμάτωση νέων μέσων και πρωτοποριακών μεθόδων στην πρακτική των επεμβάσεων.

Πολλές από τις παραπάνω μορφές συνεργασίας είναι ήδη ενεργές, στην περίπτωση της μεσαιωνικής πόλης της Ρόδου, και τα αποτελέσματα είχαμε την ευκαιρία να τα αξιολογήσουμε στο συμπόσιο που έλαβε χώρα το φθινόπωρο του 2001, με τη συμπλήρωση «δεκαπέντε χρόνων έργων αποκατάστασης». Όμως, η σημασία και οι πολιτισμικές αξίες της μεσαιωνικής πόλης αλλά και η εμβέλεια των έργων είναι τέτοιες, που προσφέρουν πολύ περισσότερες δυνατότητες για συστηματικότερη προσέγγιση. Αυτή η, ποιοτικά, νέα συνεργασία με τους φορείς της εκπαίδευσης θα επιτρέψει να τεθούν και μακροπρόθεσμοι στόχοι και, επίσης, να αξιοποιηθούν χώροι, οι οποίοι παραδίδονται από τα εκτελούμενα έργα, με χρήσεις που θα συμβάλουν στην ενημέρωση της κοινωνίας, στην επιμόρφωση του ανθρώπινου δυναμικού των έργων και, τέλος, στην αναβάθμιση της εκπαιδευτικής λειτουργίας.

5. Συμπεράσματα

Στη μεταβιομηχανική εποχή, που χαρακτηρίζεται από κρίσιμα περιβαλλοντικά προβλήματα, με κυρίαρχα αυτά της διόγκωσης των αστικών κέντρων και της αύξησης των επιπέδων της ατμοσφαιρικής ρύπανσης, η προστασία της πολιτιστικής κληρονομιάς αναγνωρίζεται ως μέρος του ευρύτερου ζητήματος της περιβαλλοντικής και πολιτιστικής ανάπτυξης.

Οι σύγχρονοι στόχοι της κοινωνικής και οικονομικής ανάπτυξης, χωρίς να εξαιρείται ο τουρισμός, μπορούν να υλοποιηθούν με σεβασμό προς τα έργα του παρελθόντος, μόνο στο βαθμό που γίνονται δεκτές οι διεθνώς θεσπισμένες δεοντολογικές αρχές για τις επεμβάσεις και εφαρμόζονται οι απαιτούμενες επιστημονικές και τεχνολογικές γνώσεις.

Η ενίσχυση του ρόλου της εκπαίδευσης συμβάλλει, ώστε το σχήμα «μελέτη – συντήρηση - διαχείριση και αξιοποίηση των μνημείων», να αποτελέσει έναν αειφόρο κύκλο ανάπτυξης.

Ο νέος επιστημονικός και τεχνολογικός χώρος, που συγκροτείται στις μέρες μας και έχει ως αντικείμενο την κατανόηση των φαινομένων φθοράς των υλικών στα ιστορικά μνημεία και την καθιέρωση αποτελεσματικών μεθόδων συντήρησης και προστασίας, στηρίζεται σε δύο βασικές αρχές:

1. Στην αντίληψη ότι τα διάφορα φαινόμενα φθοράς δεν είναι παρά το αποτέλεσμα της αλληλεπίδρασης των υλικών με το περιβάλλον και,
2. Στην παραδοχή ότι οποιαδήποτε προσέγγιση αυτών των προβλημάτων θα πρέπει να αναγνωρίζει και να σέβεται την ακεραιότητα κάθε έργου και ταυτόχρονα τη διττή του ταυτότητα ως φορέα ιστορικών και καλλιτεχνικών αξιών.

Η θεώρηση αυτή καθιστά τη διεπιστημονικότητα έννοια κλειδί και ταυτόχρονα όρο για τη συγκρότηση του επιστημονικού-τεχνολογικού υποβάθρου της συντήρησης σήμερα. Το πρώτο σημείο απαιτεί τη συμβολή των θετικών και φυσικών επιστημών

(χημεία, φυσική, επιστήμη των υλικών, μηχανική, φαινομενολογία κλπ), ενώ το δεύτερο προϋποθέτει γνώσεις ανθρωπιστικών επιστημών (αρχαιολογία, ιστορία της τέχνης, αισθητική κλπ).

Παράλληλα, ο επεμβατικός χαρακτήρας της συντήρησης απαιτεί τεχνολογική κατάρτιση και ανάπτυξη δεξιοτήτων.

Η συνεργασία ανάμεσα στα εκπαιδευτικά ιδρύματα και τους φορείς που είναι υπεύθυνοι για την εκτέλεση των έργων συντήρησης δρα καταλυτικά στην υλοποίηση των καθαυτό εκπαιδευτικών στόχων, αλλά και στην προσπάθεια για τη διαμόρφωση του νέου γνωστικού χώρου.

Η αμφίδρομη λειτουργία αυτής της σχέσης έχει ευεργετικές συνέπειες και προς τις δύο κατευθύνσεις:

- Για τους εκπαιδευτικούς και ερευνητικούς φορείς προσφέρεται ένα πεδίο παρατήρησης, άσκησης και τελικής δοκιμασίας κάθε νέου μέσου.
- Για τους επαγγελματίες και τα έργα η επαφή αυτή προσφέρει άμεσα τη δυνατότητα της ενημέρωσης για τις επιστημονικές και τεχνολογικές εξελίξεις.
- Τέλος, η συνεργασία πάνω σε σημαντικά προβλήματα οδηγεί συχνά και στην παραγωγή Know How. Τέτοια παραδείγματα είναι η καθιέρωση των κραμάτων Τιτανίου για τον οπλισμό των συγκολλήσεων αλλά και η εφαρμογή «διπλής ακτινοβολίας» laser, από το υπέρυθρο και το υπεριώδες, για τον καθαρισμό των γλυπτών της δυτικής ζωφόρου του Παρθενώνος.

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