Training Course on Cultural Heritage Protection in the Asia - Pacific Region 2006

Research, Analysis and Preservation of Archaeological Sites and Remains

11 September – 11 October, 2006, Nara, Japan

Cultural Heritage Protection Cooperation Office,
Asia/Pacific Cultural Centre for UNESCO (ACCU)

Agency for Cultural Affairs, Japan (*Bunkacho*)

National Research Institute for Cultural Properties (NRICP)

International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM)

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Preface

The Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU) was established in Nara in 1999 with cooperation of the Agency for Cultural Affairs, Japan (*Bunkacho*) Nara Prefectural Government, and the Municipal Government of Nara, with the purpose being to serve as a domestic centre for promoting cooperation in cultural heritage protection throughout the Asia-Pacific region.

Since then, our office has been engaged in the protection and study of cultural resources through training courses, international conferences, the training of young leaders in cultural heritage protection, the production of databases, our website and newsletters, and public relations.

The ACCU Nara training courses have comprised a significant part of the work of heritage protection and research, and this was the seventh such course we have held. The theme of this year's course was “Research, Analysis, and Preservation of Archaeological Sites and Remains” and was held in cooperation with the National Research Institute for Cultural Properties and the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), from 11 September to 11 October, 2006. Fifteen participants from across the vast Asia-Pacific region gathered in Nara to conduct their training.

Our purpose was to conduct training in regard to these methodologies of research and investigation focusing on the excavation and the subsequent organization and classification of materials, as well as the methods and principles relating to the preservation, the access, appreciation and understanding of archaeological sites and historic places by the public. Especially we offered the lecture on the Risk Management in this training course. Furthermore, we shall use this training session as an opportunity for mutual debate, information exchange, and network building by archaeological experts in the Asia and the Pacific region.

It is believed that information relating to the practical aspects of the latest methodologies and technologies is difficult to convey and disseminate promptly in the Asia and the Pacific region. This situation needs to be improved, especially regarding the precision in archaeological site exploration, and by providing the skills to researchers so that they may able to address this issue.

I believe that the discussions and lectures in this course were also a good opportunity for the exchange of ideas and knowledge between the participants, all of whom come from different cultural backgrounds. I hope that in the future every participant will be able to utilize the results of the course and the networks that were built at that time, in their own countries.

We would like to express our deep gratitude to the prominent international experts who kindly

delivered lectures, and to the organizations that provided generous support in organizing the course. We would also like to express our appreciation to the participants, who actively took part in the discussions and whose eager efforts made the course more efficient and successful.

We hope that this report will benefit those who are making strenuous efforts in this field throughout Asia and the Pacific.

YAMAMOTO Tadanao
Director
Cultural Heritage Protection Cooperation Office,
Asia/Pacific Cultural Centre for UNESCO (ACCU), Nara

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1. General Information

Training Course on Cultural Heritage Protection in the Asia - Pacific Region 2006 - Research, Analysis and Preservation of Archaeological Sites and Remains- (11 September – 11 October, 2006, Nara)

General Information

1. Organizers

Jointly organized by: *Bunkacho* (Agency for Cultural Affairs in Japan); the Asia/Pacific Cultural Centre for UNESCO (ACCU); the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); and the National Research Institute for Cultural Properties

In cooperation with Japan's Ministry of Foreign Affairs; the Japanese National Commission for UNESCO; Nara Prefectural Government and Nara Municipal Government

2. Background

In Asia and the Pacific region, there are various forms of cultural heritage which are of great value from a global point of view. Proper investigation, analysis, preservation and development of these sites and remains are required of heritage professionals, in order to ensure that this important cultural heritage is safeguarded for future generations. ACCU Nara in partnership with ICCROM and *Bunkacho* has been organizing courses since 2000 on this topic with a view to building the capacities of professionals in the region. The course will examine the needs in the field, and highlight potential solutions including practical aspects of the latest methodologies and technologies for investigation, conservation and development of archaeological sites.

3. Dates and Venues

Course dates and duration: 11 September (Monday) to 11 October (Wednesday), 2006
Venues: ACCU Nara-Cultural Heritage Protection Cooperation Office,
(Nara Prefectural Government "Horen" Office, 757 Horen-cho, Nara City);
Additional venues: Facilities of cooperating organizations; sites undergoing preservation and restoration, etc.

4. Objective of the Training Course

The objectives of the training course are to:

- provide participants with a knowledge of recording and analytical methods for archaeological features and relics;
- provide participants with knowledge of principles and methodologies of preservation of archaeological sites;
- provide participants with the knowledge of development and utilization of archaeological sites;
- provide participants with an opportunity to network with colleagues from the region and share experiences.

5. Training Curriculum

- Lectures

-Conservation and Utilization of Cultural Heritage Resources
-Risk preparedness for Cultural Heritages
-Recording Survey Methods of Archaeological Features and Relics
-Development and Management of Archaeological Sites
-Introduction to Archaeological Science
-Introduction to Scientific Dating Methods
-Introduction to Conservation Science
-Introduction to Environmental Archaeology

- Presentation and Discussion

-Presentation of the Current Status of Each Country, World and Cultural Heritage Resources, and Exchange of Views
-Recapitulation of the Training Sessions

- Practical Trainings and On-site Lectures

-Workshops: Classification of Archaeological Relics / Measuring and Drawing / Rubbing
: Recording of Archaeological Features
: Conservation Science
-Case Study on Preservation, Development and Utilization of Archaeological Sites (3-day study tour)

6. Participants in the Training Course

(1) The training course is offered to the following 37 signatory countries listed on the

UNESCO World Heritage Convention (see below). For application, UNESCO National Commissions or UNESCO liaison offices need to submit the following documents required for those individuals nominated no later than **23 June, 2006**: letters of recommendation written by the head of the organization to which a nominee belongs; a profile of the nominee; a report on his/her major achievements.

*A total of 15 people will be selected from the nominees as participants in the training course.

Afghanistan, Australia, Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Iran, Kazakhstan, Kiribati, Kyrgyz, Lao P.D.R., Malaysia, Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, Philippines, Rep. of Korea, Samoa, Solomon Islands, Sri Lanka, Tajikistan, Thailand, Tonga ,Turkmenistan, Uzbekistan, Vanuatu, and Vietnam

(2) Qualification Requirements

Applicants should be:

1) experts or equivalent, aged 45 years or younger, who are engaged directly in the excavation of archaeological sites, and the preservation, restoration, and/or development of archaeological features, and who can make effective use of the results of the Training Session upon returning to his or her home country.

2) those who have a good command of English, the working language for all lectures, so that they can deliver presentations and write reports from the Training Session;

3) those who can attend the entire training programme;

4) those who are in good health to complete the entire training programme;

5) those who can submit all of the required documents (i.e. a recommendation by NATCOM, and reports) within the deadlines outlined;

6) those who can continue exchanging information and interacting with ACCU Nara after returning to their home countries;

7) those who were not previous participants in training courses organized by ACCU Nara;

7. Notification of Screening Results

After consideration with the other organizers, ACCU Nara will select 15 people (one person per nation only) around the end of July from among all applicants. After selection, the UNESCO National Commissions from each country and successful applicants will be informed of the screening results.

8. Certificate of Completion

Each trainee will be awarded a certificate upon completion of the course.

9. Language of the Training Session

English will be the working language throughout the course.

10. Documents for Application

(1) Application Form (Form 1)

(2) Report Relating to Cultural Heritage Preservation.

The report should be written by the applicant and should be mentioned present and previous work related to the theme of the course engaged in by the applicant. This report will be weighted during selection of the participants.

(3) Letter of Recommendation by NATCOM

(4) Letter of Recommendation by the Attending Chief Official (Annex 1)

(5) Documentation Indicating English Proficiency (if obtained)

11. Expenses

Expenses during the Training Course shall be borne by ACCU Nara, as follows:

(1) Travelling expenses:

Each of the participants (except those from Australia, Republic of Korea and New Zealand) shall be provided with an economy class return air ticket from the nearest international airport from their residence to Kansai International Airport, and transportation fees between Kansai International Airport and Nara.

(2) Living expenses:

Participants shall be provided the basic living expenses incurred during the training course from 11 September (Monday) to 11 October (Wednesday), 2006. Arrangements for accommodations will be made by ACCU Nara

12. Secretariat

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2. Programme Schedule

	Date		Morning (9:30-12:30) (Lecturer / Venue)	Afternoon (13:40-16:40) (Lecturer / Venue)
September	10	Sun.	*Arrival*	
	11	Mon.	Opening Ceremony Orientation Session (ACCU)	
	12	Tue.	Conservation and Utilization of Cultural Heritage Resources (Cases in Japan) (Mr Ito / ACCU)	Risk Management for Cultural Heritages (Dr Inaba･Mr Murakami / ACCU)
	13	Wed.	Conservation and Utilization of Cultural Heritage Resources (Dr Wijesuriya / ACCU)	
	14	Thu.	Country Report by Participants (1) / Discussion (Dr Wijesuriya / ACCU)	
	15	Fri.	Country Report by Participants (2) / Discussion (Dr Wijesuriya / ACCU)	
	16	Sat.		
	17	Sun.		
	18	Mon.	National Holiday	
	19	Tue.	Introduction to Archaeological Science (Prof. Sawada / NRICPN)	Introduction to Dendrochronology (Dr Mitsutani / NRICPN)
	20	Wed.	Introduction to Dating Methods (Prof. Nagatomo / NRICPN)	Recording Survey Methods of Archaeological Features and Relics (Mr Kiguchi / NRICPN)
	21	Thu.	Principle of 3D Laser Scanning Survey and Application / Photogrammetry with Digital Camera and Application / Principle of GPS and Application (Mr Kiguchi / NRICPN)	
	22	Fri.	GIS Usage and Data Integration / Set-up Database of Archaeological Sites and Relics) (Mr Kiguchi / NRICPN)	
	23	Sat.		
	24	Sun.		
	25	Mon.	Work Shop: Classification of Archaeological Relics / Measuring & Drawing / Rubbing (Mr Nishiguchi / NRICPN)	
	26	Tue.	Introduction to Conservation Science & Work Shop : Scientific Preservation Treatment for Cultural Properties (Prof. Nishiyama / Nara University)	
	27	Wed.	Work Shop (Conservation Science) : Scientific Preservation Treatment for Cultural Properties (Prof. Nishiyama / Nara University)	
	28	Thu.	Work Shop (Conservation Science) : Transcription of Stratigraphy (Prof. Nishiyama / Nara University)	
	29	Fri.	Development and Utilization for Archaeological Sites (Dr Ono / ACCU)	
	30	Sat.		

October	1	Sun.	
	2	Mon.	Introduction to Environmental Archaeology & Survey Work Shop (Dr Matsui / NRICPN)
	3	Tue.	On-site Lecture (Nara Imperial Palace Site) (Mr Takase & Mr. Nakajima)
	4	Wed.	On-site Lectures (Mr Kawashima / Matsugase Daiba : Mr Kojima / Torihama Shell Midden Site)
	5	Thu.	On-site Lectures (Mr Matsumura / Fukui City History Museum : Mr Mizuno / Ichijo-dani)
	6	Fri.	On-site Lectures (Mr Kondo / Azuchi Castle in Shiga Prefecture : Mr Hanada / Mounded Tomb Group Site at Oiwayama in Yasu City)
	7	Sat.	
	8	Sun.	
	9	Mon.	National Holiday
	10	Tue.	Future Issues in the Preservation of Cultural Heritage (Ms Tunprawat / ACCU)
	11	Wed.	Closing Ceremony
	12	Thu.	*Departure*

Proceedings

1. Opening Ceremony
2. Summary of Lectures
3. Workshops
4. On-site Lectures

1. Opening Ceremony

The opening ceremony of the 2006 training course was held on 11 September 2006 at the Kasugano-so reception hall in Nara City, with fifteen course participants and honorable guests from the Agency for Cultural Affairs, Japan (*Bunkacho*), the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), the National Research Institute for Cultural Properties, Nara Prefectural Government, Nara Municipal Government.

Mr Suzuki, Director, Programme Department of ACCU

Mr Yamamoto, Director of ACCU Nara Office

The opening addresses were given by Mr SUZUKI Yoshimori, Director, Programme Department, ACCU; Mr YAMAMOTO Tadanao, Director, ACCU Nara Office; Mr ASANO Atsuyuki, Head, Office for International Cooperation on Cultural Properties, Cultural Properties Department, Bunkacho; Dr Gamini WIJESURIYA, Project Manager, the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); Mr YASUDA Ryutaro, Head, Centre for Archaeological Operations, National Research Institute for Cultural Properties; Mr FUKUTANI Tateo, Director, Science City&Higher Education Coordination Office Division, Nara Prefectural Government; and Ms IKEDA Midori, Chief, Cultural Assets Division, Board of Education, Nara City. In the above mentioned speeches, organizers and guests extended warm greetings to theparticipants and stressed the success of the training course. At the end of the ceremony, the participants and an observer introduced themselves and a group photo was taken with staff and guests.

Mr Asano, from the *Bunkacho* (Agency for Cultural Affairs, Japan)

Dr Wijesuriya, from the International Centre for the Study of the Preservation and Restoration of Cultural Property

Finally, the participants proceeded to the Nara Prefectural Office. They were ushered to the roof floor of the building, where many historical monuments designated World Heritage can be observed. Unfortunately, the sight was not

Mr Yasuda, from the National Research Institute for Cultural Properties

Mr Fukutani, from the Nara Prefectural Government

Ms Ikeda, from the Nara Municipal Government

clear, but participants were given the explanation of those monuments seen from there. After this stop, the participants met the Deputy Governor of Nara Prefecture, Mr NISHIO Tetsuo. He greeted participants and introduced Nara Prefecture. The participants also asked the Deputy Governor about the prefecture.

In the afternoon, the participants and ACCU staff met in the ACCU meeting room whereupon each member introduced themselves. After that, an introduction to the training course was given regarding the course theme, objectives, logistics, and requirements. Following this, presentation about daily life in Japan for visitors was made, followed by an open question period.


Meeting with the Deputy Governor of Nara Prefecture, Mr Nishio

2. Summary of Lectures

Various experts delivered a series of lectures during this Training Course. The following is a complete list of the lectures with a brief description of their contents.

■ **Conservation and Utilization of Cultural Heritage Resources (Case in Japan)**
(12 Sept.) ITO Masayoshi (Agency for Cultural Affairs)

- History of the enactment of the law for protection of cultural properties in Japan
- System and category of cultural properties in Japan
- Types of historical sites
- Preservation system for historical sites
- Preservation and management of historical sites
- Utilization and promotion of historic sites etc.

■ **Risk Management for Cultural Heritages**
(12 Sept.)
INABA Nobuko (NRICP, Tokyo), MURAKAMI Yasumichi (Hyogo Prefectural Board of Education)

"How to reduce disasters through the experience of the Great Hanshin Earthquake"


Lecture by Ms Inaba and Mr. Murakami

■ **Conservation and Utilization of Cultural Heritage Resources** (13 Sept.)
Gamini WIJESURIYA (ICCROM)

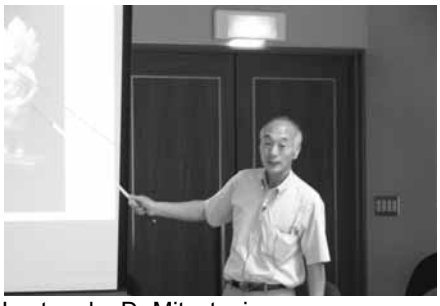

Lecture by Dr Wijesuriya

- The role of ICCROM, how it cooperates with the ACCU and what can be achieved by becoming an ICCROM member state.
- Explanation of international guidelines such as charters, declarations, recommendations and conventions and the background for their establishment
- Different countries have different issues, so achieving a balanced management plan of heritage is not always easy.
- A variety of stakeholders all have a role in the preservation of heritage. The definition of preservation also differs from region to region and evolves with time.
- Our task in management of heritage is comprised of the 4R's (Revisit, Research, React, Results).
- It is important for us to take in international knowledge as experts can give precise suggestions but local communities should be the ones who have direct contact with the site.
- All stakeholders should work together in management and preservation of heritage.

Presentation by Mr Tahir Saeed

Discussion after the presentation

Lecture by Prof. Sawada



Lecture by Dr Mitsutani

■ **Country Reports by Participants / Discussions** (14-15 Sept.)
Gamini WIJESURIYA

- Each participant gave a presentation of a country report. Many issues were raised and valuable information was exchanged through challenging discussions.
- In almost all countries the key issues are lack of qualified human resources, insufficient legislation, and lack of public awareness.

■ **Introduction to Archaeological Science** (19 Sept.)
SAWADA Masaaki (University of Kokushikan)

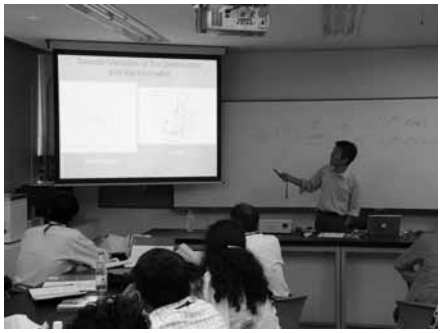
- Introduction of five main fields of archaeological science : age determination, identification of materials and production technique, environmental archaeology, conservation science, and exploration and measurement of ruins.
- Conservational treatment is not only important for preservation, but also for presentation and utilization.
- An issue concerning the freeze dry method for objects, whereby conservation which can manage the objects' color such as wet color or dried color of wood.
- Professionals have to choose the best treatment for conservation of cultural properties from both academic and practical perspectives.

■ **Introduction to Dendrochronology** (19 Oct.)
MITSUTANI Takumi (NRICP, Nara)

- Dendrochronology has many varieties and extension of fields such as Tree-ring Dating, Dendroclimatology, Dendroecology, Dendrohydorosy, Dendrochemistry and Dendroisotopes.
- There are many historical wooden buildings and structures in Asian countries, so Dendrochlonology is useful and effective to understand the history, the material and techniques of the architecture.

■ **Introduction to Dating Methods** (20 Sept.)
NAGATOMO Tsuneto (Nara University of Education)

- Explanation of principles of age determination methods.
- Age determination is conducted by stratigraphy and typology in Archaeology for determining relative age.
- Scientific methods are also used for age determination such as numerical and relative methods.
- Isotopes, radiocarbon dating (C-14), fission track, luminescence, electron spin resonance are included innumerical methods.
- Archaeomagnetism, paleomagnetism, and dendrochronology are included in relative methods.
- Careful consideration is required to use a result for age determination, and further consideration will be needed to choose the most appropriate method.



Lecture by Prof. Nagatomo

■ **Recording Survey Methods of Archaeological Features and Relics** (20 Sept.)
KIGUCHI Hiroshi (PASCO Corporation)

Lecture by Mr Kiguchi

- Introduction of GIS and its availabilities in Archaeology
- GIS(Geographic Information System) is widely used in the field of archaeology such as making maps for archaeologists, excavations, measurement of cultural properties, historical park design and constructing database of cultural properties.
- The explanation of background and the reason for GIS's wide and rapid diffusion of advances in the field of Japanese archaeology
- Demands for acquisition and practical use of digital data are increasing more rapidly each year, however the handwritten drawing will be necessary even if digital data or photography developed, because a drawing can provide us with much selected information depending on different research purposes.
- Introduction of 3D digitizer, digital photogrammetry and CAD

Demonstration of 3D digital, digital photogrammetry and CAD

GPS measuring by participants

■ **Principle of 3D Laser Scanning Survey and Application / Photogrammetry with Digital Camera and Application/ Principle of GPS and Application**
(21 Sept.) KIGUCHI Hiroshi

- GPS Demonstration. Set up base point of GPS measuring and demonstration how to use handy GPS was also conducted outside. Plane-table survey to compare GPS point.


Lecture by Mr Kiguchi

■ **GIS Usage and Data Integration/Set-up Database of Archaeological Sites and Relics**
(22 Sept.) KIGUCHI Hiroshi

- GIS is a system of computer software, hardware, and data.
- It also helps personnel to manipulate, analyze and present information that is tied to a spatial location.
- GIS is an important tool to support decision-making and to present geographical information by visualizing.

■ **Development and Utilization for Archaeological Sites** (29 Sept.)
ONO Kenkichi (Agency for Cultural affairs)

- Purposes of historic sites utilization should be developed to make sure the significance.
- Precautions for arrangement from both of conservation and utilization perspectives are as follows.

1) Precautions for arrangement with respect to conservation
- Reliable conservation of essential value
- Enhancement of study on conservation and better accuracy for arrangement
- Improvement of arrangement methods and techniques(Conservation and succession of traditional techniques and development of new techniques)
- Conservation of the landscape including surrounding areas

2) Precautions for arrangement with respect to utilization
- Enhancement of study on public opening and operation
- Development and selection of appropriate methods and techniques suitable for utilization purposes (Learning and research resource/Town development resource for establishing regional identity/Sightseeing resources/Multipurpose space)


Lecture by Dr Matsui

■ **Introduction to Environmental Archaeology & Survey Work Shop** (2 Oct.)
MATSUI Akira (NRICP, Nara)

- Environmental archaeology was mainly composed of five topics: screening and flotation examples, human bones and evidence of injuries, human and dogs, pigs in eastern Asia, and research on toilet sites.
- Environmental archaeology has contributed to obtaining

much information such as diet, pathology, demography, lifestyles, mortuary, social stratification and kinship from human bones.

- Human bones exhibit many differences between male and female.
- Comparing dog's bones and pig's bones is also effective to establish when domestication has begun.

Lecture by Ms Tunprawat

■ **Future Issues in the Preservation of Cultural Heritage**
(10 Oct.)
Patcharawee TUNPRAWAT (SEAMEO-SPAFA)

- Explanation of the activities of SEAMEO-SPAFA.
- SEAMEO-SPAFA cultivates awareness and appreciation of cultural heritage; promotes and enriches archaeological and cultural activities in the region; and furthers professional competence in the fields of archaeology and fine arts to advance mutual knowledge and understanding among member countries.
- Its projects are based on cultural resource management, conservation collaboration with local community, and training for architects and engineers. The CollAsia 2010 project aims to improve the conditions for the conservation of heritage collections in Southeast Asia countries.
- Group session's topics were as follows:
  1) List key concepts that you have learnt from the course
  2) List five major challenges in terms of heritage preservation in the Asia Pacific Region
  3) How can the course help you to overcome these challenges

3. Workshops

25 Sept.

■ **Classification of Archaeological Relics/Measuring & Drawing/Rubbing**

NISHIGUCHI Toshiki and JINNO Megumi (NRICP, Nara)

Workshop 1- Wet Rubbing of roof tiles

- Many roof tiles have been excavated from the Nara Heijo Place Site, so the roof tile is one of the typical relics and is important in identifying the historical age.
- Introduction of Japanese ancient roof tiles. For example, rosette motifs on round tiles and arabesque motifs on flat eaves tiles were often used in the sixth to twelfth century AD.
- Each of these tiles has various types, so classification and analyses of motifs in detail are very important.
- The wet rubbing methods have many advantages such as 1) real scale 2) easiness to make many copies 3) faster than drawing method 4) cheaper than taking photos.

Lecture by Mr Imai at NRICPN

Wet-rubbing: recording method of the information of roof tiles

Practicing the techniques of wet rubbing

At the storage of roof tiles

Workshop 2- Method and Drawing Pottery

- Introduction of two kinds of drawings in order to record archaeological objects: projection drawing and cross section drawing. In addition, projection drawing includes horizontal projection and vertical projection.
- Explanation of the concept, procedures and tools for drawing.
- Observation notes should be added in order to complete the drawing.

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Drawing and Measuring of pottery

26 –28 Oct.

- **Introduction to Conservation Science & Workshop: Scientific Preservation Treatment for Cultural Properties/Transcription of Stratigraphy**

  NISHIYAMA Yoichi (Nara University)

Lecture – Introduction to Conservation Science

- Introduction of Japanese conservation science especially about wood and metal artefacts.
- In principle, archaeological relics should be kept as they found, and altered in any way.
- Excavated wooden artefacts are very fragile even if they appear to retain their original form because wood constituents such as cellulose and lignin have eluted from the wood material.
- Sometimes chemical processing and preservation will be required in order to minimize additional deterioration. Chemical materials for the preservation should have some criteria as follows; 1) a high degree of dimensional stability, 2) reversibility and 3) non-harmfulness to the environment and human health.
- The preservation treatment of iron and bronze relics is as follows: 1) Desalination (for iron objects) 2) Stabilization (for bronze objects) by BTA (benzotriazole) treatment 3) Resin impregnation 4) Resin application 5) Rust removal 6) Bonding or patching. Reversibility of processes is required.

Lecture by Prof. Nishiyama

Workshop2- Scientific Preservation Treatment for Cultural Properties

- Introduction of the equipment and many artefacts treated with synthetic resin at the laboratory
- Waterlogged woods identification by observing a cross section, a radial section and a tangential section in both conifer and broad leaf tree under a microscope
- PEG impregnation method of woods and gravimetry to see changes in weight before and after PEG impregnation

At the laboratory

Practice

Workshop 3 – Transcription of Stratigraphy

Participants had an opportunity to take off the stratum by using Polyurethane resin (Tomac NS-10) at Saidaiji excavation site located on the north part of the Nara Imperial Palace Site.

4. On-site Lectures

■ **Nara Imperial Palace Site** (3 Oct.)

TAKASE Yoichi and NAKAJIMA Yoshiharu (NRICP, Nara)

- Overview of the Heijo Palace Site, from its historical background to contents.
- History of the maintenance activities at the Heijo Palace Site
- Conservation and maintenance for the remains in the Heijo Palace Site
- Concept of the museum for ruins, and problems of application
- After the lecture, Mr Nakajima took the participants to the museum, and then to the palace site to have an actual look at the various presentation methods shown there.

Lecture by Mr Takase on the history, maintenance and restoration of the Heijo Palace Site

Lecture at the Heijo Palace Site, by Mr Nakajima

■ **Fukui Pref.～Shiga Pref.** (4 – 6 Oct.)

4 Oct.

Matsugase *Daiba*

KAWASHIMA Kiyohito (Ohi-town Historical Materials Museum)

- Matsugase *Daiba* (the Battery Fortification) was designated as a national historic site in 2001 for the first time in Ohi County.
- Ohi-town had carried out research and excavations withassistance of prefectural and national subsidies from 1994 to 1998.
- At the completion of the excavation, the town educational board made the basic plan for preservation and maintenance of the sites to utilize as a historic park.

On site lecture at Matsugase *Daiba*

At Mikata-cho Jomon Museum, brief explanation by Mr Kojima

Torihama Shell Midden Site/Mikata-cho Jomon Museum

KOJIMA Hideaki (Mikata-cho Jomon Museum)

On site lecture at Torihama Shell MIdden

- The Torihama Shell Midden Site, which is situated at the meeting place of two rivers (Hase River and Take River), was discovered by chance in 1961.
- Wooden artefacts, ropes, woven items, and lacquered objects have been excavated in tremendously good condition through ten excavations from 1962 to 1985. Torihama Shell Midden was called "A time capsule from the Jomon Period."
- Torihama Shell Midden site is estimated to spread out about 4,000m^2 areas and to be semicircular (100m east to west and 50m north to south).

A tour of Fukui City History Museum

5 Oct.

Fukui City History Museum and *Yokokan*

MATSUMURA Tomoya (Fukui City History Museum)

- Explanation of history of Fukui, ancient Fukui, the castle town and city of the modern times and great people of the last days of the Tokugawa Shogunate and the Meiji Era.
- Introduction of gallery of the Matsudaira Family collection.
- Nationally designated as a place of scenic beauty, *Yokokan*, which was the second house of the Matsudairas, is a classic representation of the middle Edo period with a drawing room showing refined taste and a wandering path style garden.

On site lecture: sitting on *tatami* mats in the reconstructed Japanese house, *Yokokan*

Ichijodani Asakura Family Historical Museum

MIZUNO Kazuo (Ichijodani Asakura Family Historical Museum)

- Ichijo-dani is an important example of a castle town of the Warring State Period. Given a lecture on the history of the site at the museum, the participants visited the Ichijo-dani site.
- Mr Mizuno gave a detailed explanation about the reconstruction project (how to reconstruct buildings from the archaeological features), looking around the reconstructed houses and gardens.

At the three-dimensional reconstruction site

6 Oct.

Shiga Prefectural Research Institute of Azuchi Castle

Shiga Prefectural Azuchi Castle Archaeological Museum

The revival of the Azuchi Castle "The House of Nobunaga"

Azuchi Castle Remains

Mr Kondo giving a brief lecture on the Azuchi Castle

KONDO Shigeru (Shiga Prefectural Research Institute of Azuchi Castle)

- Shiga Prefectural Azuchi Castle Archaeologist Museum is located in *Omi Fudoki-no-Oka*, a historical park containing the special historic site of Azuchi Castle.
- Oda Nobunaga, who was the most powerful feudal lord finished construction of a castle in 1579. However the castle was burned down less than three years from its completion of construction.
- The mystery of Azuchi Castle was solved by recent research which led to the discovery of the original plans of the castle. After the explanation of Azuichi Castle and Archaeological Museum, Mr Kondo showed participants around the house of Nobunaga and the Azuchi Castle Remains.

A tour of the revival of the Azuchi Castle "The house of Nobunaga"

Participants climbing up restored *Ote-michi* stone steps at Azuchi Castle Remains

The Dotaku Museum (The Mysteries of Dotaku)

HANADA Masahiro (Educational Board of Yasu City)

- The Dotaku Museum was established to preserve and enhance the knowledge of our ancestors and the past and present culture of Yasu city.
- The museum grounds also include the Yayoi period historical village and the Miyayama No.2 *Kofun* site and Mounded Tomb Group Site at Oiwayama.

On-site lecture at mounded tomb group site at Oiwayama

At the Dotaku Museum

Country Reports by Participants

Cambodia

Tech SRUN

Archaeologist
Archaeological Unit, Department of Monument and Archaeology I
APSARA Authority

Introduction:

The one-decade assets of international co-operation:

Since 1993, following more than one decade of regional and internal conflicts, the site of Angkor with its 40 principal monuments and hundreds of archaeological reserves continues to profit from the constant attention of the international community.

The site benefits from the increasing growth of tourist activities, which continue to provide essential financial resources to the country.

Today, Angkor is generally recognized as a model of success of international cooperation in the field of protection of cultural heritages in a post-conflict situation. The royal government has actively supported the activities of the National Authority APSARA, which is in charge of managing the site. In addition, the international community is represented by the International Committee of Coordination (ICC), which celebrated its tenth birthday in 2003. The ICC works with national authorities in the difficult and complex enterprise of protecting the historical site of Angkor. It is rare to see such cooperation and commitment continuously supported by a coherent mechanism of international cooperation.

At the beginning of the international cooperation, in 1993 a model project called "Plan of Zoning and Management of the Environment" (ZEMP) was initiated by UNESCO and the UNDP. The Team has 21 experts including one Khmer expert. The project's guiding principle - the adoption of an approach using several disciplines, with the concept of a durable development of the area of Siem Reap/Angkor with respect for the site and local values - remains topical. In the first phase, the priorities of the international action were focused around the urgency and the commitment of the Cambodian Government at fulfilling the conditions

posed by the worldwide Committee of Heritage at the moment of registration of the site, such as:

- Establishment of a national agency of protection with adequate personnel;
- Establishment of ZEMP plans (UNESCO and UNDP).
- Definition of the buffer zones;
- Establishment of a mechanism of monitoring and coordination of the international effort of conservation.
- Establishment of ICC and National Law for the Protection of Cultural Heritage (January 1996).

The site of Angkor faces new challenges and requires a plan of management

Since 1993, a great number of projects have been put into action at Angkor. The main point of focus was not only the restoration of monuments, but also the establishment of a GIS and the studies and research undertaken by different disciplines. This has contributed enormously to the comprehension of how significant the site is.

Since years, Angkor has experienced a very fast transformation in the socio-economic and environmental context, which has added to a whole new series of conservation problems.

Angkor is considered a living site that has monuments surrounded by natural resources (forest and water) with a population (around 900 000 people, in 2006) living in the Angkor Park. However, while measures are being taken to conserve the archaeological structures, APSARA simultaneously has taken into account the major source of the local residents' revenue. The main aim is that the inhabitants have the opportunity to benefit directly from the tourist industry.

External work of APSARA:

Since Angkor was registered in the World Heritage list in December 1992, the Angkor area has accepted the help offered from the international community, international governments, institutes and NGO organizations working in the Angkor region.

Internal work of APSARA:

APSARA was created by Royal Decree in 1995. Today, it is under the authority of the President, of the Vice Prime Minister and the Director General. Furthermore, it is also organized under the directors of the following departments:

1- Department of Personal and Finance
2- Department of Monuments and Archaeology
3- Department of Angkor Tourism Development
4- Department of Urbanization and Development in Siem Reap/Angkor Region
6- Department of Social and Economic Development
7- Intervention unit

Department of Monuments and Archaeology I

The Department of Monuments and Archaeology I, is most responsible for all sites. The Department has many Khmer specialists such as archaeologists, architects, engineers and technical specialists, who work according to their own skills and are responsible for carrying out the following tasks:

1- Plan and implement the management of the monuments including their maintenance, in Angkor Park and at the rural points of cultural interest.
2- Establish a scheme of protection and conservation of Angkor Park; establish the risk map of monuments in terms of their ecological and historical value, including data on the health of the monuments and the risks threatening them.
3- Enhancement of landscapes and areas of water surrounding the monuments.
4- Plan archaeological surveys, excavations and all necessary archeological prevention and safeguarding measures.
5- Plan and manage the land use in the protected zones (zone 1 and zone 2).
6- Cooperating and coordinating with international teams working in the Angkor area and ensuring that they follow the archaeological guidelines for the Angkor area.
7- Put in place well trained and well-equipped mobile teams for the management, maintenance and archeological follow-up of the sites.
8- Study, advise on and control private investments in Angkor archaeological park.

The Department of Monuments and Archaeology I, has created seven Units:

- ***Archaeological Unit:*** responsible for the protection and the evaluation of the archaeological sites.
- ***Maintenance Unit:*** is the immediate intervention when building elements at temples and other monuments are in danger of collapse.
- ***Conservation Unit:*** is divided into groups of conservators according to temples that they control.
- ***Surrounding Management Unit:*** preliminary studies have led to a visitor's circulation plan on the whole of Angkor Archaeological Park. Further studies in order to develop surrounding management plans are underway.
- ***Cleaning and Clearing Unit:*** cleaning and cutting grass and small plants growing around the temples.
- ***Monument Clearance Unit:*** clearing all kinds of small plants that are growing on the temple. Furthermore, the unit cooperates with all the groups of the temple's conservation in order to survey dangerous places or collapsed areas of the temple. They inform the Maintenance Unit of the need to proceed with emergency interventions.
- ***Forestry Management Unit:*** this unit surveys and prunes all big or decaying trees (risky trees) in Angkor Park that could fall or cause damage due to storms or rain, in order to avoid any adverse impact on the monuments and visitors.

Archaeological Unit

The Archaeological Unit consists of a team of Khmer archaeologists that are divided into four groups:

- ***Preventive Excavation Unit:*** Responsible for carrying out preventive excavations.
- ***Tangible Heritage Research Team:*** In charge of inventory work on tangible heritage collected from different places like unsafe ancient mounds and ruins. They collect artifacts provided by local residents, some institutes, the police and international institutes. These artifacts are documented and put into a database before being given to Angkor Conservation.
- ***Intangible Heritage Research Team:*** The team's research goals are focused on local communities' lifestyles, traditional customs and ceremonies that are organized by local people that live in the Angkor Area.
- ***Ceramics Conservation Center*****:** This Center studies and makes an inventory of all pottery of the Angkor area. They are concerned with the chronology, the commercial

and cultural exchanges, and the function of the different places within an archaeological site.

The most important team is the **Preventive Excavation Team.** This Unit has to respond promptly to urgent announcements of archaeological emergencies in Angkor Park and throughout the province of Siem Reap.

Preventive Excavation Team

1-Intervention on the Parvis:

APSARA has developed the Project of the Parvis for the whole Angkor Archaeological Park. The "Parvis" is an approach area near each temple or group of temples. We planned a 'visitors circuit' and visitor facilities (such as parking, toilets, restaurants, souvenir shop and resting places).

Preventive excavation had to be undertaken before this Project could be carried out. It was necessary to avoid the destruction and loss of any archaeological data from the site. Through to this excavation, we discovered more about social life in ancient times.
For the development project of the Parvis in Angkor region there is a need of collaboration between the Preventive Archaeological Unit and "Abord Unit" with the Landscape Unit. The partnership is crucial at the beginning of every task because the teams have to work together on choosing a location for each Parvis. After the location has been chosen, the Landscape Unit designs a location plan and the Preventive Archaeological Unit follows this up with research. This is particularly important for determining the significance of a site, and assisting with decision-making.

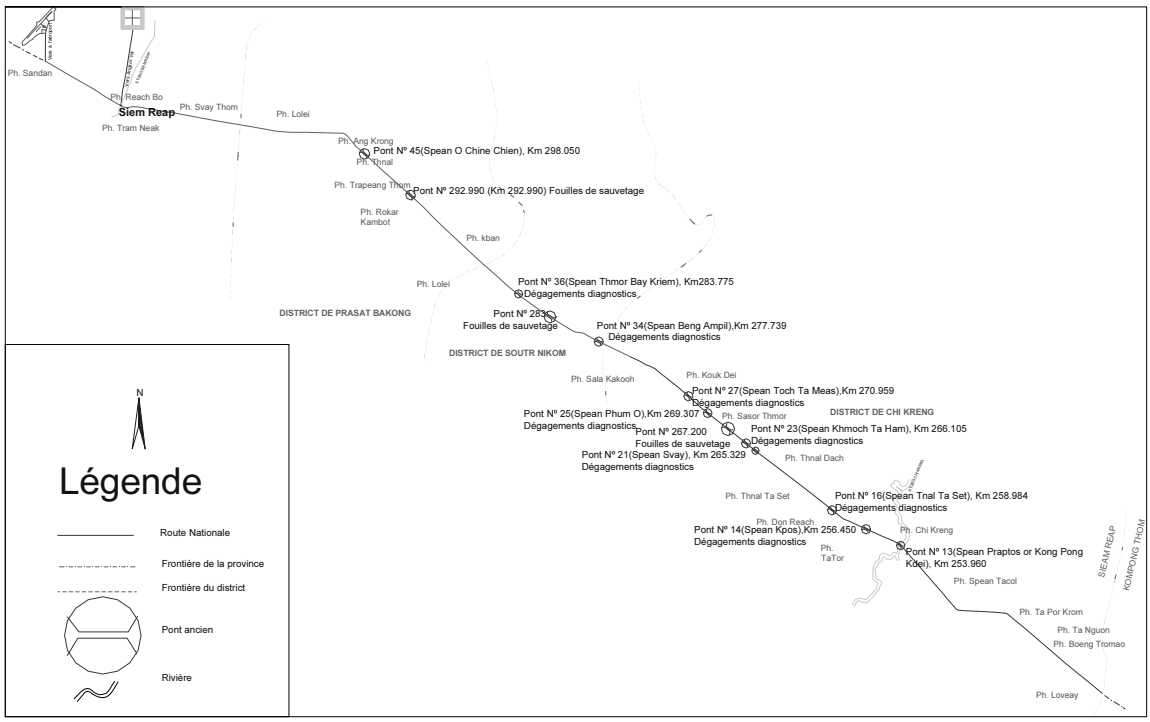
2-Intervention on the ancient bridges, along National Road N^{o} 6:

Every development, conservation, restoration and investment project in the Angkor area must first be approved and the recommendation of the ICC must be obtained.

In 2003, the Preventive Excavation Team collaborated with the Ministry of Public Works and Transport in the Project of "Road Rehabilitation" along National Road N^{o} 6, which stretches from Siem Reap to the Kampong Thom border.
This was an urgent preventive excavation because there were 13 ancient bridges that we needed to apply the archaeological preventive excavation to.

First step: we excavated in order to determine the limit of the bridge's pavement and embankment step, then we gave advice on how to choose an acceptable place for constructing a new bridge. Alternatively, we advised on a by-pass instead of using the ancient bridge.
The main purpose is to protect all ancient bridges from destruction through Road Rehabilitation and the building of new bridges.

Second step: recently, APSARA proposed the project of "Restoration and Consolidation Project of 13 ancient bridges and manage their surroundings as a cultural site and erect information panels for tourists". We have surveyed the bridge's structure condition and will conduct the Project during the next dry season.

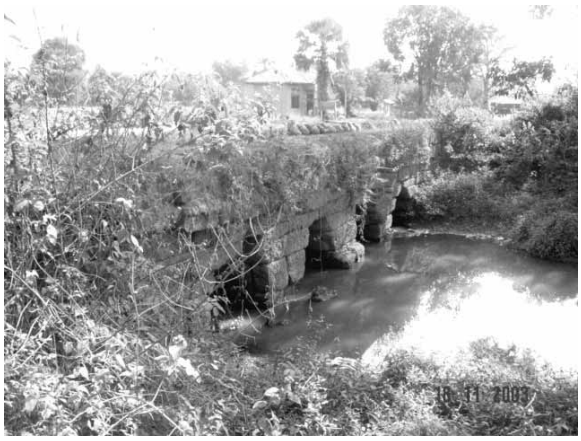


Photographs of intervention activities on the three bridges (in the first step):

1- Kampong Kdei Bridge:

Removing accumulated soil from the Kampong Kdei bridge drainage system in order to protect the bridge basement from water flow.

2- Beng Ampil Bridge:



Before excavation bridge's embankment

Excavated to determine the limit of the pavement and embankment step

The bridge's pavement after excavation

This is the end of the bridge's embankment step

A new bridge was built 1.5m from the ancient embankment

A new bridge being constructed

A new bridge already constructed

3- Thmor Bai Kreim Bridge:

Before excavation bridge's

Excavated to determine the limit of the pavement and embankment step

Handle auguring to study the bridge's foundation


A new bridge was built 1.5m from the ancient embankment

3-Intervention on the Roluh ancient bridge, on the Golf Course in the Pourk district:

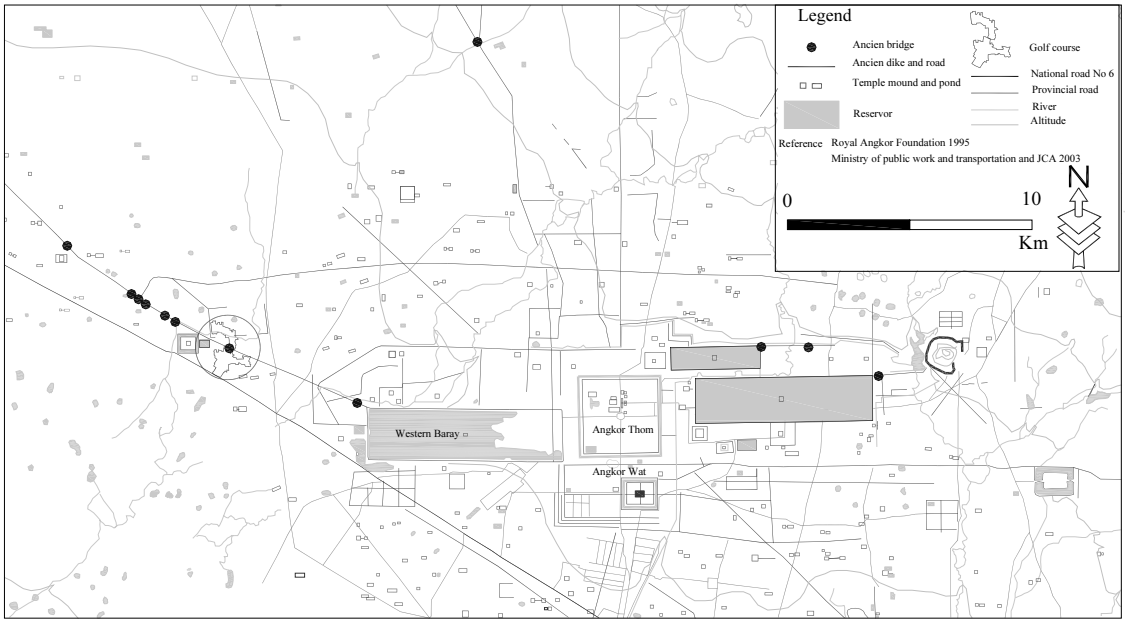
In addition to excavations and conservation of the ancient monuments in the APSARA Protected Zones of the Angkor region, the Preventive Excavation Team and Phokeethra Country Club cooperated in the conservation and enhancement of Roluh Bridge.
Roluh is an ancient bridge that was built during the Angkor period (perhaps in the 12^{th} – 13^{th} century). It is located along the ancient road running from North to West of the Western Baray to Prasat Sdok Kok Thom (in the eastern part of Thailand).

The bridge is situated in the developing area of the Golf Course of Phokeethra Country Club in the Pourk District, therefore it is within protected zones 3 and 4 (a Royal Decree "Reachkret" approved by His Majesty the king in May of 1994) of the Angkor Archaeological Park that presents a strong obligation for protection and conservation.

Thus the Archaeological Preventive Excavation Team of the APSARA Authority Department of Monuments and Archaeology I carried out an immediate preventive excavation in order to give a chance to Phokeethra Country Club to develop their golf course without destroying or losing any ancient infrastructures and archaeological data.
Moreover, the Archaeological Team collected and recorded all the archaeological data in order to conserve and enhance this ancient bridge.

In the future, APSARA and Phokeethra Country Club will consolidate the bridge considered a real archaeological heritage. Involved in this project are engineers, architects and archaeologists working together.

In this case, conservation and developing activities worked well together; it is a real example of partnership between conservation and development that should be followed by other development projects in the Angkor area.



The bridge before excavation

Clearing the bio-vegetation covering the bridge

The bridge after clearing the bio-vegetation

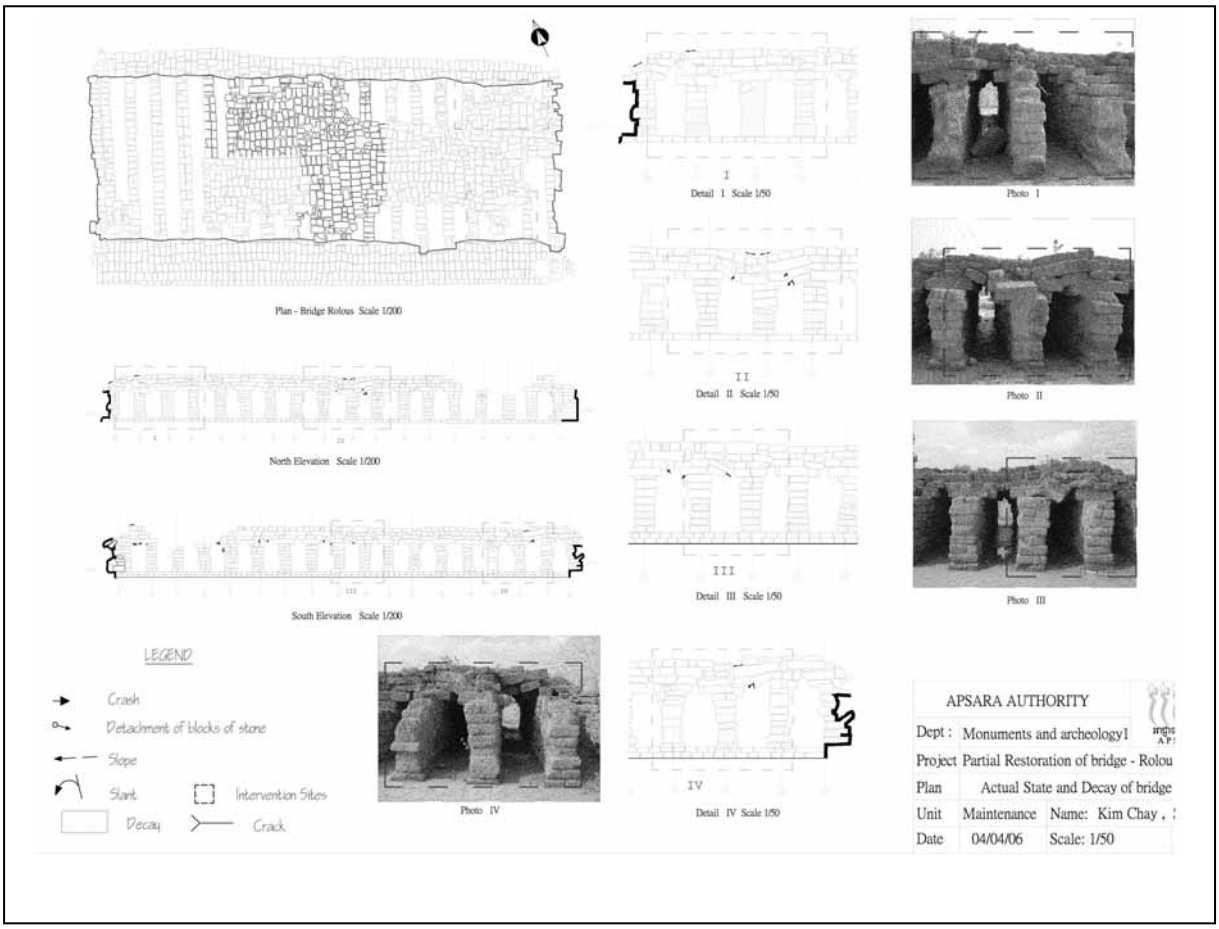
Removing the soil from the bridge

The bridge after removing the soil

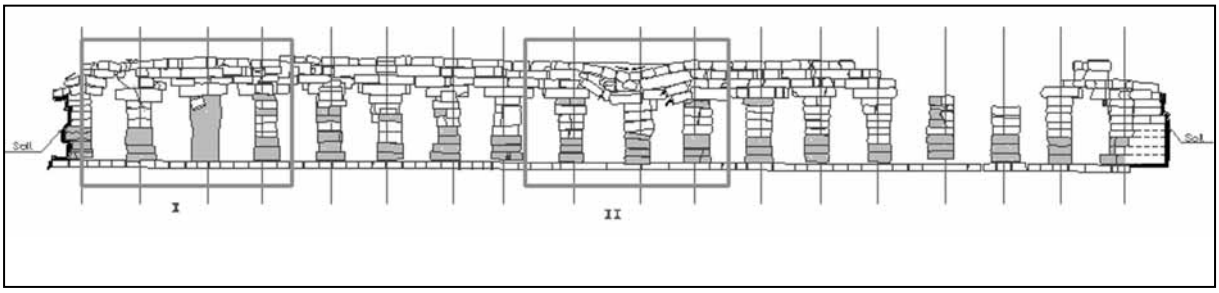
Using an excavator to clean the accumulated soil out of the bridge foot, in the aim of finding the bridge pavement and its embankment step

Blockages caused by accumulated soil in the bridge's drainage

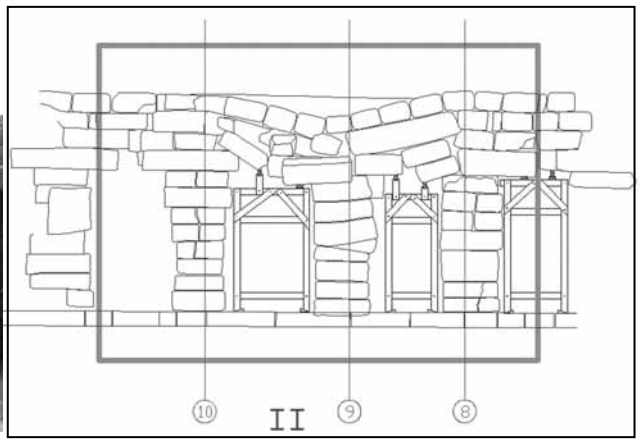
Using water pumps to wash out the soil blockages in all drainage areas



"Restoration Project of Roluh, an ancient bridge on the Golf Course in Pourk".



Photograph of plan II, Roluh bridge



Detail plan II, will be shoring up in order to prevent the bridge structure from collapsing

Conclusion:

Nowadays, most of the organizations and researchers focus only on monument structures, history, arts, local communities' lifestyles and traditional customs. They do not pay much attention to the conservation, restoration and enhancement of ancient infrastructures (roads and bridges) and underwater archaeological excavations.

At this time, I would like to ask for help from international institutes that are working for cultural heritage to rehabilitate, consolidate, conserve and restore the ancient infrastructures and ancient bridges.

Reference:

- PROPOSITION DE PROJET, Etablissement d'un Plan de gestion pour le site du Patrimoine mondial d'Angkor, Centre du Patrimoine Mondial, Août 2006

India

Vasant Kumar SWARNKAR
Deputy Superintending Archaeologist
Archaeological Survey of India

PROBLEMS AND NEEDS FOR CULTURAL HERITAGE PROTECTION AND RESTORATION ACTIVITIES IN INDIA

India is very rich in antiquarian wealth. This wealth is in the form of ancient monuments ranging from pre-historic rock shelters to a variety of monumental edifices, such as rock-cut caves, temples, mosques, tombs, churches, forts, palaces, reservoirs etc., many belonging to different dynasties and ranging from the pre- historic period to the 19th century A.D. The Archaeological Survey of India is protecting more than five thousand monuments/sites throughout the country including 18 World Heritage Sites. Today several of them are in a very good state of preservation or at least in presentable condition. Preserving these priceless edifices for posterity is a challenging task and this task is undertaken by the Archaeological Survey of India a feat unparalleled in any country due to a variety of reasons.

These are the very principles that still govern the conservation works of the Archaeological Survey of India; for the first time in the history of the Archaeological Survey of India the Director General was invested with the legal authority to preserve ancient monuments and sites, and objects of national importance, through enacting "The Ancient Monuments Preservation Act" in 1904 by Govt. of India. But gradually this Act has been superseded by the "Ancient Monuments and Archaeological Sites and Remains Act of 1958" and the Rules of 1959. Subsequently the Archaeological Survey of India issued a notification on 16th June, 1992 to prohibit and regulate all mining and construction activities within 100m and further 200m from around the monument to avoid further damage and to maintain the surroundings of the monument. The Archaeological Survey of India and its conservators have been recognized as being among the best in the world in regard to the art of conservation. The Archaeological Survey of India is not only preserving/restoring the monuments throughout the country, but also in places like Bamiyan (Afghanistan), Egypt and at Angkor (Cambodia).

Working Scope Under the Archaeological Survey of India

The structural conservation of the cultural heritage of India is one of the primary functions of the Archaeological Survey of India. The activities of the survey have increased manifold. We can clarify the main functions of the A.S.I. through its various attached offices in the national capital and state capitals, and also in some important cities of various states.

(i) Structural conservation of ancient monuments/sites and remains (protected or otherwise) special/ annual repair works: (ii) chemical preservation of ancient monuments (including paintings thereupon), antiquities and research in chemical laboratories; (iii) original works including original construction work-sanitary fittings and electrifications, illumination of monuments, maintenance of Modern Buildings under the Archaeological Survey of India: (iv) acquisition of Land for protection and preservation of monuments; (v) development and maintenance of gardens around protected monuments etc: (vi) exploration/excavation works: (vii) documentation of antiquities: (viii) setting up and maintenance of site Museums: (ix) archaeological expeditions outside India: (x) cultural exchange programmes; (xi) promotion of archaeological studies in Universities; (xii) publications and printings of books and reports, and (xiii) training in the field of Archaeology.

It is known that the growth of jungles (wild vegetation), the destructive action of salt, wind, rain, earthquakes, vandals and the business of quarrying for bricks and stones, causes the destruction of monuments and sites. The lack of sense of values is also a responsible factor for the destruction. In the present scenario, urbanization is a major threat to India's cultural heritage.

With ruined standing monuments the main task of rescue has been the clearance of fallen debris, the restoration of the core of masonry or brickwork exposed by the facing having fallen off, filling up grouting cracks, under pinning worn-out bases of walls, resetting perilously out of plumb walls, making ruined wall tops watertight, pointing the open joints, eradication of vegetation etc. In rock-cut caves the gradual wearing of the rock has been the chief problem while chemical preservation is called for some cases, but in the majority of cases the percolation of water from one on more resources, which may be at a considerable distance from the monuments, is generally hard to detected and check.

In excavated remains with the structures of more periods, the problems are necessarily different, the preservation of overhanging later structures, often resting on nothing more than loose earth or debris and sometimes with the drainage of rainwater from the lower levels much deeper than the adjoining surface level is particularly hazardous.

Similarly, many more monuments/ sites are being conserved every year by the various offices of the Archaeological Survey of India, information on which is also published in Indian Archaeology- A Review, the journal of the Archaeological survey of India. A factor of over-riding importance is the aesthetic consideration involved in the restoration of the ancient monuments/ sites. An ancient monument/site, signifies the achievement of a particular age and is the product of the creative urge of the people of the time and thus bears the indelible stamp of the age in which it was constructed. If the conservator understands the monuments as a whole, the age and the architectural style it belongs to, the nature of its building materials, the structural aspects and the reasons for its decay, he can confidently plan and execute its repairs and will in the end, be surprised to find that the aesthetic consideration has already been taken care of without any special effort and that restoration (repair) is in complete harmony with the character of the monument.

The application of a preservative coat on the cleaned stone surface of monuments is one of the most important conservation measures to slow down the weathering of aged stone depending upon its degree of penetration into the stone body, microclimate and the characteristics of the stone itself. However, the conditions under which the stone preservatives are evaluated in the laboratory are generally at variance to when used in the field and as a result, if is not possible to achieve the deep penetration of consolidates, it indicates that the purely academic research on small samples under ideal laboratory conditions cannot always be of direct value for conservators facing real problems in the field. The weathering behavior of monuments made of ashlar masonry and composite veneering marble in polluted environments indicates that the stone conservation problems are also dependent upon the building design and functional environment the different stone members are exposed to. The building designs of monuments made of ashlar masonry of colossal size with thick dry masonry walls permit the ingress of water and the inner core of the masonry remains wet over extensive periods of time. As a result, the weathering phenomenon continues unabated even when the micro climatic conditions are not very favorable. The functional environment being experienced by the in-situ stone members of the monuments in such cases is different than the microclimate in the vicinity of the monument. The functional environment is also modified in the case of monuments in polluted environments due to certain localized action of visitors.

In carrying out repairs at the monuments the archaeological conservators of the Archaeological Survey of India have tried to conserve the structures in conformity with the original pattern with a view to extend the monument's life with dignity and as a result the aesthetic view of the monuments have been preserved. Conservators have been able to recognize and diagnose problems, to know where the right replacement materials may be obtained and to know where the appropriate skills may be found to carry out the work.

Causes of Destruction

Several causes can be attributed to the decay of monuments, but age is the main cause. Atmospheric action due to constant exposure, and roots of vegetation embedded in the walls are other agencies.

Gradation of weathering courses on the roof and walls, which is exposed to direct sun and rain, blockage of original drains which causes stagnation of water inside the monuments and changes of environment and ecology cause destruction of monuments. Above all, human negligence has wrecked many ancient monuments and treasures. Monuments, which were constructed centuries ago are exposed to sun and rain due to atmospheric conditions, and the growth of moss, molars and lichen takes place.

Climatic Deterioration

Climate is the consequence of many elements and factors of a varying nature. The main elements to be considered are variation in temperature and sunshine moisture etc.

The main factor is water, which reacts chemically (by oxidation, Carbonation, Hydrolysis) with the stone and breaks down the mineral structure.

The excavated structures at Nalanda (Bihar) were found to have become powdery due to salt crystallization. Ajanta, ellora and other caves scooped from Deccan trap, a soft variety of rock, weathered by exfoliation shell by shell with hard rock forming core climate deterioration depends on the degree of intensity of climatic agents and also on the nature of the material. In the case of structures built of the same variety material found in Rajasthan and Gujrat, it is observed that structures in Bengal are found to deteriorate at a faster rate. This is because the rainfall and humidity in Bengal are higher than in Rajasthan.

Wind flow also contributes to the deterioration of monuments. Monuments in desert areas and near the sea are found abraded due to the battering action of sand, and sea wind by chemical action. The sea breeze carrying sea salts can reach 24 to 48 kms inland. The chemical examination of decaying rock at Elephanta Caves lying close to the sea, revealed the presence of sea salts, and the splitting of one of the heads of a Trimurti figure in elephanta was found to be due to climatic action.

Along with temples like Sun Temple, Konark Orrissa, and Dabeswara Temple, Sarepally (A.P.) lying by the sea and built of stone, the shore Temple at Mahablipuram even though built of hard granite is also affected by salt action.

The deterioration of a monument is also related to the direction and intensity of the wind. In the Jagmohan of the Sun Temple (Konark), the northern side face does not get washed by the sea as it does on the other sides, but the decay was found to be more on the northern side. In the case of Taj Mahal (Agra), weathering in the shape of a large deposition of surface accretion in the form of fine dust, was observed on the N-W side of the structure from the meteorological studies carried out at Agra, it was found the prevailing wind at Agra is mainly in the N-W direction, combined with pollutants from iron foundries, a thermal powerhouse etc.

In Moti Masjid (Delhi) about 40 of the facing slabs of the marble have been found broken by the oxidation of the iron –dwells. As a result of the pressure exerted by the oxidized dwells, the stone developed cracks.

A greater part of the Asokan inscription at Jaugada (Orrissa) inscribed on granite rock, disappeared, due to the high temperature and rains of the area.

Botanical Deterioration

The climate and terrain of India favours vegetation growth, which in turn has contributed to the deterioration of ancient monuments.

The plant Kingdom can be sub divided into cryptogams (seedless) and phanerogams (seed bearing) based on the means of reproduction.

The Cryptogamic growth i.e. algae, lichen and moss, is generally found in heavy monsoon regions and also inside the monument where, water tickles inside, like the ruined monuments, rock-cut cave etc. The rock-cut caves at Elephanta, Karle, Bhaja, Kanheri, The Lingraja Temple (Orrissa) and Pillared Temple (Hanumakonda), Bibi ka Maqbara (Aurangabad) and Qutub Shahe Tombs (Golconda) are some of the monuments that are facing these problems.

The problem due phanerograms growth can be seen at the roof of cave no. 11 at Khandagiri (Orriss), which has developed cracks due to growing roots of a tree above. In ellora caves much damage has occurred due to root penetration. At Sun Temple, Katarmal (Uttaranchal) a peepal tree has almost destroyed the main temple.

Because of the growth of a big tree within Kadaleswara Temple at Halebid, (Karnataka), the structure has fully collapsed.

The single cause of the greater part of damage to Indian Monuments is due to the unchecked growth of vegetation.

Biological Deterioration

The damage to wooden parts of a structure by termites and rats in India requires no elaboration. Among the birds, pigeons found on top of domes and shikharas of temples are directly and also indirectly responsible for the damage to monuments in the long run. Bats living in large numbers in the dark interiors of monuments are a great nuisance and the excreta of bats is found chemically strong enough to cause damage to any smooth wall surface.

In any neglected monuments, the climatic, botanical and biological deterioration would be occurring at the same time and as a result of their prolonged combined action, the structure as a whole becomes weak.

Natural calamities like earthquakes, landslides, cyclones, flooding can also damage the ancient monuments like at cave No.-18 (Ajanta) Buddhist Temple at Harwan (Kashmir).

Inherent Factors

A good number of ancient structures are situated close to water sources like rivers, seas and water tanks like Konark, Mahabalipuram, Saluvakuppam, Augade Fort (Goa), Ballarpur Fort, Khandwa (M.P.). Poor quality of material and workmanship is also responsible for the deterioration of monuments like Imambara of Asafud-Daula (Lucknow). This monument is made of ill burnt bricks, which disintegrated fast when coming into contact with damp.

Though some ancient temples, mosques and tombs surviving as living monuments, are being looked after and maintained by Trustee Boards, Custodians etc., preservation of ancient structures with a modern spirit, basing on archaeological and architectural values, can be said to have been initiated in India by the British from the early decades of the 19th century. The preservation work of Taj Mahal for example was begun in 1808 and for Qutub Minar in 1826. Though the Archaeological Survey of India has existed since 1861, the conservation work of monuments was brought under its purview only in 1886. In 1896, Government of India decided that conservation should be given priority over 'survey and research'. Sir John Marshall was appointed as Director General of the Archaeological Survey of India (1902) and among his major functions, the most important was to ensure that the ancient monuments of the country were properly cared for, that they were not utilized for purposes which were

inappropriate or unseemly, that repairs were executed when required and that any restoration work was attempted or conducted along artistic lines.

During the time of Marshall a rational approach towards conservation evolved and found acceptance in England, and this same approach was introduced by Marshall in India. The principles of preservation of ancient monuments followed in India are embodied in "The Conservation Manual" prepared by Marshall in 1907 (revised in 1924) and also in the periodical staff memoranda of the Director General of the Archaeological Survey of India. Some of the principles are as follows:

- Historical value is gone when the ancient monument' s authenticity is destroyed. Broken or half decayed original work is of infinitely more value than the smartest and most perfect new work.
- Every original member of the building should be preserved intact, and demolition and construction should be undertaken only if the structure could not be otherwise maintained.
- Annual repairs are indispensable in the case of archaeological monuments.
- Hypothetical restoration can be done, if they are essential to the stability of the monument.

With the practical experience the aim of treatment of monuments stated by the Archaeological Survey of India:

- Its preservation without disfigurement or alteration of the character.
- Its maintenance in a proper and attractive condition.
- The complete examination of the remains and documentary evidence concerning it.
- The preparation of monographs, guide books, and reports, so that the historical and artistic interest may be brought home to scholars and the visitors, which may rouse general interest in the ancient monuments of the country.

Here I would like to quote some examples taken from the challenging problems and remedial conservation works undertaken by the Archaeological Survey of India on the monuments also inscribed in the World Heritage List.

The sun temple, Konark (13^{th} century) and Khajuraho group of temples (10^{th} – 11^{th} century) are built in ashlar masonry in the northern style of architecture (Nagra style) with curvilinear shikharas topped by an Amalaka. Since the beginning of this century, the various conservation measures have been carried out to salvage the tottered structure of the Sun temple,

Konark. These conservation measures carried out in the last eight centuries have helped significantly to conserve this world heritage monument but the weathering of fine carving depicting the plastic art continues to be a matter of concern.

The conservation problems of the Khajuraho group of temples, though older than the Sun temple, at Konark are relatively less severe due to the different nature of the stone as well as the less drastic climatic conditions. In these temples, only some pockets are more affected due to mineralogical variations of the stone matrix and localized high humid conditions, as a function of building design.

The white marble mausoleum, the Taj Mahal (1631-1648 AD) is made of brick and mortar, and marble is used only on the veneer slabs, which have been clamped with iron dowels. The moisture and environmental conditions may not result only in local cracks but the stress may travel to the adjacent slabs as well which may eventually bulge or crack and permit the ingress of moisture and pollutants. Such a phenomena, which is a factor of the building design may further modify the functional environment to accelerate the rate of damage (if not cared for) than under normal weathering conditions, influencing the mechanical and isotropic behavior of marble veneer slabs

Conservation Problems:

Functional environment is defined as the continuously changing complex of all conditions and influences, which are interacting, with the different composite materials of the monument. It is these interrelationships that should be the focal point of investigations while evaluating the conservation problems of a monument. The functional environment considerations acquire greater importance in the case of monuments made of ashlar masonry or when located in a polluted environment.

The constituent materials of stone are continuously undergoing alterations due the changing environment and are never in perfect equilibrium with their surroundings. Among the natural weathering agent water seems undoubtedly to be the most potent cause for the deterioration of monuments. The damage due to water can take place in numerous forms because it participates directly or indirectly in more actions and reactions with stone than any other agent. It dissolves, hydrolyses and hydrates rock materials, thereby some of the minerals are leached out and the stone gets weakened. It transports reagents that may be oxidizing, reducing, acidic, basilic or salt forming as well as carrying bacteria and various organic compounds both in and out of the stone. The effect of pollutants in the form of acid rain on marble/calcitic stones is a common observation. It enters by gravity, osmosis, capillary and

siphon action, and because the common rocks are hydrophilic, it can and does, permeate through exceedingly tiny openings. In areas where the water table is high or where the surroundings of the monuments do not have a proper drainage system, the water may rise by capillary action. By osmotic pressure, water-imbibing minerals may swell within rocks and disintegrate them. Swelling may likewise result from the interlayer hydration of common rock-forming minerals such as iron oxides and a hydrite and by other minerals taking on water in crystallization. Dissolved salts brought in by rain rising from the soil or generated within the stone by weathering may, during crystallization as the water evaporates, destroy the stone through granular disintegration or by the spalling of the surface shell.

The weathering potential of water in the case of ashlar masonry monuments is much more severe for the same material which otherwise would have been under normal microclimatic conditions. To investigate the extent of damage caused due to Mahadeva temple, Khajuraho, it is essential to briefly evaluate the various conservation problems of these monuments. It is pertinent to identity the pockets which remain wet even after a long gap between rains and to study the areas which permit the ingress of water and accumulation of water in such pockets as a result of building design. In this respect, the Sun temple, Konark and Kandariya Mahadeva temples were closely examined with reference to the earlier conservation measures.

The conservation of Sun Temple, Konark- Problems and remedies

Brief Description & Historical Background

The Sun Temple, Konark is situated about 65 km from Bhubaneshvar, the capital of Orissa State. This monument was built in the 13th Cent. A.D. by king Ganga Narsimha and stands in a nearly rectangular, walled compound, approximately 253 metres east to west and 167 metres north to south. The compound contains, in addition to the main temple, the remains of several smaller temples.

The Jagmohan of the main temple is roughly square, approximately 30 metres in width and 12 metres in height; it is surmounted by a truncated pyramid roof divided horizontally into terraces and with tiers of cantilevered shelves. The roof is approximately 36 metres across and 18 metres high and is surmounted by Amlaka approximately 13 metres in diameter and 8 metres high inside. The masonry is corbelled to form a hollow pyramid. To the west of the Jagmohan are the remains of Shikhara with the sanctum, sanctorum, originally wider and much taller, than the Jagmohan, but now barely rising above 10 metres.

Externally, the original, exposed surface is richly carved with a profusion of sculptures and bas-reliefs and even the walls of the niches, in which the sculptures stand, have carved textures.

The Jagmohana and the Shikhara stand on a common plinth, 6 metres high, with richly carved sides, incorporating the huge decorative wheels of the Sun God's Chariot, with a team of horses at the eastern end.

Beyond the eastern side of the main temple are the remains of a pillared hall on a high platform, often referred to as a dance hall or Nat Mandir, but now believed to have been a banqueting hall or Bhoga Mandapa. The pillars and the sides of the platform are again richly carved. The buildings and the integral sculptures are made of Khandolite stone blocks, laid dry, with iron clamps in places, providing horizontal restraint. A number of sculptures and some decorative features such as doorjambs, lintels etc. are carved from chlorite, a dense fine-grained green stone.

The sun Temple, Konark was apparently attacked and damaged by the Muslims towards and end of the 16th or early 17th century. Following the temple's desecration, it was abandoned as a place of worship.

Over the next centuries, the temple, no longer used and therefore unmaintained, suffered from structural deterioration, sand-drifts, and robbery. The shikhara collapsed in stages, the last being in a gale in 1848. The plinth was engulfed in sand dunes to a considerable depth in the early part of the 19th century and the Rajah of Khurda had its sculptures removed to a temple being constructed in his fort.

Proposals were made for taking up the repairs of the Sun Temple in the 19th Century but significant works could be taken up only in 1903, when the temple was also declared as a monument of national importance. The excavations revealed the plinth and the Jagmohana, which had been damaged by the fall of the last part of the Shikhara. At the same time, the wrought iron beams that had supported the ceiling inside the Jagmohana, which had fallen to the floor during the first half of the Nineteenth century, were carried outside and stacked in the compound.

In order to conserve the Jagmohan from further damage, internally the walls of the Jagmohan were lined with a dry stone masonry wall nearly five metres in thickness, the door openings closed and the open space inside was filled up with sand.

Other important works of conservation and protection included a plantation of tree belts up to the 1920's to check the drifting of sand.

In 1950, the Government of India, appointed a committee of experts, to go into the whole question of the preservation of these monuments. The recommendations of this committee started a campaign of restoration and preservation works, under the directions of the Archaeological Survey of India, with emphasis on exclusion of rain water, grouting of the plinth and its foundation, removal of algae growths and chemical treatment of the stone surface to reduce porosity. The results that can be seen today are spectacular.

Stone Used in the Construction

The stones used in the construction of the various structures in the complex of the Sun Temple, Konark are

1. Laterite
2. Khandolite
3. Chlorite

Laterite has been basically used in the core while Khandolite blocks laid dry with iron clamps have been extensively used in the veneers. The exposed surface of the veneer is richly carved. Chlorite blocks richly carved and polished have been used as jambs and lintel beams in the opening of huge doors etc. Wrought iron beams have been used to span the roof and openings in the walls behind the doorjambs.

Problems

Although there are no problems concerning the conservation and preservation of the laterite and chiroite stone used in the construction, in view of the composition of the Khandolite stone, despite regular chemical treatment and preservation, there are some particular areas where certain problems have been faced in the proper conservation and preservation.

The Khandolite stone used in the construction of the temple occurs abundantly in the Eastern Ghats of India. The main mineral constituents of Khandolite are quartz, garnet, sillimanite, orthoclase, graphite etc. On getting weathered, clay minerals, iron oxides of hydroxide etc. may be present in various proportions depending on the original mineralogical proportions and the degree of weathering. The Khandolites cannot be considered very tough rocks, and their mineralogical composition and texture are such that these are rather easily

susceptible to physical erosion and chemical weathering as compared to the generally tough rocks like granite, basalts etc. Despite the above inherent drawback of Khandolite, this rock has been commonly used in Andhra Pradesh and Orissa for constructing temples and monuments of which Jagannath Temple, Puri Lingaraj temple, Rajarani temple, Bhubaneswar and the Sun temple of Konark are the most famous, namely for the magnificent exuberance of the finest sculptures and superb craftsmanship.

The Sun Temple, Konark has drawn the attention of art loving people, archaeologists, tourists and the common man due to its exquisite sculptures. These invaluable sculptures have been exposed to the action of the atmosphere for the last seven centuries or so. The exposed surface of the stone blocks is now found to have been affected adversely through physical erosion and chemical weathering. The fine sculptures with which the monument (of Khandolite stone), is decorated are found to have been defaced or disfigured at places due scouring, pitting, scaling, and disintegration owing to loosening of minerals grains etc. caused by natural decay, weathering and erosion.

As per the study of the scientists of the Archaeological Survey of India, the factors responsible for the deterioration of the stone of the Sun temple, Konark are:

1. Deterioration by Sand - Blasting Effect

It is generally observed that when the coastal winds blow towards the monument, the wind carries angular sand particles. When the sand particles strike against the surface of the monument at considerable speed, abrasion and scouring action of the stone takes place.

2. Micro Biological Growth

This is in the form of algal growth etc. on the surface of the stone, discolouring the beauty of the monument and also causing bio-chemical decay or alteration of the mineral grains. Since their nature is to grow, they try to penetrate into the pores of the stone fabric and cause either the cracking or weathering of the stone. The green form or the slightly black one is pre-dominant.

3. Inherent Weakness of the Stone

Owing to various climatic and general factors, the Khandolite stones have undergone physical erosion and chemical weathering due to loosening of the grains by the process of

mineral alterations viz. the conversion of feldspar into white kaolin and of garnet into dark brown iron oxide or hydroxide minerals, ascribing a mottled appearance to the rock. Physical and chemical weathering have effected the stone surface of Konark temple to varying degrees, giving rise to scouring, pitting, disfigurement etc. of the fine sculptures.

4. Deterioration by Salt Saturated Air, Humidity and Rainfall

The temple is located in close vicinity of the sea, therefore, the stones are very much affected by the saline salts that get impregnated in the body of the Khandolite stone of the temple, and the sand grains abrade the surface of the stone. In nature, the physical weathering of stones and rock takes place on account of various factor e.g.:- wind, rain and solar radiation etc., and the cumulative effect of all these. During the rainy season, the soluble salts go into solution and penetrate the pores of the stone, and when humidity is reduced, evaporation takes place. The soluble salts tend to come out on the surface and in this process any impediment on the way is mechanically removed, thus causing damage to the stone like pitting, erosion and cracking at times. Since the temple is in a tropical climate with moderately heavy annual rainfall (around 1200mm), mainly due to monsoons, the meteorological factors are playing a vital role in the damage to the Khandolite stone of this temple.

Measures Taken for the Preservation

The following measures have been taken for the proper conservation and preservation of the Sun Temple, Konark with particular emphasis on the safeguarding of sculptures on the Khandolite stone and the veneer stones.

Chemical Treatment and Preservation of the Stone

The micro-biological growth, moss and lichens were removed from the surface of the stone, as well as from cracks, pits and interstices with the application of a 1% or a 2% solution of ammonia in water. The softened vegetation growth was then eliminated by mechanical means with coir brushes. Deeper holes and cracks were cleaned with nylon bristle brushes. Further cleaning and removal of soluble salts was done using clean water.

Kandariya Mahadeva Temple, Khajuraho

To prevent water leakage inside the temple, the joints on the top were sealed. But the problem of water seepage could not be fully achieved. In the sanctum and mandapa of the

temple, the floor and lower portion of the inside walls remain wet even after a gap of one month when the rains are over. The wetness on the outside can also be observed at a level of 0.3 to 0.6 metres below the main floor of the temple. The periodic chemical conservation measures for the removal of microvegetation from the stone surface, fungicidal treatment, consolidation of relatively more weathered stone members and application of a preservative coat are being taken. The wetness inside the walls was observed by relative humidity and conductance measurements through the opened joints (Table –1). The temperature measurements at different depths inside the wall both from the inner as well as outer sides of the temple were recorded. The increase in temperature and the increase in relative humidity by depth are on the expected lines and confirm that the functional environment inside the core of the wall is different than the microenvironment.

TABLE –1

FUNCTIONAL ENVIRONMENT MEASUREMENT OF INSIDE WALLS OF KANDARIYA MAHADEVA TEMPLE, KHAJURAHO

(JANUARY 15.00 – 17.00 HRS.)

LOCATION/AREA	TEMPERATURE (C)		RELATIVE HUMIDITY (%)		CONDUCTANCE (MILLI MHO)
	SURFACE	DEPTH	SURFACE	DEPTH	
Garbha-griha (inside)					
West Wall	20.5	2”-20.0	35	2” 48	0.61
	21.0	4”-19.5		4” 55	
		6”-19.5		6” 65	
North Wall	20.5	2”-20.0	38	2” 45	1.58
	21.0	4”-19.5		4” 54	
		6”-19.5		6” 68	
South Wall	20.5	2”-20.0	37	2” 48	
	21.0	4”-19.5		4” 61	
		6”-19.0		6” 69	
East Wall	20.5	2”-20.0	39	2” 50	
	21.0	4”-19.5		4” 60	0.73
		6”-19.0		6” 70	

Outer Side Walls					
West Wall	21.5	2”-21.0	33	2” 36	
		4”-20.5		4” 43	0.58
		6”-20.5		6” 50	
North Wall	21.5	2”-20.5	33	2” 35	
		4”-20.0		4” 42	1.08
		6”-19.5		6” 51	
South Wall	21.5	2”-20.5	33	2” 36	
		4”-20.0		4” 42	0.51
		6”-19.5		6” 49	
East Wall	21.5	2”-20.0	33	2” 36	
		4”-20.0		4” 42	0.71
		6”-19.5		6” 52	

The Taj Mahal, Agra

The conservation problems of the milky white veneering marble slabs due to functional environment are different than the conservation problems discussed above. The role of water as a weathering agent is relatively less severe and mainly confined to the electrochemical corrosion of the iron clamps, resulting in the development of cracks, localized stress and damage to the slab veneering, thereby permitting the intrusion of foreign matter and water vapour which in the long term could do more damage.

The functional environment experienced by the outside marble veneer slabs and inside marble stone is different. Normally, the outside arches should be more soiled than the inside marble surface, but the marble screen and lower areas of Sheeshmahal corridor (currently visitors are not allowed) were observed to have a thick greasy soiled surface giving a dirty appearance. This difference in the accumulation of greasy matter had been due to the repeated touching of hands by the visitors. Whereas the outer areas in general are free from this nuisance as the visitors go around the mausoleum at a distance. This area inside has recently been chemically cleaned though the effect of grease at some places can still be observed especially inside the Sheesh Mahal –corridor.

Discussion

The conservation problems of stone monuments made by dry stone masonry work are mainly due to the ingress of water and these are further aggravated depending upon the nature of the stone and the proximity to the coastal area. One of the basic requirements for long-term

preservation of stones in such monuments is to stop the ingress of water by appropriate measures, which may involve the sealing of joints and cracks, and by using grouting as well in some cases. The degree of damage is also observed to be relative to the colossal size of the structure and the thickness of the walls, which act as a reservoir for the ingress of water. These measures followed by present chemical conservation measures are expected to yield better results than at present. However, the consistent efforts to develop better preservation materials as well as technology to achieve deep penetration/consolidation need to be continuously pursued.

In case of the Taj, the greasy/tarry particulate matter deposited on the marble surface needs to be removed periodically to prevent a surface reaction due to the presence of soluble salts and reactive anions in the deposited particulate matter. The joints between the marble slabs need to be periodically checked and sealed wherever required to prevent the ingress of moisture and pollutants thus avoiding the problem of corrosion of iron clamps. To desist the visitors from touching the marble screen, a temporary barricade has already been provided after the recently completed chemical treatment work and is proposed to be replaced by a more effective system with a provision of a hardened glass screen. This will help to modify the functional environment of the marble screen as well.

Since I am working in the Delhi Circle of the Archaeological Survey of India I would like to describe some problems and conservation measures taken by the Archaeological Survey of India on Delhi monuments situated mainly at Qutb Complex and Humayun's Tomb; both are World Heritage Sites.

The World Heritage Committee identified and listed Qutb and Humayun's Tomb on the World Heritage list in December 1993 in its meeting held in Columbia. They represent unique artistic achievements and are masterpieces of creative genius. Both the sites attracted the attention of archaeological conservation in the beginning of the last century and were protected by the Govt. of India in the beginning of the present century and have since remained under regular maintenance.

Qutb and Humayun's Tomb, are two milestones in the history of Indo-Islamic Architecture, and although they come under the same socio-cultural system, artistically represent two distinct traditions and styles besides having been set up in different environments with different surrounding land use and being nearly 350 years apart on the time scale. The Qutb Minar was the tower of victory attached to the Quwwatul-Islam mosque. Its foundation was laid by Qutbuddin-Aibak, the first slave ruler of the Delhi Sultanate, soon after the defeat of the Rajput rulers of Delhi when the Turks occupied the city and the new Sultanate was

established. The minar having a diameter of 14.32m at the base and about 2.75m at the top with a height of 72.5m and having 379 steps was completed by Qutbuddin's successor Iltutmish. The minar lost its original cupola towards the end of the 18th century. The fourth and fifth storeys of the minar are the works of Firoz Shah Tughluq who replaced its original fourth storey with two storeys. Selective use of sandstone and marble in its projecting balconies with stalactite pendentive type brackets and calligraphic decorative bands on different storeys enhance the grandeur of the monument.

Qutb and Quwwatul Islamic mosque were constructed on the ruins of old temples and the construction material of the temples was reused in their construction. The area of the monument was under religious use even before the construction of these monuments during the Rajput period and the recent excavations conducted in the vicinity prove that this area was located just outside the fortified citadel of Lal Kot. The area was full of Brahmanical and Jaina temples and was known as Yoginipura before the foundation of the first city of Delhi by Anangpala II, the Tomar ruler in the middle of the eleventh century A.D. who constructed Lal Kot as his citadel and ruled from there. The Turks also occupied Lal kot and ruled from there too. The Qutb complex was later enclosed within Lal Kot when its eastern extension was provided during late Khalji rule.

The ancient Indraprastha, which had been transformed into sub-division (pratigana or paragana) and the new city of Kaiqubad on the right bank of Yamuna at Kilokhari were urban settlements outside the city of Delhi. In between these two settlements developed the village of Ghiaspur (now known as Nizamuddin) when the Sufi Saint Hazrat Nizamuddin Aulia stayed there. After his death in the early fourteenth century and his burial there, the locality developed as a big graveyard where all those who followed him wished to be buried. This graveyard continued to enlarge until the late Mughal period and was never part of any enclosed city of Delhi. Humayun's Tomb occupied the predominant position in this area, in which besides Humayun and his wives, a large number of Mughal princes and princesses are buried. The lofty mausoleum of Humayun with its double dome is situated in the middle of the **Charbagh** garden on a podium faced with a series of cells with arched openings. The central octagonal chamber contains the cenotaph and is encompassed by octagonal chambers at the diagonals and arched lobbies on the sides, the openings of which are closed with perforated screens. Each side contains three emphatic arches, the central one being the highest. A 42.5m high double dome of marble surmounts the roof with pillared kiosks placed around it. Red sandstone is largely used, relieved by white and black marble. The tomb was most probably constructed around 1565 A.D.

Qutb being the architectural wonder among the Islamic constructions of the country, always attracted the attentions of rulers more than other monuments. Around 100 years after the completion of the minar it was damaged due to lightning and was repaired. Muhammad Tughlaq, Ferozshah Tughlaq and Sikandar Lodi all repaired it in the 13th-15th centuries A.D. Their records are available on the stone blocks of the monument and also in contemporary literature. Such details are not available about Humayun's Tomb. Qutb minar was twice damaged by lighting; once in 1326 and again in 1368. The former was during the reign of Muhammad Tughlaq who repaired it in 1332, a record of this is inscribed at the door leading to the third balcony dated 8th April, 1332. The latter was on the 8th February 1368 when due to lightening the tower was damaged and masons like Nana, Salha, Lola and Lashamana were employed to repair it. The tower was repaired on 1st February,1369 under the architect-mason chahada, son of Devapala and the maternal grandson of (someone) and the masons Nana and Salha, and the carpenter Dharamuvanani. The record gives measurements of the repaired area by dropping a measuring cord, but this is not very clearly understandable. This repair work is also mentioned in contemporary literature *"Futuhat-i-Firuz Shahi"* (14th century A.D.)

Sensible maintenance has always helped in the upkeep of the monuments and has reduced the necessity for repair and replacement many times. Removal of extensive vegetation, judicious cleaning, pointing of joints and other such routine maintenance have added to the stability of the structures, particularly monuments like Humayun's Tomb. Therefore, the monument has never posed any real structural threat and minor repairs in forms of pointing of joints, occasional replacement of red sandstone blocks and slabs wherever they are found weathered and flaked or replacement of damaged marble pieces, underpinning the stone masonry of walled enclosures and side buildings, plastering and providing lime-concrete flooring, repairs to the water channels and tanks, grouting the cracks and consolidating the stone masonry, maintenance of gardens and chemical treatment of the structure have continuously been carried out at Humayun's Tomb and its surrounding structures.

In maintaining the monuments and their surroundings special emphasis has been given to assure that modern construction activities are restricted even outside the protected limits for which concerned local municipal authorities and enforcement agencies have always been consulted. They insist that the environs of the monuments should be preserved and the skyline not be disturbed.

The Delhi Circle of the Archaeological Survey of India has carried out certain items of special repairs at **Qutb Minar** and its surrounding monuments in the recent past, which require a mention here.

1. Strengthening (grouting) the Foundation

"Consequent to the damage caused by a severe earthquake in 1803, major structural repairs were carried out between 1805 and 1828. The cupola put up during the repairs to replace the fallen one, was brought down in 1848 as its design was based on conjecture and it looked incongruous on the top of the Minar." Bulges in the masonry of the Minar and cracks in the veneering stones were repaired in 1920. Again major structural repairs were carried out between 1944-49. The veneer in general, particularly the inscriptional bands had bulged out badly at places and had started falling down. The affected portions were carefully reset in lime mortar in consonance with the original pattern after inserting stainless steel dowels. Cracks in the hearting were grouted and made watertight. In 1960 and thereafter in 1964 the successive officers in charge of the Monument expressed their deep concern over the development of cracks on the veneer stones and suggested a thorough examination. As a result, an Expert Committee was constituted by the Government in 1964 to go into the defects and also to suggest any remedial measures on finding the unsatisfactory condition of the foundation of Qutb Minar. In the first instance, it was decided to check the verticality of the Qutb Minar, hence the 1st observation was made in October, 1964, 2nd in April, 1965, 3rd in July, 1966, 4th in April, 1967, 5th in January, 1969 and 6th in March, 1975, which showed a tilt of 0.4 m at the first balcony, 0.58 m at the second balcony, 0.79 m at the third balcony, 0.85 m at the fourth balcony and 0.94 m at the fifth balcony and the general direction of the tilt remained towards the south-west in each case. It was observed that for a base of 14.32 m diameter and 72.5 m height the tilt was not serious. Since no previous record on the verticality of the Qutb Minar was available, it is not possible to say the tilt noted was of recent origin. It was recommended by the Expert Committee to strengthen the foundation of Qutb Minar by way of grouting at different pressures taking into consideration the safety of the Minar.

Development of cracks on the veneer stones compelled the authorities to have a thorough examination of the Minar and also to ascertain the fact responsible for the decay. As a result, mortar used during construction was taken from various places for chemical analysis, which showed a presence of a considerable amount of water-soluble salts. The presence of soluble salts in the mortar has resulted in the weathering of the masonry. The rusting of iron dowels used in the original construction was an importance cause of cracking of the veneer stones. The deterioration of mortar and development of cracks due to expansive forces of rusting dowels allowed ingress of moisture leading to the concentration of soluble salts; possibly with the deterioration of mortar there has also been settlement of the masonry. Thus the extent of deterioration on stone and mortar was serious enough to affect the overall quality of the masonry and its performance.

The minar directly rests on an ashlar masonry pedestal 1.68 m high and 16.45 metres square. There is a platform below the pedestal, which is built of rubble masonry and about 18.59 metres square. A trench dug down to a depth of 9.75 metres on the eastern side shows that the lower footing of the rubble platform rests on masonry set in lime concrete and a thick rubble packing in mud mortar on the western side. The western side the trench was sunk to a depth of 8.22 metres but the natural soil or bottom of the foundation was not reached.

Efforts were also made to ascertain whether or not the Minar directly rests on bedrock, the National Geophysical Research Institute was requested to carry out geophysical work at Qutb to acquire the information. Accordingly, some tests were carried out. In spite of very limited scope of making adequate measurements, due to the existence of various structures obstructing the layout of lines and destroying current flow etc. the depth of the bedrock could be located around 45.72 m to 50.60 m Considering the stability of the structure it was felt that the weakness of the foundation could be the cause of the tilt which is within safe limits. In addition, the stress in the masonry calculated as 75.32 tones per Sq.metre was deemed within the safe limit, but left little margin of safety.

In view of the existence of a larger number of pockets in the masonry of the foundation, it was decided that an attempt should be made to strengthen the foundation by filling the voids both below and around the Minar proper with cement grout, keeping the grout pressure low enough to avoid any upsetting of the stress equilibrium already attained.

As planned, grouting was started along the periphery of Qutb Minar i.e. (S-1) series to create a barrier around the foundation so that grout injected inside the area might not escape or be wasted. In this series there were 32 holes in all. The maximum quantity of grout consumed in one hole was 134½ bags and minimum 61½ bags of cement in the proportions of 5:1 thickened to 1:1 under a pressure of 5 p.s.i.

On the whole, consumption of the grout in the interior did not show a very different picture from what was expected on the basis of information gathered by core recovery. Test holes drilled, showed that grout did not reach the 14.32m diameter base of the structure of the Minar, Horizontal holes were, therefore, drilled from east to west and vice-versa to a depth of 6.70m in two stages and grouted to fill in the voids. In the first stage holes (1.38 or 3.50cm dia) were drilled with standard non-coring rotary equipment up to a depth of 3.00m. Subsequently, casing pipes (2” or 5cm dia) were fixed in the areas where the overburden was loose and holes were thoroughly washed with water which were grouted with a water cement ratio of 5:1 (by volume) progressively thickened to 1:1. in the second stage, the same holes were drilled further up to a depth of 3.00 metres, which were washed and grouted following the above procedure at

a pressure of 10 p.s.i. In the third or final stage, the same holes were further drilled up to a depth of 2.69m., and were washed and grouted; thus 32 holes along the periphery of Qutb Minar, 48 holes in the square platform and 16 holes in the four corners were drilled and grouted.

Four upheaval gauges with a sensitivity of 0.001" or one thousand of an inch were installed at the four corners to assess if there was any disturbance caused due to the pressure of grouting. There was no incident of use of excess pressure to indicate upheaval at any point. Although at a later stage, when grouting was almost completed and the interior spaces were packed up, grout was seen coming out through joints of masonry of the super structure, which was a good sign of successful grouting. Thus the grouting operation to consolidate the loose fabric of the masonry of the foundation and distribute the load over a wider area was carried out.

The work was started on 16.11.1971 and completed on 7.9.1972 and 5460 bags of cement were used during the execution of the work. An expenditure of Rs.6,62,300/- was incurred during 1971-72 for the execution of the work.

2. Replacement of Damaged Steps

It was observed that in some cases the stones of the steps at Qutb were found deteriorated due to the influx of visitors and of weathering for a very long time. The steps had become slippery due to the continuous flow of visitors in spite of the fact that the stones used at the time of construction were the most durable and hardest ones that were locally available. Hence It was decided by the authorities of the Archaeological Survey of India to replace the same with fresh stones strictly in conformity with the original pattern for which a through study was made by the engineers, and Delhi quartzite stone matching with the original characteristics in size and colour was selected.

The work was taken up by the Archaeological Survey of India after proper documentation, including detailed drawings were prepared. In addition, before conservation, photographs of the steps were also taken. Thereafter, the damaged and worn out steps were taken out very carefully without causing any damage to the adjoining structure. The bed mortar originally provided beneath the steps was found almost dead, which was then removed. Special artisans familiar with the dressing of Delhi quartzite stones were employed. Thus the stone steps as per the required size were prepared.

While fixing the first step at ground level, a compatible bed of mortar was provided. Copper pins were also fixed in between the tread of the first step and rise of the second step to avoid any movement and also to have proper interlocking. Thus, the damaged steps at Qutb up to the first balcony were replaced successfully.

3. Replacement of Weathered Veneer Stones

Following a severe earthquake shock in 1803, major structural repairs were carried out from 1805 to 1828. Bulges in the masonry of the Minar and cracks appearing the veneer stone were repaired in 1920. The rusting of iron dowels used in the original construction was also an important cause of cracking of veneer stones. Besides this, the red sandstone was flaking due to the weathering of the stones. Hence, it was decided to replace the damaged and weathered stones with fresh ones to stop further deterioration. The work was taken up for execution during the year 1985, for which detailed drawings were prepared and photographs taken before conservation began. A thorough study for the procurement of red sandstone was made by the engineers taking into account the original characteristics of the red sandstone, and it was decided to import the same from Tantpur from where it was brought at the time of original construction.

Damaged and weathered stones were taken out carefully little by little and the overhanging portion was strutted properly. The core masonry was also studied from where the dead mortar was taken out and it was properly washed in order to make dust proof. Special artisans were engaged for the dressing and fixing of the red sandstone veneering and they prepared stones of required size depending upon the actual requirement at site. Red sandstone veneer was fixed in proper alignment strictly in accordance with the original pattern with compatible mortar, and copper clamps were also provided at the joints while jointing two stones, and simultaneously copper clamps were provided in between the core masonry and veneer stones and was filled with lime cement concrete. The core was also grouted with pure liquid cement by gravitational method to fill up the cracks in the core masonry at various levels. The old veneer stones that were in sound condition were also fixed and stones with calligraphy were either re-fixed after consolidating them or were left untouched. Work is in progress at this time.

4. Replacement of Old and Decayed Stones at Quwwatul-Islam-Mosque in the Qutb Complex

Owing to the weathering effect and the rusting of iron clamps, the red and buff sandstone was flaked and cracked at so many places that they were taken out very carefully bit

by bit following the procedure as at Qutb Minar. Fresh stones have now been provided. It has also been noticed that many such stone blocks are reused stones of an earlier period, all of which have been preserved properly if decorations of relief work have been found on them.

5. Replacement of Weathered Veneer Stones at Madarsa (College) Complex Within the Qutb Complex

This particular complex is located to the south-west of the Quwwatul Islam Mosque. Some rooms and halls are in ruins making an 'L' shaped block. They are believed to represent Alauddin's tomb and college (madarsa) started by him in the 14th century A.D. It is made of RR masonry with a veneer of quartzite stone. The veneer stones are weathered due to time. These weathered stones were properly documented both in drawings and in a photographic manner, and replaced properly with the same Delhi –quartzite stone from the same quarry from which the stones were brought at the time of original construction. This work has recently been successfully completed.

A full inventory and documentation on the buildings with their contents and the landscape of the site needs to be prepared immediately, which is required for the better management of the World Heritage Site. Satellite photos, aerial photography, as well as aerial and terrestrial photo-grammetry may prove to be very valuable in forming a quantitative inventory of these sites for the holistic approach of future archaeological studies.

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PRESERVATION OF PRAMBANAN TEMPLE COMPOUND AFTER AN EARTHQUAKE

I. Introduction

First of all, I take this opportunity to thank you for the chance to participate in the Training Course on Preservation and Restoration of Cultural Heritage in the Asia – Pacific Region 2006. The following provides some general information on Preservation of the Prambanan Temple Compound after the Earthquake of 27th May 2006. The reason for writing about this is that preservation is becoming an interesting issue in Indonesia and throughout the world. One week after the earthquake my team and I from the restoration division of the Directorate of Archaeological Heritage undertook a preliminary observation of the area and the cultural heritage. Besides, to share the experience, in my opinion, this tragedy is relevant to the theme of the course.

As we know, on Saturday 27th May 2006 at 05.57 am, a tectonic earthquake measuring 5,9 on the Richter Scale struck Yogyakarta and Central Java Provinces. The epicentre was 37 kilometers to south of Yogyakarta in the Indian Ocean at a depth of 33 kilometers. The 57-second disaster destroyed properties and infrastructures in several regencies such as Bantul Regency, Yogyakarta, Sleman Regency, Kulon Progro Regency and Klaten Regency. More than 6,200 people died, and more than 6,500 people lost their homes.

The disaster destroyed various cultural heritages such as Temples in the Prambanan district, Yogyakarta Palace, Tamansari (water castle), the Great Mosque and Traditional Town in Kota Gede, the Royal Cemetery in Imogiri, and Bayat Cemetery in Klaten, as well as other cultural heritages.

This report focuses only on Prambanan Temple Compound, as a world cultural heritage that suffered serious damage. Based on a historical note in 1584, a big earthquake occurred in the area and completely destroyed the upper part of Siva temple. At present, we are facing the prospect of an imminent eruption of Mount Merapi, which is near the temple.

II. Prambanan Temple Compound

Prambanan Temple Compound comprises four complexes: Prambanan Temple Complex (Larajonggrang), Sewu Temple Complex, Lumbung Temple Complex, and Bubrah Temple

Complex. This complex is situated in Prambanan, a village of Sleman Regency, and approx 17 km from Yogyakarta City towards Solo, on the border of Yogyakarta and Central Java Provinces.
The temple complex was built on the plateau near the Opak River. Situated in an ideal spot, the temple overlooks the Opak River flowing quietly in the west, the Sorogedug plateau in the south, from where the beautiful sight of the Prambanan plains and surroundings can be admired, and in the North, Mount Merapi rising beautifully in the sky.
The Prambanan Temple Compound was listed as one of the World Cultural Heritage, number 642 by UNESCO in 1991.

a. Prambanan Temple Complex

Prambanan Temple Complex is the biggest Hindhunese temple in Indonesia, built by Rakai Pikatan in 850 AD. The complex is located in the south yard of Prambanan Temple Compound. The entire complex is divided into three square yards and each yard is surrounded by walls and connected to each other by one entrance. There are six large temples in the main yard standing in two rows from North to South. On the west row there are three main temples, Civa temple in the middle flanked by Visnu temple on the north and Brahma temple on the south. All are facing East. On the east row there are three smaller temples, which are called Vahana temples (Vahana means carriage).
All temples in the main yard have been restored by the Government of the Republic of Indonesia.

Besides those six main temples, there are two Apit temples (at the North and the South and the main yard in between has the two rows of temples mentioned previously), four Sudut temples (at each corner of the main yard), and Kelir temple (at in front of each entrance of the main yard, this main yard is surrounded by a stone wall measuring 110 meters x 110 meters. This main yard is surrounded by a stone wall of 110 meters x 110 meters. Noteworthy is the fact that it is not the main temple – which contains the statue of Civa Mahadewa – that forms the most sacred place of the Prambanan temple group, but the temple Menara Sudut, which stands south of the eastern flight of steps. This temple has an open front, which is different from the other seven Menara Sudut temples (there are eight Menara Sudut temples, the four flights of steps of the main temple are each flanked by a pair of them). Inside the temple we find a base with a hole, under which there is a tube containing three rocks shaped as a parallelogram. This tube is not visible from the outside. There are lines drawn on these stones indicating the sacred spot in the centre of the square. In other words, the main statue does not stand exactly on the sacred spot, but a little to the northwest. This situation is also found in the Gunung Wukir temple, Merak temple, Badut temple and Kidal temple.
Parallel with the surrounding wall of the main yard stands the surrounding wall of the second yard on the lower ground level. This yard is 222 meters x 222 meters and has an entrance in the center of each wall. Within this yard there are 224 perwara temples (minor temples) standing in four rows.

Two of them stand on the east side and those on the northeastern side have been restored by the Yogyakarta Archaeological Office,

The third yard is larger than the other two, and measures 390 meters x 390 meters, but the wall does not run parallel with the two other yards. It faces more to the southwest, while the other two both face the points of the compass.

b. Sewu Temple Complex

Candi Sewu is located in Dukuh Bener, Bugisan village, Prambanan sub district, in the Klaten regency, Central Java province, 17 kilometers from Yogyakarta. Candi Sewu is located inside Prambanan Temple Compound, which also consists of Prambanan, Lumbung and Bubrah temples. Other temples which are located near Sewu temple but not in Prambanan temple Compound are Gana temple, Kulon temple and Lor temple. Gana temple is located about 300 meters to the east, Kulon temple is located about 300 meters to the west and Lor temple is located about 200 meters to the north of Sewu temple complex. Both Candi Kulon and Lor were found in stone pile statue condition.

Candi Sewu contains of 249 temples, consisting of one temple as the main temple, eight Apit temples and 240 guard temples. The pattern of Candi Sewu is concentric where guard temples at east-west-north-south orientation surround the main temple. In Sewu temple complex, there are eight Dwarapala statues, which stand at the four corners of the second yard entrance. Each corner has Dwarapalas in a pair and stand opposite each other. The height of each statue is 2.95 meters and they are placed on a 1.11 meters rectangular platform.

The main Sewu temple is located in the first yard, which is bordered by a 0,85 meters fence. It faces east and the fence is 40 meters x 41 meters. The height of the main temple is 29.8 meters. The main temple has one main room and four display rooms. Each display room has an entrance. The east entrance of the display room also functioned as the entrance to the main room.

Guard temples and Apit temples are located in the second yard. All guard temples are arranged in four lines, which form a concentric rectangle. First line consists of 28 buildings, the second line 44 buildings, the third line 80 buildings and the fourth line, 88 buildings. All guard temples in line I, II, IV are facing to the outside or overshadowing the main temple. While the guard temples in line III face the main temple. Apit temples are in between Candi Perwara line II and III. Each corner has one pair. Each pair of Apit temples holds a pathway, which cut the second yard through its middle. Each pairs of eight Apit temples have the opposite orientation.

Vertically, Candi Sewu can be divided into three parts. They are the base, the body, and the roof of the temple. All the temple components are made from andesite except the core of the main temple, which is made from. The structure of the brick cannot be seen from the outside because it is inside the temple.

c. Lumbung Temple Complex

Lumbung temple complex is located on the Northeast side of Prambanan temple or in the south aspect of Sewu temple. The complex consists of the main temple and is surrounded by sixteen perwara temples. The main temple faces East, and the perwara temples, North, West, and South. There are five perwara temples that have been restored in the north and the west of the main temple by the Central Java Archaeological Office.

The main temple is formed of 20 sides; there are sculptures of men and women on the outside of the wall and the near entrance as on Kalasan temple and Sari temple in Yogyakarta. There are niches on the outside wall for Dhiyani Budha statues. The roof of the main temple was a ruin when it was first found. Restoration of the main temple is in process.

d. Bubrah Temple Complex

Bubrah temple is located to the North of Lumbung temple and the South of Sewu temple. The main temple is a rectangular shape. The temple faces west and there are no Perwara temples surrounding the main temple. The temple was built originally of andesite stones. Previous restoration has succeeded to reconstruct the foot and body of the temple, but the temple's roof is still in ruin.

III. Earthquake at Yogyakarta and Central Java

At 05:57 hrs on 27th May 2006, an earthquake measuring 5,9 on the Richter scale struck Yogyakarta and some parts of Central Java. The epicentre was located approximately 3,7 kilometers south of Yogyakarta, on the 8,4^{o}LS and 109,95^{o}BT at a depth of 32 kilometers.

The earthquake caused tremendous damage to the world heritage site of the Prambanan Compounds. For the time being, the first zone complex is closed to visitors because of structural damage to the temples even though the temples are still standing, but the second zone is open. Civa temple is the most seriously damaged of the six major temples, with numerous cracks on its four corners, widening everyday. The main temple of Sewu temple is also very seriously damaged.

Based on geological information, the serious damage occurred because the Compound lies on an active fault line called Opak Cesar, from Prambanan, Piyungan, Plered, Imogiri, and Pundong. The fault line is more active because further earthquake activities (Bambang Sutedjo; KR Daily, 3rd June 2006, page 12).

Besides the Prambanan World Heritage site, other cultural sites were also damaged, such as Plaosan and Sojiwan Temples, Taman Sari Water Castle and the Sultan's Palace in Yogyakarta, the historic town in Kota Gede, Centres of handicraft and batik producers, such as the well-known Kasongan village also sustained serious damage.

IV. Condition after the Earthquake

Government reaction to the earthquake consists of 2 phases of activities: Phase of Emergency Response and Phase of Recovery. In the first phase, the activities are focused on actions that have to be implemented promptly to minimize more damage. And, this phase should be conducted within three months. Emergency response of the Directorate of Archaeological Heritage through the Archeological Office of Yogyakarta and Central Java (*Balai Pelestarian Peninggalan Purbakala Yogyakarta dan Jawa Tengah*) have been carried out, that is:

1. To establish a rescue team for temples in Yogyakarta and Central Java
2. To undertake identification and observation to assess the damage to the temples
3. To identify and register
4. To document heritages through photos and video
5. To collect the stone of ruins in a dangerous position
6. To collect technical and archeological data
7. To build temporary storage
8. To put a non-permanent reinforcement around the structurally dangerous buildings
9. To measure the stability of temple through vertical and horizontal measurement
10. To erect signs and border lines in dangerous areas for visitors

In order to assess the damage to Prambanan Temple Compound, four days after the earthquake experts from Gadjah Mada University made a Rapid Visual Assessment. Detailed observation and comprehensive research will follow at the next phase.

The assessment group reported various levels of damage to the temple. Siva Temple and Sewu Temple are seriously damaged. Up to now, even though the six main temples in the main square of Prambanan temple and Main temple of Sewu are still standing, it cannot be denied that seriously damage has occurred. The damage to Siva temple is presumed to have been caused by structural reinforcement being too rigidand the deformation of the body of Sewu temple will influence building stability. On the other hand, the damage to Lumbung temple and Bubrah temple was not so serious.

Based on the preliminary observation, the main damage can be divided as:

- Structural: ruin, sagging, slanting, deformation, cracking
- Material: cracking, broken, peeled off
- Site: line cracking

a. Prambanan Temple Complex

Observation of Prambanan temple complex has been carried out by Geological assessment by Gadjah Mada University (UGM), namely Subagyo Pramumijoyo, who assessed the main square in the south between Brahma temple and Apit temple. In addition, there are line cracks (length 15 m,

wide 2 cm). Other cracking is located on the outside of the east wall dividing the two Perwara temples serial I (length 9 meters, width 0.5 centimeters). Based on observation, the cracking is not influencing the main structure of the temple.

Observation undertaken by a civil engineer of UGM, namely Kabul Basah Suryolelono, stated that almost all temples experienced damage, especially Brahma, Civa, Visnu and Garuda temples. Structural damage is caused by the very rigid condition of the buildings.

The main damage can be described as follows:

1. Structural
   a. Sagging

      There is a great deal of sagging of the temple buildings, especially Civa temple which is found on the fourth side of the entrance gate, approximately 8 – 10 millimeters. There is slanting on the Brahma temple of 21 millimeters eastwards.

   b. Cracking

      Almost all temple buildings are cracked especially on the footings. The cracking on Civa temple was found on the body and chamber entrance at four to five centimeters in width.

   c. Deformation

      There are many deformations on Civa temple especially on the footings, the body, gate, and chamber walls. While at Brama temple deformation was found on the footings, gate, and terrace floor. The deformation on Wisnu temple was found on its gate

   d. Cracks

      Structural cracks occurred on part of the footings and body of the temple as with the body of Civa temple.

   e. Ruination

      Almost all of the components of the temples are in ruins, especially the roof part of Ratna, the fence, and *langkan* fence. The other parts in ruin are the wall fence I on the south side and the west, and fence III.

2. Material damage
   a. Stone Cracking

      Almost all temple buildings have been damaged by cracking of stone materials such as that caused by horizontal and vertical movement of the earthquake. There are many cracked stones on all footings of temples.

   b. Broken

      Damage such as broken stone is evident on the footing parts and temple body, as on the body of Civa temple on the Southwestern side and the carved relief on the wall of the body.

   c. Fragmentation

Almost all components of the temples are in ruins especially the roof of ratna, the gate, and *langkan* fence. The fence of Square I on the south side and west, and gate III is in ruin.

d. Peeling

Many stones on part of the body of the temples of Brahma, Civa, Wisnu have peeled off.

e. Ruination

Ruination of stone material of temple components was found from the roof of ratna, *langkan* fence, and gate, especially in Brahma temple, Ciwa temple, and Wisnu temple.

3. Land cracking

Land cracking occurred in the main square of Prambanan temple complex at a length of 30 meters from North to South.

Furthermore, on the 8 and 9 of June 2006, in a close consultation with the Department of Culture and Tourism of the Republic of Indonesia, UNESCO dispatched an international expert mission to Yogyakarta to inspect the Prambanan World Heritage Site. Professor G. Croci, a UNESCO expert in the field of structural engineering and restoration of archaeological and historical monuments was accompanied by Ms. Himalchuli Gurung, Programme Specialist for Culture, UNESCO Office, Jakarta. The mission emphasized two major areas to be focused on during the emergency phase:

- Based on a field inspection, it was decided to focus immediate attention on Sewu Temple, the most damaged temple, with severe cracks at each of its four corners, which are getting wider and wider each day. There is a ***major risk*** of collapse if the temple is not wrapped up rapidly with fiber strips and/or a propping system.
- In the Prambanan Temples, there is also a need for **urgent action and should be conducted** to clean the debris between the six major temples and to remove and replace the instable stones threatening to fall from the top of the Temples, which would be a danger to visitors.

Inspection result of Prambanan temple complex by Prof. G. Croci as follows:

It includes a certain number of temples that we have surveyed:

- three main temples of Siwa (the biggest), Brahma, Wisnu
- three Wahana (Garuda, Nandi and Angsa);

All of them, generally, have suffered an enlargement of the vertical joints with consequent outward deformations, cracks in the stones, collapses of some *ratna* (small stupa), collapse of parts of the balustrades, inclination of the top pinnacle, etc.

The deformations that have been measured.

The temples were originally built in a dry stone technique (Andsites and Basalts).

As we'll see in the next paragraph, during the time they were rebuilt (in the second half of the past century) reinforced concrete frames were inserted in the masonry body.

Presently there are no risks to the general stability of the temples but there are several local risky situations with regard to the safety of people: some fragments, *ratna*, stones, etc. have collapsed on the cornice and roofs and are under unstable conditions.

In detail these are the situations that we have surveyed:

- *Brahma Temple.* The pinnacle on the top has collapsed, some *ratna* are damaged, several vertical joints are deformed and wide open, and some stones have cracked and have slid outwards. Some stones of the balustrade have fallen down. A global crack probably crosses diagonally at the base of the temple. The photos show different degrees of damage.
- *Siwa Temple.* There are several cracks in the stones, opening of the vertical joints, outwards deformation.

  The footing of the second stage is broken.
- *Wisnu Temple.* The damage is less compared to the two other temples. Part of the balustrade has collapsed.
- *Wahana Temples.* Generally the damage is less important than in the temples of Brahma and Siwa, even if enlargement of the joints and cracking in the stones are frequent.

  In Garuda temple the top pinnacle is dangerously leaning.

  In Nandi Temple part of the balustrade collapsed, the central ratna collapsed as well.

  In Angsa Temple damage and collapses occurred in some ratna.
- *Apit and Kelir* suffered minor damage.
- Gates. The gates suffered significant damage and collapsed.

It is well known that Japan has a lot of experience in regard to the preservation of Cultural Heritages in earthquake zones. The Government of the Republic of Indonesia through the Directorate General of Historical and Archaeological Heritage, Directorate of Archaeological Heritage invited the Government of Japan to participate in a discussion concerning research of heritages, which will be held on 18th to 26th July 2006 in Yogyakarta and Central Java. The Japan mission consists of structural and architectural experts from many universities, and is coordinated by the National Research Institute for Cultural Properties in Tokyo. Mr. Yamato will coordinate the team from Japan. Observation of Prambanan and Sewu temple complexes have been carried out by measuring the movement of the temple body. The research is expected to support the comprehensive planning of the restoration method for heritages in earthquake zones.

No	Building Name	Type of Damage
1	Siva Temple	Body structure is cracked on the part of subsement in the southwest, temple footing is damaged on the part of foot of the temple in the northeast (width 4-5 centimeters) Shearing of temple structure occurred on the steps in south and east direction to outside (length 4 cm) Material stone is cracked and part of the building component is ruined
2	Brahma Temple	Body structure is cracked and building components ruined, especially on the ratna roof and langkan fence. The condition of the east gate is slanting to the outside. Building components that were ruined are broken and scattered in the surroundings of the square.
3	Wisnu Temple	Body structure cracked, component of langkan fence on the south side is ruined and broken into many parts.
4	Garuda Temple	Part of the roof structure (kemuncak) is slanting, some of the roof of ratna and the langkan fence is ruined.
5	Nandi Temple	Roof structure (kemuncak) is broken, parts of ratna, langkan fences are ruined, and stones are broken.
6	Angsa Temple	Some of ratna roof and langkan fence is ruined and stones are broken.
7	Apit Temple	Apit temple to the north, part of the roof is ruined
8	Perwara Temple	Perwara temple serial II no 1 on the east side, part of the roof structure (kemuncak) is ruined.
8	Wall Square	Gate of wall square I, on the west side is ruined and the wall to the northwest is ruined. Gate of fence square II on the south side is ruined.

Table 1. Type of damage

b. Sewu Temple Complex

1. Structural

a. Foundation sagging

There is less than 1° sagging of the foundation of Sewu Temple after the earthquake.

b. Slanting

In the corners of the main temple there are some parts of the wall structures that slant ± 1^{o} - 3^{o}.

c. Deformation

There are serious deformations on all four sides of the main temple's wall. We can observe this from the stone structures, which have been pushed out from the original structure by the earthquake.

d. Stretching

There are some parts of the structures where spaces between stones have increased. This can be seen on the porch parts and on the frame of the four entrance walls.

e. Collapse

One of the pinnacle's connectors between the main temple and the porch collapsed. The pinnacle of Perwara Temple line III no. 49 also collapsed

2. Material damage

a. Stone cracking

There are many components that have cracked especially stones from the lower part of the four corners and the four sides of the main temple. Stone cracking is also evident in one of the doorpels of the main chamber and porch part of Perwara Temple line II no. 39.

b. Stone breaking

There are many components that exhibit broken stone especially from the lower part of the four corners, the four sides of the main temple, and the lower part of the porch and the main chamber entrance's doors.

Inspection result of Sewu temple complex by Prof. G. Croci:

Sewu temple suffered severe damage and it is the temple in the most dangerous situation as there is a real risk of significant collapse. It has been surveyed that the main damage is to this temple.

This damage is detailed in the 'crashing phenomena', relevant outward deformations and large opening of the joints.

c. Lumbung Temple Complex

1. Structural

a. Foundation sagging

There is no evidence that can explain the damage to the foundation.

b. Stretching

There is stretching on the main temple and Perwara Temples no. 9, 11, 12, 13, and 14.

c. Collapse

The main pinnacle and the small stupas of Perwara Temple no. 13 have collapsed. Some components of the main temple and Perwara Temples no. 9, 11, 12, 13, 14 have also collapsed.

2. Material damage

a. Stone cracking

There is stone cracking on the main temple and Perwara Temples no. 9, 11, 12, 13, and 14.

b. Stone breaking

There are many components that exhibit broken stones especially the footing parts of Perwara Temple no. 12. There also broken stones on the corners of the body parts of Perwara Temple no. 11.

c. Total breaking

Perwara barat laut pada blok batu bagian bawah pintu masuk candi

d. Bubrah Temple Complex

There is no serious damage to Bubrah Temple Complex caused by the earthquake on 27th May 2006.

V. Cultural Value and Structural Safety

A statement by Prof. G. Croci after an assessment of Prambanan temple compound reported that the temples of Prambanan, built in the 9th century, before the realization of the greatest dry stone temples of Angkor, must maintain their huge historical value as witness of an ancient civilization and of an advanced building construction capacity, Originally those temples, as happened in some other regions of Asia, were abandoned without any maintenance so that when they were rediscovered in the eighteenth century they were in very bad condition.

It has been only since the second half of the twentieth century, however, that important works of restoration and reconstruction have been carried out. These works, as said previously, have been restored based on the original construction, a dry block structure, with reinforced concrete frames.

Besides the hypothetical advantages of this solution of reinforcement (and also the possible negative consequences of the seismic behaviour and on the conservation of the stones due to the presence of salts in the concrete) such work has to be reconsidered, namely maintaining the authenticity and historical value of those exceptional buildings.

The insertion of reinforced concrete elements, even if not visible, certainly represents a significant alteration in respect to the original conception; authenticity has been partially compromised.

Today, however, that belongs to the past, and tomorrow it will be part of the history; a period when reinforced concrete was largely used, as for example in Bauphon, a mountain temple in Angkor where huge reinforced concrete walls, begun decades ago to stabilize the soil, are still under construction.

The task today, considering the large damage that the earthquake has produced, is therefore to re-think our interventions in order to avoid further mistakes, balancing on the one hand the cultural value and on the other, safety requirements.

To fulfil this task it is necessary to proceed with precise steps providing a clear diagnosis before taking any decision regarding definitive intervention.

These steps are:

- to have a detailed survey of the damage and in particular of the deformations that have been produced;
- to carry out a mathematical model of the temples considering the seismic interaction of the dry stone structure and of the reinforced concrete frames;
- on the basis of this model to evaluate the safety levels that the present structure is able to provide, even if deformed, in relation to probable further earthquakes;
- to evaluate the benefits of possible interventions considering their compatibility with the historical value of the buildings and the increased safety levels that is possible to achieve;
- if necessary, to test in-situ the proposed interventions.

VI. Action Plan

Based on condition of Prambanan Temple Compound and another heritages after the earthquake of 27th May 2006, and so that restoration work is urgently implemented, restoration must be based on comprehensive planning in order to counter unforeseen damage in the future.

According to the main policies of the Government of the Republic of Indonesia disaster response is divided into three phases, i.e. emergency response, reconstruction and rehabilitation, and recovery. But, in the Archaeological Heritage there are two phases of activities, i.e. emergency response and recovery.

Emergency response will be implemented in the short term within three months (July, August, and September), i.e.:

1. Emergency rescuing on the part of square and temple building comprising: documentation, information gathering, dismantling (*penurunan*) consolidation and data collecting;
2. Square reconstruction for visitor control consists of: documentation, determination of borders for visitors and fencing for visitors areas consisting of documentation, border determination, and fencing.

   Recovery consists of middle term (1-5 years: 2007 – 2012) and long term (6-25 years: 2013-2038). The activities in this phase are:

1. Study and Research:
    a. Structural research (civil engineering, geology, conservation, geophysics, geography, and archaeology);
    b. Architectural recovery (study of archaeology and architecture);
    c. Utilization (remaking of system and utilization)
2. Rehabilitation or reconstruction:
    a. Total restoration, activities will be carried out on those temples that exhibit extreme damage;
    b. Partial restoration, activities will be carried out on the temple especially on architectural components
3. Utilization
    a. To state zoning
    b. To control visitors
    c. To prepare the facilities

Restoration planning of Prambanan Temple Compound after the earthquake also involves financial planning, which is expected to take more money to recover the temple than before the earthquake.

Prambanan and Sewu temples have been seriously damaged. Previous restoration of those two temples was completed in 1993.

As one of the World Cultural Heritages, it is under the responsibility of UNESCO, we must work together to undertake the preservation of Prambanan Temple Compound. The fund of USD 75,000 has been allocated by the World Monument Fund, through UNESCO to enable the restoration of Prambanan and Sewu temples.

Based on the preliminary study it needs more than IDR 130,000,000,000 for the complete post-earthquake recovery of the temple. The funding is collected from the National Budget, Provincial Budget, Private Sector and International funds. To manage all programs of the planned preservation of the Prambanan Temple Compound. A task force has been established, which is coordinated by the Directorate General of Historical and Archaeological Heritage, Ministry of Culture and Tourism.

PHASE	ACTIVITY	Schedule of Activity					FUND
		Short Term			Mid-Term	Long Term	
		July	Aug	Sept	2007 - 2012	2013 - 2038	
I. Emergency Response	1. Emergency Rescue						APBN APBD Private International
	a. Temple Square						
	1) Documentation						
	2) Information Gathering						
	3) Data Collecting						
	b. Temple Building						
	1) Documentation						
	2) To go down/Consolidation						
	3) Collecting						
	2. Square Control						
	a. Documentation						
	b. Determination of the visitors border						
	c. Erecting fences						

Table 2. Planning of Restoration Execution After Earthquake, re: Phase of Emergency Response

PHASE	ACTIVITY	Schedule of Activity					FUND
		Short Term			Middle Term	Long Term	
		July	Augt	Sept	2007 - 2012	2013 - 2038	
II. Recovery	1. Study/Research						APBN APBD Private International
	a. Structural Repair						
	b. Architectural Recovery						
	c. Utilization						
	2. Rehabilitation/Reconstruction						
	a. Total Restoration						
	b. Partial Restoration						
	3. Utilization						
	a. Ordering of Zoning						
	b. Control of Visitors						
	c. Ordering of facilities						

Table 3. Planning of Restoration Execution After Earthquake, re: Phase of Recovery

Government policy to combat earthquake damage consists of 2 phases of activities, Emergency Response and Recovery. In the first phase, the activities are focused on actions that have to be implemented promptly to minimize further damage.

This phase should be conducted within three months, that is:

- To identify, to register and to undertake documentation;
- To collect stone from the ruin and those in a dangerous position;
- To build temporary storage;
- To put a non permanent consolidation on dangerous structures;
- To erect signs and border lines in dangerous areas for visitors.

In the second phase, i.e. recovery phase the main focus is on rehabilitation and reconstruction activities to bring the temple back to the condition it was in before the earthquake. In this phase it is possible to carry out physical intervention aimed at prolonging the existence of the building and as risk preparedness for the future. The phase of recovery will be conducted within five to ten years. The activities consist of:

- Research

  The multidiscipline research on archaeological, structural, material, and environment will be conducted on the site
- Restoration

  Restoration activities will be applied based on the research above. It can be total or partial restoration.

Based on an inspection by Prof. G. Croci. In the present situation, and in particular the lack of knowledge concerning the role of the frame structures and their interaction with the dry stone structure do not take any definitive measure.

Therefore, we can now only identify those urgent actions that need to be undertaken with different targets.

These actions comprise two aspects:

- to eliminate local risks related to unstable stone blocks, ratna, fragments, etc. which could fall down with obvious risks to people and workers;
- to reduce the risks of collapse which may involve relevant parts of the temple. These risks are mainly the Sewu temple where the building technique with small blocks (some of them are cube shaped and have insufficient overlap) is a big concern.

The urgent actions therefore relate to:

- a general inspection and survey of damage and local possible detachments, in particular of stone blocks and fragments. For this purpose it is necessary to provide scaffolding and, if that is the case, a crane to lift down pieces of stone; workers to stabilize the blocks and fragments are also required;

- to realize a provisional system of propping and countering the lateral deformations of the temple of Sewu.

the provisional measures that we suggest, based on two interventions:

- to build on the four terraces, at the base of the corners of the main central tower, a series of props, partly inclined, to support the structure and prevent further horizontal movement;

to realise two belts to horizontally stiffen the tower. The first belt will be at the level of the terraces utilizing the doors that cross the galleries allowing access from one terrace to the other. The second is the level immediately over the roof of the four galleries as shown in the Figure. These belts can be made of steel or other suitable material

VII. Conclusion

Based on observations, the damage that can be identified on the Prambanan Temple Compound is in various scales from low to high. Prompt restoration action is needed and needs to be done carefully. The execution has to be based on comprehensive multi discipline researches.

Government policy towards the earthquake consists of 2 phases of activities, that of Emergency Response, in which there are two activities: emergency rescue and square control, and the Phase of Recovery, comprising three activities: study or research, rehabilitation and reconstruction, utilization.

Research of a restoration method on structural technology against earthquakes to maintain our high heritage is very important. And execution of restoration must be based on comprehensive planning.

During the restoration, Prambanan Temple Compound can still be used for tourism, but visitor accessibility to the safe area should be controlled.

Risk preparedness against disasters in the future can be achieved by comprehensive and integrated activities within the framework of sustainable preservation.

Bibliography

Department of Education and Culture, Directorate General of Culture, Committee for the Restoration of Wahana Temple, Rara Jonggrang Prambanan Temple, Yogyakarta, “Report on the Restoration of Wahana Temple”, Jakarta, 1993

Directorate of Archaeological Heritage, Directorate of History and Archaeology, Department of Culture and Tourism of the Republic of Indonesia, “Report on Preservation Heritages after the Earthquake of 27th May 2006 at Yogyakarta and Central Java”, Jakarta, 2006

Central Java Archaeological Office, “Early Observation Report on Prambanan Temple Damage after the Earthquake”, Klaten, 2006;

Soediman, “ Chandi Laradjonggrang at a Glance”, Kanisius, Yogyakarta, 1969

Prof. Eng. Giorgio Groci, “Technical Report, Survey on the Situation after the Earthquake of the 27th of May, the Prambanan Compound, the Temple of Plaosan, the Temple of Sojiwan, the Tamansari Complex (Water Castle), the Palace of the Present Sultan and Governor of Yogyakarta, the Mataram Mosque and the Complex of the Royal Family Grave”, Roma, 2006.

Yogyakarta Archaeological Office, “Early Observation Report on Prambanan Temple Damage after the Earthquake”, Yogyakarta, 2006;

Iran

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Abstract

This report discusses the main problems concerning cultural heritage protection issues in Iran, in particular those related to the category of the preservation of historical sites and monuments. The causes of the problems can be classified and divided into the impacts of wrong policies in management and difficulties in technical affairs.

Introduction

Iran is a wide country located in one of the most strategic regions of the ancient world, and has always played a role as a bridge between the old continent, Europe and the Persian Gulf, where so many well-known ancient civilizations and historical events occurred. Its powerful cultural and historical movements have never stopped, not even after the massive destructions of foreign forces such as the Mongols and Arabs and the other invaders. Owing to its powerful cultural roots and long historical background, all of its enemies were absorbed into the Iranian community. In spite of these damages, Iran is still one of the richest countries in the world regarding the field of cultural heritage.

On one hand, these historical monuments include various construction styles and masonry such as: stone constructions, wooden structures, brick constructions and even rock architecture, scattered throughout the country. On the other hand, there are various types of buildings and urban spaces with different functions, like palaces, houses, caravanserais, bazaars, mosques, and the like. Also, there are different climates inside the country and subsequently, the different environmental affects have culminated in a wide variety of traditional architecture in Iran. As a result, we need a wide range of various experts with specific knowledge as well as specific equipment, in order to preserve all kinds of properties.

But unfortunately, the partial management system of the country and some of its wrong policies prevent us achieving sustainable solutions and appropriate careers, concerning the protection of our cultural heritage.

The lack of constancy in the management system

Each transformation in the governing system or cabinet in Iran, results in many changes in management policies; because every new manager has new ideas and as a consequence, the second level managers are being replaced and these new managers who are not necessarily experienced in the field of their management, will cause significant changes in the general policies of the operative body of their organizations. Experts as a matter of fact, are the only constant unit in this system; however, sometimes, new managers change their duties not especially related to their interests and experiences. All these replacements cause different problems that can be categorized in two different levels: the level of management and the level of the operation body of the organization, which indeed are experts.

In the management level, a new appointee to a post, who is not sure for how long he will be in charge of the post, is only concerned with getting a brilliant resume, so that he can gain a more important post or present himself in the time of the next replacements, which is not necessarily a negative point. The problem arises when in the time of the evaluation of a manager, quantity will be given the priority and quality is often forgotten. As a result, a manager tries to start numerous *short-term important* projects instead of long-term conservation and preservation projects, so that he/she could terminate them sooner and add fabulous issues to his management period resume by using numbers and statistics, illustrated by programming tourist camps, landscape design, designing and printing of brochures (many of which are full of false information). Sometimes, these activities proceed to the conservation and documentation process. On the other hand, if the manager decides to start a conservation project, he would rather start the operative activities as soon as possible, although without adequate research or accurate documentation of the site or the monument.

At the experts' level, also the cyclic change of policies has its own impacts. As conservation affairs need considerable expertise, adequate research background and cyclic consulting sessions (all of which are long term procedures) an expert in charge of a specific site or field, needs enough constancy in his/her job in order to have a better focus on the matter. Such replacements and changes of duties among experts, in the most optimistic view, if not stopping the rhythm of the conservation process, certainly it slows it down. And the problem becomes more complicated because of the lack of a kind of constant management plan in the project monitoring process; because, if we are not able to establish a stable system of management, which is also not established in many other countries, we must at least create a defined procedure of documentation of the projects so that a new expert will be aware of the accomplished activities and gathered information.

Most of the managers are not professional in the field of cultural heritage

Most managers in the Iranian governmental system are rarely chosen from experienced experts who are talented in the related fields. These managers are not even well educated in the field of management studies. These managers mostly gain some experiences during the time of their management, but after some time, they are again replaced and must experience a new field! The cultural heritage managers are mostly selected from the ex-managers of municipalities, ministry of housing and urban design, ministry of transportation and roads and the like. These managers are mostly not familiar with the cultural heritage category and sometimes they compare conservation and restoration projects with modern construction projects.

The lack of coordination between the cultural heritage organization and other governmental organizations and ministries

One of the main duties of the Cultural Heritage and Tourism Organization is to define buffer zones for historical monuments and sites in the framework of *the Limits Law*. There are some restrictions that must be considered in these buffer zones, so that any land use changes or construction in these zones must face certain limitations, so that it does not harm the historical values of the site or the monument; though, the lack of coordination among governmental organizations does not allow these rules to be considered and performed accurately.

The *Ministry of Roads and Transportation,* in its different construction plans, such as roads, railways, airports, etc, the *Ministry of Industries and Mines,* in its plans for plants and factories or mine extraction programs, the *Ministry of Housing and Urban Design*, in its plans of village and urban development, the *Ministry of Energy*, in selecting the location of dams or power plants and the municipalities, in their plans for new urban constructions and renovations must consider these rules. Owing to the fact that these governmental organizations and ministries do not seriously consider the cultural heritage buffer zones' rules, we must not expect nongovernmental companies or even ordinary people to do so.

The most famous example of the mentioned issue in recent years was the case of *Jahannama tower* in the historical city of *Isfahan*. Somewhere in the landscape zone of the *Naqsh e Jahan* square, which is a famous World Heritage Site, a high-rise building was being built, damaging the landscape of the site. And finally after months of negotiations by UNESCO authorities, and cultural NGOs, the former Iranian president decided to use his power to put an end to the conflict and the owners of this high-rise building agreed to decrease the height of the building. Now the question is: if what Iranian Cultural Heritage and Tourism Organization (ICHTO) approves as a law in order to keep the skyline of the historical square, why does respecting this law need so much effort? What if *Naqsh e Jahan* square, like many other examples, was not a World Heritage Site? Were the efforts inside the country enough to stop

this cultural disaster? *Naqsh-e-Jahan* square is a well known World Heritage Site and even the president entered the negotiations, how many less famous historical sites are in the same dangerous situation and we are not aware of it?

Another example, happening nationwide: fading historical urban texture and the policies of the municipalities to let the people renovate their buildings and build houses with more floors, which to the owner means more profit. As a result, owners of historical buildings are encouraged to do so too, in order to gain more benefits. Those whose houses were not registered as a cultural heritage, succeeded in rebuilding their properties, but those whose properties were registered in the list of National Historical Monuments, started complaining for not being permitted to do so and ICHTO still have so many problems with these owners in trying to convince them to conserve these monuments instead of destroying them. Furthermore, in recent years the government has decided to renovate the defective urban texture, with no consideration given to the differences between a *defected urban texture* and a *historical urban texture.* As a consequence, the owners whose properties are located in the historical urban textures abuse these rules to renovate their properties. Sometimes they are even permitted to build one additional floor (more than the others) to their buildings, because their houses are located in the so-called *defected texture.* Many of these new laws are to encourage residents in this kind of urban texture to renovate their neighborhood.

These are only some of the problems that ICHTO is facing due to the lack of coordination with other ministries and organizations. In order to decrease the conflicts between different organizations, the Iranian government has started to merge those organizations with conflicting responsibilities. According to the mentioned policy in 2004 the Iranian Cultural Heritage Organization (ICHO) and the Iranian Tourism Organization (ITO) were merged in order to form a bigger and more powerful organization, which was named as the Iranian Cultural Heritage and Tourism Organization (ICHTO). But, this solution not only failed to solve the problems, but actually caused some new problems, such as concentration on the tourism category and its benefits rather than the preservation of cultural heritages. The idea behind this combination was letting the cultural heritage help to improve the tourism industry, but the thing it is, cultural heritage is not necessarily a way of improving tourism.

As a matter of fact, cultural heritage itself is a national cultural treasure that must be conserved and praised just because of its nature and identity. Looking at the cultural heritage just as a tourist attraction is the most dangerous assumption and sometimes, the massive tourism seriously damage historical sites. When a historical site is hosting a great number of tourists, tourist facilities are needed for them and sometimes they are so badly planned and designed that not only can they not reach the needs of the tourists, but also they are harmful to

the environment and landscape of the site. Besides, the number of tourists that a particular site can host in each period of time must be defined so that sites do not face a tourist flood at particular periods of the year. Is the historical value of a site, Persepolis for instance, purely an attraction for the number of tourists visiting the site each year?

Thus, the Cultural Heritage Organization does not need to be joined to any other organization; instead, it needs to be believed as the conserver of the national treasures by the nation and the government. The fact that national treasures must be protected by powerful supervising laws, established by experienced and highly graduated managers and experts must be understood by every individual of the Iranian nation; and if we are considering cultural heritage as a source of income, at least we can do it from the correct path and plan a long-time program for these national treasures and not look at them only as an instrument of making money.

To ignore the cultural heritage as a national treasure

Iran, as a developing country, needs to define lots of infrastructural projects on its path to reach sustainable development. Accordingly, both governmental and nongovernmental organizations and companies must pay special attention to the national treasures such as the environment and cultural heritages. Even if we do not care about what we have inherited from our ancestors, it is our duty to preserve them for the next generations.

To ignore the environment as a background and basis of the cultural heritage

It is a suitable environment that leads man to create a relic; thus, the environment as the natural bed of a cultural heritage monument has to be conserved as well, especially in the case of the cultural landscape which cannot be separated from its natural background and the environment. This issue can be better illustrated by some examples.

During history all civilizations have been shaped near water resources. As the plateau of Iran has a considerable shortage of water resources, especially in its central parts, which are mostly covered by deserts (*Kavir*), Iranians tried to adapt the situation so that they could create their settlements. This led to form of architecture and urban design that is the most well known sample of Iranian architecture. *Kariz* is the most important infrastructure item in shaping this desert civilization. *Karizt* is a grid of underground canals that conduct water from a water source, which is normally located in higher areas and some times too far from the civilization core, to the place that a colony is being shaped. Nowadays, with the new water transfer technologies *Krariz* is gradually being forgotten. Many of the canals that once used to be a living part of *Kariz* now are being destroyed or sometimes sewage is directed through these canals. *Kariz* should not only be considered as a cultural heritage site, but also as a good clue

to recover old cultural sites, urban textures and their landscapes, for instance, historical *Persian style gardens* and *garden pattern cities.*

Another example is the water distribution system in *Isfahan,* which was designed in the *Safavid* period (17th century). This system used to conduct the water of *Zayandeh Rood* (the river that goes through the ancient city of *Isfahan*) by a well-organized grid of *Madie* (the traditional name of such canals) into the agricultural and residential areas. Today, because of the development plans and new land use programs, gardens and farms are being changed into residential and commercial land by the owners. Of course, the most important reason for this kind of land use change is the ever-increasing land value. Sometimes, increasing the land value, reaches the point where the benefit of selling the land of a farm or garden is much more than the benefit of the agricultural activities there, so, the owner changes the land use and sells the farm as a residential area! Without these gardens and farms the canals are vanishing little by little and maybe some day no trace of them will be found.

The problems concerning the preservation of religious heritage

The religious heritage is so important that ICCROM focused its 2003 forum on this topic. A special problem that religious heritages face in Iran, is a phenomenon named *Vaqf,* which is an Iranian-Islamic tradition. *Vaqf* is to present ones possessions, such as building, farm, money to a religious person or foundation for charity purposes. A usual kind of *Vaqf* is to specify an amount of money to be spent for restoration or rebuilding of the tomb of a religious person, which is a sacred place. Although, this tradition itself is a civilized phenomenon, the problem is that there are certain religious foundations or even organizations in charge of administration of the *Vaqf,* which are not necessarily interested in conservation and preservation topics. Some of these organizations are so rich that they allocate huge budgets to many development activities and projects. Sometimes, these organizations or foundations decide for the reconstruction operation of the tombs and holy shrines in order to add some new parts to them without consulting with the experts, and do them according to their own taste.

The most important example of the aforementioned organizations is *Astan e Qods e Razavi* that governs the holy shrine of Imam Reza (the 8th *Shiids* holy leader) in Mashhad and its possessions. Imam Reza was killed in the 10th century and buried in a village where the city of *Mashhad* is now located. Situated in northeast Iran, *Mashhad* is the second biggest city in the country. Afterwards, the *Shiites* have presented different properties as *Vaqf* to the holy shrine of Imam Reza, the only *Shiite* Imam buried in Iran. Accordingly, the tomb has been developed with chambers, courtyards and a great beautiful mosque which was built in the 16th century near the tomb which was built by queen *Goharshad*, the wife of *Shahrokh,* one of the *Timurids'* kings. The great dome covers the tomb and both the great minarets that are covered

by gold. *Astan e Qods e Razavi* is a very powerful foundation and so rich that it even makes loans to the government. Unfortunately, this grand foundation does not pay sufficient attention to government policies and has its own policies. The restoration, reconstruction and development projects that this foundation does, has not only destroyed many historical/cultural values of the holy shrine and *Goharshad* mosque, but has also destroyed a valuable part of the historical texture of the city around the shrine; just as in the development of the shrine and the ways to access the shrine through four sides of the shrine. If Imam Reza were alive today, he would not be happy with all this destruction and disturbance to the cultural values of a city. These activities of the *Astan e Qods e Razavi* is becoming a pattern for other religious foundations to commit such actions, as much as they can afford it, instead of being concerned with cultural and historical values.

The specifications of Iranian archaic construction

Archaic architecture has shaped the most important type of Iranian traditional architecture, which is mostly constructed with masonry materials. The construction materials in the ancient world had always depended on local regional and environmental availability. The main accessible material in the central Iran region is soil; thus, soil was the resource of almost all of the major construction materials in the mentioned region, which appear as adobe, brick and different kinds of mortars made with clay. Using such materials, the architect has to avoid tension stresses as much as possible, because these materials can only bear compression and have to be designed so not to bear tension. With these materials, huge thick walls, arches and domes are made. Although this construction was sometimes reinforced with wood, its capacity to bear tension was not enough for horizontal forces. The other problem is thrust which normally occurs in the walls located in the sides of arches. The traditional architecture used to design and build a series of arches supporting each other so that each arc takes the thrust of the adjacent arch. Thus, in many cases to prevent destruction the ruined arches and domes have to be rebuilt first. These issues have the following problem:

In some cases, field research and documentation of the relic which shows the original shape and the height of the structure is needed, which takes much time and effort. Sometimes, in order to repair the damage made by the thrust, some experts decide to use reinforced concrete or steel beams inside the original structure of the building, which could be useful in a static condition, but terribly harmful in dynamic conditions, and may cause serious damage to the monument; besides, using these kinds of modern materials will have an irrevocable effect on the body of the monument.

Earthquakes as the most dangerous natural disaster in Iran

As mentioned, the ancient civilizations have always developed near water resources, and as rivers in Iran compared to the vast area of the plateau are very scarce and the few rivers of central Iran are mostly dry, so residential centers are mostly formed near underground water resources. There are some good natural rock beds for the flow of water; most of the underground water resources are gathered in these places, which are also in areas having the highest risk of earthquakes. Thus these civilizations, depending on water, have always been forced to suffer earthquakes, while the most precious type of Iranian architecture is shaped in the central Iran region, in places with a high risk of earthquakes. A good example of these masterpieces of architecture is in the ancient city of Bam, which was tragically destroyed by a powerful earthquake in January of 2004. Central Iran region's architecture comprises massive constructions as mentioned before, but is lacking tension strength and cannot resist horizontal earthquake forces. Considering the high risk of earthquakes in this region we understand the high priority of a kind of complicated conservation for this kind of architecture against earthquakes.

In order to determine an appropriate way for the conservation of this kind of structure, as the first step, we must take into consideration the ways that the ancient architects found regarding this problem. The only solution is finding a way of cohesive behavior and to gain this goal we must choose the suitable form and plan so that monuments can resist horizontal forces as much as possible. Symmetrical plans, such as the rectangle, regular shapes, polygons and best of all, a circular plan, with conical structure of the walls that helps the architects build high rise walls such as at *Gonbad e Qabus,* which is one of the tallest examples of such structures in the world. In the field of construction materials, different kinds of cohesive mortar are also useful.

As an appropriate and acceptable modeling has not yet been done, we still cannot judge them and their strength against different types of forces and without this insight; we cannot draw up a good plan for restoration of such constructions. Up to now, the only solution is to complete the damaged parts of the constructions so that we can at least form its symmetrical shape, but without an acceptable structure analysis any other solution must be studied more precisely.

In the late 60s, a conservation movement was formed in the field of reinforcing historical constructions, based on the wrong belief that without a good and stable structure, a traditional construction cannot resist external forces. But the worst part was yet to come, because these experts believed in using modern materials such as reinforced concrete in the

restoration of these constructions, believing in their good strength against different types of tension would help to save these monuments.

Ignoring the necessity of Iranian ancient architecture technology revival

One of the impacts of the modernist revolution was new methods of construction. With new knowledge of construction engineering, it became possible to build high rises or suspension bridges. At this time engineering development allowed massive construction and structures; one of the most famous examples was the Eiffel tower. Iran was also affected by this revolution at the beginning of the 20th century. New methods of construction were used by Iranian architects to build great buildings, most of which are still used by governmental organizations and ministries.

But there was also a bad effect on traditional Iranian urbanism and architecture. At the same time, Iran was facing a great number of immigrants from villages to the big cities that were in need of housing for this population. Because of the fast production of buildings in this way, the historical methods were being forgotten. If this technology was intended for Iranian architecture to modernize itself step by step, it could be regarded as a revolution of Iranian architecture, but the thing is it was just a cliché. This new technology was little understood and was even used by non-professionals to solve the housing problem in this situation of fast population growth. Other shortages were completely ignored; things like non-compatibility of the new housing with culture and climate. Now, decades after, we are on the road to perdition of Iranian architecture and it is architects themselves who are sacrificing Iranian architecture to reach so-called modern art and architecture.

To gain from the past, we must start with the procedure of modern architecture from the very moment it entered our culture, but this time we must view the modernism like an instrument to be used in Iranian architecture and not let it influence our basic architectural concepts. While not rejecting the new technology, we must use it in the proper way. After all, we are witnessing many traditional architects in different fields of construction and architectural decoration losing their position and sometimes being absorbed by this new movement and few are employed in the field of conservation and restoration of historical buildings.

After some time, the Iranian Cultural Heritage Organization, facing a shortage of masters of conservation, decided to find them and train a next generation of traditional masons, masters and skilled workers. Because of the ancient way of training (from apprentice to master) with ever decreasing restoration activities, no new generation was trained; besides, because of the few jobs available, some masters were not willing to train apprentices and face the

consequences of competing with them to find new jobs. So a higher education center (not a university) was founded in 1985 in order to organize these masters and gather the facilities for them to train a new generation of educated masters, which in the new technical literature were called technicians. The field of study is called “Conservation and Restoration of Historical Buildings and Urban Textures”. Before that, in the Iranian higher education system this field only offered a Master title and mostly for the graduates of civil engineering and architecture.

At first glance, it seemed the best way possible to revive the inherited knowledge of masters but it did not take long before the original goal was lost. Those ‘technicians’ who graduated from the Higher Education Center were supposed to start practical conservation activities and they had the opportunity to be employed in the Cultural Heritage Organization. When they entered the body of the Organization and faced the differences between themselves and white collar workers, many of them decided to continue their studies in order to gain a higher education title and as a consequence, a better position in the Organization, which from their point of view, was an official job. This was completely contrary with the goal that these technicians were trained for.

The problem became more complicated when this Higher Education Center started to offer this field of study as a B.Sc. degree. It was the first time that the Cultural Heritage Organization was facing the phenomenon of “conservation and restoration of historical buildings and urban textures” with titles like a B.Sc. They were not engineers, they were not architects and they were not even technicians. Whatever they were, they were the production of the Higher Education Centre of the Iranian Cultural Heritage Organization and the Organization was responsible for them. Without the facilities to employ all of them as official staff, many of them are now working in non-related fields and many are struggling to contract with the Organization and we still have a shortage of technicians and masters who can handle the practical job.

In the Deputy Office for Preservation and Conservation where I am working, for example, while almost half of the official staff are graduates of the aforementioned Centre, only one of them still remains a technician, and always has been willing to work on conservation projects. Even when in the historical complex where our Office is situated, we were in need of restoration he was the only person who started the project without hesitation. Because, when he started his education, he did it just for his deep respect and love for the historical monuments that led him to his way. That is why he has never cared about his academic degree; despite he has always been accused of not having the ability to continue his studies.

The lack of paying sufficient attention to the preparation of the documentation process before any preservation activity

The problem will be better explained if illustrated by an example: A doctor in the very first step of treatment tries to diagnose a disease, as it is said, "a disease is cured when it is known". In order to achieve this, he has to do some medical tests and obviously, the use of some medical equipment, such as radiotherapy and MRI scanning could help him to do his job better.

It is generally accepted that before starting any sort of preservation activities, we should provide appropriate information and documentaries of our subject, such as surveys, drawing of general maps and details, mechanical and chemical specific tests and the like. Preparing the documentation process should be considered as the base of any other future activity at historical sites and monuments; either it would be an abstract research project or an operative activity such as renovation. Furthermore, an appropriate documentation process could provide and keep the information, which is the main aim of the cultural heritage protection. If the remains of historical monuments are known as their bodies, then the potential information would be their soul, so we should explore and save this information as much as we can and consider this fact as our main duty. To attend the operative preservation and restoration activities without this process could be even more harmful for a historical building or site.

A comprehensive preservation process includes following steps:

1. Preparing documentation, Technical tests.
2. Pathology: to classify all kinds of damages and causes of them.
3. Assessment: the possible solutions concerning remove, reduction or control the damages.
4. To integrate and evaluate the information and documentaries.
5. Presenting the optimum solutions and their details in the framework of a comprehensive preservation and restoration plan.
6. Presenting a long-term program for preserving the historical property.

Unfortunately, those involved in a large number of preservation and renovation activities in my country are not paying sufficient attention to the mentioned process. Actually, the operative activities are more attractive for the management system; hence, more budgets could be allocated to these sorts of activities.

Nowadays, so many new technologies such as 3d LASER Scanning and geomagnetic surveying are used in the preparing documentation process. Recently, some companies have introduced such equipments to the Organization, but there is still some resistance among the

managing body of the Organization as they perhaps fear being seen to change their minds or maybe its just old fashioned thinking. But changes always happen and this situation is no exception. Nowadays, the experts of the Organization who have learned more about these technologies encourage their bosses to use such facilities for the historical sites and gain the advantages of them.

Archaeological excavations without foreseeing the preservation process for archaeological trenches.

Again an example: A doctor sets out to dissect a dead body to find out the cause of death or acquisition of some biological information. In such a case, he does not have to care about the preservation of the body, because just getting more information is the object of the dissection. But, if the doctor carries out an operation on a living person, then his first duty would be to save the patient's life.

In my opinion, what distinguishes a good archaeologist from a bad one is the sense of responsibility in preserving the trenches as the bodies of a historical site after the excavations, not just doing crude digging. Unfortunately, most Iranian archaeologists manage and perform their excavations without considering even the urgent preservation principals after digging the historical sites and furthermore, they do not even bring their programs in line with those branches of the Organization, which is in charge of the preservation affairs.

Recently, an archaeologist who was the head of the excavation program in a Parthian period's graveyard, located in Yazd province, excavated all the ancient graves inside the cemetery, not leaving even one of them unexcavated as a sample for future researches of the site, moreover she did not even provide appropriate and sufficient documents of her excavations. In other words, so much valuable potential information has been lost as a result of such selfish behavior.

Archaeologists are usually interested in analysis and work on the archaeological objects that are found during the excavations rather than the architectural remains. Thus, most of them collect these portable objects and leave the architectural parts of trenches that culminate in future damages to the remains. When there are asked for such a subject, most of them point their finger at the experts of the Preservation and Restoration Office and accuse them of carelessness in their responsibilities.

In some cases, recognition of the general information of a historical site, such as a general map of an ancient city does not need any archaeological excavations. Instead of direct excavations that cause the above mentioned problems, we could receive this general

information by using some new technologies such as GIS, geomagnetic surveying, geo electrical surveying, infra red surveying and the like. In recent years, the use of these new technologies has been recommended to the archaeological and research centers of the Organization. Some archaeological bases and research departments have started to use such equipment, but most archaeologists still believe in traditional methods of excavations.

I would like to bring an example by pointing to the case of Takht e Soleiman World Heritage Site, which is well known as an international level historical site in Iran. There is a huge and deep thermal spring in the center of the remains of Takht e Soleiman complex that appears as a small lake. The level of the lake is constantly rising as the result of a great build up of sediment. The ancient remains are buried beneath the sediment. In the 1960s, German and Iranian archaeologists started the excavation of some key parts of the huge Zoroastrians fire temple, but the research programs were stopped as the result of the 1979 Revolution. 15 years after the revolution one of the Iranian members of the previous team, Mr. Mohammad Mehryar, took over the archeological researches of the site and continued his studies with the least volume of excavations inside the site, because he deeply believed that excavations should be done on a small scale and new excavations must be limited to necessary ones. He also used to cover the trenches in order to preserve them. He passed away in 2004 and consequently, a young archaeologist was assigned to continue his researches, but he chose a different way. He excavated a wide area inside the site in just two archaeological seasons, which was almost equal to the area excavated since the beginning of the archaeological activities in 1960s!

It is worth mentioning that Takht e Soleiman is located in a high area of the Alborz mountain range, and is usually is covered by snow even in autumn, so the archaeological trenches would be extremely damaged as a result of freezing weather. But the real disaster is the fact that the new archaeology team continues its excavations full speed ahead without any preservation activities in its program. Now, they are continuing their digging on an axis that could be studied by analyzing aerial photos and it seems that their only motive to do so is to find new objects even at the cost of damaging the architectural body of a unique monument.

When one of our colleagues asked the head of the archaeological team whether in his opinion the massive volume of excavation left without any conservation operation would result in damage to the monument or not, He simply answered: "I am afraid if conservators have not progressed as much as the archaeologists……!"

He could be right, if he had used modern technologies, such as geomagnetic surveying, 3D LASER scanning, x ray, GIS and the like in his archaeological activities; but he is not even acquainted with the basics of such methods.

To use such technologies, not only helps us keep the body of an ancient site by avoiding unnecessary excavations, but also could culminate in gaining some valuable general information, which could be used as the basis of long term management plans for the site. Fortunately, nowadays the use of this equipment and methods is increasing among the Organization's related units and research centers.

The lack of comprehensive specific instructions in the field of preservation

In spite of the fact that most preservation activities in Iran are restricted in urgent preservation operations, there are no approved comprehensive specific instructions for such operations. As a result, everyone who is charge of such activities have their own way of facing a preservation case. For example, in the case of roof insulation for historical buildings, in particular those covered by a dome and arches, there is still no agreement among the experts if we should use bitumen or obey the traditional method of using mud and chopped straw (*Kahgel*). As a matter of fact, we are not permitted to undertake restoration activities as a trial and error process.

Variety of the Iranian traditional architecture's forms

Traditional Iranian architecture has a wide variety of architectural styles due the wide area of the country, its long background of civilization and history, and different climates and cultures, all of which has culminated in a wide range and various architectural styles scattered in every part of the country.

Many restrictions make the architect use specific types of material; for example lack of wood does not let the architect think of a wooden structure in central Iran or a warm climate makes the architect think of tall walls in order to produce more shadow and sometimes the introvert culture leads the architect to design inner courtyards.

As a result, we need a wide range of various experts with specific knowledge for each sort of traditional construction and specific equipment as well, to support and preserve all kinds of historical monuments accurately.

Incompatible Construction materials

Costs have always been an important factor in urban economy; therefore, the architect always looks for a way to use the domestic construction material. For example, in mountainous areas he uses rocks and in the dessert tries to use clay or bricks. Also gypsum could be mentioned as a key material in Iranian architecture, which wondrously is available almost all over Iran and with different preparations and combinations can be used in any climate and with

any type of material. That is why in particular cities that we come across have different colors of houses and neighborhoods. All of these are just because of the specific color of the soil or other material available in a specific region.

To use some incompatible materials such as cement, in some preservation and renovation activities for historical buildings could be harmful, because their chemical and mechanical specifications are totally different from the original materials. In addition, to use cement as a mortar for restoring the traditional brick constructions, not only does not let us to return to the original in order to correct our previous operations, but also causes serious damage by keeping the moisture inside the body of the original construction, which are not protected against wetness. For example, filling the joints between the rows of a brick wall with cement changes the path of the moisture from the joint into the surface of the bricks and as a consequence, some scurf will cover the façade of the wall that could damage the construction little by little.

Climate

Another key factor in the case of the preservation of historical monuments is the climate of the region. There are 4 major types of climates in Iran, as mentioned in the following:

- In the warm and humid climate of the northern coast of the Persian Gulf for example, we observe flat roofs made of wood with balconies on both inside and outside façades. Different types of window to let the air flow through the house and materials such as mud and gypsum to act as insulation.
- In the central Iran region which has a warm and dry climate we have a completely different architecture. Vaults, copula, tall walls and ceilings and in the case of urban design, we see narrow allies for instance. Material is mostly brick and mud mortar with gypsum and the roofs are covered by different kinds of domes and arches.
- In rainy temperate areas between the northern side of the Alborz mountain range and the southern coast of the Caspian Sea, gable roofs with different kinds of materials such as metal, wood or bricks are used in order to resist heavy rains.
- In the cold mountainous areas, houses have as few, windows as possible in order to save energy, with low ceilings so that the volume space in need of heating would be decreased.

Those aforementioned characteristics combining with culture and the period in which a monument is created are the factors that affect the architecture and make different types of architecture in Iran. That is why each city has its own character and face.

When we understand that we are facing such a variety of architectural styles in Iran, it becomes more clear how complicated the conservation could be. And unfortunately, those parts of the government dealing with the building and renovating affairs in the cities, not only are not considering these architectural-historical values, but most of their designs for construction or renovation do not even consider the different climates and cultural specifications of the different regions.

As we already have examples of Iranian ancient architecture that considers humans, nature, is energy saving and environmentally friendly, it is not too much to expect new urban designers, who enjoy modern facilities, just to follow their ancestors and consider these essential factors in renovating and constructing new places for cities. As all these projects are designed, accomplished and monitored by a different ministry and organizations, we must not expect just one organization to be responsible for all these conservations of historical values of urban textures and urban design. This is a long-term process and needs to be understood by every part of the government and also needs good monitoring by the cultural heritage organization. And this organization must have the authority to do so, so that it can terminate any project, that is disturbing cultural and historical values of the cities or any individual monument.

Conservation basic theories

There are masters in the field of conservation and restoration, whose theories are studied and used in any historical site and we owe them a lot in the field of restoration and even the primary polices of funding an organization in charge of cultural heritage. But we must not hesitate to criticize any technical action, no matter who the person responsible for the project is; no matter he/she is a university student or the greatest professor ever.

The necessity of a systemic information exchange centre

There is not a defined and well-organized system of gaining and distributing information and up to date technologies among the experts. Most of the experts are not aware of what is going on in international academies, seminars, assemblies and any other scientific event through the world. With the ever-progressing new methods of conservation and even new theories in this field, we need a well-organized information technology system in order to be aware of the latest academic results, although there are a few experts who always look for the latest news and information in the field of historical and cultural heritage preservation. There is no way to organize this information and all the new academic advantages that the experts learn from many sources such as the World Wide Web, personal communications, taking part in

seminars, etc. are limited to themselves and often their specific duties do not allow an opportunity to use their knowledge in the specified field.

A new scientific academic result is useful when it is reflected in prescriptions and technical codes. Therefore, a central core consisting of experts is needed in order to gather all the information of any related scientific event and help other experts to have easy access to any useful information. For this reason, a kind of periodical publisher is needed, so that all the information could be gathered, integrated and distributed in this periodical magazine or alike. This core of information must also be in contact with the experts so that they can gather their information and let others access the information gained by any individual in the organization. Obviously, in this way, we also need to exchange our points of view with the international specific organizations and research centers in order to learn more about similar experiences and the last instructions in the mentioned fields to improve our knowledge and skills.

Malaysia

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GUA TELUK KELAWAR (GTK), AS A CENTRE OF RESEARCH, ANALYSIS AND PRESERVATION OF ARCHAEOLOGICAL SITES AND REMAINS

1.0 INTRODUCTION

The main tasks of the Department of National Heritage (DNH) besides dealing with heritage entities are to preserve, conserve and restore the essential icons of Malaysian Heritages. As well to implement the formulation of related acts, collection of documentation, research, preservation and development of heritage, efficiently and in an orderly manner. It places emphasizes on many aspects including cultural, natural and underwater heritage. National legacy is a slice of memories of a lifestyle of a people that reflect their civilization, so it needs to ensure such memories remain for future generations. In Malaysia, the protection of heritage resources is governed by federal legislation, under the National Heritage Act 2005.

No fewer than 200 potential archaeological sites have been listed throughout the country. The list includes both West and East Malaysia. The potential sites listed comprise the pre-historic era (Paleolithic, Neolithic and Metal Age), proto historic era (defined as the period of 'Indianization', circa 1BC to 1200 AD) and the historical era (14th century onwards). To realize the vision and the mission, Malaysia, in the 9th Malaysia Plan (Malaysia's 5 years major economy blueprint), plans a draft of systematic archaeological excavation throughout the country. Principally, all sites (mostly archaeological ones) that have their own value or criteria of 'heritage' will be guarded under the DNH

2.0 GTK AS A HERITAGE AND ARCHAEOLOGICAL SITE

One of the sites that could be elaborated on is GTK (Gulf Bat Cave). This site is situated at Bukit Kepala Gajah limestone massif around 4 kilometers from Lenggong, Perak, Malaysia. GPS reading's show the location of this site situated at latitude 5º 07' 04" North and longitude 100º 58'

07" East. The cave is accessed through Kampung Lahar and is about four kilometers from Lenggong-Grid road. The walk from the closest vehicular access takes approximately 10 minutes through a rubber plantation, an orchard and scrub land. GTK is located on the foothills; a rock shelter with a floor measuring 32 metres long by 16-20 metres wide. Rises and declines of ground water in the order of several metres of the old water table should account for the cave height. Fluctuations are seasononal, it descends during the dry season. Groundwater occurs preferentially along the bedding and along joint directions in the limestone bedrock. This has resulted in the formation of the rock shelter.

Based on radiocarbon dating taken from various levels in the cave, the average rate of soil formation in GTK was probably 0.17 mm/year. For the same period, i.e., the early Holocene, the average rate for GTK would have been higher at 2.08 mm/year. The difference could be due to the location of GTK at the foothills, where it was more exposed to winds and sheet wash which allowed a lower rate of soil formation.

2.1 Excavation

GTK has been excavated since 1990 by the Center of Archaeological Research Malaysia, located at the University of Science of Malaysia (USM).

2.2 Findings

The oval shaped unifacial tool found here had its prototype dated 74,000 years ago and was discovered in the nearby site of Kota Tampan. Associated with these stone tools in GTK were riverine shells, animal bones, human remains and pottery shards dating back 6000 years.

The skeleton

In March 2004, excavations revealed one burial dated to about 8,300 years ago. A female skeleton was found together with mortuary artifacts such as stone tools, food shells and various meats. The skeleton was found in a tight foetal position, its bones extremely fragile, poorly preserved and in parts crushed beyond recognition. However the skeleton partially damaged by a rockfall was excavated, examined, conserved and measured in order to extract data such as age, height, sex and race. The post-cranial skull bones were very fragil. Only parts of the face bones were preserved – part of the brow ridge, zygomatic arch bone and the palate. The palate

is long and narrow in appearance (dolichurany). Approximately less than 20% of the post-cranial bones were preserved, including large limb bones both upper and lower. At the upper limbs, only parts of the humerus, radius, ulna and scapula were preserved while the right acetabulum of the pelvis, the left fibula and calcaneous of the lower limbs were visible.

Shells

More than 2,019 pieces of shells were recovered from pit 9, 10 and 11 at trench JZ3. The vertical distribution shows that there were an increase in pit 10 and 11 which revealed more than 78% of the total shells found. This sudden increase in reverine shell (Brotia costula/spinoza) and the significant reduction in marine shell (Batissa violacea) should be noted when attempting to delineate the burial area. More than 60.6% of the shells were scattered in quadrant 1 of trench J and JZ3(A) the area where the skeleton was found.

Animal Bones

A total of 350.1 gm of animal bones including lizard, rat, primate and reptile were recovered from this burial site.

Stone Tools

More than 80% of the stone tools excavated had been placed around the skeleton in the area of Trench J and JZ3. The tools were largely limestone flake tools. Three pebble tools, one of quartzite and two of limestone shaped into chopping tools; the quartzite chopper was bifacial flaked. The pebble tools had been placed at the head and feet of the skeleton.

2.3 Dating

The dating for GTK is based on the results obtained from Gua Badak C, which is also located in the foothills, in the same area of GTK and Gua Harimau. Ros Fatihah and Yeap

(2002) dated the age of Gua Badak C by the uranium series method using two sections of a stalagmite. Gua Badak C is about 52.2 ± 9.5 ka and 46.5 ± 15.5 ka. At the latest dating, the caves at the foothills of Lenggong emerged around 8,000 years ago.

3.0 ISSUES

Most countries in the world are facing many issues and problems regarding the preservation and conservation of their heritage, especially archaeological sites. Such issues are similar to those in Malaysia and sometimes they have sensitive issues that need to be dealt with. There are certain issues relating to our heritage preservation and conservation;

3.1 Quarry

Quarry activities will destroy the heritage site especially limestone caves. Although quarry activities can help our economic situation, at the same time such activities will destroy the heritage sites especially archaeological sites and remains. For example the quarry activities have destroyed Gua Badak (Lenggong Valley), the cave site where rock paintings were found a few years ago. These activities have also destroyed many cave sites at Kinta Valley, Ipoh, and Perak such as Gua Khantan, Gunung Rapat, Gunung Keroh, Gunung Karang Besar, Gunung Karang Kecil, etc.

3.2 Guano's

Guano's activities will also destroy archeological data by digging up whole areas which obviously will harm the cultural layer of historic stratigraphy in the cave site. Gua Kajang, Gua Ular and Gua Ngaum (located near GTK) have already been disturbed by these activities. Fortunately, GTK is undisturbed as yet and is protected from these guano collectors as the site has already been excavated and conserved by archeologists from the Archaeological Research Center, University Science of Malaysia (USM).

3.3 Vandalism

Vandalism is a major cause of destruction of the beauty of the cave wall. Some visitors have an interest in making their own memorable sketches such as their

name or number on the cave wall which spoils the natural view of the cave. Most of the caves which have old paintings such as Gua Kelawar (located in the district of Sungai Siput, Perak), Gua Badak and Gua Tambun (located in the Kinta Valley, Perak) have been destroyed by irresponsible visitors. For example, Gua Kajang which is located near GTK has been totally covered by new paintings.

4.0 PRESERVATION AND CONSERVATION

Overall the task of preservation and conservation of archaeological sites and remains in Malaysia are directly under the responsibility of the following two institutions:

1) Goverment Agencies
2) Learning Institutions/Universities

One of the agencies involved in taking care of archaeological sites in Malaysia is the Department of Museums Malaysia. State museums always cooporate with the Department of Museums Malaysia in taking care of all the archaeological sites in the whole country, to maintain all heritage sites. However, the task since 31 March 2006, is under the Department of National Heritage (DNH).

In Malaysia, there are three institutions/Universities that are directly involved in preservation and conservation of archaeological sites, they are the National University of Malaysia (UKM), University of Malaya and the Archaeological Research Center, University Science of Malaysia (USM). These institutions are playing an important role in equiping Malaysia with professional manpower and excellent archaeologists to preserve and conserve our heritage sites. These institutions always undertake research and excavate all the potential site to collect data in the archaeological perspective. These institutions always deal with the Department of Museum Malaysia to undertake in-depth research and excavate potential sites.

Research carried out by the Department of National Heritage (DNH), Archaeological Research Center and University Science of Malaysia (USM) at GTK are:

4.1 Preservation and Conservation

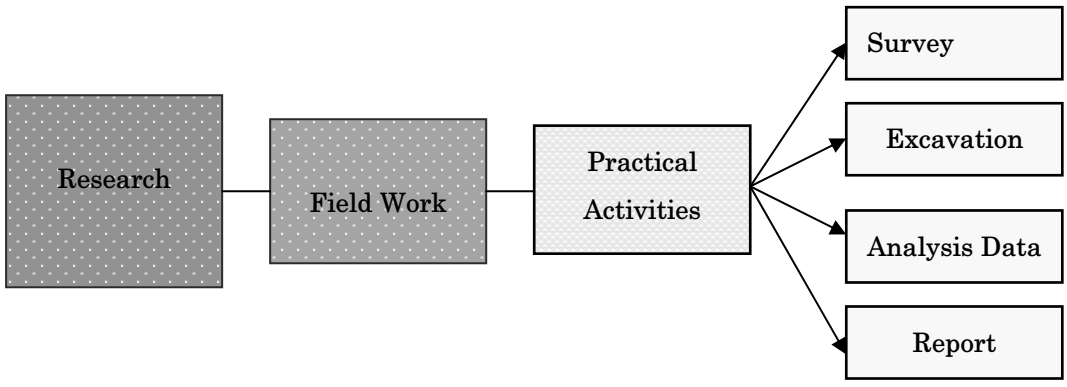
Preservation and conservation of our heritage as archaeological sites and remains is in the hands of the people. Everyone should be proud of it and take their part to ensure that our heritages are safe for the next generation. Conservation means any

action taken to protect data relating our heritage and conservation of artifacts, ecofacts, monuments and so on. To maintain the artifacts proper environmental control, fumigation, physical protection of the artifacts as well as repair, the restoration of damaged works back to their original condition is essential.

Regarding GTK, USM has taken action to preserve and conserve the human skeleton now at the Archaeological Research Center, University Science of Malaysia (USM). The fragile condition of the skull, mandible and teeth meant that preservation had to be under special humidity control in the laboratory at the Archaeological Research Center, University Science of Malaysia (USM). This skeleton is now under 24 hour air-conditioning at a constant temperature of 20 degrees Celcius and at relative humidity control of between 45% - 55%. Other findings such as stone tools, shells, pottery shards and animal bones were also conserved to ensure all artifacts were maintained and safe. In fact, GTK is always kept clean for visitors and students to carry out research and practical studies for ten days or three weeks every semester.

4.2 Research Programme

Until now, the Archaeological Research Center, University Science of Malaysia (USM) still carries out their research at GTK by excavation. At Lenggong Valley, USM has provided a hostel for USM students involved in fieldwork. They will be exposed to the practical side of archaeology such as fieldwork or surveys, excavations, writing reports, analysis and interpretation. The student can apply both theory and practical experience with new technological approaches and modern equipment. Overall, the research steps at GTK site are as below:



According to the flow research, USM also published many articles about GTK in local journals such as *Jurnal Arkeologi Malaysia, PURBA, Museum Monograph* as

research activities from an archaeological perspective. GTK has also held discussions in archaeological seminars, forums etc.

4.3 National Heritage Act 2005

The implementation of the National Heritage Act 2005 is to guide and preserve the heritage sites in our country. The government genuinely ensures our heritage especially the historical and archaeological sites as a legacy for our future generations. The act was implemented to provide the conservation and preservation of National Heritages, natural heritages, tangible and intangible cultural heritages, underwater cultural heritages, and treasure trove and other related matters.

Under the National Heritage Act 2005, archaeological relic means-

(a) Any archaeological deposit; or

(b) Any artifact, remains or material evidence associated with an archaeological deposit, in any part of Malaysia be it fifty or more years old; "site" includes any area, place, zone, natural heritage, monument or building attached to land, archaeological reserve and any land with building, garden, tree or archaeological reserve; "Heritage site" means a site designated as a heritage site under section 24.

- *Section 86 (National Heritage);*

(1) No person shall excavate any land for the purpose of discovering an object unless he holds a license approved by the Commissioner

(2) Any person who contravenes subsection (1) commits an offence and shall upon conviction be liable to imprisonment for a term not exceeding five years or to a fine not exceeding fifty thousand ringgit or both.

Based on the statement of the National Heritage Act 2005 in Section 86, all heritage sites especially archeological sites are absolutely protected.

- *Section 112. Offences in respect of heritage sites*

(1) No person shall, without the approval in writing of the Commissioner –

(a) dig, construct, excavate, build, plant trees, quarry, irrigate, burn lime or deposit earth or refuse, on or in the heritage site or conservation area;
(b) demolish, disturb, obstruct, modify, mark, pull down or remove any monument in any heritage site;
(c) erect any building or structure abutting upon a monument in any heritage site;
(d) destroy the relationship of a building and its environment that is incompatible with the character of the neighborhood in any heritage site;
(e) clear any area or interfere with, destroy or remove any tree, plant undergrowth, weed, grass or vegetation in any heritage site; or
(f) Undertake any activities or actions that would likely cause damage to the adjacent and surrounding land which have been registered as a heritage site.

(2) Any person who, without lawful authority, contravenes subsection (1) shall be guilty of an offence and shall on conviction be liable to imprisonment for a term not exceeding five years or to a fine not exceeding fifty thousand ringgit or both.

- *Section 113. Offences in respect of heritage object*

Any person who destroys, damages, disfigures, disposes of or alters a tangible cultural heritage, without a permit issued by the Commissioner commits an offence and shall on conviction be liable to imprisonment for a term not exceeding five years or to a fine not exceeding fifty thousand ringgit or both.

- *Section 114. Offences in respect of National Heritage*

(1) No person shall, without the written approval of the Commissioner, transfer, demolish, remove, alter, renovate, export, add to deal with any National Heritage except in cases of urgent and immediate necessity for the safety of persons or property.

(2) Any person who contravenes subsection (1) commits an offence and shall on conviction be liable to imprisonment for a term not exceeding five years or to a fine not exceeding fifty thousand ringgit or both.

- *Section 118. General Penalty*

(1) Any person who commits an offence under this Act or any regulations made under this Act where no penalty is expressly provided shall on conviction be liable to a fine not exceeding fifty thousand ringgit or to imprisonment for a term not exceeding five years or both, and for a second or subsequent offence he shall be liable to a fine not exceeding one hundred ringgit or to imprisonment for a term not exceeding ten years or both.

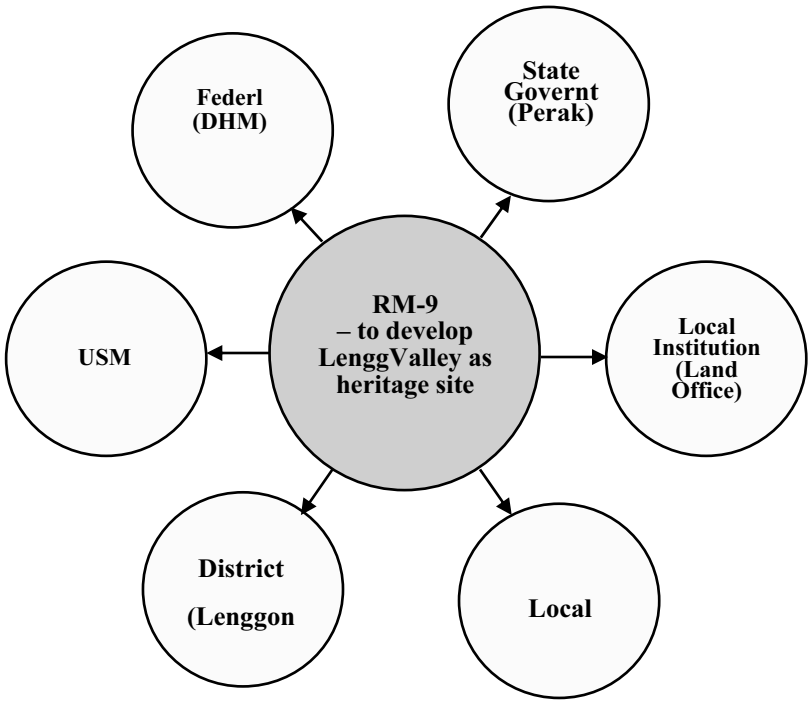
(2) Where the offence committed resulted in damage to or the demolition or destruction of a heritage item, the court may order the person to pay, in addition to any penalty that may be imposed under (1), the costs of the repair, restoration or reconstruction of the heritage item.

In general, the implementation of the National Heritage Act 2005 is an attempt to preserve and conserve our heritage such as artifacts, monuments and archaeological sites. The National Heritage Act 2005 also targets the preservation of antiquities and archaeological sites and control of the export of antiquities. Apart from that, the Department of National Heritage (DNH) has registered all potential sites of archaeological interest as a record known as the National Heritage Register (Daftar Warisan Kebangsaan). In future, the Department of National Heritage (DNH) will provide all the data concerning our heritage including arts, history, culture, festivals, folklore and archaeological sites in Malaysia as general information source. The public, tourists, students and researchers can access all data easily.

4.4 Blueprint To Develop Heritage Sites

RM-9 was a long-term programme (five years) undertaken by our goverment to develop more structures and facilities to improve the social life of our people. It's a blueprint to provide the infra-structure, hospitals, education, health, defence, culture programmes, research and development, etc. All agencies are required to deliver their services to ensure the aim of our goverment will be reached. Accordingly, under RM-9, the Department of National Heritage also has a blueprint to develop Lenggong Valley as a Heritage Valley. This programme was a future plan designed to develop all the archaeological sites in Lenggong Valley as a world heritage standard. All the archaeological sites will be protected in one zone to maintain evidence, as well as being a regional concept towards the development of whole

areas of cultural importance. These sites such as GTK, Gua Gunung Runtuh, Lawin, Bukit Jawa and Gua Harimau did not exist as preserved sites and were isolated before, now, however, the plan to develop all the sites in one whole area is a great chance. And it will give more advantage to local communities to increase their income by selling their products such as handicrafts, local food, domestic tourism etc. As well as the caves, mountains, hills, rivers, lakes, parks, gardens, culture and all that is environmentally natural provides an asset for the holistic development at Lenggong Valley.



The Department of National Heritage receives co-operative assistance from agencies particularly State Government, local municipal governments, local institutions, the land office and the important institution is the Archaeological Research Center, University Science of Malaysia (USM) which was the pioneer of research at Lenggong Valley. Through research and excavation by USM, in the Lenggong Valley there are archaeological sites such as Kota Tampan (dating back 74,000 yrs), Bukit Jawa (200,000 – 100,000 yrs), Bukit Bunuh (40,000 yrs), Lawin, Gua Gunung Runtuh (10,000 yrs), Gua Badak, Gua Batu Tukang (2000 yrs), Gua Dayak, Gua Harimau (4000 yrs) and GTK (8000 yrs). All sites are now under the Department of National Heritage which proposes to register the sites under the National Heritage Act 2005 later this year.

5.0 CONCLUSION

The main focus of establishing the Department of National Heritage (DNH) was to take positive action to preserve and conserve our national heritage sites. However, at the same time all Malaysian peoples should be responsible and take part in the preservation and conservation of archaeological sites and remains, as they are our cultural heritage. GTK at Lenggong Valley is a real example of where archaeologists fulfill their responsibilities to expose our heritage by research, analysis and preservation of archaeological sites and remains.

REFERENCES

National Heritage Act 2005

Mokhtar Saidin. 2005. Cave formations of sites with skeletal remains in Lenggong, Perak. Dlm. Zuraina Majid. 2005. *The Perak Man and other prehistoric skeletons of Malaysia*. Pnyt. Pulau Pinang: Universiti Sains Malaysia. Hlm. 119-130.

Steven Chia Ming Soon. 1995. Prehistoric pottery sources and technology in Peninsular Malaysia based on compositional and morphological studies. In. *Monograph Department of Museum and Antiquity Malaysia*.

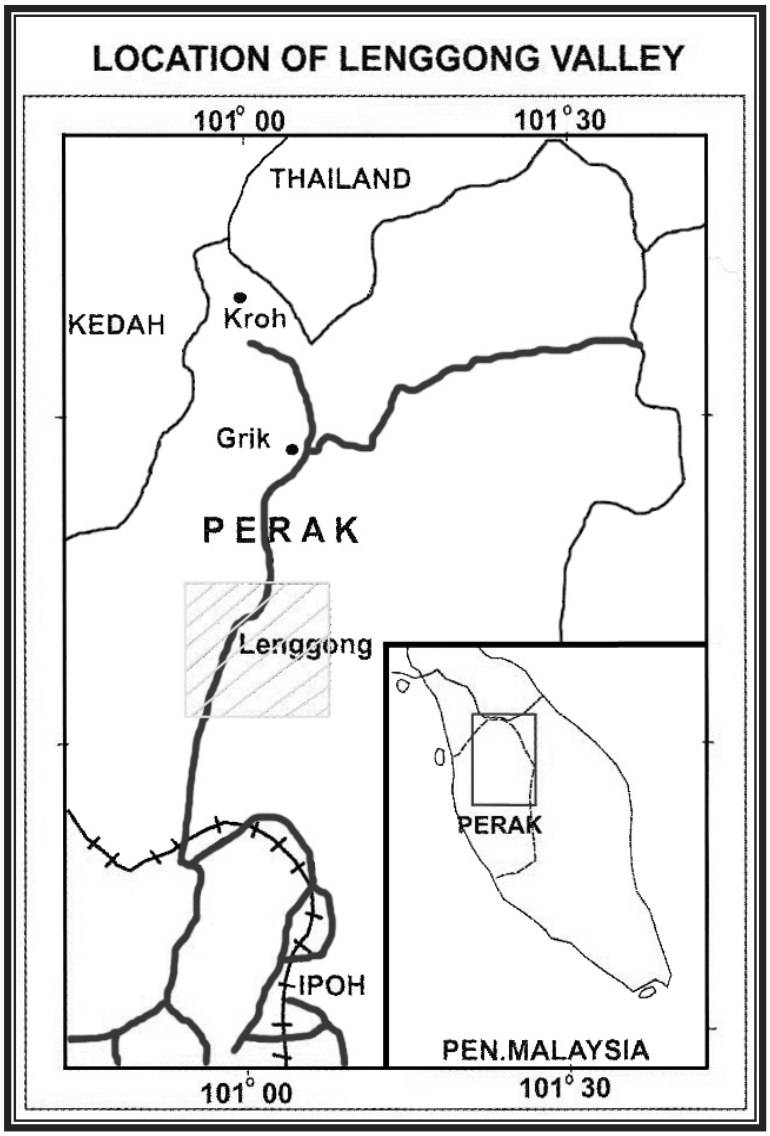
Teuku Jacob & Agus Soepriyo. 2005. A palaeonthrological study of the Gua Gunung Runtuh. In. Zuraina Majid. 2005. *The Perak Man and other prehistoric skeletons of Malaysia*. Pnyt. Pulau Pinang: Universiti Sains Malaysia. Pg. 33-43.

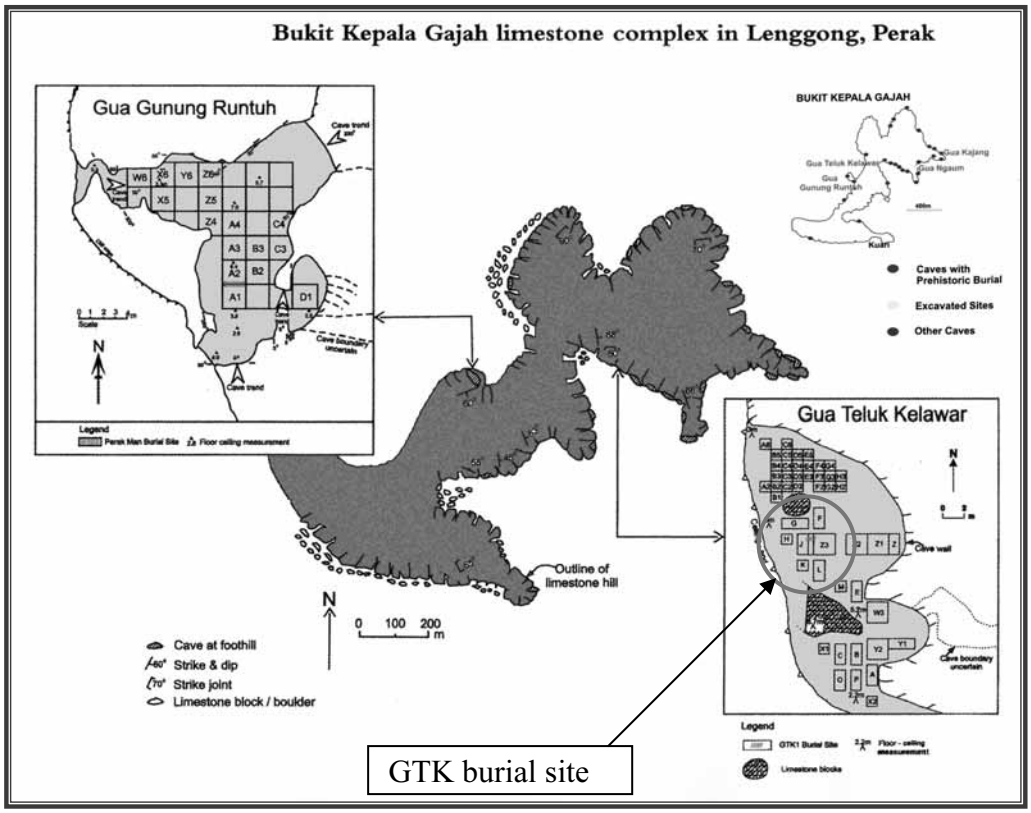
Zulkornian Hassan & Steven Chia Ming Soon. 2005. Gua Harimau, a prehistoric cemetery in Lenggong, Perak. In. Zuraina Majid. 2005. *The Perak Man and other prehistoric skeletons of Malaysia*. Pnyt. Pulau Pinang: Universiti Sains Malaysia. Pg. 363 – 382.

Zuraina Majid. The excavation and analyses of Perak Man buried in Gua Gunung Runtuh, Lenggong, Perak. In. Zuraina Majid. 2005. *The Perak Man and other prehistoric skeletons of Malaysia*. Pnyt. Pulau Pinang: Universiti Sains Malaysia. Pg. 1-43.

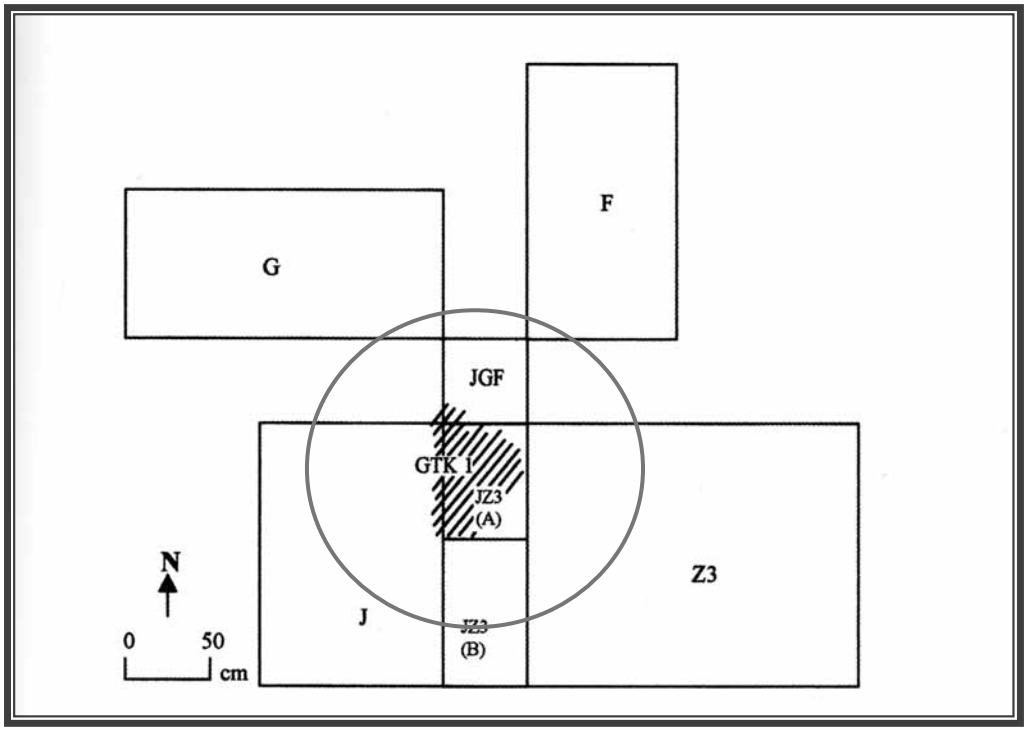
Zuraina Majid at al. A skeleton from Gua Teluk Kelawar, Lenggong Dated 8,400 ± 40 bp. In. Zuraina Majid. 2005. *The Perak Man and other prehistoric skeletons of Malaysia*. Pnyt. Pulau Pinang: Universiti Sains Malaysia. Pg. 345-361.

Zuraina Majid. 2003. *Arkeologi di Malaysia*. Universiti Sains Malaysia, Pulau Pinang: Pusat Penyelidikan Arkeologi Negara.

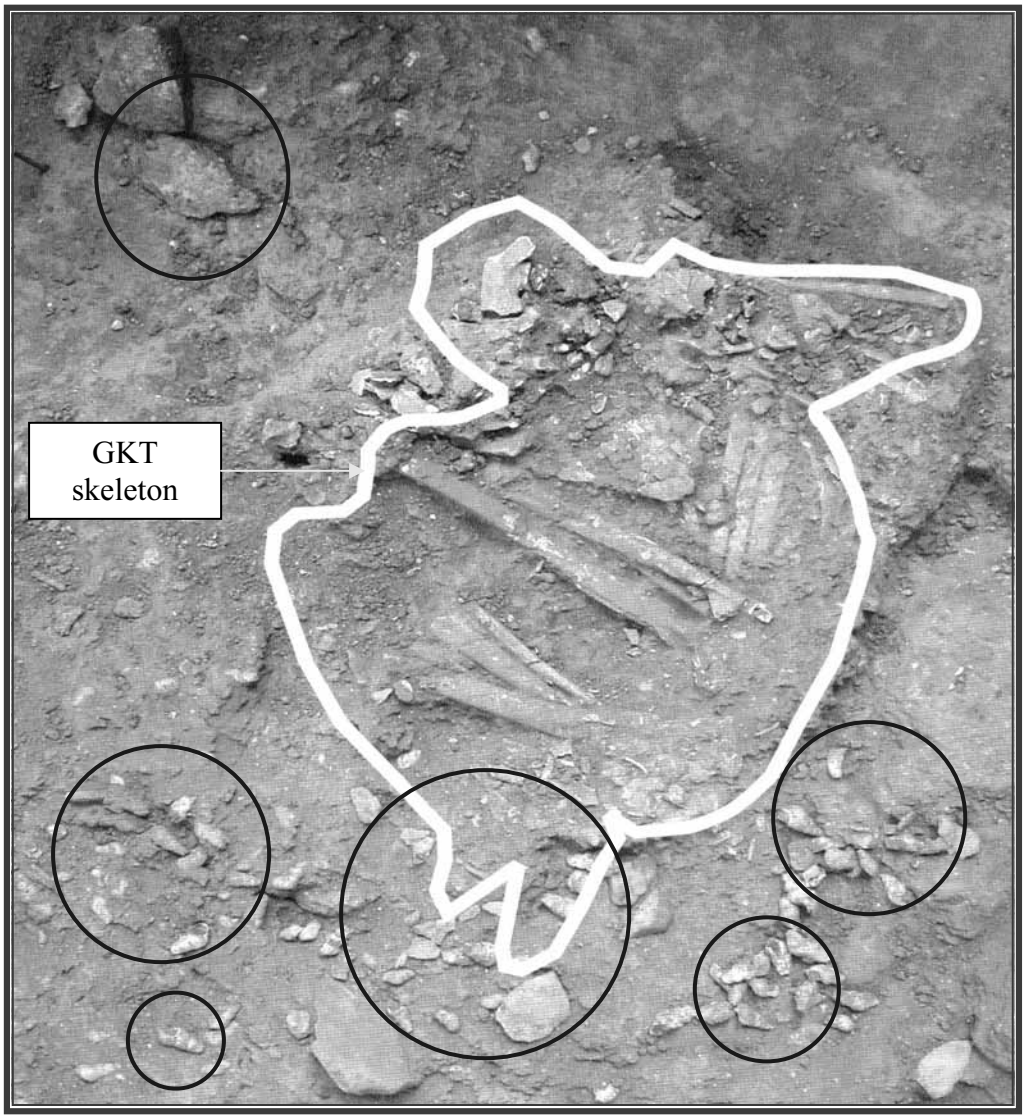




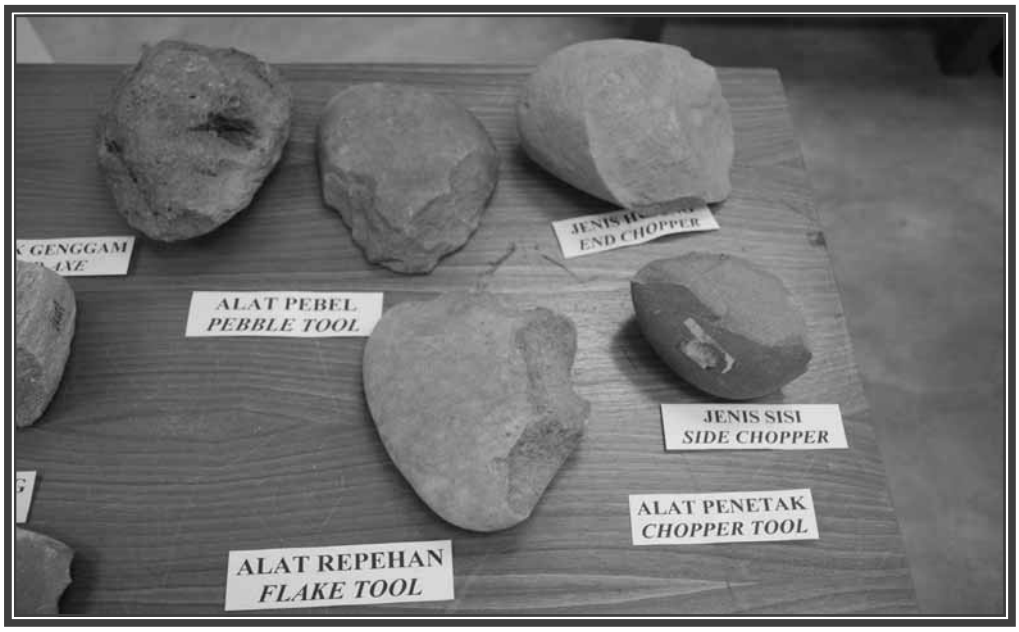
Ground map showing the location of GTK.



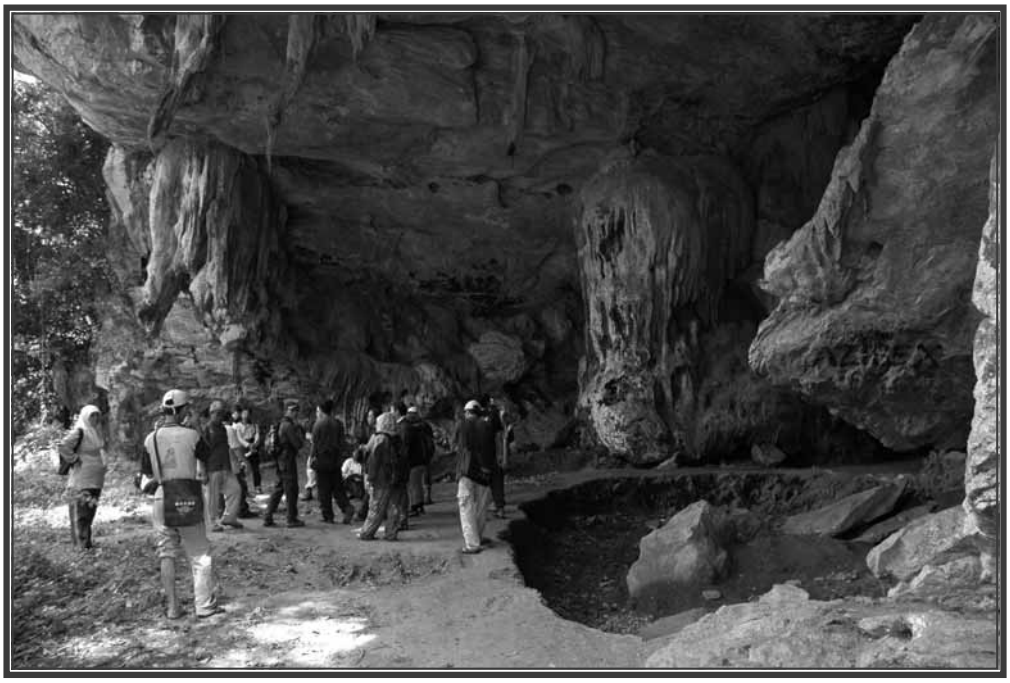
Location of GTK skeleton in trench JZ3 (A)



GTK in situ in the foetal position, buried with stone tools, faunal remains and shells

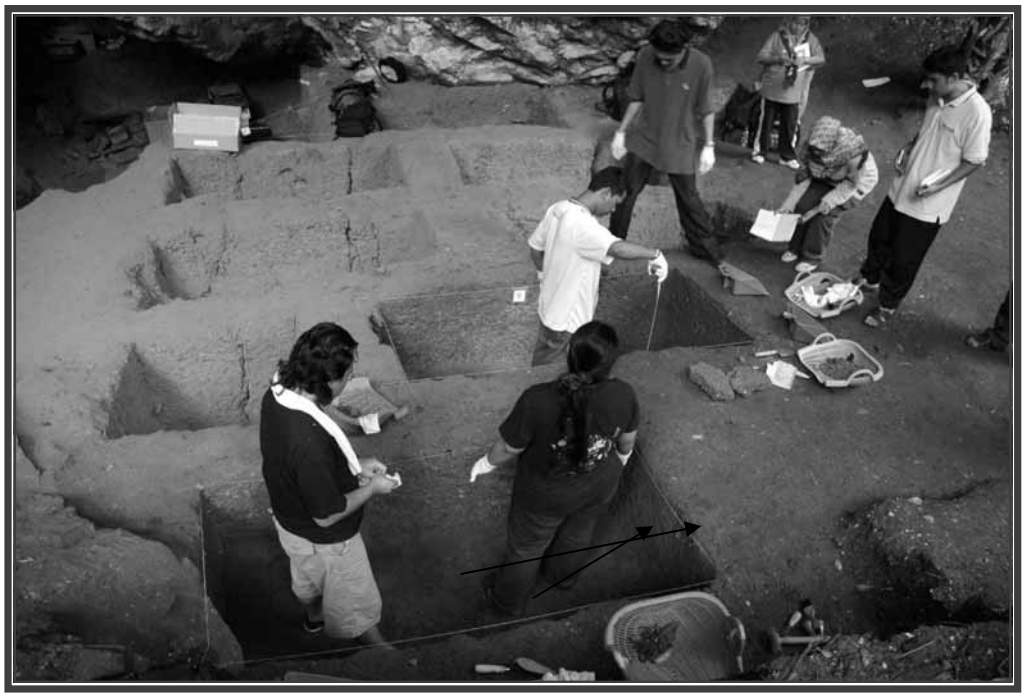


Stone tools at GTK



Guano activities

Vandalism by irresponsible visitors



Excavation at GTK

Maldives

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Problems and Need for Cultural Heritage Protection and Restoration Activities in the Maldives-- Mainly as concerns archaeological sites and remains.

The Maldives is a group of 1190 small, low-lying coral islands situated in the Indian Ocean. Of these islands, some 200 are inhabited. The group's total area, including land and sea, is about 90,000 sq km. Since the islands are small and low-lying, no island is more than a few feet above sea level. The topic of this paper is the problems and needs for cultural heritage protection and restoration activities in the Maldives, mainly as relates to archaeological sites. Cultural heritage encompasses the values, beliefs, practices, institutions, monuments etc. of an entire group of people.

The National Council for Linguistic and Historical Research, where I work in the Heritage Department, is acutely aware of the need for cultural heritage protection and restoration, and of the numerous problems associated with this arduous task. Today the term "Cultural Heritage" has undergone a change. Once it encompassed the monumental remains of cultures. Now the concept includes new categories, such as the intangible, ethnographic or industrial heritage. Today, currently living cultures, as well as cultures of the past, are equally vital to the heritage of a nation. In today's high-tech world, the documentary and digital heritage is rapidly becoming part of the world's cultural heritage. In most nations, including the developing nations, cultural and educational resources are being produced and accessed in digital form, rather than on paper. The need to preserve the intangible cultures, as well as the tangible, is very great. For a developing third world country like Maldives, the problems associated with cultural heritage protection and restoration are immense. For an island nation like Maldives, where there is more sea than land, underwater heritage is also extremely important.

This paper deals more with archaeological sites and remains, which are an integral part of any nation's cultural heritage. Archaeological sites are associated with ideas or beliefs of a past civilization. In Maldives, with the conversion to Islam there was no total destruction of Buddhist temples. Many in the capital Male' would have been destroyed, but the sites all over the archipelago were merely covered up and abandoned. Later some were excavated and

investigated, but no restoration or preservation work was ever undertaken. This has resulted in the loss or theft of important artifacts.

As the islands of the Maldives are far flung and isolated, the archaeological sites are also on different islands, and access to them is somewhat difficult. As the vast spans of ocean separate one island from another, transport between them is difficult and expensive. Archaeological remains exist on most islands. Archaeological excavations and other evidence illustrate the fact that Maldives has been populated for more than two thousand years. In Maldives there are no mountains or hills. The islands are generally very flat, no more than 3 or 4 ft above sea level. However, on several islands there are hemispherical mounds about 15 – 30 ft in height. Research points to the fact that Buddhism existed in the islands since its arrival during the third century BC. The mounds are what remain of the monasteries and temples built during the 1000 years or so in which Buddhism flourished in the Maldives. Most of the monasteries were constructed on large islands.

The first reference to archaeological sites in the Maldives was made in 1835. Mr. H. C. P Bell of the Ceylon Civil Service, who was stationed at Colombo in 1879, visited Maldives in 1879 and suggested that an archaeological survey would establish that Buddhism had flourished there. Later, in 1920 and 1922, Mr. Bell carried out some excavations, which established that there were many Buddhist archaeological sites in the Maldives, dating back to pre-Islamic times.

In Maldives, there are two types of archaeological sites: those that are on particular islands and those about which nothing is known except their existence. The main problem we face today is that resources available in the field of archaeology are very scarce. There is no skilled manpower, materials or financing with which to carry out excavations scientifically. The terrain and the climatic conditions of the Maldives are adverse factors when excavated sites are kept exposed.

There are 128 known archaeological sites on 91 of the islands. Among these, some are considered to be sites of the pre-Islamic period. Earlier excavations were carried out by amateur Maldivian teams on the islands of Fuah Mulaku, Thoddoo, Ariyadhu and Kin'bidhoo. These excavations were not scientifically conducted and resulted in extensive and irreparable damage to the sites. The ancient archaeological site of Kaashidhoo Kuruhinna Tharaagan'du is the only scientifically investigated archaeological site in the Maldives. Kaashidhoo is a large island, situated in Male' atoll, a few miles north of the Capital, Male'. The navigation teams that carried out the excavations did not bother to preserve the place.

Foreign archaeologists, such as the well-known explorer Thor Heyerdahl and Professor Egil Mikkelsen of the University of Oslo, conducted excavations on different islands of the Maldives. These excavations disclosed structures built about 400 years before the advent of Islam in the 12th Century. Members of the Staff of the National Council for Linguistic and Historical Research always worked with these foreigners in the excavation work.

Maldives being a group of islands, with more water than land within the country's borders, underwater archaeology is immensely important. More or less the same techniques could be applied to the conditions of working underwater. In Maldives there are 48 known shipwrecks. By finding more about the wrecks, more light would be shed on navigation in the Maldives and in the Indian Ocean as a whole. Historical wrecks, like vessels, aircraft and such underwater objects, constitute the underwater cultural heritage. There are also submerged cities, and human objects like underwater cave paintings. This unique part of the heritage should be protected from treasure seekers and looters who disregard all archaeological methods of preservation.

Other than archaeological sites and remains there are other historical and cultural monuments that are in urgent need of protection and restoration. The ancient mosques of Maldives, tombstones, monuments and artifacts in the National Museum are all part of our cultural heritage that need to be preserved for all time.

The early history of the Maldives will come to light with proper excavation of the ancient archaeological sites found on different islands. Preservation and conservation are serious problems, due to lack of professional expertise. Cultural heritage protection is still a new and young discipline in the Maldives. We still have no qualified archaeologists or conservators. As a result of awareness programs conducted by the NCLHR, the populace of the Maldives is gradually waking up to the fact that it is of vital importance to preserve our cultural heritage as a legacy for future generations. Only then can we understand our past. It is of the utmost importance that the future learn from the past.

Micronesia

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Problems and needs for cultural heritage protection in the Federated States of Micronesia (mainly concerning archaeological sites and remains)

The Federated States of Micronesia consists of four states: Pohnpei, Yap, Chuuk, and Kosrae. The FSM comprises the Eastern and Western Caroline Islands and its total land area is just 270.8 square miles stretched over more than one million square miles of the Western Pacific Ocean.

Pohnpei is the capital of FSM and the largest and highest among all the state islands. This classic high volcanic island is well known for its historical site, Nanmadol, a vast stone city on a manmade island.

Yap is a high island lying the farthest to the western side of the FSM states. It is known for its dancing grounds and stone monies.

Chuuk is situated between Yap and Pohnpei state. It is best known for the under water archaeological sites of WWII sunken vessels.

Kosrae, the island of the sleeping lady, is located farthest east and closest to the equator of all the states. It is known for its Lelu ruins, similar to the Nanmadol structures in Pohnpei state.

It is true that the FSM is culturally and linguistically Micronesian, but each Island state has its own distinct rich culture and languages with different customs and traditions. European, Japanese and American cultures have strongly influenced these cultures and provide a common thread throughout all of them. Because of these influences, more problems and the needs for cultural heritages protection increased

Like most countries, development may be the most common thread among all the problems in the FSM. Since most people from the FSM are now highly influenced by foreign cultures, clearing of land for building modern houses near or within an archaeological site does not

bother them. Even the government sometimes doesn't care, building a recreational facility for the FSM games is more important to them. Sometimes political and financial issues are a problem, the government may build a facility for a financial source like apartments, or maybe lease land on which a historically significant heritage exists.

Another major problem is natural causes, erosion or natural disasters and of course over-grown trees will naturally demolish or deform the physical characteristics of sites if not carefully protected. Sometimes visitors are the problem, they sometimes remove or misplace any removable remains or artifacts to where they please. Sometimes the institutes or researchers who took artifacts outside for detailed analysis create problems, some never return them.

The true major problem of protecting the archaeological sites in the FSM from my own personal point of view is the lack of work effort and building capacity between the agencies and landowners. For example, if someone does not have enough land and needs more planting space it is easy to get (for an archaeological site, the agencies must consult the landowners for investigation and try their best to convince the landowner otherwise). Poor legislation on the protection of cultural heritages is a definite problem. The government must determine a way to protect all the historical sites for the benefits of youth or younger generations. These problems are just among the few problems encountered at this stage in the FSM. Ever since the introduction of foreign cultures into the FSM, money which is power and the main source of living today has totally wrecked some of our pride and heritages. Poor management and poor public awareness within the state causes even more damage to our cultural heritages.

The need of all the states of the FSM is basically, more support and assistance from the knowledgeable countries on financial issues, field methodologies and protection program areas. The FSM is an under or non-developed country which has a vast variety of cultural heritages that must be recognized locally, regionally and nationally. Most archeological sites in the FSM need to be restored, rehabilitated and most important, preserved and protected.

Since I am from the State of Pohnpei, the rest of the report will be based on the problems and needs of Pohnpei State, which I strongly believe is similar to the rest of the FSM states.

Pohnpei State has one of the most outstanding archaeological sites in the FSM, Nan Madol Ruins. This monumental complex is now on the U.S. National Registry list of Historical Places and National Landmarks. Hopefully by the end of this fiscal year, it will be a grandfather to the Pohnpei state registry of historical places. Like most of the archaeological sites throughout the FSM, it is owned by several land shareholders. The demand of each landowner varies when it comes to access the site and fees for entering each land property. For the government to be

able to protect the site, they must somehow provide for the demands of each landowner. These issues not only create problems for the government to protect the area but create problems and great disputes among the landowners. The site was recently being prepared for the government to help maintain it but it was not able to maintain the full integrity of the site. Overgrown trees have caused the interior wall of the most intact structure, Nan Douwas to collapse. The structure might be possible to restore but more funding and manpower is needed for a careful investigation and restoration of the collapsed sections. This is the same at most of the similar architectural structures, such as Lelu of Kosrae State.

A tentative list of potential archaeological sites were submitted by all the states of FSM to the World Heritage list, World Parks and State registry of Historical places for nomination and registration. Owing to poor legislation and upgrading of criteria for registries such important progression is difficult. Working through the system is complicated and must be thoroughly explained to all involved agencies for clearer and smoother flow.

Another problem is lack of manpower and skills of the responsible agencies. Like for instance, Pohnpei state, only one field surveyor is available and management needs to be improved for better preservation and protection of sites. Sending trainees or hiring professional expertise to do more intense training requires a lot of funding of which we have a limited supply.

Public needs and demands are important too but create problems as well. Problems of building houses for shelter and farming land for food for the people must be solved. My own thinking is that if a family or person has no choice but to destroy or disfigure an archaeological site for such purposes, it might be better for the government to somehow find a replacement of public land or property for use.

Tourism is one of the major contributors of economics for Pohnpei State, tourist and researchers are welcome to visit the sites. But because people have different personalities, abuse and removal of remains have disturbed the physical characteristics of the site. Researchers may be a problem if taking artifacts away for further analysis and never return it or probably keep or sell it or maybe dismantle the site just to find what they need and never bother to restore to its most original state, which I believe won't happen but just a minor concern.

There are other problems concerning traditional heritages and oral histories of the FSM. All the states have a unique cultural and traditional heritage. Nowadays, the older generations or historical informants are passing away and need to be interviewed in regard to locating historic sites.

Enough of problems, I think its best to go to the needs now. Need for all the states of FSM is simple, more money to run the show or go back to the past when outside influences were not introduced. My own personal belief, the protection of cultural heritage within the states needs help from any available source from any nation who is willing to support it.

FSM is a very small nation but rich in cultural Heritages compared to some other countries but has a vast selection of rich cultural heritages, which I'd like to share with anybody anytime, it would be my pleasure.

Mongolia

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Institute of Archaeology

The Mongolian Institute of Archaeology is the main institute which runs primarily archaeological research and the safeguarding of archaeological properties and findings. This institue was established in 2002 as an independent Institute. Our institute is under the authority of the Mongolian Academy of Sciences, there are 16 institutes.

Our institute has been running research works in the fields of the Palaeolithic, mezolithic and neolithic ages, Bronze and early Iron Ages, Khunnu and ancient states period, Mongolian dynasties period, Paleoanthropological and paleozoology research and Restoration of archaeological findings. Archaeological research started in Mongolia at the end of the 19th century. One of the earliest, long-term joint Mongolian-Russian expeditions was established in 1920. Since the 1990s, our research cooperation has broadened. Various scientific institutions from other countries such as Russia, Korea, USA, Japan, Germany, France, Turkey, Belgium and Italy have been motivated to undertake archaeological research with us.

Every year our institute conducts over 10 joint archeological research projects. Generally each expedition has one conservator from the financial supporter country for immediate conservation of the findings. Conservators from Mongolia do not have the chance to be involved on the site excavation. Many archaeological artifacts are found by joint research expeditions. There have been more than 20.000 archeological findings from the Palaeolithic Age. Archaeological findings include stone, leather, wood, iron, bronze, ceramics, silver and gold artefacts etc. These findings are brought to our institute. We generally take photographs, carry out documentation and some cleaning and some restoration of archaeological findings. . Some objects are sent to the Center of Mongolian Cultural Heritage for further conservation treatment.
Because our institute doen't yet have a good laboratory we send samples to some foreign countries for dating and material analysis.

Cultural heritage of Mongolia and archaeological survey

The broad land of Mongolia has a history and a culture that have been built up over the course of several thousand years of human habitation, and is regarded as one of the cradles of civilization.

Research of Palaeolithic, Mesolithic and Neolithic Ages:

The Mongolian-Russian-American joint Palaeolithic expedition has unearthed evidence that proves that about 750.000 – 800.000 **(seven hundred fifty thousand to eight hundred thousand)** years ago early hominoids were living in the present Mongolian territory.

Stone tools: Many stone tools have been found in Mongolia. Early Man fashioned stone tools. As he began to acquire finer skills in the working of stone, he made not only weapons but also all kinds of jewelry, implements and stone monuments, and began to learn how to construct villages and towns.

Palaeolithic (HOIT TSENHER AGUY CAVE) petroglyphs: Mongolia is rich in rock paintings that constitute archaeological relics of ancient man's multifaceted primitive, social and cultural life. By the style and manner of drawing, chronologically these petroglyphs pertain to different historical periods.

In 1952 a geographer O.Namnandorj was the first to discover ancient drawings in the Hoit Tsenher Aguy Cave of the Manhan Sum in Hovd Aimag. Later, academician A.P.Okladnikov made an independent study and published several scientific articles where he suggests that those petroglyphs related to the Palaeolithic period, a notion, which the overwhelming majority of scholars and researchers have come to support. The Hoit Tsenher Aguy Cave is situated 25 km to the west of Manhan Sum centre and is a limestone cave. Its inner height is nearly 15 m, length is 30 m and width is almost 40 m. There are several ancient drawings on the rear wall in the northern part of the cave.

There are many types of animals, wood and a number of dots drawn on the brighter wall of the cave. The male animals may be recognized by the way they are drawn standing still and by the way a male deer, for example, is drawn with big horns. There are also elephants, ostriches, wild goats and bison drawn on the ceiling in the corners of the cave. It is very interesting that there are many dots above the ostrich. Similarly, there is a two-hump camel drawn in

profile. Thus scientists have established that a tradition of cave painting of animals and different figures originated in the Upper Palaeolithic period.

Many cave paintings such as in the Von de Gom, Lyasko, Castillio, Three-Brother Cave, montinyak, Combarelle, Nio and Altamir found in Western Europe, France and Spain have been studied in depth. Scientists now consider that cave painting, which is a most ancient classical relic of primitive art as originating in Western Europe is no longer valid because relics from the Palaeolithic period are being found in Eastern Europe, the Near East, Siberia and Central Asia.

Scientists have also established that the Hoit Tsenher Aguy Cave paintings are similar to the petroglyphs pertaining to the Western European Palaeolithic period. A number of dots above the animals in the Hoit Tsenher Aguy cave paintings are similar to the petroglyphs in the western European Palaeolithic period. A number of dots above the animals in the Hoit Tsenher Aguy cave paintings denoting the number of animals is a characteristic feature of Palaeolithic period art. Trees drawn in the Hoit Tsenher Aguy cave paintings are also similar to those Palaeolithic period paintings found in Western European caves such as Castillio and Nio.

There is a good reason to attribute these petroglyphs to the Upper Palaeolithic period because apart from deer, wild sheep, camels and bison depicted on the cave paintings in Hoit Tsenher Aguy cave which exist even now, there are tigers, elephants and ostrich which once inhabited ancient Mongolia but later disappeared.

Research of Bronze and Early Iron Ages:

The Mongolian-Russian-American "Altai" expedition team discovered substantial rock art sites known as "Tsagaan salaa and Baga-Oigor"; these sites are of cultural significance because they show how artistic values are very influential in understanding ancient culture, particularly Bronze Age culture in Western Mongolia and Altai regions.

Slab graves: Also known as "square graves" are generally constructed of four slabs of stone as an open box, with deer stone; the dead body is buried 1-2 meters beneath the ground. Such graves date back to the Bronze and Iron Ages (12-3 centuries B.C.) and spread from the Altai ridges to the Mongolian eastern plateau, from Baikal Lake to the Gov areas. Square graves are located on low hilltops, passes in groups of 2-3 and usually are located at the foothills, in valleys and plateaus at tens or dozens at a time. Excavations of the square

graves have been carried out in the basins of Herlen, Tuul, Onon, Hurh and Orhon rivers as well as in the Mongolian eastern plateau. Similarly, excavations were made in the Baikal Lake areas. Researchers divide the square graves into following four categories:

Ⅰ.with high stone statues in the four corners;
Ⅱ.with low flat stone walls;
Ⅲ. with four disc-type walls;
Ⅳ. with high walls.

Excavations of square graves typically reveal bones of wild and domestic animals, pottery fragments, decorative bronze buttons, beads, and ornamental items made of gold or semi-precious stones.

Burial mounds: The Central Asian nomadic people created ceremonial and cultural relics such as burial mounds. A burial mound consists of a round circle made of stones in the center, a round or square frame made of upright stones and 10-150 stone surrounding piles. They are located on flat plateaus, in the river valleys, at the foothills, on the hilltops and mountain passes. In central and western parts of Mongolia impressive burial mounds are widely found, however, in the eastern part there are very few. Archaeological excavations of the big burial mounds are in the initial stage but there is no doubt that they have to be studied scientifically.

The excavations of the ancient graves in Southern Baikal, Tuva, Southern Siberia, and Central Asia reveal that larger graves belong mostly to the Early Bronze and Iron age. Some scholars make an interesting suggestion that ancient graves are not only archaeological relics but may also constitute artefacts of ancient architecture and astronomy.

Deer stone: The nomadic herdsmen of those times constructed stone mounds and stone-flagged graves of great size, and used great skill in the beautiful execution of carved “deer stones”. The “deer stones” were originally created in the Bronze and Early Iron ages by the tribes inhabiting the territory of Mongolia, Baikal Lake and Tuva Altai Mountain areas. “Deer stones” are erected mainly one by one on plateaus, in valleys, at foothills and on small hilltops and comprise of up to 20 stones at a time as a composition of burial mounds or memorial construction. The “deer stones” are between one and four meters high. The four sides of a long oblong stone are nicely trimmed and the total surface is divided vertically into three bands. All around the stone in the upper section are images of the sun and moon, and in the middle section are many deer, leaping and flying. The lower section is decorated with carvings of knives, swords, bows and quivers, battle axes, hooks, mirrors and so on.

In fact “deer stones” are the most ancient anthropomorphic monumental sculpture. To make a “deer stone” it requires drawing, craftsmanship and carving skill as well as painstaking efforts, hard labour, time and workmanship. “Deer stones” are erected and located at specially selected locations, surrounded by beautiful nature, as burial mounds or memorial constructions intended for the public observation. Judging by size, form, substance and intention they are remarkable monumental sculptural works. Scientists of these stone monuments estimate that they range in age from the second millennium to the third century BC.

Until now over 500 “deer stones” have been found of which about 450 are on the territory of Mongolia and the rest are found in the southern Baikal, Tuva and in the Russian Altai areas. A few stones with deer drawings on them very similar to the “deer stones” have been found in Kazakhstan, Central Asian states, Orenburg province, the Caucasus, Black Sea, Bulgaria and Elbe. Scientists consider that “deer stones” were not intended for transportation nor were movable to one place or another. They were created by warriors who strictly respected their country's traditions and left behind them on-site relics. The fact that ancient relics of “deer stones” are still found in the territory of Mongolia confirms that these relics first appeared in the middle of the Bronze Age in the central part of Mongolia, in the Early Iron Age they spread to Central Asia and further to the Caucasus, Black Sea, Bulgaria and Elbe. They were not created by resident settlers but by nomads reflecting their historical, social, demographic and intellectual development and representing relics of Mongolia's ancient history and culture.

Petroglyphs: Mongolia is home to many thousands of carved and painted rock images, typically depicting men and animals in hunting scenes. The petroglyphs are classically interpreted as having a ritual function, as elements of a thanksgiving ceremony or as a call of animals to the hunt; series of dots placed next to certain animal figures appear to represent the number of animals of the same species. Petroglyphs originating in the Palaeolithic age spread widely during the Early Bronze and Iron age and became common in Mongolia. It is with good reason that scholars refer to Mongolia as an “infinite stock” of petroglyphic drawings. The people of that period cut stones to portray such animals as wild goat, deer, roe deer, wild ram, fox, wolf and domestic animals like horses, cattle, camels and hunters, and armed warriors as well. Though real animal pictures prevail in them, a number of stylized pictures of deer with bird-like mouths, large round eyes, beautiful spiral antlers can also be seen. This “pattern design” of deer and other animals was wide spread in the steppes arts of Asia and Europe during the Early Iron age. Numerous archaeological relics of the Bronze age like deer monuments, petroglyphic drawings, bronze knives with engravings of wild ram and goat heads, golden clips show that primitive art “animal pattern design” spread in Central Asia, particularly in Mongolia during the Bronze age. The art relics created through “animal pattern design” are important artefacts and are evidence of economic and cultural relations during the Early Bronze and Iron age in Asia and Europe.

Research of Ancient states period

The Hunnu period is also one of the subject areas attracting study in Mongolian archaeology. The Mongolia-France joint project "The First Nomadic Empire" team has been successfully excavating Hunnu tombs in the Central Mongolia since 2000.

The Institute of Archaeology, Mongolian and Korean National Museum archaeologists have accomplished their goal of organizing the annual "Mon-Sol" project since 1997. The objectives of the "Mon-Sol" project are to explore the interactions between both nations' culture and genealogy.

The hunnus are people who established their statehood first from among the Central asian nomadic peoples and played an important role in history. Since the indigenous territory of Hunnus stretched from Baikal Lake in the north to the Gov in the south and from the Hyangan mountains in the east to the Altai mountain range in the west, there are numerous archaeological graves, settlement remains and petroglyphic drawings left. There are over 2500 graves of both noblemen and laymen in 50 places such as Aimags as Arhangai, Uvurhangai, Tuv, Bulgan, Huvsgul, Uvs, Hovd, Gov-Altai, Dundgov, Hentii and Selenge. The Hunnu graves are in their tens when few and in over two-hundred when many. The grave of a layman has a stone barrier of 5 to 13 meters and the body is placed inside a wooden coffin or stone enclosures to a depth of 1-7 m underground. The clothes, weapons, decorations and utensils of the dead person are also placed in the grave. The grave of a hunnu nobleman is bigger than that of a layman and required more efforts to prepare the site. Graves of Hunnu noblemen are found in places like the Noyon mountain in Tuv Aimag, Duurlig and Bor Bulag in Hentii Aimag. The grave of nobleman has a square stone barrier of 14x14 to 50x50m. The barrier has on its south side an opening of up to 22,5 m long and the body is kept in a wooden coffin inside double timber enclosures to a depth of up to 14 m underground. The clothes, decorations, weapons, utensils and other possessions of the dead noble are also placed in the grave.

Turkic monument: The Turkic people emerged on the political arena of Middle Asia, Kazakhstan, Southern Siberia and Central Asia by establishing their kingdoms twice in the 6 to 7th centuries.

The first Turkic khaganate existed from 552 to 630 and the second khaganate from 682-745. There are, therefore, quite a number of historical relics of the Turkic period. These include tomb graves of noblemen, altars, shining monuments, statue-stones, zel stones, rock scripts and petroglyphic drawings. A large group of statues was found in the eastern part of the country

from the Turk period. Known locally as "man-stones", such statues have been attributed to Turkic and Mongol peoples of the Middle Ages. Their precise function is unknown, but it is possible that these statues originally served as funeral monuments or as supports to ancestor-worship traditions. Statue-stones are relics erected at the sites of memorial complexes of noblemen, stone fences and ancient graves. They can also be found erected separately. Most of the statue-stones were cut to portray a man's head, face, eyes, nose, mouth, ears, beards and arms in his sleeves, utensils and weapons. Most of the statue-stones have broad faces, a narrow beard, earrings and a glass in his right hand and a loose left arm. They are portrayed with narrow hide belts with spots and with fire-generating devises in its bag on the west and a knife and sword in front. Some of the statue-stones were cut to show the details of person's peculiarities so that one could recognize him; others were cut to show a man's head and face in general.

Stone fences: The other important memorial relic relating to the Turkic period is stone fences. One may often come across square fences of flat stones erected on their sides and fences with stone floors. Stone fences are found in singles and in sets. The fences usually have statue-stones and “zel stones” on the east or south of them.

Square fences are widely spread in the central and western parts of Mongolia and researchers usually relate them to the 6 to 7th centuries. Square fences, statue-stones, zel stones are also found in the eastern part of the country, for instance, in Hentii Aimag. Some of them were excavated and studied by H.Perlee who made an interesting suggestion in that those memorials in the eastern part of the country might belong to the Kidans.

The Mongolian-Turkish joint project has been undertaking a successful study in the Orkhon River Valley, World Heritage Site.

Research of Mongolian Dynasties period:

Research of an ancient town site: It has become a truism widespread in many places that, because the Mongols adopted a nomadic pastoral economy, they did not build towns or villages. And yet we know from archaeological research and from written documents those peoples of Mongol origin were establishing towns about 2000 years ago and that they were erecting buildings of a very distinctive architecture. Archaeological evidence of more than 200 ancient towns has so far been discovered on Mongolian territory.

Kharakhorum: The 13th-century capital of the Mongol Empire. The city was built in 1220 on the orders of Genghis Khan and was founded on the site of a city previously occupied during the Uighur period. Around the city was a large square wall, with gates in the middle. Within the city were separate districts occupied by artisans and craftsmen, traders, administrators and private citizens. Because the Khans of Mongolia in those days honored all religious faiths, a total of 12 worshipping places where Christian, Buddhist and Islam believers actively held services exist. We know from archaeological research that Karakorum was a great centre for metalwork and other handicrafts. The city had an iron and steel foundry well advanced for its time.

Excavation of this site was started in 1890 by a Mongolian-Russian archaeologists' joint expedition. Evidence of other early Mongolian cities of this time is still being discovered and researched. Many artefacts have been unearthed. Since 1999, a Mongolian and German archaeologists joint expedition has been carrying out archaeological excavations and they discovered one king's palace, four round ovens used for the baking of roof-tiles, bricks and ornamental construction materials, traces of *khanz* heating systems, which run under the floors of the houses and traces of an iron smithy and site of casting of precious metals.

Mongolian-German archaeological institutes have managed the joint **"Kharkhorum"** project since 1999. The project is exploring the ancient capital of Mongolia and conducting archaeological excavations as well as geomagnetic geological surveys.

Mongolian-Japanese joint project **"New century"** has been effectively undertaking archaeological excavations in the **"Aurag"** ruin of Genghis Khan's period.

Mongolian statue-stones: Over recent years about 60 Mongolian statue-stones have been found on Mongolia's territory mainly in the eastern region.

By their design, shape, clothing (headdress, garments, belts, footwear, ornaments, etc.) experts claim that the statue-stones are of Mongolian origin and date back to the 13-14th centuries.

Dr. D.Bayar, researcher at the Institute of History, Academy of Sciences made a study on the statue- stones for his Ph.D. (History) in 1991 substantiating the above version which is a widely shared view held by scientists and researchers in a number of foreign countries.

Earlier it was thought that statue-stones found in Central Asia and Mongolia related to the Turkic period.

Turkic relics found in Mongolia date back to the 7-8th centuries. Their pattern is entirely different. While Turkic statue-stones are situated in an upright position, the Mongolian statue-stones are in a sitting position.

Statue-stones of such type are found in the Shiliin Gol province of Inner Mongolia, The People's Republic of China, which proves that statue-stones are of Mongolian origin. The fact that similar statue-stones attributable to the medieval history of Mongolia exist on Cheju Island of South Korea requires further in-depth study.

Mongolian graves: Mongolian graves can be identified by the oval-shape stone dam on their surface. The dam is usually 175-320 cm long and 400-75 cm wide, and the construction stones are laid down thickly. Mongolian graves can be found from 2-3 at a time to more than 20, mainly on the mountain slopes, hilltops, mountain passes and along the river helix.

Inside the Mongolian graves of 13-15th centuries the man is buried with his head to the north along with his possessions like bow and arrows, quiver, saddle, knife, gold and bronze engraved belt, gold and precious stone decorations, earrings, bronze mirror etc. However, Mongolian great khan's graves and other noble persons graves have not as yet been found.

Monasteries: From the 16th century Buddhism spread in Mongolia, and Buddhists started to build monasteries and temples. At the beginning of the 20th century there were more than 700 temples and monasteries in Mongolia. Every one of these had its own particularities and all were exceptional examples of oriental architecture. The buildings are made of wood, brick and stone, and the main wooden props are set in stone foundations. There were highly specialized religious schools in operation at that time training architects, artists and sculptors.

Fig. #1 001

Fig. #1 002

Fig. #1 003

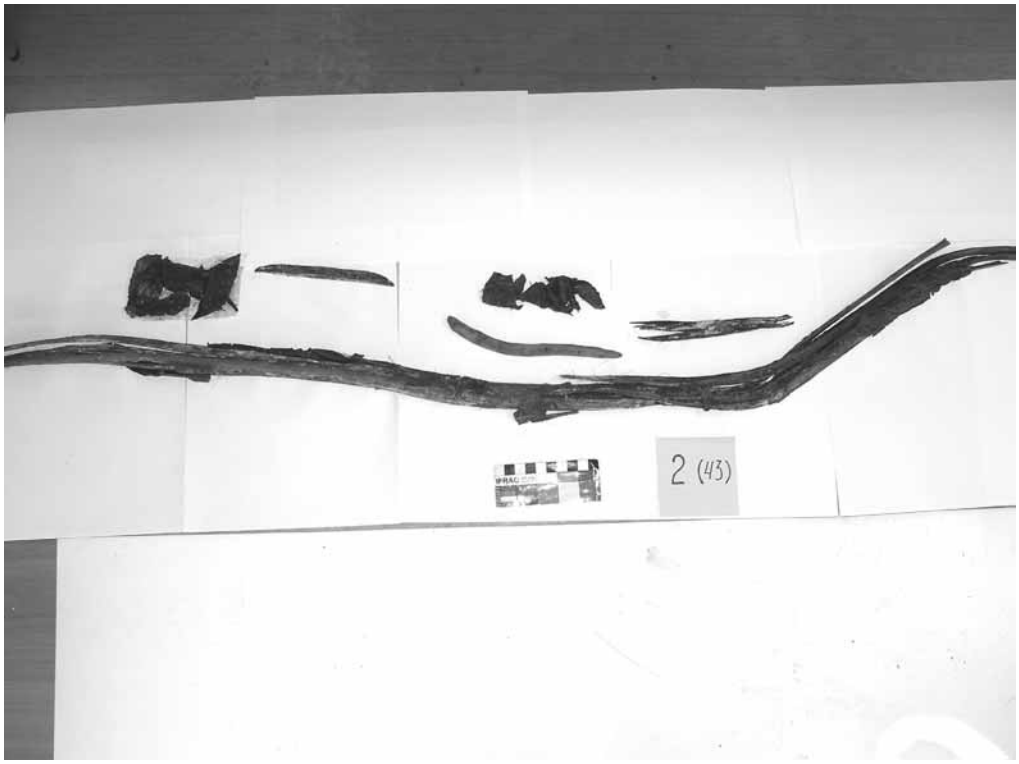

Fig. #1 004

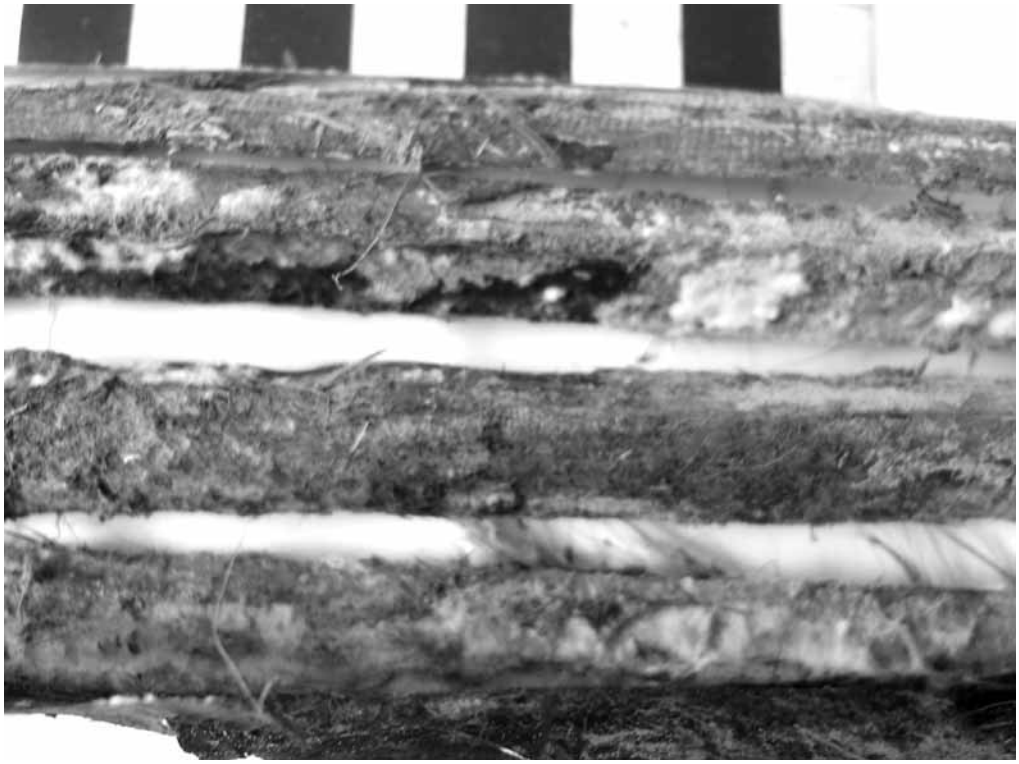

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Fig. #1 012

Fig. #1 013

Fig. #1 014

Fig. #1 015

Fig. #1 016

Fig. #1 017

Fig. #1 018

Fig. #1 019

Nepal

Saraswati SINGH
Chief
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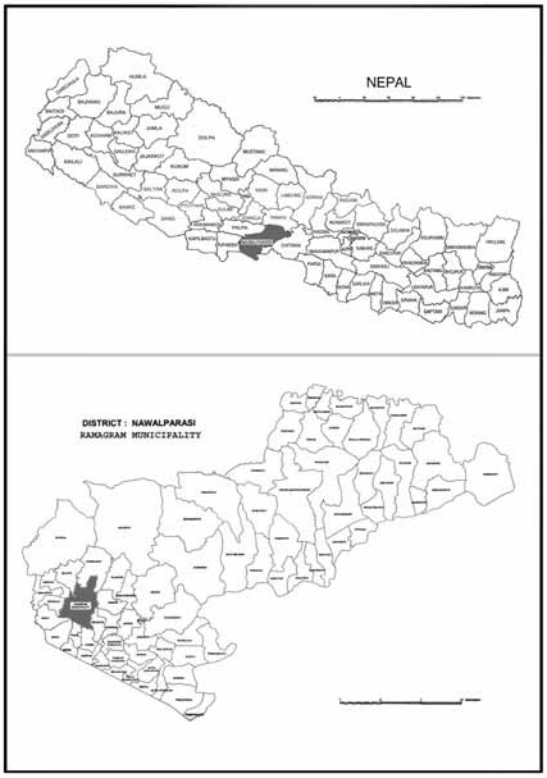
Department of Archaeology

EXCAVATION ACTIVITIES IN NEPAL WITH SPECIAL REFERENCE TO RAMAGRAMA STUPA

Introduction: -

The Kingdom of Nepal is a small country geographically situated between two large countries – China on its north while India is to the south, east & west. Geographically it lies between the latitude 26^0 22' to 30^0 27 'n and longitude 80^0 4' to 88^0 12 ' east. The Kingdom covers an area of 147,181 sq km. (56827 sq. miles). It is divided into four topographical zones, the great Himalayas, Trans Himalayas, Middle Himalayas & Tarai or hot tropical flatland. The highest zone is the great Himalayas in northern Nepal. Eight of the 14 highest mountains in the world including Mt. Everest (8848 m.) are located in Nepal. The Tarai, generally flat and fertile lowland is the southernmost topographic zone of Nepal. Most of this area comprises the northern extreme of the Gangatic plain of India. The majority of excavated archaeological sites are located in this zone.



Nepal has a population of 25 million. The Nepalese indigenous population comprises two major groups-The Indo -Nepalese whose ancestors migrated to the country from the south and the Tibeto Nepalese whose ancestors entered Nepal from the north. The majority of the population practice

Hinduism and Buddhism. Buddha the founder of Buddhism was born at Lumbini in present day Nepal to the southwest of the capital city, Kathmandu.

As other nations of the world, Nepal is also rich in tangible and intangible cultural Heritages. It is a home to and equally famous for ethnic diversity due to the geographical topography of the country. Numerous communities live there and are quite different one from other. Therefore, the culture produced by them has made Nepal rich in ancient monuments as well. There are eight ancient Monument Sites listed in as World Heritages by UNESCO. Nepal is also rich in archaeological sites. Many archaeological sites are scattered throughout the country ranging from the pre-historic to historic period.

The Majority of the ancient excavated archaeological sites are related to Buddha and his life. Among them are Lumbini, Kapilvastu and Ramgrama (or Devdaha-the natal town of Mayadevi, the Mother of Buddha).

Excavated cultural heritage in Nepal

The history of excavation is little over a century old in Nepal. After the discovery of an Ashokan pillar by some unknown person in unknown circumstances at Lumbini, the first excavation, although not regarded as a scientific one, was conducted by Khadga Shumser in 1896. The result was of great importance as the Lumbini; the birthplace of lord Buddha was discovered there.

The second so called scientific excavation was conducted by A. Fuhrer at Sagarhawa in 1898/99. Dr. Fuhrer was recruited by ASI as an archaeologist from the English government of India to supervise the excavation work conducted and funded by the Nepalese Government; but it turned out to be more devastating than expected. The site was recorded by P.C. Mukherjee the following year, who also undertook reconnaissance around the area and discovered the town of Kapilvastu in Tilaurakot mound.

The real scientific and well-documented excavation was done or {started} by P.C. Mukharjee in Nepal in 1899. After Mukharjee, Lumbini was further excavated by Keshar Shumser in 1932-1938 but it was a more simple dig and included the preservation of the Mayadevi Temple. The temple of Mayadevi, which we see now in Lumbini was and is the prototype of this project.

After 1960 the major excavation works resumed in Nepal. Of them Devala Mitra worked in Kapilvastu, Kodan and Lumbini but her result was more somewhat negative evidence.

Immediately after her negative result, The Nepal government started to dig in Lumbini and it was the first scientific excavation conducted by the government of Nepal.

During the 1970s, Risso University took great pains to dig in Tilaurakot. They worked for almost a decade and established the antiquity of Tilaurakot mound from NBP to the Neolithic period. Their photographic and drawing report is still the landmark report to study about Tilaurakot.

Side by side the DOA was also excavating in Lumbini and Tilaurakot during the 1970s and 1980s, which resulted in many things from Lumbini and Tilaurakot. Many stupas were opened in Lumbini and two entrance gates (East and West) in Kapilvastu.

Later the Japan Buddhist Foundation started to work on the conservation of Mayadevi temple at Lumbini in 1992, which led to the discovery of a marker stone. The marker stone was placed by some unknown people on the spot where Lord Buddha first trod the earth. The veneration of the spot was being paid by the people from the very early phase of Buddha's life. It was a great discovery and is now another landmark of Lumbini, after the great stone pillar erected by Ashoka.

During the 1990s another breakthrough in the archaeological history of Nepal was the excavation of pre-historic caves in the trans – Himalayan region of Mustang. Human occupation in some caves was found to be as old as three thousand years old.

Around the turn of the century Ramagrama Stupa was put to the excavation spade, a dig which the writer is going to present in more detail here.

A Brief Introduction of Ramagrama

Lord Buddha went into Nirvana at Kushinagar at the age of eighty. He was cremated there and his bodily relics were divided into eight parts and were distributed to eight claimant states and ethnic groups. The recipients were:

Bulis of Alakappa	Mallas of Kushinagar
Mallas of Pava	The King of Magadha
Brahmins of Bethdwipa	Shakyas of Kapilvastu
Lichhavis of Vaishali	Koliyas of Ramagrama




Ramagrama was populated then by the Koliyans. Since they received one part of the relics, the old king of Ramgrama, as mentioned in old Buddhist scriptures and written about by Chinese pilgrims, built the stupa containing the relics of the Lord.

After building the Stupas containing the relics of Buddha, these sites became the center of pilgrimage and devotion.

Emperor Ashoka visited those sites along with the Ramagrama stupa in the third century before Christ. Then came Fa-Hsian and Hieun Tsiang from China. Ho-Che also from China was the last pilgrim to make a pilgrimage to those especially eight Dhatu stupas.

After that, Ramagrama went into oblivion and in 1896 Dr. Hoey visited the stupa but did not speculate it as being Ramagrama.

Bhichhu Shakyananda in 1964/65 speculated that mound was of Ramagrama and later weight was added to the speculation by B.K. Rijal. Rijal was an archaeologist. Therefore, it was accepted by the government and academic circles as well.

In 1998, the Nepal Government, started to excavated the mound and found the tantalizing result of three phases of stupa evolution. The core of the stupa remains to be opened. The evolution phase gives the convincing evolution history of the stupa. There are three distinctive phases of the stupa already recorded. They are from Mauryan Sunga/Kushana and the Gupta period. The stupa was abandoned in the 6/7th century.

Location:

All Buddhist literatures mention Devdaha to the east of Lumbini. Fa-Hian, the famous Chinese traveller in the 5th century AD visited the Ramagrama Stupa after walking five Yojan east of Lumbini garden. Hieun-Tsiang, another famous Chinese traveller, came to Ramagrama after walking more than 200 Li towards the east from Lumbini in the 7th century AD. Both distances, 5 yogan or 200 li equals 40 miles approx.

The site is located in 83^0 41' 05" east and 27^0 29' 55" north at the height of 107 m from MSL. It lies south of the headquarters of Nawal Parasi District at a distance of 4.5.km. Nawalparasi is about 250 k.m. South-west of Kathmandu. It is about 75 km east of Lumbini.

Need for the excavation

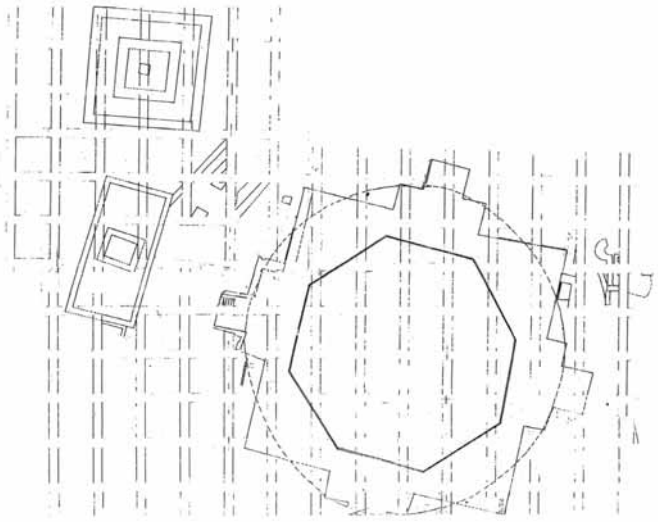
The main aim of the excavation was to detect the mound supposed to be stupa by some scholars and merely a heap of bricks due to the collapse of some buildings by others. Six seasons of full excavation revealed the site through the historical period of Mouryans to Gupta. Since the center is still waiting to be exposed, the antiquity may go well before Mouryans.

Excavation activities and findings of Ramagram Stupa
Mud Stupa (At the Center)

Although no actual evidence as yet, the excavator has speculated that a mud stupa at the core of the mound because it is such a huge construction would not have been created just for the fun. There should be some sort of important object of veneration inside it, which could be the mud stupa with the content of something important. That can be nothing but the relics of Lord Buddha!

From the study of the currently exposed structures, the mud structure has been conjectured to be about 20 m in diameter and less than three meters in height. This guess is judged on the contemporary Stupa of Vaishali in India.

Brick structure of circular plan



The mud structure (if any) was covered by a huge brick structure outside. The bricks are the largest in size from the area and measure 7x26/27x40/41 cm. The thickness of the structure should not be less than 4 meters and diameter of this structure exceeds 36.5 meters. Very few portions of it could be exposed. The height of the in-situ structure is recorded up to 115 cm only. There are only 15 courses of bricks in - situ and one more on top of it in circular alignment. This phase of structure temple of Lumbini is attributed to the Mouryan period, with a comparative study of Mayadavi temple in Lumbini.

Cruciform structure

A structure on the cruciform plan has been erected on top of the first phase circular base. The four extended parts of this structure are almost aligned to the edge of the circular structure below, and four corners go beyond the circular alignment. The height of this structure, from the study, shows it to be nearly 7 m high with walls decorated with pilasters and carved bricks. The carvings on the bricks from this structure are not of the molded type but have been cut before firing. The design of the cuttings is also simpler. The motifs are more geometric than the floral designs. All dorsal and ventral corners are decorated with the carved pilasters. The area of this structure measures on average 37 meters north to south and the same length east to west.

Octagonal structure:

Above the cruciform structure is raised another decorative structure in octagonal form. The walls of this structure are also decorated as in the lower structure. The height exceeds little over a meter only. All eight corners of the octagon are adorned with carved bricks and five pilasters are erected in between two corners. The size of this structure is 24 meters in diameter and each of the eight arms measures 10.25 in length. There is a nice pathway created in between the edge of the cruciform structure and the base of this octagon wall. The area was afterwards paved with brick concrete and grit in order to arrest the rain percolation inside the structure.

Above this structure rises the brick dome of the stupa. We do not know exactly how big and how high this dome structure is. Some more clearance on top of the mound is necessary in order to know this. The dome should be not less than 7.5 m in diameter and at least three meters in height from the top of the octagonal structure. If the dome was a truncated shape like in Kushinagar then the height could go up more than that. The Chinese travellers have written the height of the stupa to be of 100 chi or nearly 85 ft. nearly. Besides, the main stupa, four locations have been noticed with subsurfacial structural remains. Out of those four remains two are distinctively the monastic complex. Two need more data. We conjecture that they are also a monastic complex.

Monastic complex next to stupa:

1. Size 13.5x13.5 m
2. 2.40 m wide rooms no dividing walls: noticed because of its organic nature; it was rotted.
2. Bricks 2 sizes: 6x19x30, 6x23x36cm (shows two distinctive phases)
3. As many as 32 courses of bricks are left, in-situ.
4. Stupa at the courtyard. 115x115 cm: 6 courses of bricks left, brick size 5x19x29cm reused ones: rests on top of flood level.
5. No tiles at all found, showing the roof also to be made of organic materials.

Monastic No. II

1. Only Partially opened. Brick sizes-5x26x37, 5x20x32cm
2. Almost to the size of monastery no. 1.

Praying Platform

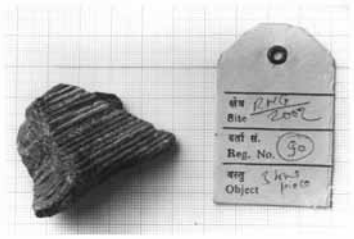
1. Size 8x17 m: middle portion measures 4x4.5 m and is found raised half a meter higher.
2. Central raised portion aligns to the center of the main stupa and is linked to a paved street. The platform is 25 cm higher than its surroundings.
3. The thickness of the wall is 80-85 cm, brick size is 4x20x34cm, 18 courses of bricks are left in situ.

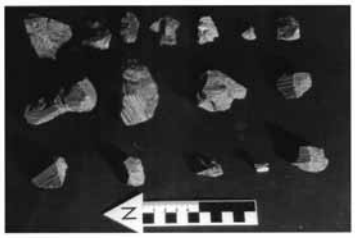
Antiquities and small finds:

Three remarkable terracotta heads are retrieved from the excavation. Two of the figures are female and one belongs to a man. All of them were found from the disturbed layer of stupa. Thus none of them were in their original context. Fortunately the face parts of them all are safe but the polish has gone due to the acidic content of the deposits. Those are considered as the masterpiece on the terracotta molding found at Ramgram. It can be assumed to be the art creation of Gupta. The lower lips are heavily protruding outwards, the relic of the nose is noticeably high with a flat top; the ears are pierced with big holes for heavy ornaments. The hair is curly.

Carved Stone Pieces:

Many pieces of carved stones were found at the Eastern part of the Stupa. Such quality of stone was not found in Nepal. Therefore, it is speculated to have been imported from India.





During the life of more than two thousand years the stupa and the surroundings of Ramagrama have gone through many changes. The stupa evolved for nearly thousand years since its creation in the 4/5th century. Then, the area seems to have been discarded as a religious place and became overgrown with trees and became part of the forest. The monasteries were discarded, the stupa was deserted and both types of structure started to crumble. Floods covered the area and the architectural structures were buried.

We do not know exactly the cause of its abandonment. But some sign of vandalism is noticeable. Not only vandalism, the act of treasure hunting also went on and incidents of crimes followed in the area. All these things went on until the 1st half of the 20th century. Then again the area is found to be occupied by the people and Dr. Hoey then rediscovered the place as an archaeological site in 1898.

The whole aim of the excavation was envisaged so as not to harm any structures. Therefore, any cutting operation was planned to remove only debris collected in the due course of time.

Maximum care has been taken not to fell any tree until and unless it is really necessary to cut them out. The fully-grown trees where the trenches have had to be laid were shifted to the garden area to the south of the stupa.

The original bricks are saved in order to reuse them in future restoration and conservation, for which they are buried safely and can be taken out when deemed necessary.

Most of the baulks are not cleared out, instead left in-situ. If some archaeologists want to restudy the particular stratigraphy he/she can do so just by cutting them before clearing the grass deposit of the refilled trenches.

Research is a continual process. There are many things to be done. There are more questions added on the information of the site than the results it gave within the study period of six season's digging.

A few questions still needing answers are:

- Is there really a mud stupa at the core of the mound or not?
  There is hope.
- Is it not possible to retrieve the tangible evidence of Ramagrama in the form of inscription or seals?
  Ashoka had left inscription there, according to a Chinese traveller.
- Where was the city of Lanmo the Chinese Pilgrims visited before they arrived at the stupa from west?
  Could it be Punditpur?
- Can we not collect indirect evidence, like in Kushinagara, from the concentration of the four monastic complexes in all directions of the stupa?
  It is possible that those sites could throw light on Ramagrama stupa because if the stupa were of lesser value there would not be so many monastic complexes although small in scale.

Conclusion:

Although the effort of six season's digging did not yield any tangible evidence in the form of inscriptions and seals in Ramagrama, the following achievements were accomplished:

- Merely a heap of bricks turned out to be a nicely decorated stupa evolved through the historical period of different phases (Mouryan to Gupta).
- Previously there was controversy about the mound itself whether it was a stupa mound or a heap of bricks formed due to a collapsed building. It is confirmed now as a stupa mound surrounded by at least four monastic complexes. They are in different directions and different distances showing the stupa as one of great importance.
- The distal and directional location as mentioned by the Chinese travellers totally fits this stupa. There are no other prominent stupas between Lumbini in the west and the river Narayani to the east, Sivalik range on the north and most of Kushinagar of India in the south. Therefore, the claim that the stupa could be Ranagrama fits.
- A new find of an archaeological site of Punditpur of equal size and depth of time contemporary to Tilaurkot is adding more weight to this stupa to be Ramagrama because both the Chinese travellers Fa-Hian and Hieun Tsiang did arrive at the stupa from the west at a small distance from Lanmo (their Ramagrama city). Both of them mentioned the stupa to the southeast of Ramagrama (Lanmo) city.

New Zealand

Joanna Kate WYLIE
Archaeologist
New Zealand Historic Places Trust

Problems and needs for cultural heritage protection and restoration activities in New Zealand (archaeological sites and remains)

"Cultural heritage is irreplaceable…The conservation of heritage places associated with our ancestors, cultures or past allows people to experience in a small way a taste of how past generations lived and to develop a greater understanding of our history and culture" [NZHPT 2004:2].

Introduction

Aotearoa New Zealand has a relatively short archaeological record as one of the last landmasses to be inhabited by humans, but contains a diverse range of archaeological sites dating from initial Polynesian settlement more than 600-700 years ago. There are currently over 58 000 recorded archaeological sites in New Zealand, and previously unrecorded sites continue to be found. Pre-1900 A.D. archaeological sites have legislative protection under the *Historic Places Ac*t 1993, which is administered by the New Zealand Historic Places Trust (NZHPT), but authorities (consents) can be granted to permit the damage, modification or destruction of archaeological sites under controlled conditions. There has been a marked rise in the number of authorities received by the New Zealand Historic Places Trust over recent years, particularly in coastal New Zealand, and this trend reflects the increased rate of development throughout New Zealand. Current major threats to archaeological sites include residential housing subdivisions, roading and infrastructure works (e.g. wastewater reticulation) and the oil and gas industry. Archaeological sites are also under threat from natural processes, notably coastal erosion, and the protection and restoration of New Zealand's archaeological resource is becoming increasingly recognised as a critical issue.

Archaeological Sites in New Zealand

Recent data from the New Zealand Archaeological Association's (NZAA) Site Recording Scheme indicates that there are now more than 58 000 recorded archaeological sites in New

Zealand [Darmody 2006: 68].[1] Approximately 80 percent of all recorded sites are located within the North Island, with particular concentrations in Northland, Auckland, Hauraki-Coromandel and the Bay of Plenty [Darmody 2006: 68]. The remainder are located in the South Island (approximately 18.5 percent), notably in the Otago/ Central Otago region, and the Offshore Islands (approximately 1.5 percent) [Darmody 2006: 68]. Those areas with the greatest concentration of archaeological sites reflect not only the density of past human occupation, but also the completeness of archaeological survey coverage. Large parts of New Zealand have not been systematically surveyed and there are many as yet unrecorded archaeological sites, as indicated by the ongoing addition of new records into the Site Recording Scheme. More than 1100 new records were added in the year ending 31 March 2006 alone [Darmody 2006: 68].

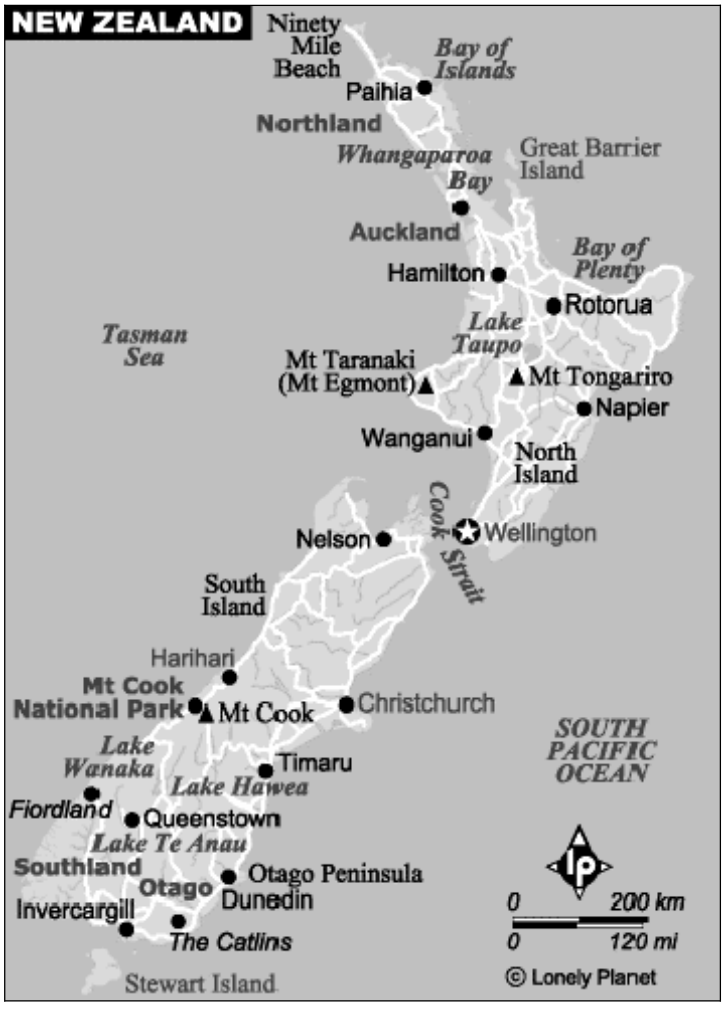


Figure 1: Map of New Zealand
Copyright: Lonely Planet
[URL:www.lonelyplanet.com/mapshells/australasia/new_zealand/new_zealand.htm]

[1] Data provided for year ending 31 March 2006. The New Zealand Archaeological Association was first established in 1954, and is a charitable organisation that seeks to promote and protect New Zealand's archaeological sites.

Archaeological sites in New Zealand can be categorised into two main types: prehistoric Maori sites and historic sites. Prehistoric Maori sites relate to the occupation and settlement of New Zealand prior to the arrival of Europeans. New Zealand's first inhabitants arrived from East Polynesia, bringing with them the dog, rat and cultigens such as taro, kumara and paper mulberry, but there is considerable debate as to when these people first arrived [Irwin 2006]. Radiocarbon testing of Pacific rat bone from cave deposits indicated that human occupation may have initially occurred as early as 50 B.C.–150 A.D., but most archaeological researchers agree that human arrival dates to 1250-1300 A.D. [Higham and Jones 2004: 229, 232]. Approximately 84 percent of all recorded archaeological sites relate to the prehistoric Maori occupation of New Zealand, and site types range from occupation sites such as kainga (villages) and pa (defended settlements), to shell midden ('rubbish dumps'), horticultural remains, rock art and umu (Maori ovens) (see Figure 2).

Figure 2: Example of a prehistoric Maori site: half-sectioned umu
Photo: Jo Wylie, 2001

The remaining 16 percent of recorded archaeological sites relate to the historic occupation of New Zealand following European settlement. Initial European settlement in New Zealand is marked by the arrival of sealers and whalers in the late 18th century, and there were approximately 2000 non-Maori living in New Zealand by 1839 [Phillips 2006]. Large numbers of Europeans immigrated to New Zealand during the 1840s, and by 1852 the non-Maori population totalled approximately 28 000 [Phillips 2006]. New Zealand's first immigrants came from England, Ireland, Scotland and France (to a lesser degree), and later arrived from other European and non-European countries such as Germany, Dalmatia and China. Archaeological evidence of New Zealand's historic occupation includes the remains of historic industries such as gold mining and whaling (see Figure 3); shipwrecks; early towns and cities

such as the Macetown Chinese settlement in Central Otago; and military sites associated with the New Zealand Wars (c. 1845 – 1872) (see Figure 4).

Figure 3: Remains of try works at Oashore Whaling Station, Mahia Peninsula
Photo: Jo Wylie, 2005

Figure 4: Lower Redoubt, Te Porere Redoubts
Photo: NZHPT Photographic Collection: AR 2262, T. Hosking, 1970

A Resource Under Threat

Concerns were raised over the future of New Zealand's archaeological resource as early as the 1960s, when archaeologist Roger Green wrote of the need to preserve archaeological sites in light of growing threats; namely industrial development, urban expansion, afforestation, mechanised agriculture, quarrying and road construction [Walton and O'Keeffe 2006: 266-267]. The National Historic Places Trust (now the New Zealand Historic Places Trust) produced Green's text in pamphlet form, and the NZHPT continue to produce and distribute a pamphlet on the protection of archaeological sites.

Archaeological sites have come under increasing pressure over the intervening years since Green's 1963 paper, with Walton and O'Keeffe [2004: 272] noting that there has been "…wholesale destruction of the archaeological record" in particular areas of New Zealand. Threats to archaeological sites remain largely unchanged from those originally identified by Green. The demand for coastal property continues to rise, particularly in the Coromandel, Bay of Plenty, and Northland, all of which are areas originally favoured by Maori for occupation and settlement. Approximately 30 percent of the authority applications (312 in total) received by the NZHPT during the 2006 financial year were for residential subdivision development/ house construction. Infrastructure works (e.g. roading, wastewater systems) and industrial activities (e.g. mining, forestry) also continue to cause irreversible damage to the archaeological record, accounting for approximately 21 and 22 percent of the total authorities received respectively (Figure 4). The oil and gas industry has emerged as a particular threat over recent years, specifically in the Taranaki region (Figure 5).

Figure 4: Martha Mine, Waihi, Coromandel
Photo: Jo Wylie, 2006

Figure 5: Installation of gas pipeline, Tikorangi, New Plymouth
Photo: Jo Wylie, 2006

The adverse effects of natural processes on archaeological sites are now also more clearly understood, and recent studies such as the multi-agency Southland Coastal Heritage Inventory Project (SCHIP) have revealed the significant impact of coastal erosion in particular. As stated by Walton [2006: 38]:

> *"Coastal erosion threatens a significant loss of archaeological sites as throughout prehistory people have tended to congregate at the coast and shell middens, the most common remains, tend to be found in largest numbers near the source of the shellfish".*

Results from Stage 1 of the SCHIP fieldwork indicated that coastal erosion was the predominant reason why 87 of the 157 previously recorded sites could not be relocated [Jacomb and Walter 2005]. A similar project has recently been initiated along the Coromandel coastline, and various observations have been made about the effects of erosion in other parts of coastal New Zealand. Prickett [2005:54] notes for example that an annual average loss of 38 centimetres has been calculated along exposed sections of the Taranaki coastline, and states that almost half of Ruatoki Pa in North Taranaki has eroded into the sea over the past 30 years [Prickett 2005: 48]. Walton (2006)

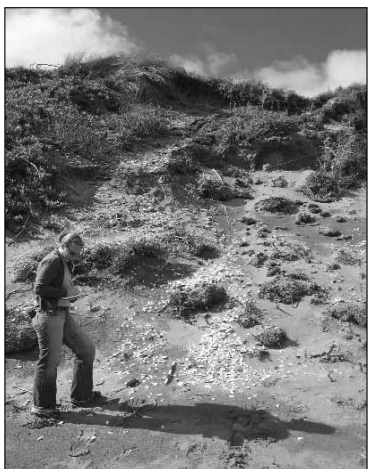


Figure 6: Eroding midden, Queen Elizabeth Park, Paekakariki
Photo: Jo Wylie, 2006

similarly found that dunes along a stretch of the Kapiti coastline adjoining Queen Elizabeth Park had significantly eroded since archaeological survey data was first collated in 1998, and states that it is probable that a considerable amount of archaeological evidence has now disappeared because of the continual retreat of the shoreline [Walton 2006: 37] (Figure 6).

Quantitative data on the destruction of archaeological sites has further been provided by specific landscape/ regional studies, such as those undertaken by Prickett (1985), Ross and Foster (1996) and Phillips and Allen (2006). Prickett's (1985) comparison of site condition as inferred from 1950s aerial photographs and based on recent observations revealed that at least 55 of the 95 sites in the study had been damaged by bulldozing for farm activities, and that 28 of the 95 sites had suffered "substantial major damage" [Walton and O'Keeffe 2004: 272]. Ross and Foster (1996) assessed the condition of 229 known sites in the Auckland area, and found that almost all sites in their sample had suffered some damage [Walton and O'Keeffe 2004: 272]. 24 percent had been largely destroyed, and 14 percent were completed destroyed [Walton and O'Keeffe 2004: 272].

Phillips and Allen's (2006) assessment of archaeological sites in the Waihou River Valley on the Hauraki Plains found that nearly 75 percent of the known pre-European Maori archaeological sites have been severely damaged or destroyed. Archaeological survey data and historical records (Maori Land Court books) indicate that there were over 238 Maori settlements along the flats adjoining the Waihou River and its eastern tributaries, but only 66 sites remain unaffected today [Phillips and Allen 2006: 82, 91]. The primary causes of this site damage/destruction were identified as flood protection works, farming activities such as the creation of drainage systems, and building construction [Phillips and Allen 2006: 91].

Quantitative site damage data is now also becoming available as a result of the NZAA's Site Recording Scheme Upgrade Project, which involves the upgrade of information on already recorded sites. In the Tauranga district for example, an area of high development pressure, 46 of the 175 (26 percent) visited sites had been destroyed, and the fieldworkers were unable to relocate a further 81 (46 percent) sites [Walton and O'Keeffe 2004: 272].

How can our sites be protected?

New Zealand's archaeological sites remain under considerable threat as industry and development continues to expand, particular in coastal areas, and the protection of this resource is becoming of increasing concern to the archaeological community. As stated by Walton and

O'Keeffe [2004: 272], site destruction "remains the fundamental challenge for management of the archaeological heritage".

The current aim of archaeological heritage management in New Zealand is to save those sites that can be saved, and fully investigate and record those that cannot [Walton and O'Keeffe 2004: 273]. This latter outcome is provided for in legislation under the *Historic Places Amendment Act* 2006 (the 'HPA'). This legislation was first introduced in New Zealand in 1975, in the form of the *Historic Places Amendment Act* 1975, and has subsequently undergone several amendments, the most recent taking force on 1 August 2006. The fundamental purpose of the HPA is to "promote the identification, protection, preservation and conservation of the historical and cultural heritage of New Zealand".

The protection of New Zealand's historic heritage from inappropriate use, subdivision or development is now also a matter of 'national importance' under the *Resource Management Amendment Act* 2003 (RMA). Local authorities (Regional and District Councils) are charged with the responsibility of protecting historic heritage within their respective regions or districts, and this involves the identification of heritage places, management of adverse effects on these places, and promotion of protection of heritage values in keeping with conservation principles [NZHPT 2004: 14]. Recognition of the importance of New Zealand's archaeological heritage varies between local authorities however; some councils have little regard for archaeological sites, whilst others are more proactive in their approach. A case in point is the Auckland Regional Council, which employs specialist archaeological staff and maintains its own cultural heritage inventory.

The archaeological provisions of the HPA (Part 1) focus specifically on the protection of New Zealand's archaeological resource, and state that any person wishing to modify, damage or destroy an archaeological sites/ sites must apply for an authority from the NZHPT.[2] The NZHPT may either grant an authority in whole or part, or decline an authority. Modification, damage or destruction of archaeological sites without an authority from the NZHPT is unauthorised, and constitutes an offence under the HPA. Any person who commits such an offence is liable for a criminal conviction and fine of up to $40 000 for damage or modification, or up to $100 000 for site destruction.

[2] An archaeological site' is defined in the HPA as any place in New Zealand that was either associated with human activity prior to 1900 A.D., or is the site of a wreck of any vessel where that wreck occurred before 1900 A.D., and is/ may be able to provide evidence relating to the history of New Zealand through investigation by archaeological methods".

Challis [1995: 175] describes the authority provisions of the HPA as a consent process, and it is correct that most authority applications received by the Trust are granted in whole/ part, with conditions attached. 252 authorities were granted/ granted in part during the 2006 financial year, and four were declined. Authority conditions vary depending on the nature of the proposed activity, and the impact that it will have on archaeological sites(s), but always provide mitigation against adverse effects. Standard mitigation conditions include the requirement for archaeological monitoring, recording and investigation (where appropriate). A detailed investigation will generally be required if a site is to be totally destroyed by the proposed activity.

Whilst the archaeological provisions of the HPA allow for the damage or destruction of archaeological sites, albeit in a controlled fashion, the authority process does provide the NZHPT with the opportunity to assess a site at the time that it is under threat, and allow a less damaging outcome to be negotiated than would otherwise be possible [Challis 1995: 175]. This is evidenced by a recent authority granted for the construction of an apartment/ retail complex in central Wellington (New Zealand's capital city), where the project archaeologist encountered significant archaeological remains during monitoring of the preliminary earthworks. The NZHPT consequently reviewed the conditions of the authority and required the authority holder to undertake a detailed archaeological investigation. This investigation resulted in the discovery of three fragile punga (wooden) structures associated with the former occupation of Te Aro Pa, a recorded archaeological site, which are now to be preserved in-situ after lengthy negotiations between the authority holder, NZHPT, City Council and Wellington Tenths Trust (representing Maori interests).

Other positive heritage outcomes negotiated as part of the authority process include the setting aside or 'reserving' of particular sites within a larger development, or the restoration of archaeological sites as mitigation against destruction of other remains. The Trust recently granted an authority for example for the partial demolition of a dry-stone wall in Manukau, Auckland, on the condition that the stone was re-used to restore *in situ* sections of the wall on a neighbouring property.

Development plans can often be too far developed to allow for positive heritage outcomes as part of the authority process however, and the NZHPT therefore advocates for archaeological input as early as possible during the initial planning process, particularly with large-scale commercial or residential developments. Prickett [2005: 59] comments that it is usually too late to save sites when a project has reached the proposal stage, which is why professional archaeological input during the initial planning phase is imperative for ensuring the best heritage outcomes. Early archaeological input means that recommendations can be made such

as the relocation of a building platform or rerouting of a roadway to avoid archaeological sites, before the finalisation of plans and drawings. Such recommendations prevent the often-impossible situation whereby the NZHPT and the authority process is seen to be the 'ambulance at the bottom of the cliff', particularly in the eyes of Maori.

Heritage orders and covenants are further heritage protection mechanisms available within the framework of the *Historic Places Amendment Act* 2006. Section 5 of the HPA enables the NZHPT to give notice of the requirement for a heritage order in accordance with the *Resource Management Act*). Heritage orders provide protection for heritage under immediate threat, but have inherent risks and should only be used when site protection is not available by any other means [McLean 2006: 4(5)]. They are therefore of little relevance to pre-1900 A.D. archaeological sites which are already afforded protection under the archaeological provisions of the HPA, but may be a potential tool for at-risk sites that post date 1900 A.D.

Heritage covenants are a more commonly utilised protection mechanism, and are a critical tool for ensuring long-term heritage protection [www.historic.org.nz]. A covenant is signed between the landowner and the NZHPT, and permanently attaches to the land title, placing conditions or restrictions on its use, meaning that any subsequent landowner is also bound by the document [www.historic.org.nz]. Breach of a covenant is an also an offence under the HPA. The NZHPT has currently entered into more than 80 covenants with private property owners, most of which relate to built heritage, but covenants have also been signed for selected archaeological sites. Covenanted archaeological sites include several Maori rock art sites and five Maori pa. Archaeological sites can also be protected by open space covenants under the *Queen Elizabeth II National Trust Act* 1977, or through covenants applied under the *Conservation Act* 1987 [NZHPT 2004: 4].

Two further mechanisms under the HPA that can assist with the protection of New Zealand's archaeological resource are registration and gazettal. Registration is a process of identification of significant heritage places, but the scheduling of registered sites by the local authorities in their District/ Regional Plans makes those sites subject to the rules or codes attached to these plans, thereby affording them additional protection beyond the archaeological provisions of the HPA.

Gazettal is an important tool for enabling the protection of New Zealand's 20th century archaeological heritage, which does not currently fit the legislative definition of an archaeological site. Examples of this at-risk heritage include New Zealand's World War II military fortifications, and industrial remains such as gold mining landscapes. Gazettal is a process whereby a post-1900 A.D. archaeological site can be declared as an 'archaeological

site' as defined in the Act by notification in the *Gazette* and by public notice, if it is *"a site that is or may be able, through investigation by archaeological methods, to provide significant evidence relating to the historical and cultural heritage of New Zealand*" [*Historic Places Amendment Act* 2006]. Gazettal then affords that site protection under the archaeological provisions of the Act, meaning that it would be unlawful to damage, modify or destroy a gazetted archaeological site without an authority from the NZHPT. An historic stonewall and bush tramway complex are the only two post-1900 A.D. archaeological sites to have been gazetted by the NZHPT, but a comprehensive programme of gazettal has been identified as a priority responsibility in the NZHPT's *Statement of Intent* for 2006-2009 (see Figure 7).

Figure 7: Gazetted archaeological site: the Makatote Tramway, Tongariro National Park
Photo: Department of Conservation Tongariro/Taupo Conservancy, 2005

Another very effective tool in ensuring protection of archaeological sites is to have them set aside as a reserve for public benefit. This is primarily achieved under the *Reserves Act* 1977, although archaeological sites can also be reserved under other legislation such as the *Conservation Act* 1987 and *Te Ture Whenua Maori Act* 1993. There are eight categories of reserve under the *Reserves Act* 1977, but the most relevant category for the purposes of this paper is 'historic reserves'. Historic reserves are established in order to ensure the long-term protection and preservation of places, objects and natural features of cultural, historic, educational, archaeological or other special interest (*Reserves Act* 1977).

Some of New Zealand's most significant historic archaeological sites are protected within historic reserves, including numerous military sites associated with the New Zealand Wars, such as Ruapekapeka Pa, Omata Stockade and the Te Porere, which is a combination of historic reserve and Maori reserve (under the *Te Ture Whenua Maori Act* 1993). A number of prehistoric Maori archaeological sites are also managed as historic reserves, including a several important pa sites, rock art complexes, and significant archaeological landscapes such as the Raoul Island East Polynesian archaeological landscape. Historic reserves are primarily administered and managed by the Department of

Conservation, but other parties including the NZHPT and local authorities (Regional and District Councils) can also be vested with this responsibility, as is the case with Te Porere, which is the responsibility of the NZHPT.

A case study illustrating the effectiveness of reserves as a protection mechanism for archaeological sites is that of the Otatara Pa Historic Reserve, which is managed by the Department of Conservation. Otatara Pa is an extensive defensive and settlement complex, and archaeological features include two pa (Otatara proper and Hikurangi) and numerous pits, house sites and terraces [Wylie 2004]. Otatara is one of New Zealand's earliest and most remarkable extant pa sites, and has been registered by the NZHPT as a Category I historic place in recognition of its national importance. Otatara Pa was first set aside as an historic reserve in 1972, but the reserve boundaries did not fully encompass the extent of the Otatara pa complex, which covers an area of approximately 44 hectares [Wylie 2004]. A proposed subdivision of land adjoining the historic reserve in 2001 threatened to impact upon the archaeological integrity of the Otatara Pa complex, but the Department of Conservation negotiated the purchase of a number of the proposed subdivision lots, and more than nine hectares of land has now been added to the Otatara Pa Historic Reserve since 2003 (Department of Conservation 2005: 64).

Barriers to site protection

Whilst the preceding section outlined the various protection mechanisms available, archaeological sites continue to be damaged and destroyed, and several barriers to site protection can be identified.

> *"The basis for all site protection programmes is the identification and recording of sites" [Challis 1995: 173].*

One of the primary barriers to site protection has been the inadequacy of the NZAA Site Recording Scheme (New Zealand's national inventory of archaeological sites) as a tool for planning /resource management processes. The Site Recording Scheme was originally created as a special interest database, but has been increasingly utilised as a planning tool following the introduction of the *Resource Management Act* 1991 and the amended *Historic Places Act* in 1993, particularly by local authorities [www.nzarchaeology.org]. Some local authorities use the data to create alert layers on their planning maps or in their GIS systems for example, which allows them to inform landowners (and potential land purchasers) of the likelihood of archaeological sites being located on their land. The use of the Site Recording Scheme within a

statutory and regulatory context has highlighted inadequacies with the data however, including a lack of national coverage and variability in the quality/ level of data for particular sites [www.nzarchaeology.org; NZHPT 2004: 39]. Some site record forms were found to have minimal detail, and inaccurate location information [NZHPT 2004: 39].

The NZAA recognised that accurate and current information was vital to the long-term protection of New Zealand's archaeological sites, and launched the Site Recording Scheme Upgrade Project in 1999 to address the inadequacies inherent in the data. As previously mentioned, the Upgrade Project involves the upgrading of information held on recorded archaeological sites, with a particular focus on location information (e.g. grid references) and site condition and threats, and fieldwork has been partly funded by each of the participating local authorities [www.nzarchaeology.org]. Upgrade fieldwork is now well underway across New Zealand, with 67 of the 86 local authorities having either completed the Upgrade Project in their respective regions/districts, or committed to participating in the project [Walter 2006: 71]. Eight local authorities have refused to participate however, and a further 10 have not responded to communication from the NZAA [Walter 2006: 70].

Whilst the Site Recording Scheme Upgrade Project will correct inaccuracies with the existing data, further archaeological surveys are needed to resolve the issues surrounding the lack of national survey coverage, as noted by Prickett [2005: 58]. Some areas of New Zealand are either unrecorded or significantly under-recorded, and in other areas there has been a bias towards particular site types. There has been a focus on pa in the Taranaki region for example, to the detriment to other less visually impressive sites such as horticultural remains and kainga (undefended villages) [Prickett 2005: 48]. Additional archaeological survey work has generally been hindered by resourcing constraints, namely a lack of time and money, and surveys and assessments have primarily been undertaken within a resource management archaeology framework only. Recent projects such as the aforementioned Southland Coastal Heritage Inventory Project are helping to fill the gaps in our survey knowledge however, and it is hoped that similar projects will continue elsewhere across New Zealand. Predictive modelling can however provide information about the likelihood of archaeological sites in the absence of any archaeological survey data, and has recently been used within the Waipoua Forest in Northland, where the dense vegetation impedes total survey coverage.

A further barrier to site protection in New Zealand is a lack of awareness and understanding about the archaeological resource. There have been considerable achievements and advancements in New Zealand archaeology since the establishment of the NZAA in 1954, but Wilson and O'Keeffe [2004: 280] contend that the discipline still occupies a "relatively precarious and marginal position in New Zealand". Many New Zealanders still associate

archaeology with overseas sites such as the buried cities of Pompeii and Herculaneum, or the ancient remnants of South American civilisations such as Machu Picchu, and believe that New Zealand is too young to have its own archaeological history. It could be argued that many New Zealanders wouldn't even be aware of the types of archaeological sites found within New Zealand, let alone understand the effects that certain activities can have on archaeological sites, and thus it is not surprising that unauthorised damage is still occurring throughout the country.

The NZHPT, NZAA and other organisations such as the Department of Conservation all have an important role to play in educating New Zealanders about the importance of archaeology, and the NZHPT's *Statement of Intent* for 2006-2009 identifies the increasing of New Zealanders' understanding of their heritage and its importance to both cultural and national identity as a priority issue. It does appears though that public attitudes towards archaeology may be changing, albeit slowly. The NZHPT's range of archaeological brochures has been well-received, and recent open days during excavations for the Wellington Inner City Bypass and Lawrence Chinese Camp Redevelopment in Central Otago (Figure 8) proved very popular, but a recent television series on archaeology couldn't even make it to prime-time viewing.

Figure 8: Educating school children about the Lawrence Chinese Camp excavations
Photo: Rick McGovern-Wilson, 2005

Key stakeholder groups also need to be educated about the importance of New Zealand's archaeological resource. These groups include local authorities, forestry companies, major industry leaders, special interest bodies such as the New Zealand Federated Farmers and even the Department of Conservation, who have the role of managing both natural and cultural heritage on public conservation land (*Conservation Act* 1987). A recent workshop and subsequent training session undertaken between representatives of the NZHPT and Department of Conservation revealed that there is still a lack of appreciation for archaeological values, and that these are often overshadowed by competing natural or recreational values. The most critical of these stakeholder groups however are local authorities, given their increased responsibilities towards historic heritage with the passing of the *Resource Management Amendment Act* 2003. Local authorities can be said to have a variable attitude towards archaeology; selected Councils are quite pro-heritage whilst archaeology barely features on the radars of others. The NZHPT recognises that understanding and appreciation of

the need for archaeological site protection can be improved through education however, and regularly undertakes training workshops.

Another commonly cited barrier to the protection and restoration of New Zealand's archaeological heritage is a lack of resourcing, even within the public sphere, and decisions often need to be made as to which sites require priority attention. This is evidenced for example by the Department of Conservation's ongoing development project at Otatara Pa, which has received targeted funding as one of the Department's national icon sites.

A lack of resources is of particular concern to archaeological sites within private ownership. Some protection measures such as the fencing of pa to prevent stock damage may require little financial input, whilst others such as the conservation of wooden structures may be beyond the reach of private individuals. Assistance has recently become available however through the NZHPT's National Heritage Preservation Incentive Fund (NHPIF), which can provide private individuals with up to 50 percent of the required funds to enable the protection or restoration of heritage places. There are conditions of eligibility such as the requirement for a site to be registered by the NZHPT as a Category I historic place, or to meet the criteria for Category I registration, but the NHPIF is still a valuable resource for the protection and restoration of cultural heritage places in private ownership. Funds have recently been allocated to assist with the preservation of an historic wooden slab whare in the Wairarapa, and the conservation of the three punga structures associated with the historic occupation of Te Aro Pa, Wellington.

Restoration of archaeological sites

Restoration is defined as "returning a place to a known earlier form by the introduction of new or similar materials…usually where a place has been damaged" [Jones, Harlow and Gosling 2002: 8]. Restoration has not been widely utilised in New Zealand, and has generally only occurred in the past as mitigation against site damage. This is evidenced by the restoration work undertaken at the Te Porere Redoubts during the 1960s – 1970s in response to concerns about the deteriorating condition of the earthworks as a result of both natural processes (slumping), and cultural processes (people walking along the top of the earthwork features). Reconstruction was undertaken on the earthworks of the both lower and upper redoubts, but there was a particular focus on the upper redoubt, which has been estimated as being 80 percent reconstructed [Ritchie and Barr 1994: 18] (Figure 9). Earthwork features were similarly restored at Tauwhare Pa in the Bay of Plenty in 1990, but to a lesser extent than at Te Porere [Department of Conservation 2000].

Figure 9: Restoration works to repair walls of upper redoubt, Te Porere Redoubts, 1977
Photo: NZHPT Photographic Collection: AR 3842, 1977

Whilst previous restoration works at Te Porere and Tauwhare Pa have largely stood the test of time, there has been a shift in attitude and ethics about restoration over recent years, with Jones *et al*. [2002: 55] noting that it is generally opposed by the ICOMOS charters, such as the International Charter on Archaeological Heritage Management, Article 7. Restoration can still have an important role to play within an archaeological heritage management framework however, particularly with regards to public education and advocacy, but should only be undertaken in accordance with sound conservation principles.

The value of restoration in aiding public interpretation of archaeology has been recently recognised by the Lawrence Chinese Camp Charitable Trust and Queen's Redoubt Trust. The former group owns the historic Chinese Camp at Lawrence in Central Otago, and intends to redevelop the site as part of major heritage tourism development, as illustrated by the concept plan below (Figure 10). This redevelopment will involve the reconstruction of part of the former camp, and archaeological investigations are currently underway, which will guide the restoration work and assure authenticity [Jacomb, McGovern-Wilson and Walter 2005: 20]. The Queen's Redoubt Trust is similarly seeking to create a major educational and visitor attraction at the Queen's Redoubt, an important New Zealand Wars site in the Waikato region, and is also utilising restoration as a means of achieving this goal (www.queensredoubt.co.nz).

Figure 10: Lawrence Chinese Camp Redevelopment Concept Plan
Copyright: Lawrence Chinese Camp Charitable Trust

Whilst archaeological site restoration is an effective tool for heritage education and advocacy, it can require a significant investment of financial and human resources, which is a considerable barrier, particularly for private individuals, community groups and charitable organisations. A case in point is the Queen's Redoubt Trust, which was only able to purchase the Queen's Redoubt property after five years of fundraising and negotiations.

Concluding Remarks

New Zealand's archaeological heritage is rich and diverse, but recent studies have shown that it is also at risk from a wide range of threats, ranging from rapidly expanding industrial and residential development to natural processes such as coastal erosion. Preservation of our archaeological sites for future generations has consequently become a matter of national importance, and there are a number of mechanisms and tools available by which this can be achieved. These include heritage covenants, reserving of land, and funding assistance for the preservation of archaeological sites in private ownership. The various mechanisms and tools each have their own limitations, but the biggest barrier of all against the protection of archaeological sites is New Zealanders' lack of understanding and appreciation of their own cultural heritage. Heritage education and advocacy is therefore of paramount importance, and recent developments are being made in this regard, including increased media exposure of archaeology. Major restoration projects such as those underway at the Lawrence Chinese Camp and Queen's Redoubt will also play an integral role in educating the public about the important of New Zealand's archaeological heritage.

Bibliography:

Challis, A. (1995). 'Current Directions and Issues in Archaeological Site Protection'. In *Archaeology in New Zealand*, Volume 38(3) 169-190.

Darmody, R. (2006). 'NZAA Site Recording Scheme File Co-ordinators Report'. In *Archaeology In New Zealand*, Volume 49(2): 67-68.

Department of Conservation (2000). '*Tauwhare Pa Scenic Reserve, Ohope: Conservation Plan*'.

Department of Conservation (2005). *Department of Conservation Annual Report: For the Year Ending 30 June 2005*.

Higham, T. and M. Jones (2004). 'Chronology and Settlement'. In L. Furey and S. Holdaway (eds), Chang*e Through Time: 50 Years of New Zealand Archaeology*, pages 215-234. New Zealand Archaeological Association Monograph 26.

Irwin, G. 'Pacific Migrations', *Te Ara – the Encyclopedia of New Zeal*and, updated 9 June 2006.
URL: http://www.TeAra.govt.nz/NewZealanders/MaoriNewZealanders/PacificMigrations/en

Jacomb, C., R. McGovern-Wilson and R. Walter (2005). 'Gold New World'. In New Zealand Heritage, Issue 99:18-21.

Jacomb, C. and R. Walter (2005). 'Southland Coastal Heritage Inventory Project, Stage 1: Waiparau Head to Omaui'. Unpublished report by Southern Pacific Archaeological Research.

Jones, K., D. Harlow and R. Gosling (2002). 'Caring for Archaeological Sites: New Zealand Guidelines'. Draft for Discussion.

McLean. R. (2006). 'Draft Statutory Advocacy Manual'. Internal NZHPT document.

NZHPT (2004). *Heritage Management Guidelines for Resource Management Practitioners*.

NZHPT (2006). *Statement of Intent: 2006-2009*.

Phillips, C. and H. Allen (2006). 'Damage Assessment of Waihou River Sites'. In *Archaeology in New Zealand*, Volume 49(2): 82-93.

Phillips, J. 'History of Immigration', *Te Ara – the Encyclopedia of New Zealand*, updated 9 June 2006.
URL: http://www.TeAra.govt.nz/NewZealanders/NewZealandPeoples/HistoryOfImmigration/en

Prickett (2005). 'The Taranaki Archaeological Landscape – Past, Present and Future'. In *Archaeology in New Zealand*, Volume 48(1): 45-60.

Ritchie, N. and C. Barr (1994). 'Te Porere Management Plan: Draft'. Department of Conservation, Hamilton.

Walter, L. (2006). 'NZAA Site Recording Scheme Upgrade Project Coordinator's Report. In *Archaeology in New Zealand*, Volume 49(2): 70-71.

Walton, T. and M. O'Keeffe (2004). Archaeological Heritage Management. In L. Furey and S. Holdaway (eds), Change *Through Time: 50 Years of New Zealand Archaeology*, pages 263-282. New Zealand Archaeological Association Monograph 26.

Walton (2006). 'On the Beach: Monitoring the Coastal Middens of Queen Elizabeth Park.' In *Archaeology in New Zealand*, Volume 49(1): 29-39.

Wylie, J. (2004). 'Otatara – Proposed Review of Registration'. Unpublished Report for the NZHPT.

Websites:

New Zealand Historic Places Trust website.
URL: www.historic.org.nz

New Zealand Archaeological Association website.
URL: www.nzarchaeology.org

Department of Conservation website:
URL: www.doc.govt.nz

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PROBLEMS AND NEEDS FOR CULTURAL HERITAGE PROTECTION AND RESTORATION ACTIVITIES IN PAKISTAN

Pakistan is one of the fortunate countries of the world in that it has one of the oldest socio-political backgrounds traceable to the Old Stone Age. The existence of this Stone Age has been estimated at two million years ago on the soil of Pakistan. The areas of this earliest Palaeolithic culture has been located in the Potwar Plateau of Punjab, which appears to have been the earliest home of Homo Erectus and Homo Habilis outside Africa, roughly in the time range of the first Glacial and Interglacial phases of the Pleistocene Age. Though their actual remains have not so far been found in these areas, the crude stone tools used by them for their livelihood, and termed as Pre-Soan tools by anthropologists and archaeologists have been found in abundance. These hominids roamed about here for many thousands of years, and towards the end of the Ice Age they were showing progress towards life in settled communities and a culture called Mesolithic. Then with the advent of agriculture, the stone tools became refined as Neolithic specimens.

The beginning of organized social living and division of labour comes dramatically to our knowledge at Mehrgarh in Kacchi Plain, south of the Bolan Pass in Balochistan. Some low and high cultural mounds were recognized as the abodes of this prehistoric community, and have been scientifically excavated during the past three decades. The discovery of an organized community life in the 7^{th} millennium BC on the soil of Pakistan is of immense significance, as very few ancient places in the word have shown such remote cultural antiquity.

The traits of early agricultural economy so introduced and developed continue during the following two millennia the traces of which have been discovered in different areas of Pakistan. The distribution of these sites spreading over almost the whole of Pakistan, shows that the dissemination of this prehistoric culture was a uniform phenomenon throughout, which

developed later on into the Chalcolithic era when the change over from stone, copper and bronze took place in the 4th millennium BC.

From the mosaics of these nascent agrarian cultures emerges in full bloom the Bronze Age phenomenon of an organized society over the vast regions embracing the plains of the Punjab and Sindh, which has been named the Indus Civilization. Today, through the constant and consistent efforts of archaeologists we have gathered information about this civilization that flourished for well over one thousand years.

After flourishing for about one thousand years (Ca.2750 to 1750 BC) this civilization declined. The causes of this decline and eventual fall have been postulated by many researchers and eminent scholars. However, between the fall of the Indus Civilization and the advent of the historic period, there is a gap in our knowledge, which has been partially filled by the discovery of the so-called "Gandhara Grave Culture" in the areas of Swat, Dir and Peshawar Valleys and later on at Hathial in Taxila. This culture has spanned the gap between the two periods of the Bronze and Iron Age and is so named because it presents a pattern of living in the Gandhara regions as evidenced by the distribution of the graves spread over a large area.

The dawn of the historic period in ancient Pakistan relates to the Aachmenian times. One of the important habitations of this period was located at Taxila. Today, the area where this ancient city was located is called Bhir Mound. It has been regarded as a classic landmark of those remote days. Later, the Macedonian invasion led by Alexander the Great in 326 BC is likewise a great event, which served as a catalyst in the process of cultural fusion of East and West in the northern parts of the subcontinent. The impetus given to Buddhists by the Mauryan Emperor, Asoka, and the artistic impulses emanating from the Bactrian Greeks in Central Asia led to the fruition of the Gandhara Art under the patronage of the Kushanas and their successors.

The period from the 1st century AD to the 4th Century AD is a remarkable period in the history of Pakistan when the sculptural art becomes a handmaiden to spiritual zeal. The decline of the Graeco-Buddhist culture in ancient Pakistan resulted in the revival of Brahmanism, though Buddhism continued in a much weaker form and its sculptural art degenerated to Tantric iconography, often in the medium of bronze or brass groups belonging to the 9th and 10th Centuries AD. The Hindu Temples of the Salt Range areas, especially the Malot Temple are built in four-square Kashmiri style. Similarly a group of Hindu temple at Ketas, southern and northern Kafir Kot at Bilot in Dera Ismail Khan are noteworthy examples of this religious art.

Although the first impulse of Islam was actually felt in the north-western regions of the sub-continent almost immediately after its stabilization in the Arabian peninsula under the caliphate of the first and second pious Caliphs, its real impact of far-reaching effect became evident a little later when the sea-port of Debul was attacked and reduced by an energetic young Arab General, Muhammad Bin Qasim by the close of the first Century Hijra (711-12 AD). With this political change, the socio-religious pattern of the local society was also changed. The next wave of Islamic culture which came from Central Asia to this part of the subcontinent was initiated through the military excursion of Sebuktegin and later by his son and successor Mahmud of Ghaznin in the later decades of the 10^{th} – 11^{th} Century AD.

The early decades of the 16^{th} Century witnessed yet another political change in the subcontinent, and brought a new religious power to the scene. The progenitor of this dynasty as called by modern historians, the Mughal Empire, was Zahir-uddin – Muhammad Babur. The rule of this imperial power lasted for well over three hundred years when it declined and fell. The Imperial Mughals introduced a much refined and sophisticated socio-cultural pattern into society. The way of life so introduced was a happy assimilation of Iranian and local traits and traditions. Indeed Lahore and Thatta are the two celebrated cities where the most sumptuous representation of Islamic architecture of the grand Mughals is found in such abundance.

In the high mountains of northern Pakistan, in the adjoining Hindukush, the western Himalayas, and Karakorum, some of the world's largest rock art is spread along the banks of the Upper Indus. Petroglyphs of unique diversity and abundance cover cliffs, rock faces, and boulders accompanying the Indus river from Indus-Kohistan to Baltistan and reaching as far as Ladakh and Tibet. Rock art sites do not only follow the routes along the Indus itself, but also grace important mountain passes and valleys of the Indus tributaries including the Gilgit river up to Yasin and the Hunza valley. A main cluster, however, occurs between Shatial in Indus-Kohistan and Raikot Bridge extending over more than 100 km. The heart of this complex lies at the foot of Nanga Parbat (8,125 m) around Chilas and Thalpan in the Diamer District. So far, more than 50,000 rock carvings and 5,000 inscriptions have been discovered ranging from the Epipalaeolithic or Neolithic (7^{th} /6^{th} millennium BC) to the coming of Islam (16^{th} century AD). Their tremendous diversity not only allows insight into the history of various peoples with different social-cultural and political traditions as well as religious beliefs but also discloses the strategic importance of the region. These high mountain areas have been, at all times, a crossroads of important trade routes connecting China and Central Asia with the Indo-Pakistan subcontinent. Meandering through the gorges of the Indus, its tributaries, and across high mountain passes, the trails are part of a highly frequented branch of the legendary Silk Road which commences in the most ancient Chinese imperial city of Chang

‘an and extends as far as Northern India, while passing by emporia and Buddhist centres such as Dunhuang in the Gansu Province as well as Turfan, Khotan and Kashgar in the Tarim basin.

The systematic research on the rock art province began in 1978 after the opening of the 751 km long Karakorum Highway, the main traffic route between the People’s Republic of China and the Islamic Republic of Pakistan. Prof. Karl Jettmar, who realized the significance of the rock carvings for the previously unknown cultural history of this vast region, initiated a joint German-Pakistan project together with Prof. Ahmad Hasan Dani of Islamabad and Field researches were started in 1980. The project was established as a research project at the Heidelberg Academy of Sciences and Humanities in 1984 and since then for proper protection and preservation of these marvellous specimens of the past, systematic documentation and publication of rock art galleries is being carried out in close collaboration with the Department of Archaeology and Museums.

The Department of Archaeology and Museums, heir of the Archaeological Survey of India, has been preserving these historical and archaeological sites as well as monuments in its charge under the Annual Repair and Special Repair Programmes. The Department of Archaeology and Museums being the sole custodian of the nation’s cultural heritage is carrying out regular restoration works on the sites and monuments under the development projects since 1970.

The Department of Archaeology & Museums has so for protected **393** Archaeological Sites and monuments (category I, II &III) under the legal framework known as the Antiquities Act, 1975. Out of these **393** protected sites/monuments seven important Archaeological sites and historic monuments belonging to Pakistan have been inscribed on the World Heritage List by UNESCO which include; the highly prized Proto-historic metropolitan site of the Indus Valley Civilization known as Moenjodaro, the group of highly important Islamic period monuments in the World’s largest necropolis at Makli Hills, Thatta, the famous Lahore Fort which houses highly prized and unique monuments like Shish Mahal, Naulakha, Diwan-e-khas, etc, the Royal Mughal Pleasure Garden of Shalimar at Lahore, the unique military fort at Rohtas in district Jhelum built by Sher Shah Suri, the great warrior king who dethroned Humayun of the Mughal dynasty, the Taxila Valley containing three city sites of the earliest historic period of Pakistan, Buddhist sanctuaries (Stupas, monasteries, temples, etc.), and the huge Buddhist monastery at Takht-I-Bahi in Mardan district.

The main source of funding for proper preservation, conservation, protection and restoration of these sites and monuments under the charge of the Department of Archaeology and Museums is the Federal Government of Pakistan. However, the Department of Archaeology and Museums has also been getting financial as well as technical assistance

from UNESCO, UNDP, ICCROM, ICOMOS, and sympathetic countries like the USA, Japan, Korea, Thailand, Germany, Norway, Italy and The Netherlands etc.

The aim of conservation of a monument or site is to protect it from further decay, thus giving it a new lease of life. Its primary objective is to 'preserve' the original features as far as possible so that the authenticity of the monument is not impaired. Ancient monuments and archaeological sites / remains in Pakistan have suffered from a variety of causes. The natural causes are numerous and varied, for instance, thick vegetation, heavy rainfall, floods and changes in river courses etc. etc. Thus conservation of a monument or ancient site only once in many years is not enough. It needs continuous vigilance. This vigilance comes under 'Annual Repairs'. It implies regular jungle-clearance, resetting of loose bricks on the top of walls, removing of tree-roots and arranging proper rainwater drainage from the site or monument. Another major cause of decay is action of salt-penetration. The salt-laden air penetrates into the surface and wears out the structural material. Besides the natural forces, human vandalism is also one of the causes of damage to the ancient sites/remains. Similarly, brick and stone quarrying for building purposes had always been a great cause of destruction to the ancient monuments. There are reasons to believe that the pre-historic collegiate building at Moenjodaro (2500-1500 BC) was quarried by the builders of the nearby Stupa in historic times. The ruins of Harappa (Indus Valley Civilization Site) were destroyed by the Lahore-Multan Railway line as well as the construction of Pucca houses in a nearby village of the same name. The causes of damage due to human vandalism however, could be easily prevented by fencing the archaeological sites/remains and controlling the entry by admission tickets and posting guards, as well as fixing notice boards at important points.

To meet the causes of destruction by natural agents some broad principles of preservation have been laid down. These principles aim at the archaeological site or monument being preserved without disfigurement or alteration of its character. The maintenance and restoration works is to be carried out in a proper and attractive manner. A complete examination of ancient remains is to be made before starting the work and much care and patience must be devoted to the conservation work. In the conservation of ancient monuments the causes of dilapidation like wilful damage, disintegration of mortar or displacement of masonry, under-mining of foundations, bulging masonry, out of plumb walls and settlement of foundations has its own remedy. All these remedies have made the preservation of ancient sites or monuments a highly intricate process. It is completely different in form and spirit from the repairs of modern buildings. Maximum effort is made to employ the techniques and material used by its original builders. This has made the preservation / protection of ancient monuments a work of a highly technical nature. The preservation of cultural property sometimes entails its restoration.

In Pakistan, monuments of the Muslim period are more adept to restoration. These are in a better state of preservation and therefore, respond readily to treatment. Moreover, the architecture of these monuments is based on arches, vaults and domes. These monuments are also embellished with carvings, tiled wall murals and floor mosaics in geometrical and floral patterns. Although these decorations, as well as structures have successfully resisted the destructive effect of the atmosphere, cracks in their arches or domes have created alarming conditions, involving dismantling and restoration to ensure their structural stability. Therefore, memorable restoration work has been done on important monuments of historical and architectural importance. In principal, monuments like the Alamgiri Gate of Lahore Fort, the Famous Shalamar Garden, Jehangir's Mausoleum, Shishmahal and many other conservation and restoration works for structural stability, improvement of ornamentation and face lifting, have been carried out successfully by the Department of Archaeology & Museums. As a result of these efforts these edifices have been restored to their previous grace and magnificence.

The preservation/conservation of archaeological sites and historical monuments however, remains a challenging task. Besides the vagaries of time and human neglect there are many other factors that cause deterioration. Human vandalism has also played a significant role in damaging the archaeological sites / ancient remains or monuments. Unfortunately, during the British rule, adequate attention was not paid to the preservation of monuments in areas that now constitute Pakistan. Handicapped by the problems of ludicrously inadequate funds, dearth of building materials and skilled labour and trained personnel, it is only natural for the Department of Archaeology to assign priorities to the monuments on its charge.

The preservation measures generally involve two types of work: (i) annual repair which includes protection from human vandalism, eradication of wild growth, regular cleaning and dusting, provision of historical notice boards etc. and (ii) special measures comprising conservation, restoration where necessary, development of gardens etc. Normally maintenance is carried out on all Category-I sites and monuments and also on important monuments/sites of Category – II. As regards special measures including conservation, restoration and development, the funds allocated to the Department are utilized on Category – I monuments in the following order of priority: -

a) National Monuments

This category includes such monuments as are of national importance and serve as venues for State Guests and VIPs. Special allocations for the repair of these monuments are secured through the Development

Budget. When it is not possible, specific funds are obtained through the normal budget.

b) Monuments / archaeological sites that are historically and architecturally important.

Even in Category – I, some of the monuments or sites/remains are more important than others either from the historical point of view or on architectural considerations. Specific funds for the preservation of these monuments are obtained through the normal yearly budget. If this is not possible, efforts are made to meet their immediate requirements from the funds provided for special repairs.

c) Monuments / archaeological sites that are historically important and of local significance.

The repair work on these monuments or sites is carried out from the lump sum provision for special repairs in the normal budget of the Department.

The cultural relics play a very vital role and provide the virtual foundations for advancement in corporate life of any nation. It is a known fact that achievements are acquired after prolonged struggles with nature and environment. They manifest the store of creative intelligence, initiative, perseverance and integrity that have gone into the making of a particular national character. Pakistan has been very fortunate in this respect. Our ancient land has been an important primeval stage for the grand and grim drama of man's first endeavours, his integral rise, his phenomenal fall and his great resilience, which kept the stream of human life in action in spite of all the obstructions and intermittent incidents of lapses.

Over the past several years, the Department of Archaeology and Museums have successfully carried out preservation and restoration works at a number of archaeological sites/monuments such as; Jehangir's Tomb, Lahore, Noor Jehan's Tomb, Lahore Rohtas Fort, Jhelum, Asif Khan's tomb, Lahore Tomb of Shaikh Ali, Gujrat, Baoli at Jandiala Sher Khan, Sheikhupura, Hiran Minar and Tank, Sheikhupura, the archaeological remains at Harappa etc. etc. Besides consociation / restoration works have also been carried out at the following sites by the Department of Archaeology and Museums for their proper preservation, protection and presentation: -

1. Ghulam Nabi Kalhora's Tomb, Hyderabad.
2. Archaeological Site at Mansura.
3. Shah Baharo's Tomb, Larkana.
4. Chaukhandi Tombs, Karachi.
5. Fortificaiton wall of Hyderabad Fort, Hyderabad.
6. Ghulam Shah's Tomb, Hyderabad.
7. Kot Diji Fort, Kot Diji.
8. Umerkot Fort, Umerkot.
9. Makli Hill Monuments, Thatta.
10. Tomb of Lal Mohra Sharif.
11. Archaeological Site of Sirkap, Taxila.
12. Archaeological Site of Chirtop, Taxila
13. Archaeological Site of Mohra Moradu, Taxila
14. Archaeological Site of Jaulian, Taxila
15. Shingardara Stupa, Swat.
16. Butkara Site, Swat.
17. Udegram Site, Swat.
18. Jamal Garhi Site, Mardan District.
19. Nimogram Site, Swat.
20. Mankiyala Stupa, District Rawalpindi.

In the words of Sir John Marshal "no known preservation is suitable for all stones or for all kinds of decay; and no patent solutions on the market are as efficacious as they are claimed to be". It is therefore essential that each monument must be preserved according to its condition based on case-by-case demand. The main factors causing deterioration of stone built monuments in Pakistan can be classified as under: -

TEMPERATURE

Considerable differences between day and night temperatures are common in tropical areas and the alternation between day and night temperatures affects the remains. Since stone is a bad conductor of heat the forces thus set up are further aggravated by shaded areas and between surfaces of interior layers. This causes flaking to take place and to some extent granulation. This problem of flaking can be observed on the monuments of the 2nd and 3rd group at Makli Hill Monuments, Thatta.

The role of temperature as an agent of decay is for the most part indirect. It reacts on the humidity in the pores of the rock, and the solubility of salts and gases influences the rate of chemical reaction and promotes hydrolysis.

WIND

Wind borne particles are very harmful for the surface of any building and they are very dangerous when they are large. For example the velocity of the wind at historical monuments of Thatta is very high and this strong wind acts as a sand blaster on the exposed surfaces. Here limestone has been used for the construction of the monuments, and iron in the limestone is rusted by the humidity and then eroded by the strong wind causing problems of pitting which can be observed very easily. The high velocity of the wind itself is very dangerous to structures like, pagodas, towers, canopies etc. At Makli Hills Monuments, Thatta (in the third group of monuments) some stone canopies have been found collapsed due to the high velocity of the wind.

LIGHT

Natural light is also injurious to ancient remains as well as the historical monuments, because it aids harmful chemical reactions. The light rays discolour pigment that does not have the ability to reflect the light in wavelength. The energy is thereby observed and this can break chemical bonds in materials and cause them to change. The clear sign of decay can be observed on the walls towards the east and west of the historical monuments at Makli Hills, Thatta.

HUMIDITY

Humidity and temperature are closely related. The conditions of very high temperature and humidity along with the presence of light encourage the growth of organisms such as bacteria, mould, fungi and algae or plants like lichens and mosses. A thick layer of black coating can be observed for instance on most of the monuments in Makli Hill Thatta, which is due to growth of the above mentioned micro-organisms and plants on the surface.

POLLUTION

Sulphur dioxide is the most important pollution problem in stone decay. In fact dark deposits and black scabs observed on the surface of most of the stone built monuments in Makli Hill Thatta is mainly composed of calcium sulphate, which is formed by the reaction between sulphur dioxide and calcium carbonate of the limestone. The chief sources of this pollution are domestic coal fires and industrial furnaces. Although the acid gases are most

concentrated in cities and industrial areas, they are readily carried by air currents and cause damage at considerable distances from the source of pollution.

When these acidic gases react with rain or moisture sulphuric acid is formed, which is responsible for the bluish smoke typical of sulphur dioxide emission. It is observed that the formation of both oxides of sulphur (sulphur dioxide SO2 and sulphur trioxide SO3) unlike carbon dioxide the ratio, of SO2 is not influenced by the amount of oxygen present during the combustion process even if there is an excess of oxygen sulphur dioxide is still the most abundant form. The amount of SO3 produced depends in large on temperature and fluctuates between I and 10% of the total sulphur oxides, SO_3. This term is used to denote the mixture of SO_2 emitted into the atmosphere. Evidence available from continuous measurements of acid aerosols and SO_2 in the atmosphere indicates the predominance in the air of sulphur dioxide over SO_3.

The small amount of SO_3 generally produced during combustion usually depends on both the equilibrium conditions for the reaction and the kinetics of the reaction. However, the combustion processes do not have sufficient time to reach equilibrium and thus the process becomes kinetically limited. The reaction proceeds very slowly at a relatively low temperature (200 C for instance) but the rate increases at high temperature, due to the reaction rate factor. On the other hand at low temperature the amount of SO_3 in the equilibrium state is higher than equilibrium and kinetics conditions produce two opposite effects during combustion and the resulting amount of SO_3 formed is very low. At high temperatures the reaction quickly reaches the equilibrium state because of the high rate, but in the product mixture very little SO_3 is formed. At low temperatures the reaction proceeds so slowly that equilibrium can never be reached.

LIGHTNING

Lightning is the natural means of equalising electrical potential of the earth and atmosphere. When in certain atmospheric conditions, the potential difference builds up sufficiently a high voltage discharge takes place involving currents of up to 160,000 ampere for a few milliseconds. The discharge is usually in the form of a double flash with 60% of the total energy dissipated in a flash from atmosphere to earth and 40% in the reverse direction. Lightning has a tendency to strike the tops of all tall buildings standing above ground level. When there is substantial electrical resistance in the path between the point of striking and the mass of the earth, damage will generally be caused. It is nearly all dissipated as heat, and any moisture present becomes an explosive force of steam. This steam is what splits and shatters stones and has caused most such cracks which can be observed on the stone members of the monuments & remains at Makli Hills, Thatta.

RAIN

Rain is always damaging to archaeological sites/remains and monuments. Rain assisted by wind, causes general erosion of the surface. This erosion is accelerated in a heavily polluted atmosphere. The great concentration of dissolved acid gases and signs of erosion by the rain can be observed on historical sites/ monuments.

ACID EROSION

Carbon dioxide does not attack archeologically remains directly, except in certain limestone, but in combination with atmospheric water it forms carbonic acid.

$$CO_2 + H_2O = H_2CO_3$$

CO_2 is only slightly soluble so the solution is very dilute, and carbonic acid is one of the weaker acids. The action with limestone and other forms of calcium carbonate is:

$$CaCO_3 + H_2CO_3 = Ca(HCO_3)_2 \text{ (calcium bicarbonate).}$$

Calcium bicarbonate is highly soluble in water and washes away almost immediately upon formation without a tendency to form crystals. There is a similar reaction with the magnesium carbonate found in magnesium limestone.

$$MgCO_3 + H_2CO_3 = Mg(HCO_3)_2 \text{ (soluble magnesium bicarbonate)}$$

The setting action of lime mortar (and, to a certain extent, of Portland cement) is its combination with atmospheric CO2 to form another variety of calcium carbonate: mortar and concrete are therefore subject to the same eroding effects as limestone.

$$Ca(OH)_2 \text{ (Slaked lime)} + CO_2 = CaCO_3H_2O \text{ (Crystalline)}$$

Sulphur dioxide also acts in combination with water, forming first, sulphurous acid.

$$SO_2+H_2O=H2SO_3$$

This becomes oxidised further in the air, forming sulphuric acid.

$$2H_2SO_3+O_2 = 2H_2SO_4$$

Sulphuric acid is much more aggressive than carbonic acid; but it is the result of the chemical reaction, rather than the fierce reaction itself which makes this a quicker agent of erosion than CO_2.

$CaCO_3 + H_2SO_4 = CaSO_4$ (calcium sulphate) $+ H_2O + CO_2$.

Calcium sulphate in weak solution (it is not highly soluble) is not dangerous, but because of surface evaporation it will readily take up one of several crystalline forms within the pores of the stone: the most common form is $CaSO_4.2H_2O$, or gypsum.

The crystalline form occupies much more space than the simple solution and damage takes place because of this expansion within the pore structure of the stone. It is therefore somewhat akin to frost damage and materials resistant to frost will also be resistant to sulphate damage for much the same reason.

Reaction with magnesium carbonate is similar.

$MgCO_3 + H_2SO_4 = MgSO_4 + H_2O + CO_2$

The main difference is that magnesium sulphate crystals are larger than calcium sulphate ones and the risk of damage is therefore worse: for this reason dolomites and other magnesium limestones are less durable in polluted atmospheres. The sulphate resistance of limestone is very variable and this is one of the properties distinguishing a good from an indifferent stone. Although silica, the main constituent of sandstone, is not attacked by carbonic or sulphuric acid, calcareous sandstones have calcium carbonate as a matrix and so are subject to erosion in the same way as limestone and lime mortar. Other sandstones such as the excellent Darley Dale are not attacked, but they collect soot in their pores; this is almost impossible to wash out and so the highly corrosive hydrofluoric acid, which will dissolve silica or grit blasting in some form, has to be used for cleaning sandstones.

Burnt clay products, bricks, tiles and terra-cotta, are rarely affected by the crystallisation of soluble salts, but Fletton bricks, which themselves contain considerable amounts of sulphates, and have a bad pore structure, are a notable exception. Good sand-lime bricks are rarely affected; neither are most slates, but some are more susceptible and can suffer serious decay.

Sulphuric acid and carbonic acid attack lead and other metal roofs, and in 100 years about one third of the thickness of a 71b/per sq.ft. lead roof may be dissolved (forming lead sulphate and carbonate). Lead carbonate is also produced by the attack of acetic acid: this acid (found most commonly in vinegar) is found in various kinds of timber, particularly, with

tannic acid in oak, and the vapour can attack lead roofs from below. It is also produced by moss and lichen and where these reside picturesquely on a tiled roof above a lead gutter the lead can be perforated rapidly by the drip of this acid.

Although it has been assumed above that SO_2 works on limestone in the form of sulphuric acid, there is evidence to show that it can work directly as a gas and that its action in this form may be more serious than as a liquid. Further research is necessary into the relative effects of these acids both in their free state and in solution.

Other aggressive acids are produced by industry; they are generally diluted rapidly and it is only in the immediate neighbourhood of their point of propagation that they call for special protective measures, but they increase the erosive effect of rainwater over a much larger area. It may not be possible, because of aesthetic considerations, to build the chimney of the heating plant in an historic building sufficiently high to dilute any possible damaging products of combustion sufficiently to avoid affecting the building. For this reason choice of the fuel to be used is important as it can have a direct effect on the life of the archaeological remains.

The maintenance of archaeological sites/remains is a subject that tends to fall between many disciplines. The architect may be concerned only with major repairs and the aesthetics of preservation, the maintenance staff act only when something breaks down, the cleaners come into direct contact with incipient problems.

It is most desirable to provide adequate access to the internal structure of roofs by means of walkways and to the whole of a building externally over roofs and along gutters. Such provision is a good investment because it allows routine checks to be easy and effective. It is good housekeeping to maintain all concealed spaces in good order and decorated, simply because this encourages a high standard of preventive maintenance. For the same reason, it is good policy to provide fixed electric lighting within roof spaces, particularly for viewing the underside of gutters where this is possible.

Animals, including man, can damage buildings by urinating and defecating. Dogs can cause the decay of brickwork at street level and cats are said to damage zinc roofing or galvanised surfaces. Rats cause damage by building nests, which encourages rot and provides a likely spot for the start of a fire, and by gnawing at electric wires. Their entry is best prevented by trapped gullies, balloons over vent-pipes and properly protected airbricks etc. Combined rainwater and soil systems give rats many opportunities for climbing up untapped rainwater down pipes and entering a roof space via a gutter. Birds, particularly pigeons, and to a lesser extent starlings and jackdaws, damage and disfigure buildings. Their droppings block

roof rainwater outlets and cause grass and other vegetation to grow in gutters and in re-entrants on sloping roofs, and the bodies of pigeons frequently block drain outlets and down pipes. Pigeons also like nesting in stairs and turrets of historic buildings, and it is necessary to wage constant warfare to keep them out. If they win entry they build up so much mess and rubbish that it is a major task to get rid of it- and so unpleasant that workmen have refused to tackle the job owing to the lice and filth that have to be faced. The dirt birds introduce, like rats nests, leads to beetle infestation, particularly the Longhorn beetle. These kinds of problems are currently being faced at the most of the archaeological sites/monuments at the sites of Taxila, Makli Hill Monuments, Thatta and at some other sites. However, efforts are being made by the Department of Archaeology and Muse4ms to overcome these problems by adopting concrete measures.

Ingress of birds can be prevented by keeping all glazing in good order and providing self-closing doors to all spaces: simple weights on pulleys are best for doors not in frequent use. Roosting and nesting of birds can be prevented by netting, spikes, and sticky bird repellents applied to the masonry- but there is a danger of the latter staining the stone. High-voltage wires have been tried but these are difficult to maintain in practice as when a sitting bird receives a shock it rises and instinctively defecates neatly onto the wires thus tending to create a short-circuit. So in practice the device is found to need too much maintenance itself. A simpler method that often works is the fixing of nylon thread.

Bacteria and lichens cause the decay of building materials by producing acids that react chemically with the structural material. Examples of this are sulphate-producing bacteria that grow on stone, and lichens and mosses, which produce acids that attack lead and low-silica glass. This problem is being faced at some of the monuments at Makli Hill, Thatta.

Damage and decay caused by leaving the growth of vegetation unchecked is not at all rare. Ivy, wallflowers, and wisteria damage buildings if allowed to grow freely. Ivy drives a built-headed root into crumbling masonry and causes disintegration, although it is not so harmful to sound wall-pointed masonry. On buildings proper, rather than garden walls, ivy must be kept in check; when it is cut the stem should be treated with a “brushwood” weed-killer so as to poison the roots and prevent it sprouting again. The growth of vegetation indicates that the pointing is perished. The wall in this case is to be re-pointed as soon as is feasible.

Some kinds of wall-cladding plants, such as Ampelopsis Veitchii, Hydrangea Peliolaries, and Hedera Canaiensis, do not damage masonry directly but must none the less be kept away from eaves and gutters to avoid blockages.

The roots of trees and bushes can find their way into rainwater drains causing blockages and local ground dampness. In extreme cases rainwater drains are broken by roots and the leaking water can cause the sandy types of soil to wash away from below foundations. Conversely in clay soils there is the well-known fact that trees, particularly poplars, can damage foundations by excessive withdrawal of ground moisture in summer resulting in foundation movement and subsequent cracking of walls and partitions.

Algae, moss and lichen all grow on brick and stone masonry. If the material is adequately frost-resistant no harm need come but there is an added risk due to the dampness, and the clogging of pores. These growths can be removed from roofs by spraying with tar-wash etc. using horticultural equipment.

Ashes or cinders usually contain sulphates. If they are placed against a wall, sulphate attack can ensue, leading to bulging and decaying of the internal plaster and the disintegration of cementation matter in mortars. The effects of gradual, inevitable decay should not be neglected. Tiles falling off because of nails rusting, flashings coming loose because of mortar decaying, and lead creeping and cracking, because of thermal movement, are examples, and all can have serious effects.

The greatest part of the pollution of the atmosphere arises from the burning of fuel, in boilers, furnaces, domestic fires and in internal combustion engines. There are three principal categories of pollutant; first, grit and dust (emitted mostly from industrial chimneys), secondly, smoke or finely divided solids, which coagulate to form soot, and thirdly, gases, the two most important of these being carbon dioxide (CO_2) and sulphur dioxide (SO_2). The monuments of Thatta, Kalhora Monuments at Khudabad, Sindh and Shahdara Monuments Complex at Lahore are facing these problems.

Carbon dioxide occurs naturally, being given off by all living organisms as a by-product of respiration, as well as being a by-product of artificial combustion of fuel, the amount of dissolved un-dissociated CO_2 is fairly constant at about 0. mg/litre, but the amount of dissociated CO_2 may very widely from place to place. Sulphur dioxide occurs almost entirely as a man-made by-product, it is produced when fuels are burnt in proportion to the sulphur content of the fuel. The density of emission of SO_2 and of soot, the other major man-made air pollutant, varies widely according to locality.

The effect of air-borne vibrations can be exaggerated. It is extremely difficult to get any positive proof on a theoretical basis of what damage may or may not occur. Ground transmitted traffic vibration, particularly that from heavy diesel vehicles, is becoming more and

more regarded as a serious problem. But the airborne and ground-transmitted energy input is small and it is difficult to get instruments that are sufficiently sensitive to prove that damage occurs and it is even more difficult to identify the damage itself. However, it is also difficult to prove that damage does not occur. The practical difficulties of measurement to the required high degree of accuracy (taking into account variable weather, seasonal changes and different temperatures) over a sufficiently long period are however considerable.

In Pakistan, The conservation and restoration problems of the archaeological sites and remains are no doubt enormous. At present, seven important archaeological sites and historic monuments belonging to Pakistan have been inscribed on the World Heritage List, by UNESCO, which include the highly prized Prot-historic metropolitan site of the Indus Valley Civilization known as Moenjodaro, the group of highly important Islamic period monuments in the World's largest necropolis at Makli Hills, Thatta, the famous Lahore Fort which houses highly prized and unique monuments like Shish Mahal, Naulakha, Diwan-e-Khas, etc., the Royal Mughal pleasure Garden of Shalimar at Lahore, the unique military fort at Rohtas in district Jhelum built by Sher Suri the great warrior kind who dethroned Humayun of the Mughal dynasty, the Taxila Valley containing three city sites of the earliest historic period of Pakistan, Buddhist sanctuaries (Stupas, monasteries, temples, etc.), and the huge Buddhist monastery at Takht-e-Bahi District Mardan.

As regards their proper protection it is worth mentioning that different kinds of monuments and sites have different kinds of conservation problems. For instance the preservation of Moenjodaro is a challenge for the entire world. The problems at Moenjodaro are unique and difficult to overcome through ordinary means. The most alarming problems are the rising water table, hazardous salts rising into the standing structures through capillary action and from the atmosphere, improper & insufficient drainage systems, etc. The generous assistance of UNESCO and sympathetic countries have greatly helped in overcoming the problems, but despite serious efforts at national and international levels the elimination of the problems are nowhere in sight. The UNESCO Campaign for Safeguarding Moenjodaro is complete. Sufficient funds are still available and efforts are still continuing to make some breakthrough in finding a viable solution to the serious problems. Recently, experts from UNESCO have visited Pakistan and discussed the problems and possible solutions with the concerned authorities. The site can be saved from atmospheric adverse conditions and thermal effects by restoring a congenial atmosphere in and around the site.

The problems of the remains/monuments at Makli Hills, Thatta are no less alarming. Located on top of the Makli hillocks, the Makli monuments comprising both stone and brick buildings are exposed to different kinds of threats. The area encompassing the monuments is so vast that it is virtually not possible to isolate them from the intrusion of the

local people and their stray animals. There are also some mausoleums of saintly people greatly venerated by the people throughout the country. The annual functions at different mausoleums attended by thousands of people mostly unmindful of the importance of the monuments located there, erect camps, light fires and prepare food within the monuments. The animals wonder here and there and cannot be controlled due to the lack a barrier to the huge site. Thus man and animal greatly damage these prized monuments. The strong wind containing dust particles erode the surfaces of both stone and brick buildings at an alarming pace. People interested in the highly intricate carvings on the stones manage to take the carved slabs for decoration in their houses. The birds, especially the tits and pigeons harm the buildings due to their droppings. It is not easy to combat these problems. The Department of Archaeology & Museums is making efforts to erect barbed wire fencing to control the free passage of animal and people. Efforts are also being made to control the religious processions within the protected zone to save the monuments from further damage. A plantation has been planned to break the velocity of the strong wind containing dust particles and slats, but due to lack of water the plan cannot be successfully and usefully implemented. The monuments visibly suffer more due to disturbed micro and macroclimatic set-up around these structures. The need for restoration of congenial atmosphere for better preservations and maintenances of these monuments is greater than anything else. The main hurdle in the conservation and preservation measures is the huge funds involved and technical know how.

The conservation of Lahore Fort is a difficult task. The unique monuments are suffering from different problems of various degrees. The unique and highly prized Shish Mahal in particular was suffering from unique problems, which have been solved with the start of UNESCO-NORAD Funded Project. Both national and international experts have studied the conservation problems and its restoration work is in progress. However, the problem of high humidity inside the monuments with very thick walls has also added to the difficulties of the conservators and managers of the site. Shalimar Garden is also under threat both from the visitors and the hazard of the rising water table around the prized monument. A few years ago the unique hydraulic system of the Mughal Period was damaged but it is now being restored.

Similarly, Rohtas Fort is heavily encroached from inside and a complete village is housed in it. The Department of Archaeology & Museums have tried to restrict further expansion of the village by demarcating the limits of the village. Wild growth, makes it difficult to approach to the site, the nearby Kahan river, etc. are problems too difficult to count. Congenial climatic conditions are also necessary for the proper preservation and maintenance of the huge edifice that has been of paramount military importance since the medieval Islamic period. Huge funds are however needed to overcome all these problems.

The problems at the archaeological remains of Taxila are also complex. The wild growths are virtually uncontrollable. Recently, a workshop under the auspices of UNESCO thoroughly debated all possible remedies to the problems of eliminating the wild growths that are virtually threatening the structures and came to the logical conclusion that the use of toxic chemicals for eradication of the shrubs will further harm the structures and also pollute the atmosphere. The experts at the workshop recommended that the traditional methods for eradicating the problems are the best remedial measures, which should be continued. During the past years, a stadium was constructed on the World Heritage site of Bhir Mound at Taxila. The decision was resented at all levels and strongly opposed by the custodians of cultural heritage. The wrong has now been made good by reversing the decision. The micro and macroclimate of the valley has been disturbed at a rapid pace, which has also adversely affected the monuments. The need for restoration of the original climatic conditions has now become very necessary under the current circumstances.

The World Heritage Buddhist site of Takht-e-Bahi, District Mardan, NWFP is preserved but the problems of conservation are even bigger. The site is not easily approachable and water cannot be easily made available at the site and the conservation material is carried to the site with great difficulty. The poor drainage system has been harming the standing structure. Similarly, the restoration of the suitable micro and macro climatic conditions is also the needs of the time for better preservation and maintenance of the cultural relics in their original environments. Huge funds are needed to overcome the problems. Proper analysis of stones used as binding material as well as that used for antiquities apart from mortar is needed. On the basis of scientific research proper consolidates need to be applied so as to protect the site from disintegration. With the financial and technical assistance of the Government of Japan a project for the proper preservation and restoration of the site is ongoing.

Republic of Korea

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The Development and Problems of Korean archaeological Research

The development of archaeological research in Korea; Activities

Archaeological research in the Korean Peninsula began in the early 1900s. It continued some thirty years or so until the country came under the rule of Japanese imperialism until the 1945 Liberation of Korea. However, the excavation in 1946 of an ancient tomb at Geongju by National Museum of Korea is regarded in general as the first Korean archaeological research project. It was a typical tomb of the upper classes in the ancient Shilla period and had many valuable artifacts in it (fig.1). It was named by Hou-Chong and a 'Chong' means an ancient large scale tomb.

This research was notable not only because it was the first archaeological excavation but also because of a cast bronze vessel (fig.2) from the tomb. The vessel has a sentence composed of sixteen Chinese characters in the bottom. The sentence was interpreted as 'King Jangsoo produced the vessel in memory of the Great King Gwanggaeto' in 415 A.D.

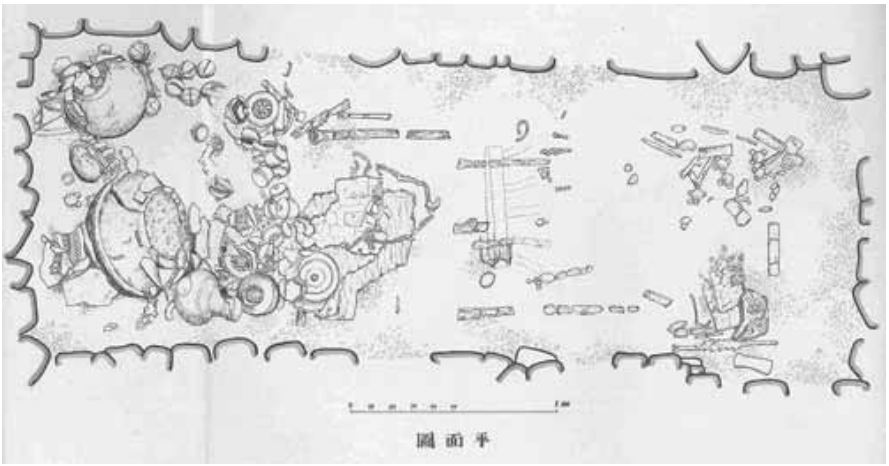

Fig. 1. The drawing shows the arrangement of artifacts when they were discovered in Hou-Chong.

There were three kingdoms in ancient Korea, called Goguryeo, Baekje, and Shilla. They were sometimes in conflict with one another, but collaborated occasionally as they expanded their territories. The Great King Gwanggaeto was a monarch in the most prosperous area of Goguryeo and King Jangsoo was his son who succeeded to the throne after his father's death in 413 A.D.

Fig. 2. A cast bronze vessel from the tomb of Shilla, Hou-Chong, Gyeongju, Gyeongbuk.

Accordingly, the sentence shows the direct relevance of the vessel and Great King Gwanggaeto of Goguryeo as it includes his actual name. Furthermore, the style of characters is similar to those on the tombstone of Great King Gwanggaeto. Therefore, it is assumed that the vessel was produced in Goguryeo. It seems to have been introduced into Shilla from Goguryeo and then buried in the Shilla tomb for some reason. Therefore, this bronze vessel has been thought of as an important artifact that shows the relationship between Goguryeo and Shilla in ancient Korea. The name of the tomb, "Ho-U", was also derived from two characters carved in the vessel.

Since that first excavation, the National Museum of Korea have continued excavating many prehistoric sites and ancient tombs such as Amsadong settlement site at Seoul (1971~1977), Songguk-ri settlement site at Buyeo (1975~1978, 1985~1987, 1992~1996), Joyang-dong site at Geongju (1977~1982), Choong-do site at Chuncheon (1980~1983), Daho-ri site at Changwon (1988~1998), Shinchang-dong site at Gwangju (1992~1998), and so on. It was not until these excavations that many archaeological items came to be valued for their historical meaning. The National Museum of Korea had been the unchallenged leader in archaeological activities in Korea for sixty years, especially until the mid-1990s when overseas researches began.

Fig. 3. Archaeological Sites excavated by the National Museum of Korea.
[left] Songguk-ri site, Buyeo, Chungnam, It is a Bronze Age town. [right] Daho-ri site, Changwon, Gyeongnam. It is a group of tombs in the Proto-Three Kingdoms period.

On the other hand, the educational department of archaeology at universities began to be established formally in the 1960s with Seoul National University at the head. Actually, almost no one was formally educated in archaeology within Korea until then. The National Museum of Korea alone conducted most of the archaeological researches. However, as archaeological experts were trained systematically in universities, it has come to produce some young and enthusiastic archaeologists. And they have played an active part in Korean archaeology since the 1970s.

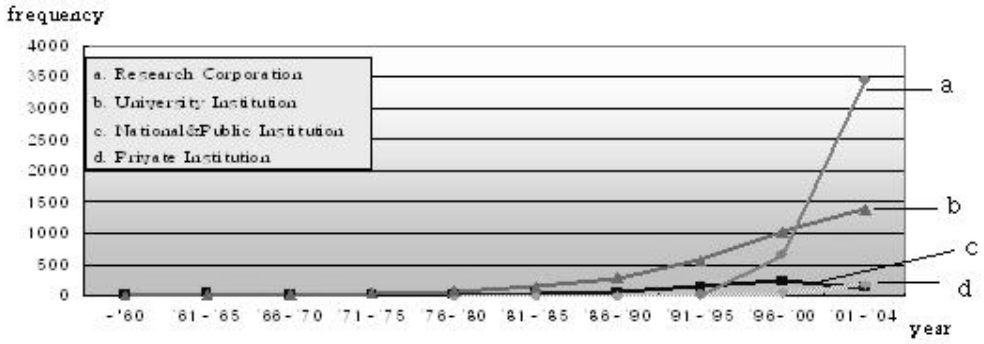

Fig. 4. The Frequency of Excavation in South Korea by Research Institution

In the 1970s, large-scale engineering works such as building dams or apartment-complexes started as a part of Korea's economic development and national land development. Therefore, it was necessary to excavate historical ruins urgently as they would be destroyed through construction activities. As a result, the number of excavations has increased constantly. More universities came to participate in archaeological researches, and some students extended their research into Korean archaeological study. They gradually took the lead in the archaeological research of Korea until the 1990s (fig.4). The frequency and scale of investigations have increased rapidly since the 1990s. This was created by the spread of land development throughout the country, which was influenced by the local self-government system set up in the mid-1990s. Furthermore, most construction works were forced to conduct archaeological surveys before starting construction by the Cultural Properties Protection Law revised in 1999. That has produced more demand for urgent excavations by engineering works (fig.5). However, the existing institutions to conduct investigations were not capable of satisfying all the demands of research. Consequently, a Research Corporation that specializes in archaeological investigations was established in the mid-1990s, and currently the number of investigations undertaken by the Research Corporation is more than thirty.

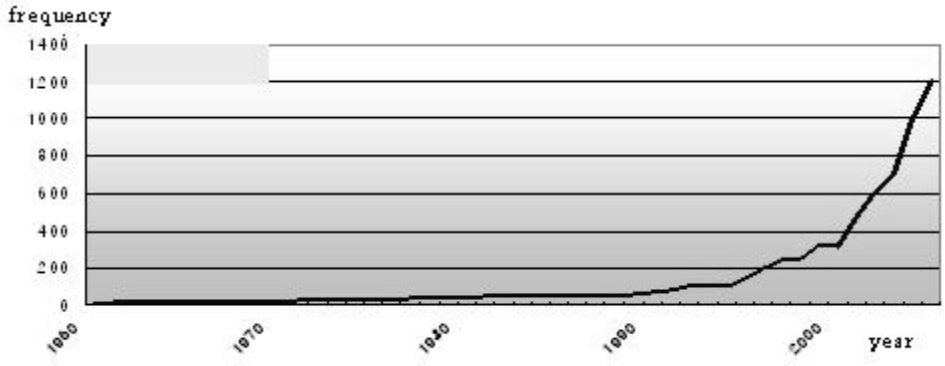

Fig. 5. The Frequency of Excavation in South Korea Since the 1960s

The Research Corporation has the advantage of having professional staff and an organization that can concentrate on researches all through the year. And so, the Research Corporation has the capability to conduct long term and grand scale researches throughout the year. Even though maybe controversial to question their role, they are certainly getting more and more of the most important archaeological research opportunities in Korea at present. Of course, they have contributed greatly to the preservation of historical remains and have developed archaeological activities.

Consequently, it was possible to obtain much more archaeological data from remains and to broaden the province of archaeological research. In other words, the growth of excavations in both quantity and scale has indeed accumulated enormous information about ruins and artifacts, and has improved on the methods to investigate and analyze them.

Many local archaeological societies have also been organized, and they have exchanged information with one another and have tried actively to explain and interpret archaeological facts. This trend made archaeological researches diverse in the field and in methodology of study compared with those of the past when most studies were focused simply on typology and chronology. Thus, objects and several types of relics, either a housing site or a tomb, all things are important including organic material, site of production such as a kiln or a furnace or a wide scope settlement site, a large group of houses, waterways, rice fields, tombs and so on. And the range of time and space in archaeological research has been extended.

Diversity of methodology: scientific research method

The purpose of archaeological research is to understand the human behavior of the past from the material available, thus one has determine above all the position of archaeological material in time and space. One of the most common items found at ancient excavations is pottery. It has been thought that pottery was used popularly in most times and regions, and that different peoples used different styles of pottery. That is, as styles change over time, the pottery has

been used to estimate dates and for this reason archaeologists are concerned with pottery in general. It is also thought possible to trace the movement or exchanges of peoples across regions by the pottery they left behind.

Before the 1990s, Korean archaeological research had the tendency to focus on typology and to explain ruins and artifacts by diffusionism. In many cases, pottery, strictly speaking the style of pottery is used as important for analysis purposes. However, as several scientific methods have been aggressively applied in many archaeological researches recently, the concern and method of research has become various and systemic from ‘in the field’ to ‘the laboratory’.

Among the scientific research methods, a dating method is utilized in general. There are two kinds of dating methods used in archaeological research. One is relative dating, and the other is absolute dating. Relative dating is the method used to identify the temporal relationship among the archaeological materials excavated, which is used in chronology by and large. Absolute dating is the method used to give the specific date of the material being studied. In Korea, since Radiocarbon Dating (C14 Dating) was introduced in the early 1960s at first, absolute dating methods such as Potassium-Argon Dating (K-Ar Dating) and Thermoluminescene Dating (TL Dating) have been applied to determine the age of remains.

Radiocarbon Dating (C14 Dating), which measures the change in C14 content, was the very first absolute dating method to be developed. Organic material that was once living can be dated to when it died by the amount of carbon-14 left within it. So the radiocarbon test detects more carbon-14 in more recent objects and less in older objects. Since this method was introduced, it has been used at various sites, contributing greatly to establishing prehistoric Korean chronology. Only foreign research institutes conducted this dating method until the mid 1990s, but Seoul National University introduced AMS in the late 1990's, and most C14 Dating is conduced by the University.

Thermoluminescence tests can be used to date pottery by detecting radioactive materials in the object and measuring minute amounts of light given off by them. Ruins composed of clay can be dated through magnetic dating. Over time the Earth's magnetic north has been moving. When clay is baked, an imprint of the Earth's magnetic field is locked into it. As long as the clay has not been moved scientists can determine when it was baked by measuring the difference between the magnetic imprint in the clay and known past locations of the Earth's magnetic poles.

Another method of estimating the absolute age is Dendrochronology, which estimates the age of wooden objects through the growth rings. If a tree is cut, its growth rings are visible. For each year that has passed, the tree's cross-section has another ring. Whether it had been a good year for the tree or bad, is visible in the rings. Narrow growth rings can mean a drought. By matching a pattern of growth rings in a wooden object with trees that are still living in the area

where the object was made, it is possible to come up with a very accurate date for the object. However, this method is not applied so much in Korea.

Another example of applying a scientific method in archaeological research is the site investigation method. Site investigation used in Korea is Ground Penetrating Radar (GPR), Electrical Resistivity, and Geomagnetic Survey.

The GPR is a geophysical method that uses high frequency electromagnetic waves and pulses to discover the existence and size of features. Energy is propagated downward into the ground and is reflected back to the surface from boundaries at which electrical property contrasts are placed. This is used to identify the distribution of almost all areas of an archaeological site, including burial grounds, kilns and buildings. It is also used to produce digital images of artifacts. This method was introduced in Korea in the early 1990s and has been actively used to acquire subsurface information before starting an excavation.

Electrical Resistivity Method injects electricity into the surface of the earth and measures the resistance volume of material to the flow of electrical currents to find features. Using the changed electric potential this method can be used to measure the specific resistance at almost all archaeological sites. It was introduced in Korea in the early 1990s together with GPR and has been utilized in excavations when looking for underground features.

Geomagnetic Survey as a nondestructive experimental feasibility study conducted using a magnetomer to find buried cultural objects such as pottery and iron. A magnetic anomaly map reveals several anomalous points in the 1st and 4th quadrants of the survey site, from where pottery and their fragments were confirmed. Six points out of seven points correlating with magnetic anomalies are found containing earthenware, a magnetically uncorrelated location produced earthenware made of unbaked clay. Shallower excavation deposits may explain this.

Fig. 6. Archaeological Research Using GPR in Bunwon-ri, Gwangju, Gyeonggi-do

Since the early 1980's in Korea, the materials from ruins was started to be analyzed and a large amount of information to explain and interpret the material has been obtained. There are several methods that analyze the material's properties and structure chemicophysically then it is applied to archaeological interpretation. The method includes microscope analysis, chemical analysis, heat analysis and radiography. These methods are applied to analyze many types of artifacts, such as stone implements, metallic goods, and pottery.

There has been relatively large amount of analysis methods carried out on pottery. The scientific analysis of pottery and earthenware involves the observation of mineral composition, chemical substance, firing temperature and microstructure, and the purpose is to study the manufacturing techniques. The provenance of pottery can be determined based on trace elements on the basis of the geological characteristics of the excavated site. Similarly, the material analysis of metal artifacts is revealed to study the substances, structures and solidity in order to examine the ancient art of metallurgy and manufacturing techniques.

One other analysis method of the materials from ruins is the analysis of organic material such as pollen analysis, plant opal phytolith analysis, and analysis of residual fatty acid and so on. These are conducted through scientific investigation and also based on the results of scientific experiments. By analyzing animal bones, fish bones, shells and bird remains found on the site, the livelihood of people living in those times could be reconstructed. In addition, examining fossilized plant materials and detecting ancient pollen can obtain scientific evidence to explain past environments. Thanks to the analysis, it is possible to determine when rice farming in Korea began and whether carbonized rice is wild or cultivated. Recently, the method is being conducted to analyze plant opal phytoliths and microfossils from plants. Furthermore, information on the dietary life of those times is being investigated by analyzing the fatty acids that remain in features or on artifacts.

Problems: Preservation and Information Management

To preserve historical remains is to clarify the worth or importance of objects in a sense. On that point, archaeological researches, especially excavations, can be recognized as the beginning of the preservation of cultural remains.

As many researchers in the archaeological field have endeavored to find methods for the successful preservation of historical remains, Korean archaeological research has developed constantly over the last sixty years in quality as well as in quantity since the National Museum of Korea began to excavate Hou-Chong in 1946. In the last decade, the number of archaeological researches has grown 1.5 times that of ten years ago (fig.5).

We have tried to classify the type of excavation into three types, called ‘excavation for study’, ‘excavation for repair’, and ‘urgent excavation’. ‘Excavation for study’ is to make a plan and select the place to be excavated for the purpose of making a study. In this case, universities or tax-paid institutes (national or public institutes) conduct the researches in most instances at their own expense. Therefore, the scale of research is not so large and the time to work on it quite short. However, no real need to hurry to meet the closing day of excavation, as the place investigated will just remain as it is.

'Excavation for repair' is conducted in the case of repairing a government-controlled historical relic. This is similar to 'excavation for study' in that the remains investigated will not disappear after finishing the research.

'Urgent excavation' has a connection with construction or engineering work. As above, it is conducted on historical ruins that are faced with destruction due planned construction. In this case, it can be decided whether to continue the construction according to schedule or not after research. Except for particular instances where it is concluded to preserve the site, most construction continues as planned. In the case of preservation, the original schedule for construction has to be revised.

It is easy to guess that the number of urgent excavations has increased rapidly recently (fig.7). These latest excavations have been undertaken by demand relevant to the nationwide scale of engineering work. Accordingly, it means quite a few ruins are faced with destruction after excavation. From this point of view, how to preserve historical remains has become an important issue.

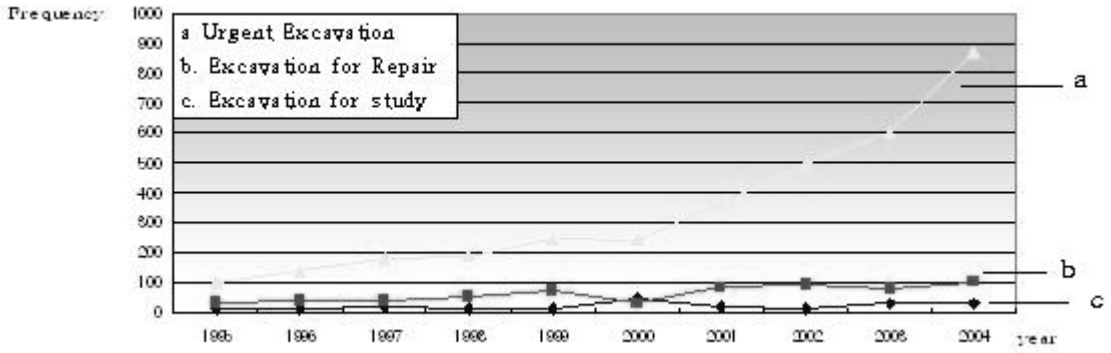

Fig. 7. The Frequency of Excavation in South Korea by Research Type

Preservation can be classified into various methods in accordance with the degree of intervention. Of them, reconstruction is the most active method. Reconstruction involves recreating the original features of the relics that have no remains left. In general, reconstruction is carried out for the cultural heritages that were destroyed by war or fire in the past. Reconstruction of Suwon Hwaseong is one example. Suwon Hwaseong was built as part of city planning by King Jeongjo in 1796 as a walled city 5,600m in entire length. But the wall and gate pavilion were left in a damaged condition due to the Korean War and reckless city enlargement. \Maintenance and reconstruction projects had been carried out from 1974 till 1978. It is a typical example of what happened when central government took charge after the 1960s. In comparison with others, it was much easier to design the reconstruction because of the abundance of direct historical materials, for example the report of Hwaseong Fortress in

10volumes. The report has all detailed records of the process of the construction including many drawings of the structure.

Reconstruction of Bulguksa, one of the most famous historical temples, is another example. The premier Kim Daeseong founded the Bulguksa at the time of the Shilla dynasty. It was the typical national temple with 80 buildings and excellent stone structures such as Dabo and the Seokga pagoda. But time passed, it remained in a ruined state without any majestic features of the past, only a few structures like Daewoongjeon (main shrine) were left. Because there were many structures lost at Bulguksa, the excavation was carried out to collect any available evidence in 1969, and the design for reconstruction was drawn up based on the excavated remains. Therefore, the significance of the Bulguksa reconstruction is the adoption of a scientific approach such as the excavations and using archaeological evidence. The design of the reconstruction was set with reference to the excavated materials, historical literatures and the study of other existing buildings.

However, it is a rare to reconstruct a site, especially a prehistoric site. One instance though is the reconstruction of the Amsa-dong prehistoric site (fig.8). Amsa-dong prehistoric site is located on the outskirts of the Han-river. It came to light when a piece of pottery with a pattern of the Korean Neolithic period was found following the great flood of 1925. The result of the excavation confirmed it was a prehistoric relic. In 1979, it was designated as a historical site and the regional government office of Seoul reconstructed the Amsa-dong Pre Historical site based on the excavated materials. The principle of selection of the habitation site was the condition of preservation and traditional signification. The structure of the top portion was to be estimated and designed based on the excavated materials. 8 dugout huts were reconstructed externally and others were reconstructed for observation inside. In comparison with other cases, it was reconstructed on the original site as the concept of a field museum to educate people without removal of the relics from the site to the museum. In general, it is common to cover it back under the earth after recording all necessity facts, but it is left at the original site to help the people understand.

Fig. 8. Reconstruction of the prehistorical site, Amsa-dong, Seoul

However, reconstruction of cultural remains is a very special case, even though the preservation is decided after urgent excavation. To transfer some important part of the remains

after finishing the research has been one of the next best methods used for preservation. It has been exhibited at a museum or other places. But it is also exceptional when compared to the amount of excavations being conducted these days.

That is to say, except for several cases of preservation or reconstruction, the ruins disappear and remains just as data or information. Therefore, it is the most important thing, I think, to manage well any information obtained from the ruins, and even though the remains will be preserved or reconstructed.

There is a great amount of information produced from archaeological sites every year. There are so various types of information such as records relevant to research; materials analyzed, maps, photographs, and so on. Some of them are digitalized others are not. The management of information has to be updated on preparing researches as well as the systematic preparation of all courses. A great deal of information obtained can be applied usefully when it is managed efficiently and synthetically. For that, various scientific plans and effort have to be conducted through all research courses. Furthermore, it is necessary to establish an efficient data base system.

Recently, the geographic survey of cultural relics conducted by the Cultural Heritage Excavation Management Division, which aims to build the database of cultural remains scattered nationwide, is one desirable instance.

The Division is making progress to produce the data base management system for materials excavated including artifacts and sites by an Institution, especially Research Corporations. These are very encouraging changes for archaeological information management. Now archaeological information management is getting to be a more important method for historical heritage preservation.

Samoa

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Current Status and Issues on the protection of Heritage Sites, the Museum and the National Archives of Samoa

Introduction

This report aims to provide in three parts, the current status and issues concerning the protection of cultural heritage in Samoa. Cultural heritage of Samoa can be classified as different areas such as heritage sites of religious or cultural significance, archaeological sites, building remains, historical buildings, collections of artefacts in the National Museum and government and public records that are stored in the National Archives.

The protection of most heritage sites in Samoa has been carried out by owners of land in which sites are located. This protection and maintenance is carried out primarily for the purpose of tourism and simply to keep family surroundings clean.

The Museum of Samoa was established in May 1999 with a very small collection of artefacts donated to the government of Samoa from the Pacific Islands who participated in the 6th Festival of Pacific Arts held in Samoa in 1996. From then on, the museum has received a tremendous amount of artefacts and historical digital photographs from local and overseas donors.

The National Archives of Samoa is not yet accessible by the public. However, there are two rooms located in different areas that store historical files and public records of the government of Samoa. Not all historical files are sorted, thus the reason why it is not accessible to the public. Meanwhile, a legislation bill has been drafted and awaits approval, and two records management guidelines have also been drafted and are now ready for consultation.

1.0 Current Status and Issues on the Protection of Heritage Sites in Samoa

Most heritage sites in Samoa are located on private lands; therefore they are maintained and protected by families or the land owners. However, in general there are many institutions that are involved in the care of heritage sites in Samoa. The Ministry of Natural Resources, Environment & Meteorology initiated and established the Heritage Coordinating Committee comprising of representatives from other Government and Non-Governmental Organisations and Institutions to plan the protection and management of sites including historical buildings. At the moment, the Samoa Heritage Coordinating Committee is in the process of preparing a Tentative List for the UNESCO World Nomination List of Heritage Sites. Samoa ratified the World Heritage Convention in 2001.

The Cultural Heritage of Samoa can be grouped as the following categories:

1.1 Natural Sites with Legendary Background

These sites make up the majority of popular sites in Samoa, such as lava tube caves where the Goddess of War or the Dwarf People used to live, rocks or mountains that are ancient heroes turned to stone, pools created by spirits etc. Their importance comes not only from their natural beauty, but also from the traditional, poetical interpretation of these phenomena by the people of Samoa.

Paia Dwarves Cave Entrance, SAVAI'I

1.2 Ancient Structures and Village Remains

Samoan ancient structures, such as the star mounds and the Tia Seu Mound, are not well known, and even less is known about their former meaning or use. Other ancient structures include the ruins of the Worship House of the Octopus,

and a large stone fortress at Luatuanuu. These structures are far from present settlements, they are in the hills and not maintained for tourist access.

Pulemeli Mound, Palauli, SAVAI'I.

In the 1960s/1970s, archaeological surveys were conducted by researchers from Auckland and the Hawaii Bishop Museum. The oldest known village remains (1000BC) were found at Mulifanua (West Upolu), also decorated Lapita Pottery. This discovery also did not lead to the creation of a site to visit, or even a signboard explaining the importance of the place.

1.3 Graves and Monuments

The graves of important chiefs or legendary heroes are often well maintained by their descendants or villages; others are forgotten in former settlements, which were abandoned. Many ancient settlements were inland, while the more recent custom after the arrival of the missionaries was to settle near the seashore. After the cyclones 1990/1991, and the improvement of inland roads, people are now shifting inland again. This change of settlement patterns can cause structures to become abandoned, neglected or destroyed by new land use.

Virgin's Grave, SAVAI'I

There are also several monuments from

colonial and historical events, e.g. the Cyclone 1889 Monument, the Monument of the Raising of the German Flag 1900, the Independence Monument 1962 etc. The government is responsible for looking after the graves and monuments at the Mulinuu peninsula, and one of our most famous tourist attractions, the grave of author Robert Louis Stevenson ("Treasure Island", "Dr Jekyll and Mr Hyde"), on Mount Vaea.

1.4 Historical Buildings

As Samoan traditional houses are made of wood and thatch, which has to be renewed periodically, there are not many "old" traditional houses on the islands. However, the art of building is still alive, with several schools, institutions and chief's families owning their traditional Meeting or Guest House.

Historical European style buildings include churches, colonial office buildings, other structures like the Clock Tower, and private homes. The Government has now started a programme to preserve old colonial buildings in Government ownership. Privately owned houses or churches are not under any control or regulations issued by the state.

Court House, (formerly known as the Old Government Building & currently occupied by the Ministry of Courts & Administration and the Museum of Samoa), Tamaligi, APIA

1.5 Administration of Cultural Heritage Sites

Presently, for sites on customary land, the village or family owning that land has complete rights. Decisions on the use of the land will be made by the Village Council of Chiefs, or by the extended family and their chiefs. There is no national legislation or policy on the management of heritage sites. Many

sites are still well maintained, because people appreciate and cherish the legends and history of their village and family. Also, some sites such as the Sacred Forest of the Tuifiti, have certain taboos and rules of behaviour, lest the spirit inhabiting the place might get angry.

Avao Bible Translation Site.

Commemoration Landmark where Missionary John Williams first arrived and was received in Samoa, Sapapali'i, SAVAI'I

The above two sites are prime examples of heritage sites maintained and protected by villagers and the church.

Tourists visiting village and family owned sites are often asked for a small entrance fee, which is used for development programmes in the village or for family income, and for the maintenance of the site. However, there are other sites that have lost their meaning to the people owning the land. Often, these sites are neglected, or may be threatened by developments or souvenir hunters, especially those from outside the village settlements. The government cannot step in if a site on private property is threatened, by using legal instruments, except for the Environment Act, which generally protects Samoan Environment (= *"the physical features of the surroundings of human beings, including the land, water, atmosphere, climate, sound, odours, tastes, the biological features of animals and plants*, ***and the social features of aesthetics."***)

In June 2001, ratification of the World Heritage Convention has also given a new impact to the protection of Heritage Sites.

1.1 Issues

Since the maintenance and the protection of many heritage sites in Samoa are carried out through a traditional system, the need for legal protection is not necessary a high priority. Private land owners, villagers and churches play a crucial part in maintaining and protecting heritage sites, their first hand protection has saved and prolonged the life and existence of these important historical sites.

The heritage sites of Samoa should be protected for future generations. Meanwhile, these heritage sites are also tourist attractions and accordingly should be well managed. This is when legal protection is required to protect both custodians of sites and tourists. The Ministry of Natural Resource, Environment & Meteorology in conjunction with the Heritage Coordinating Committee devised a Cultural Heritage Site Policy in 2001.

In summary, it is very important to note that village and family support is crucial in protecting heritage sites. The Government cannot maintain or guard these sites without the involvement of traditional owners, therefore these owners have to be respected and involved in the decision making process as the rightful custodians of these places.

2.0 Current Status of the Museum of Samoa

2.1 The Project

The museum was officially opened on 27th May 1999. The Culture Division of the Ministry of Education, Sports and Culture is responsible for the development and the operation of the Museum of Samoa. There are three relatively small rooms in which the heritage and artefacts of Samoa are displayed. One room is dedicated to displaying artefacts that were donated to the government of Samoa from participating pacific islands countries at the 6th Pacific Festival of Arts in 1996. These very artefacts were used to officially open the Museum of Samoa in 1999. From then on, the museum has received many donated items as well as historical photographs both from local and overseas residents and organisations.

The museum of Samoa is currently operated on a daily basis by two staff members and a temporary assistant from Monday – Friday, 12.00 noon – 3.30 pm. The same staff members are also working on developing the National Archives project. This structure has not changed since its establishment in 1999.


Museum of Samoa, Cabinet Room & Pacific Room

2.2 Mission

The museum of Samoa is committed to preserving the country's heritage by collecting and displaying objects that provide information for Samoans and visitors about the life, culture, history and the environment of Samoa and the Pacific.

2.3 The Building

The museum of Samoa is housed in three small rooms in an old historical building from the 1900s. The building was first built by the Germans and was originally used as a court and administration building. The British/New Zealand Occupation Force occupied the same building when they took over Samoa from the Germans. When Samoa gained independence in 1962, the first Samoan Prime Minister and his cabinet occupied the building and governed Samoa from there until 1993 when they shifted to the new government building. In addition, the front door of this building was where the 'Black Saturday' occurred (Tupua Tamasese Lealofi III who was the Mau movement leader was shot in 1929). These historical events have made this building a very important witness to the history of Samoa, therefore the building is considered a unique and a significant artefact in itself.

2.4 Collection:

The museum has some historical antiques in its collection, such as Lapita pottery, stone adze heads, the original Cabinet table and historical emblems.

Information is also provided through examples of Samoan artefacts and historical pictures such as:

- Historical photographs by .Rev George Brown and Otto Tetens
- History timeline with illustrating photographs
- Carvings such as weapons produced by young Samoans in culture workshops
- Carvings and tales of Samoan legends
- Kava Ceremony and medical plants
- Siapo (bark cloth) and its production
- The tattoo
- Producing fine mats
- Birds of Samoa
- Fishing methods and Sea life
- Traditional clothes and Miss Samoa dresses
- Artefacts from other Pacific people, donated during the Arts Festival in Apia.

Showcases of Artefacts, Pacific Room, Museum of Samoa

2.5 Current Status

The condition of the museum building poses threats to the safety of staff as well as the collection. The entire building needs to be restored to ensure that safety procedures can be carried out for the staff and the optimum controlled environment provided for the preservation of the collection. Because it is a very old building, the museum has constantly demanded the spending of a large amount of money to enable upgrade and repair work. The power supply is interrupted every now and then, which also interrupts the air-conditioned environment of the museum. Other parts of the building are deteriorating,

introducing even more threats to the collection in the way of termites and other pests.

There is currently not enough storage and exhibition space to house and display the existing collections so some items and special exhibitions had to be held elsewhere under poor conditions and out of direct control of the museum staff. The museum does not have the capacity to provide much comfort for visitor groups of more than 30 people e.g. school classes.

The collection at the moment requires specific and controlled conditions as many items are made from perishable materials such as; bark cloth, fibre and pandanus. The required conditions are currently not being met and therefore the collections are at risk.

2.6 Development Plans

Considering the status of the museum, the only ongoing development plans we are able to implement involves keeping the museum open on a daily basis, upgrading permanent displays and exhibitions; as well as monitoring the building for pests and repair work.

Future development plans prioritises the following areas;

2.6.1 New Museum Building

Owing to the structural deficiencies of the museum building, Samoa's climatic conditions and potential natural disasters such as cyclones, tidal waves, earthquakes and fires, the museum staff have raised their concern by drafting a tentative museum concept which proposes for the building of a new museum building. The new building should provide;

1. Safe Storage: Conditions away from sea level and flooding areas, concrete walls and floor (to reduce fire risk and insect damage to collections) cyclone proof building structure, security- watched premises, fire alarm system, cyclone shutters

2. Controlled Environment. At least some display areas and storage space with air-conditioning/humidity control, Insulated roof, all entrance

points (doors/windows) can be closed securely without gaps, No direct sunlight on displays, No building entrance points facing directly onto a road to reduce dust and air pollutants

3. Access for Visitors: Situated at a place easy to reach by public transport, wheelchair accessible, and visitor parking spaces available

4. Visitor Facilities:
Reception area with bag lockers toilet facilities, museum shop, museum café area with large space for introduction of group visits, and kids' activity area.

5. Museum Office: Museum office with desks for computers, display preparation tables, documentation and filing facilities, communications, tools and equipment

2.7 Environmental Factor affecting the museum

As mentioned earlier, Samoa's climatic condition is a critical matter that must be addressed if a new building is to be built.

2.8 Economical Factor affecting the museum

The museum is currently under-funded as is evident from the current status of the building as mentioned in part 1.4. We do receive operational costs from the government and 70% is spent on repair work for the building, for example, repairing the roof, which leaks during heavy rains, and upgrading of the electrical wiring. Lack of artefacts is another factor.

2.9 Lack of historical artefacts

This lack of historical artefacts is more or less due to the fact that the condition of the museum is unsuitable for the preservation of fragile items. There have been cases where donors from overseas have contacted the museum for the return of historical items. However, until we build a new building we cannot accept fragile items without the appropriate environment and storage.

2.10 Public Awareness

Since the establishment of the museum, staff observations and visitor records indicate that the number of foreign visitors to the museum is much higher than the locals (this is excluding school groups). This is of course a crucial issue that the museum staff should research for future development. Meanwhile, promotional materials are in production for distribution to hotels, public places and transport agencies.

3.0 Current Status of the National Archives

The National Archives project is currently progressing well. Although the historical archival files are not yet accessible to the public, a legislation bill has been drafted and we are awaiting its approval from the government. Two guideline documents (Code of Best Practice & Common Administrative Retention Schedule) concerning the strengthening of records management within government ministries have been drafted, and are ready for stakeholder consultations. A proposal for funding to conduct technical training and to procure archival standardised materials for use by government ministries has been approved by the Public Sector Improvement Facility (PSIF).

Turkmenistan

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THE TURKMEN ARCHAEOLOGY TODAY

Introduction

There are so many archaeological sites and architectural monuments in Turkmenistan of different periods of history. Turkmen Government pays a great attention to the preservation and conservation of the national cultural heritage for the future generation. Nowadays in our Country there are eight State historical-cultural reserve. As a result of close cooperation with UNESCO two State historical-cultural sites ("***Ancient Merw*** " in 1999, and "***Kunya-Urgench***" in 2005) have been included to the World Heritage List of UNESCO for the last six years. All necessary documents for the inscription to the World Heritage List of UNESCO the State historical-cultural reserve "***NISA***" where I work have been fully prepared and submitted to the World Heritage Centre of UNESCO for the further consideration. Old Nisa is located on the territory that constitutes core of the Parthian States. It was the land where the Parthian kings has started their conquests and turned small Parthia into a huge empire of the ancient world that stretched from Indus to Euphrates.

An excursion to the history of "Nisa" (Mithradatkirt)

Yet there is not accurate data of the period of Construction. Archaeological final informations let us to date the early Parthian period in between the middle of III century BC and the middle of II century AD. In III century BC Achaemenid Empire had been ruined with the strikes of Alexander's troops. During the period of Seleucids-the successors of Alexander, three Independent states were established: they are Bactria, Khorezm and Parthia. These countries were developing through pace along eventful historical way which had been covered in the works of authors of antiquity. Among them Parthia that existed for about 600 years succeeded best and became a formidable opponent of Rome empire at the beginning of I century AD.

It was that area where in 247 BC the tribe of ***Aparns (or Parni)*** having become a big union of nomads, which inhabited Kara Kum desert (one of the biggest desert in the world) headed by their chief, whose name was ***Arsak***, seized Parthau (Northen Parthia), ***Andragoras-the Greek governor-general*** of that Seleucid satrapy was killed. Arsak announced himself to be

the king of Independent Parthia. Then he occupied Hyrcania (area situated near the Caspian Sea), later on, the first capital of the Parthian Kingdom-Hecotompylos (the archaelogical site Shahri-Kumis near the town of Damgan in Iran) began to spring up.

General maps of Old Nisa

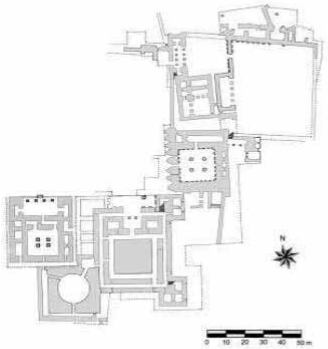


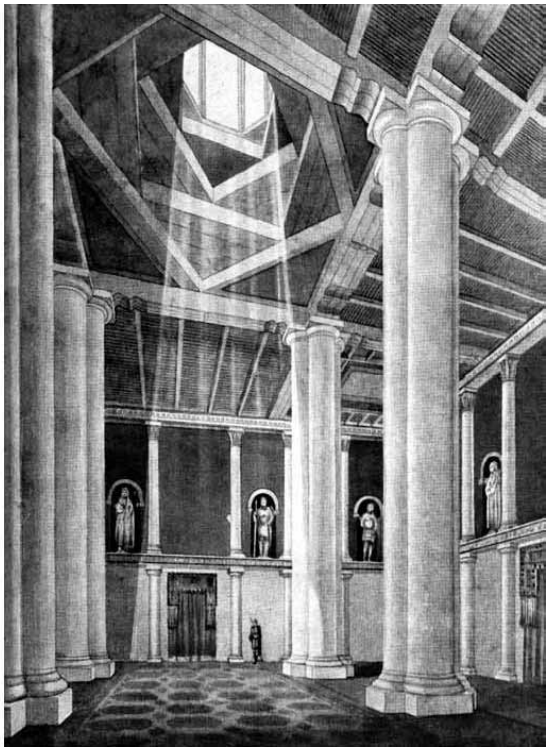
Photo from air

The first archaeological excavations in Old Nisa began in 1930.In 1946 there were established ***YUTAKE***-it means ***"South Turkmenistan Archaeological Complex Expedition***" by famous Russian archaeologist M.Y.Masson.

The fortress Old Nisa consist of two parts: The southern (or the central) & the Northern complex. In southern complex there are only Temples, the treasure of Parthian Kings is in the northern complex. The fortress was build on a natural hill and a shape irregular pentagon. The height of fortress walls stretched about 20m and 4m wide. Along the fortress walls there are 43 rectangular towers.The main area of the site about 14hectars. It was the citadel of Parthians.

But was an Old Nisa a dynastic sanctuary of Parthian Kings, the ceremonial center or the residence of Kings? It's not proved yet. Usually mud bricks were used as a main material of the building structure. Only the columns were from burned bricks. Each building was connected to each other with caridors.

Big Quadrate Hall Quadrate



Reconstruction of **Big Quadrate Hall** by G.A.Pugachenkova

The first construction is "**Big Quadrate Hall**". It is about 20m in span and with four powerful four-bladed columns, adjoins the eastern "Tower" temple. The walls in interior are decorated with semi-circle pilasters. At the height of three meters the second tier is situated, where clay coloured sculptures (man's & woman's) standing between the columns in niche . A great number of architectural decor elements were found here during excavations, such as: ornamented plates, the pieces of clay sculpture, ceramic vessels, & etc.

The walls in some section were 4-5m thick. In southern part of the wall we began to reconstruct as an experiment. Some researchers determine this building as an edifice destined for ceremonial receptions. But another researcher thinks that this building just Temple.

Metope with a line's head

Metope with a line's head

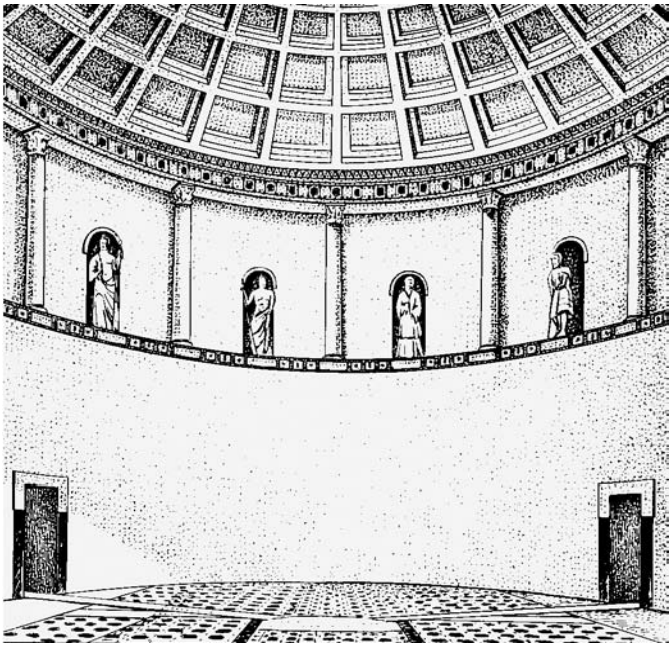
Head with helmet. Clay sculpture.

Statue of Goddess in marble

Statue of Goddess in marble

Fragment of murals with head of a woman or a young man

Fragment of masculine portrait



Reconstruction of **Round Hall** by G.A.Pugachenkova

The Round Temple presents a square in plan, surrounded by caridors, a Round Hall 17m in diameter is inscribed in it. The walls were covered with white plaster and also was two storage and along the second floor were situated mud sculptures of Gods and Goddess. The height of this Temple reached to about 14-15m and width of walls were about 3-4m.

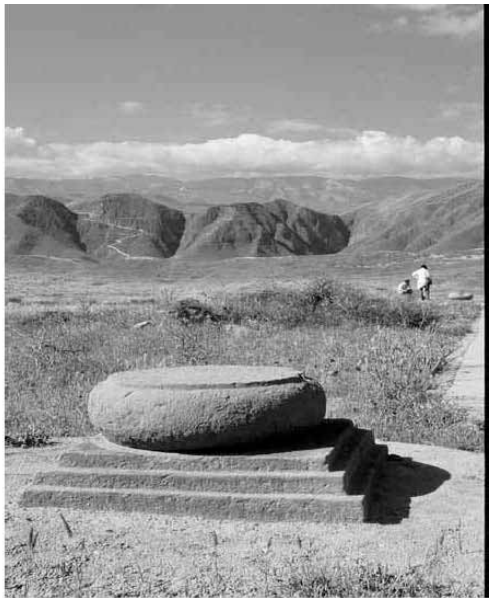
The remains of **Round Temple**

The remains of **Round Hall** (Temple)

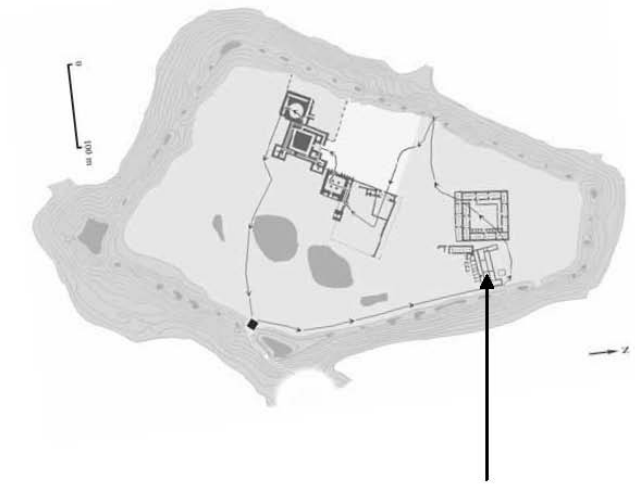
The northern architectural complex of Old Nisa consisted of a big Square House which was surrounded by various house-hold buildings, in particular winestores, filled with Khums. It was there when in 1948 archaeologists, excavating these chambers, discovered a lot ofunique collection of now famous Rythons-huge vessels in the shape Horns, made out of ivory and skillfully decorated with sculptural reliefs. Today these true masterpieces of Parthian art

belong to the National Museum of Turkmenistan. The general size of the building is 60x60m and have 12 rooms in it.

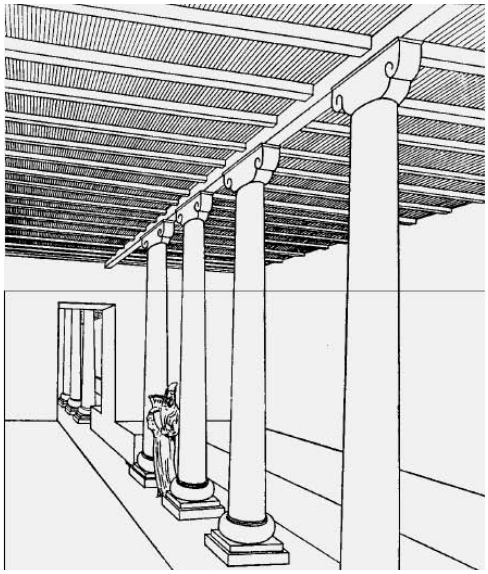
Rython from Ivory.



The stone Base under the columns

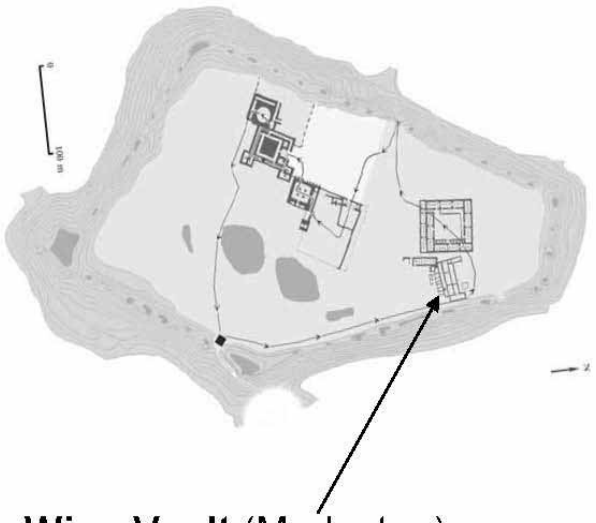


The remains of **Big Quadrate Hall**



The Big Quadrate Hall (Reconstruction)

Except of them there is also a Wine Vault (Madustan), where they used to keep their wine, rice, wheat and etc. in big jugs (vessels, khums). During the excavations of Madustan there were founded more than 2,5 thousand of such pieces with notes, so-called Ostraks with Parthian inscription. They contain rich material for study of economics, history and culture of that period. Due to those Ostraks archaeologists found out Parthian name of Old Nisa, "Mithradatkirt or Mithridatokert" the fortress of king Mithradates I (171-138 BC).



Wine Vault (Madustan),

Ostrak with Parthian

International archaeological expeditions in the remains of Old Nisa

Every year since 1990 two International archaeological expeditions work in Old Nisa. They are: Turkmen-Russian expedition by leadership of famous Russian archaeologist Dr Victor Pilipko and Turkmen-Italian archaeological expedition by leadership of Italian archaeologist Dr Carlo Lippolis.

International Turkmen-Russian expedition by leadership of famous Russian archaeologist Dr Victor Pilipko

International Turkmen-Italian archaeological expedition by leadership of Italian archaeologist Dr Carlo Lippolis

Conservation of the buildings

The new laboratory, created in the “Nisa” park in 2005, as a result of joint project elaborated between Ministry of Culture and TV and Radio Broadcasting of Turkmenistan together with UNESCO Tehran Cluster Office and CRATerre-EAG. The laboratory helps to analyze the differences between ancient and modern bricks before conservation and restoration.

In our site we usually use the local methods of conservation. For example: adding the straw into the soil from the excavations and water.

Laboratory activities

Vietnam

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Archaeology and conservation, restoration and reconstruction of relics and monuments in Vietnam

1. Objectives of Archaeological Research

In recent years, Archaeological research and excavations in Vietnam have attracted the attention of the public, and archaeological excavations are taking place more and more throughout the country. Archaeological research is to be implemented following the objectives below:

- Recognizing, researching archaeological sites, relics, monuments and antiquities underground, and underwater to study all angles of natural and social life during the different historic periods, in order to improve the natural and social life of the present.
- Enriching the national cultural heritage treasures; supplementing documentary evidence, and artefacts to the central and local museums in order to preserve, display and present the national historic – cultural traditions, serving the demand of cultural enjoyment.
- Supporting the conservation, restoration and reconstruction of relics and monuments.

2. Conservation, restoration and reconstruction of relics and monuments in Vietnam

In Vietnam, in order to meet the requirements of society on culture and to conserve special cultural heritages inherited from former generations and to promote their cultural and historic values, it is very essential to conserve, restore and reconstruct relics and monuments.

Relics, monuments and cultural structures are just one part of material cultural heritages, and include communal houses in villages, temples, pagodas, shrines, citadels and ramparts, royal

tombs, towers, ancient houses ... rich in materials such as brick, stone, wood, bamboo, leaf, etc. ... However, the main reasons why those relics have deteriorated are as follows:

- Because of war with long periods of fighting foreign aggression, many cultural structures of Vietnam have been destroyed.
- As most of the relics and monuments are made of organic materials such as wood, bamboo, leaf; and furthermore being in a hot and humid climate with many insects, relics and monuments are constantly exposed to threats
- Because relics and monuments have been restored incorrectly and do not follow scientific regulation of relics restoration, some of relics and monuments have become deformed.

Restoration and reconstruction of relics and monuments must be as close to the original form as possible.

In order to restore and reconstruct relics sincerely and scientifically, we base our work on many documentary sources such as the actual document referring to those relics, written reports and literatures and in addition, the most indispensable information is archaeological documents. Recently, archaeology has made contributions with remarkable results to the restoration and reconstruction of relics in Vietnam, and archaeologists always takes the prior steps when implementing these activities

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3. Some typical archaeological excavations supporting the restoration of relics in Vietnam

In this paper, I introduce results of some typical archaeological excavations that have been contributing successfully to the conservation, restoration and reconstruction of relics in Vietnam.

3.1. In 1996, in order to serve the conservation and restoration of Lam Kinh site, Thanh Hoa province, the National Museum of Vietnamese History surveyed and excavated this site. So far, thousands of square meters have been surveyed and excavated, now the structure and relic's vestige is appearing, based on which the Lam Kinh vestige has been comprehended. This work is ongoing.

The excavation and planning of the restoration at Lam Kinh site shows that the results of archaeology have real practical meaning.

Lam Kinh central area was the land of King Le Loi who led and won resistance war against Minh aggression (China) in the early 15th century. As in other dynasties, in order to show

sincere respect to ancestors, the Kings of Le dynasty built many big temples, shrines and royal tombs in the Lam Kinh area and considered it to be "the second capital" of Dai Viet, Le dynasty after Thang Long – Ha Noi. However, from the historic documents, we only find some sketchy information written about Lam Kinh. Most vestiges on the land of Lam Kinh are deteriorated now and it is difficult for us to imagine the overall aspect of ancient Lam Kinh.

Thanks to archaeology from 1996 to now, the horizontal surface of Lam Kinh has been outlined fully, and we can comprehend the age; it is from the XV to XVII, and XVIII centuries.

Before, when planning about Lam Kinh, archaeologists only knew the main structures like the triumphal arch, central palace, imperial temple, and now, so many structures have been supplemented with full information and data. In 2002, archaeologists discovered many structures in ruin in the 2 areas east and west of this vestige. Currently, research of these ruins is still continuous.

From the above, it can be seen that, when setting a project of design, from 1995, archaeological research at this site has been of special importance. From that time to now, this site has been excavated over a wide area. At present, restorations are still being carried out carefully in order to determine the best method and facility for this important site.

3.2. From 1999 to now, archaeological research has intensified at Hue Ancient Capital – one of the five World Heritages of Vietnam. Some excavations have been implemented here such as: investigating and excavating Dien Tho palace, Duyet Thi Duong, Tu phuong Vo su tower, Thieu Phuong garden, Truong lang relic, Truong sanh palace, An Dinh palace, Gia Long and Minh Mang tomb… The relics researched have been restored and displayed.

The relics in Hue have suffered more than 100 years of neglect, relics have been degraded, some structures have collapsed. Besides, structures requiring restoration have too many overlapping structure layers, thus, specifics and characteristics of each period, seen in each layer are decoded by research through archaeology. In fact, the archaeological work at the ancient capital of Hue has been carried out on a large scale, systematically by a united plan for the over 6 or 7 years. At first, the archaeological work was carried out along with the restoration. When permission for an archaeological investigation had been awarded, the archaeologists' research first paid attention to visual effects. When restored, most of the relics here will have enough necessary scientific data and the quality of restoration will be highly appreciated.

This is shown by the Royal Theatre at the site of the Ancient Capital of Hue, which has been archaeologically researched, as efficient documentation for restoration and reconstruction. The Royal Theatre, which was constructed in 1826 by order of King Minh Mang, was a place where

traditional arts performances and special festivals were held on the fortieth birthday of the Kings, namely Minh Mang, Tu Duc, Khai Dinh… and whose major participants were civil and military mandarins, princes, royal brothers…According to recorded history, at the time of construction of the Royal Theatre, King Minh Mang ordered many other major architectural works at this site, such as the Royal Gastronomic Place (serving food and drink to the King), the Royal Physician Institute (making up prescriptions and healthcare for the King and mandarins), the Royal Care and Education School (for care and education of small princes). In addition, there were also the Imperial Guard House, the Royal Seal Service and the Royal Insignia Warehouse - which were respectively, accommodation for the Imperial Guards, the places where the Royal Seal and Insignia were kept for display on the occasions of Great Festivals. However, at the end of the 1950s, many architectural works at this site were seriously damaged. Until the beginning of the 1960s, the South Administration decided to repair and improve the Royal Theatre by turning it into the National Musical College of Hue. Almost all architectural works at this site were not existent. Together with the extension in area, changing the ground level to make it a yard and garden and the construction of temporary houses as accommodation for teachers and students, vestiges of remaining foundations of the original architectural works were buried underground.

In 2001, archaeologists surveyed and excavated on a 3,000 m^2 site together with a field survey, many vestiges of major architectural foundations were found, and that efficiently contributed to the restoration and reconstruction of the Royal Theatre site, and also clarified many related historical, cultural and architectural issues.

3.3. From December 2003 to March 2004, the National Museum of Vietnamese History excavated the Son Tay citadel, Son Tay town and Ha Tay province, which is 1000 m^2 in area. Son Tay citadel located at this site was built during the dynasty of Nguyen (19^{th} century). The surface of the citadel is square, the length of each side is about 330m, and its walls were built of laterite. Almost all the residual wall has fallen down and is in a serious condition. Today there remains only the ruins of the two gates of the South and the West, the North gate was restored in 1996 when the East gate was completely wiped down. Most of the architectural structures on the land in the citadel have disappeared so that it is really difficult to redefine those structures on the existing site. The excavation has been carried out to meet the requirements of the Project of preserving and restoring relics in the Son Tay citadel which is on its way to being appraised including sites such as: Vong palace, flag tower, the East gate... The purpose of the excavation is to provide knowledge on vestiges in the Son Tay citadel area, which has been broken down in order to make a foundation for better conservation and restoration. After 3 months of excavation, there appeared the vestige of the architectural foundation of the East gate, Vong palace and several architectural vestiges around the center

area of the citadel. The result has provided data on scale, structure and construction material of the architecture in the Son Tay ancient citadel, efficiently serving the restoration and reconstruction. It is proved that the decision of making an archaeological excavation before the project of designing/planning structures is finished, is completely right.

3.4. Over the past, conservation and restoration of Champa temples and towers has revealed many problems that need solving. In fact, most of Champa cultural heritage in Vietnam that has existed from hundreds to more than one thousand years has been seriously damaged. Most have been partially or completely broken. Here, I mention My Son, a Champa cultural heritage that was recognized as a World Cultural Heritage by UNESCO as an example of archaeological excavations serving conservation and restoration.

Among the remaining Champa architectural structures in Vietnam, My Son towers were built on land the full of obstacles and with difficult of access, at an early date, it has the most densely-distributed number of towers, the most beautiful carving and fine-art decoration. It was built and restored over many historical periods, the longest lasting one in the Champa relic sites (the 7^{th} century to the 13^{th}). At present, most of My Son's towers are in ruins, especially those that suffered during the war the consequences of which have not yet been overcome. Some of the towers have been completely ruined, parts of the architecture and carving has been broken and is scattered everywhere. Parts of the architecture has been mixed up under the bad conditions, which has not yet been assessed and evaluated. Therefore, it is necessary to excavate it to make the vestiges and the architectural parts visible so as to evaluate the damage of each tower, and then make a plan for conserving this cultural heritage in the long term.

On carrying the Project of conservation and restoration of some towers of the My Son site, the Vietnamese Institute of Archaeology excavated the F tower group of the My Son site in 2002, 2003. This is the tower that was seriously damaged in the war against America. The wall of the F1 tower has cracked, architectural parts have been broken, the tower body has collapsed. The F2 tower was damaged, the architectural parts broken and scattered everywhere. The F3 tower was completely destroyed by a bomb. After the war, all the towers became ruins, the bases of the towers were entirely buried, many positions on the towers' body and objects have been buried. In general, before excavation, the F tower is in ruins, seriously damaged and covered by grass, and is difficult to recognize.

Another project at My Son - the Project of "Safeguarding My Son World Cultural Heritage Site –Demonstration and training of in the application of international world heritage standards of conservation at My Son G group of My Son" is included in the cooperation program of UNESCO and the Italian and Vietnam group funded by the Italian government). There are 5 towers at the G tower group with different degrees of serious damage, all of them were

seriously damaged before restoration. In the two years 2004 and 2005, Vietnamese and Italian archaeologists carried out the excavation here.

Of both excavations of Tower site F and Tower site G, the entire architectural works of the existing Towers F1, F2, F3 and G1, G2, G3, G4, G5 were found clarifying the entire plan of Tower site F and Tower site G, even though not intact, the remains of such architectural works have been clarified, thereby contributing reliable materials to research and the solutions for restoration.

Excavated objects included are those made of stone, brick, terra-cotta, tiles of different kinds and all are reliable evidences helping us to have relatively full awareness of these two tower sites.

All the above proved that the study of archaeology will serve the research projects of conservation, restoration and reconstruction of relics in Vietnam. Besides, there are still some relics that are not in the restoration and conservation plan before the archaeological research because their values have not been reasonably evaluated yet. When excavated, with the proposal of scientists, relics will be restored and locality conserved, for example, the archaeological excavation of Thang Long imperial citadel relic at 18 Hoang Dieu, Hanoi. This confirmed the leading role of archaeology.

4. Proposal

From the results of some remarkable excavations serving the conservation and restoration of relics in Vietnam as mentioned above, we will find that in the future it will be necessary to make the projects of restoring and recovering be consistent as follows:

Research, surveys, archaeological excavation ⟶ *Comparison, research, correction of relics, objects* ⟶ *project planning, conservation design, restoration and reconstruction.*

This procedure shows that in order to conserve, restore and reconstruct a relic, it is necessary to carry out n archaeological research first, then build the restoration project.

N.V.C

Lecturer Papers

Archaeology and Natural Science

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Professor
Graduate School of Globalizing Asia
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Introduction

When did the study of archaeology start and how was it developed? At the end of the 18th century, coins were chemically analyzed in Europe. At the end of the 19th century in Japan, many overseas researchers were invited to promote and develop education and industry. One of these foreign researchers was H. S. Munro, an American researcher, who was invited to Kaisei School, the former University of Tokyo, as an authority in epigraphy. He taught Japanese students about chemical analysis of *dotaku*, bronze bell-shaped vessels, and gave presentations on his results at an American academic conference in 1877. This means that archeometric studies in Japan were already established at the end of the 19th century.

One study that shook up the field of archaeology in Japan was age determination, using radiocarbon dating established by an American chemist Willard Frank Libby (1908 – 1980). This method was first applied in Japan in 1951 at the University of Tokyo. At the time, a shell mound of the early Jomon Period was under excavation at Natsushima, an island off Yokosuka City, Kanagawa. Based on the archeological knowledge of the time, this shell mound was estimated as being 6,000 years old. However, the results of analyzing the earthenware using this method revealed that it was 9,240 ± 500 years old. This result re-dated the beginning of Japan's Jomon Period to 3,000 years earlier than then believed, creating a major stir in the archeological world. The use of the scientific approach to archeological studies seemed to start from a surprising finding in this manner.

Archaeometric studies were started on a major scale by Martin Aitken, who founded the "Research Laboratory for Archaeology and the History of Art" at Oxford University in 1958. He was very active in research, publishing a regular newsletter, "Archaeometry" and holding international symposiums. In Japan, two projects, "Study of relics and ancient cultural assets using the scientific approach" and "Use of conservation science, humanity, and natural science to analyze ancient cultural assets" were conducted between 1976 and 1982. These projects were funded by science research grants from the Ministry of Cultural Affairs, and close to 350 researchers in archaeology and natural science were involved. In December 1983, the Japanese Society for Scientific Studies on Cultural Properties was set up. They issued a journal,

"Archaeology and Natural Science" twice a year. In Asia, the Shanghai Museum in China publishes a journal, "Sciences of Conservation and Archaeology," which contains a range of articles on the analysis and conservation of archeological relics. More recently, an "Archaeological Research Center" has been established in Beijing.

The following five subjects take up most archaeological research. Some of the research results in these segments are described below. First is the dating of remains and relics. At present, many scientific techniques are being adopted. However, the most frequently used techniques are radiocarbon dating and dendrochronology. Joint research for cross-checking using both methods is also proceeding. Second is the study of what, where, and how potteries, bronze mirrors, bronze bell-shaped vessels, and so on are made of. This has been conducted for many years. In short, this is a study on material analysis, estimation of production areas, and clarification of production techniques. Third is studies related to the reconstruction of ancient living environments. This involves studying the living environment of early peoples by reconstructing ancient climatic conditions and the ecology of animals and plants. Fourth is R&D on conservation and restoration science technology for permanently preserving remains and relics for subsequent generations, and the fifth comprises other forms of scientific study that are not included in the above four segments—for example, studies on the exploration of ruins without unearthing them, and studies on measurement science using computers.

1. Age determination

When researching cultural assets, age determination of target relics is an important issue. In the field of archaeology, dating is determined by comparing the style of the relic, which is a relative age. On the other hand, in measurements using a scientific approach, an absolute age is given instead of relative age.

At present, radiocarbon dating is the most commonly used technique. Since the 1950s, it has generated a mass of results. In the last 20 years, though, another method gaining significant results is dendrochronology.

1.1 Radiocarbon (^{14}C) dating

Carbon dioxide (CO_2) in the air is fixed in plants by photosynthesis. Animals eat these plants, and thus animals take in the carbon that was originally in the air as long as they live. Carbon has three isotopes with different mass numbers. The generation speed of carbon with mass number 14 (^{14}C) is constant under cosmic rays of a certain strength. After a living creature dies, the concentration of ^{14}C in its remains declines as time passes due to radioactive decay. The period required for the ^{14}C content to fall by half, i.e., its radioactive half-life, is fixed.

Accordingly, the date of each relic can be determined from the amount of radioactive ^{14}C remaining in the relic.

1.2. Dendrochronology

A method which uses the fact that tree ring widths change with yearly variations in climate. This method was established by the astronomer J.E. Douglass, who investigated climate changes from the annual ring widths of trees to find the rotational period of sunspots.

The widths of annual rings of trees are governed by climatic conditions, and thus change constantly. This characteristic can be utilized to create logs of variation patterns in annual ring width dating back as far as possible using trees with known felling dates. Timber of unknown date and age is collated with the variation patterns to find the year in which it was felled. In archaeological studies in Japan, Japanese cypress, Japanese cedar, and Japanese umbrella pine are particularly useful for dendrochronology. At present, standard patterns going back to 912 B.C. for Japanese cypress, 1313 B.C. for Japanese cedar and back to 22 A.D. for Japanese umbrella pine are available.

1.3 Thermoluminescence

Minerals such as quartz present in earthenware and tiles store a part of the energy of natural radiation when they are exposed to cosmic rays, but this energy is emitted and gives off light when the object is heated. This phenomenon is called thermoluminescence. When clay is fired, stored energy is emitted as thermoluminescence, after which the object starts to store natural radiation again. Let's say the intensity of the thermoluminescence corresponding to the total amount of natural radiation received since it was fired is measured by heating a piece of earthenware. The same piece of earthenware is then irradiated with a known amount of radiation, after which its thermoluminescence is measured to calculate the luminescence efficiency specific to that earthenware. If the annual amount of natural radiation amount is also identified, how many years that earthenware has been exposed to natural radiation can be calculated, i.e., the year that the earthenware was fired can be determined.

2. Materials, production areas, and techniques

In Japan, scientific studies of archaeological materials were started by Professor H.S. Munro and Professor Morse, as described before. In 1911, Nobumasa Koga analyzed coins scientifically. In 1916, the committee for investigating the conservation method of the Horyuji Mural Painting conducted scientific studies on it. To study the trading area of archeological relics, the archeological approach is to compare types and styles of relics. The scientific approach is to compare materials, etc. of relics. In general, a scientific approach is used. Taking earthenware as an example, a piece of unknown earthenware can be identified by

comparing the analytical results of unknown earthenware with the chemical composition of earthenware excavated from kiln sites or those whose area of produce is already known. Or, the sources of clay materials are investigated.

When identifying the area of production of metals, earthenware, tiles, and stoneware, fluorescent X-ray analysis is the most commonly used technique. This is a non-destructive method that also allows rapid analysis. When X-rays are directed at a specimen whose composition is unknown, the elements composing the specimen are excited, and secondary X-rays unique to each element present are generated. These secondary X-rays are called fluorescent X-rays. The elements present in the specimen are identifiable based on the wavelength and intensity of these secondary X-rays, and the amounts contained are thus measurable. A non-destructive analysis method which only requires irradiation by X-rays is ideal for investigating precious cultural asset specimens. Another method is the use of the ratio of stable isotopes (isotope abundance) of lead. This is determined by the production age of lead deposits. Each lead deposit area shows unique isotope abundance. In other words, the lead isotope abundance of cultural asset specimens, such as glaze containing lead in bronze vessels and lead glasses, is identified, and then, using the fact that each mine has unique lead isotope abundance, the area of production of the specimen can be investigated by comparing with the data for each mine. In the 1960s, researchers in the US attempted to find the area of production of lead glass using measurements of isotope abundance of lead.

Bronze products are made of an alloy of copper and tin, but also contain lead. Since lead shows segregation behavior, a casting technique may be identified by the distribution of lead in it. Production techniques can also be identified using X-ray transmission photos of earthenware and metal products. In particular, CT scanners provide valuable information.

3. Reconstruction studies of ancient environments

This is research into discovering the living environment and natural environment of ancient peoples, as well as their habitat. For example, if large quantities of dolphin bones are excavated from one site, the research starts from ‘why’ this might be. Many results, even including the eating habits and living environments of ancient peoples, have been achieved in this area. Similar studies also produce some answers to questions such as whether bones came from a boar or a pig, and whether they were wild or domesticated. Scientific approaches are applied in this area for measurements such as the isotopic ratios of carbon and nitrogen in animal bones found at the site.

Diverse small and large holes are found during the excavation of some sites. These holes are assumed to be post holes, food storage holes, animal catches, and so on. One recent piece of

research, however, revealed some holes to have been used as toilets. Soil analysis detected undigested food particles such as seeds and coliform bacteria inside. These types of findings enable the reconstruction of ancient environments and the eating habits of ancient peoples.

As studies continue to broaden, scrapes on excavated human bones can also be analyzed scientifically to provide new findings. We can now identify, using optical instruments, different types of scrapes: whether human-induced, by stoneware, or by metal blades. Although scrapes become faint over the years spent underground, they can now be identified in detail using a range of analytical methods. Rapidly-developing methods are being used in this area. In the past, ancient environments were reconstructed by analyzing pollen and DNA. Now, foods such as seafood, meat, and fish can be identified by measuring the carbon and nitrogen isotopic ratios to find which type of food was most commonly eaten to estimate what foods ancient peoples survived on.

4. Conservation science

It is entirely logical to utilize traditional Japanese techniques to repair our cultural assets. It is also logical to employ scientific knowledge. Natural science was first introduced in the area of conservation and repair of cultural assets in the conservation of the Horyuji Mural Paintings. Proposed by Tenshin Okakura (1862 – 1913), a survey committee was organized in 1916 to investigate paintings, emergency conservation methods, permanent conservation methods, and basic conservation methods.

4.1 Approaches in conservation science studies

i) Materials analysis

To be able to investigate, conserve, and repair natural assets, it is important to know about the materials that they are made of. However, we must remember not to damage them through analysis. Even though analysis samples can be taken from the target, they should preferably be very small. Fluorescent X-ray analysis allows analysis of mainly inorganic specimens without destroying them. It qualitatively and quantitatively analyzes the elemental composition of the specimen. X-ray diffraction analysis can be used to identify crystal content (or compounds). Other than these, radioactivation analysis and atomic absorption analysis can be used to qualitatively and quantitatively analyze trace amounts of specimens; high-frequency induced plasma emission spectroscopy allows simultaneous measurement of multiple elements; infrared spectroscopic analysis and ultraviolet-visible spectroscopic analysis are employed for identifying organic substances such as fabrics, dyes, and lacquer; not to mention 3D spectral fluorescence analysis and chromatography (GC, LC, TLC).

ii) Structural research

To be able to see through opaque parts of cultural assets, such as the internal structures of Buddhist statues and design sketches of paintings, optical methods using infrared rays, ultraviolet rays, X-rays, and γ-rays are effective. Infrared rays were first used in the field of cultural assets in 1936 for investigating the patterns of Horyuji Mural Paintings by taking infrared photographs. Infrared cameras are currently increasingly being used for making out faded ink letters on wood strips and ancient writings, and for observing mural paintings and other artworks. The original shape of a rusted metal relic can be confirmed by taking X-ray transmission photos. X-rays were discovered by W. K. Roentgen in Germany in 1895. These rays have the characteristic of passing through solid objects, but leave traces on photographic film in the same way as visible light rays. Whereas the wavelength of visible rays is 4000 to 8000 Å, that of X-ray is short at 0.1 to 0.001 Å. Rays with a short wavelength can pass through solid objects, and the shorter the wavelength, the deeper they can penetrate. On the other hand, the penetrating force of X-rays fades as the atomic number of elements becomes larger, the object density becomes larger, or the object becomes thicker. Neutron rays have the characteristic of not passing through elements that make up organic substances, such as hydrogen, oxygen, and nitrogen. Unlike X-rays, though, they can pass through heavy metals, and thus can be used to view paper inside a metal container. Soon after the discovery of X-rays, experimental radiographic photos of paintings were taken. In Japan, radiographic X-ray photos were first used in the field of cultural assets in 1935. A lacquered coffin excavated from Abuyama Mound, Takatsuki City, Osaka, was investigated using X-rays. This was the first example of application of X-rays to cultural assets in Japan. However, the use of X-rays became more common in the field of cultural assets only after the 1970s.

iii) Study of the conservation environment

Investigation of the environment where a cultural asset has been conserved up to now, and establishment of environmental conditions for permanent conservation and management are an important research issue. In the case of archeological relics, the major factors that have caused damage to a relic can be identified by investigating the environment where it was buried. These findings can also be of help in setting conditions for the storage and exhibition of cultural assets, and for designing the ideal air-conditioning for an exhibition hall or storage structure. The study of molds, microorganisms, and prevention of damage by insects are also important research topics.

iv) Materials and techniques of conservation and restoration

Traditional materials and techniques have been utilized in the conservation and repair of cultural assets. In particular, we often need to rely on traditional materials and techniques for

restoring arts and crafts and building structures. However, we also need to apply conservation techniques and materials that utilize modern science to best effect on buried cultural assets which have been physically and chemically changed and damaged already underground. For example, to prevent the exfoliation of pigment from paintings, the traditional Japanese technique is the use of glues. At the same time, application of synthetic resin also has many advantages. The features of both types should be used to maximize the advantages of each.

As a general concept, traditional techniques are techniques that have been handed down over time for the conservation and repair of cultural assets. However, I believe that unique repair technique, broadly recognized and handed down, can also be regarded as traditional techniques and materials even if the history of their application is relatively short.

4.2 Conservation science for relics

In the conservation and repair of archeological specimens, we must avoid the temptation to simply enjoy and admire antiques. Accordingly, we must clearly record what kinds of chemicals were used and which methods were used for repair. Only restoration techniques that can be announced to the public are applicable to the conservation and repair of cultural assets. Basically, a record of conservation and repair (like a medical card) is created, and stored and managed together with the specimen.

Although today's repair techniques are very advanced, it is unlikely that cultural assets can be conserved forever. At some point in the future, the conservation effect will be lost and re-treatment will be needed. Accordingly, it is a general rule to use conservation materials whose effects can be reversed any time.

i) Organic relics

Organic relics include wooden relics, lacquerware, woven fabrics, leather relics, and plant seeds. Many ruins in Japan are humid, so wooden relics, which are the most commonly excavated, are fragile, since they contain excessive moisture. The study of one chemical treatment of these types of wooden materials started in the 1850s. It is a strengthening method applied by injecting potassium alum into the wood, a technique developed by the Denmark National Museum. Other permanent conservation methods include the PEG (polyethylene glycol) impregnation method, the vacuum freeze-drying method, the solvent and resin method, the silicone resin method, and the higher alcohol method. Targets of conservation treatment are not only wooden materials. Research and development of conservation treatment methods for all kind of relics related to human living, including lacquerware, fabric products, stoneware, earthenware, tiles, and metal products are required.

ii) Inorganic relics

Stoneware, earthenware, and tiles, all inorganic relics, can be conserved to some extent by hardening them with acrylic synthetic resin. The most complicated and difficult relics to conserve are metal objects such as iron, copper, and bronze products.

When planning conservation treatment for metal products, it is necessary to confirm surveys and measurements of the buried environment, surveys of the materials and structure of relics, the degree of rusting and corrosion, and chloride levels. The conservation state of the relic, i.e., the state of disease, is then diagnosed in detail for preparing a conservation treatment plan. Chlorides contained in relics are causes of rusting, and thus their removal (desalination) is one of the most important processes in conservation and treatment. Desalination methods include the removal of chloride ions using alkali solution or lithium hydroxide alcohol solution. There are also other special methods: desalinization by electrochemical means using electrolysis and reduction of rusted relics by baking it in a hydrogen and nitrogen atmosphere.

Fragile rusted relics are reinforced by injection with synthetic after which measures are applied to protect the relic from water and air. The synthetic resin used in conservation of metallic relics is nonaqueous acrylic emulsion.

4.3. Conservation science for ruins

i) Remains and gardens

Excavated sites are often refilled to conserve them. Those parts of the remains which are difficult to return to the site for conservation are conserved indoors. The best way is to conserve the entire remains without removing any of them in an exposed state. This will offer hands-on or visual experience of history. It is also useful for social education.

(1) Habitation sites and kiln sites

Habitation sites and kiln sites are reinforced by injection with synthetic resin. However, in the light of the weather resistance of synthetic resin and the structure of remains, it is not at present easy to conserve sites in an exposed state. Normally, even if the remains are hardened with synthetic resin, they are further covered to protect them from wind, rain, and UV rays. More recently, the surface soil of remains can either be cured while preserving its permeability to water, or made impermeable. The soil curing method is chosen based on the condition of the site, the remains structure, and also the purpose of the exhibition.

(2) Mounds

A typical example of a mound where comprehensive conservation measures have been taken is a conserved facility of the ancient Takamatsuzuka tomb in Nara Prefecture. To ensure non-destructive conservation, the site was kept in an environmental condition close to the conditions that prevailed inside the stone chamber before being excavated. In other words, a conservation control system was installed for maintaining the temperature and humidity (96% or higher) same as those at the time of excavation. Solutions for any problems related to the dynamic structure of the stone chamber and prevention of bacterial and fungal infection are also important. In general, each mound has different environmental conditions and site conditions, and thus treatment must be applied that is individually appropriate to each mound. What we learned from the ancient Takamatsuzuka tomb was the need to set up an ideal environment for permanent conservation instead of simply reproducing the environment before the excavation and maintaining those conditions.

ii) Stone-built cultural assets

Stone-built cultural assets include stone Buddhist statues (rock-engraved Buddhist sculptures), stone pagodas, treasure pagodas, stone monuments, stone structures, scenic stones in gardens, foundation stones at habitation sites, and stone chambers and caves within mounds.

Degradation factors are not usually single: multiple factors are organically combined. In particular, weathering by salts and fracturing by freezing and thawing are major causes. When water containing salts evaporates from a rock, salts are deposited on the surface. Water then enters the rock again, and more salts are deposited on the rock surface when the water dries. Through repetition of this action, crystals damage the surface layer of the rock, and excessive salt forms a crusty film on the rock surface. A film which looks hard at first glance would appear to make the stone more robust. However, this film is fragile and falls apart easily. In addition, the material under the hard film is often converted to soft clay and the rock collapses faster and faster. If water accumulates in a degraded part or crack in the rock, the rock breaks up when the water freezes. Buddhist sculptures engraved on rocks are also destroyed by plant roots. Continuous vibrations due to passing vehicles and damage by earthquakes are also serious problems. Biodegradation such as by lichens and microorganisms also account for a large percentage of deterioration, and thus conservation measures are needed. Epoxy and acrylic synthetic resins have been used for reinforcing rocks, but nowadays, silicate ester synthetic resin is more often employed.

4.4 Restoration techniques and international contributions

At present, research findings on conservation and restoration are broadly applied to cooperative conservation projects for overseas cultural assets. Restoration techniques often become a bottleneck for cooperative projects since the state of social affairs, cultural values, philosophies

of conservation and restoration, and so on differ in each country. Therefore, it is of key importance to build mutual understanding and trust in the field of conservation technology.
With respect to international contributions, the "International Cooperation Promotion Law on Protection of Overseas Cultural Assets" came into force this year. This law includes collection of information on the conservation of cultural assets and personnel development schemes. In 1989, the Japanese government set up the "Japan Trust Fund for Conservation of Cultural Assets" within UNESCO. We contributed to restoring the Angkor ruins in Cambodia and the Moai stone statutes on Easter Island, Chile. Our international contributions also include those by universities and related research institutes throughout Japan, in addition to UNESCO. They have raised funds in unique ways and cooperated in international conservation projects. However, information was in the past not freely exchanged among these organizations and their activities remained isolated. For this reason, the "International Cooperative Consortium for Cultural Assets" was established as part of the law to ensure that related organizations can exchange information more easily. In other words, the law aims to establish a project in which information can be closely shared among the Ministry of Foreign Affairs, Ministry of Cultural Affairs, universities, and fund-raising private organizations. This will lead to the establishment of a system that can respond rapidly to overseas requests and promote conservation and restoration projects for cultural assets by cooperation between related organizations.

5. General Science (exploration of ruins and measurement science)

These are methods of exploring remains and relics buried underground without unearthing them. Radio waves are transmitted to below the ground, and any point where the type of soil differs or anything other than soil is detected, based on the strength of reflected waves aboveground, including the refraction or attenuation of the radio waves, a difference in electrical resistance due to soil type, or any faint magnetic anomaly. The results are then comprehensively examined together with existing archeological information, and the remains and relics are further explored to reveal characteristics of the site. Taking the Shimotakahashi Kanga site in Tachiarai-cho, Fukuoka, as an example, underground radar was used to explore unexcavated areas in the site where a building site had been confirmed in an adjacent area. The result clearly confirmed the position of a pillar matching one in the excavated area. This meant there may be no need to excavate the adjacent area. Application of exploration technology also allows identification of whether a buried tomb has been damaged or remains intact.

In recent years, the exploration of cultural assets includes scientific survey approaches for cultural asset specimens such as stone and wooden relics, in addition to ruins. A range of methods including the use of computer graphics for image analysis and 3D measuring devices

for differently-sized archeological relics, from large structures such as temples to small objects, have also been studied.
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Chemical Preservation and Processing of Unearthed Wooden Articles

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1. Discovery and storage of unearthed wooden articles

Wooden cultural properties are destined for eventual demise through degradation, damage, and decay from insects, fungi, and wear. Among cultural properties, wooden articles are exceptionally prone to degradation, damage, and early demise due to their organic nature. However, there are times when wooden articles are discovered in their original form from sites which are five or ten thousand years old.

For wooden articles to retain their original form and remain stored in the earth for many thousands of years without being destroyed, there is a need for several conditions to be met. Those conditions include the following.

(1) The article is immersed in an ample supply of groundwater.
(2) The article is shielded from the air.
(3) The article is not exposed to sunlight.
(4) The article is buried where putrefactive bacteria cannot reproduce; namely,
(5) The article is buried at in a depth of least 50 centimeters from the ground surface.

However, even though an unearthed wooden article may retain its original form, a microscopic examination will reveal that such substances as cellulose and lignin have eluted from the wood material, and the article is actually in a porous, sponge-like state. As such, it would be fragile, and as it dries would be prone to shrinking, deformation, and loss of form.

Therefore, in an effort to maintain their original form, excavated wooden articles are usually immersed in such media as water containing a preservative such as formalin. However, chemical processing and preservation is needed due to such reasons as the following.

(1) Degradation and damage proceed gradually, even when an article is immersed in water containing a preservative.
(2) For large scale wooden articles, or when there are a large number of articles, changing the water becomes an enormously time-consuming and labor-intensive matter.
(3) Preserving articles in water makes them inconvenient to use for such purposes as museum exhibits.

2. Chemical processing of unearthed wooden articles

Methods and materials for the preservation of wooden articles need to meet the following criteria.

(1) The methods and materials must have a high degree of dimensional stability so that the dimensions of the wooden article remain unchanged.

(2) The methods and materials must be reversible, so that the article may be subjected to other methods of processing as the technology of preservation improves.

(3) The methods and materials must not be harmful to the environment or to human health.

The following preservation methods are presently in use as they meet the criteria outlined above.

(1) Polyethylene glycol impregnation

Taking advantage of the principles of osmotic pressure, the wooden article is impregnated with high molecular weight polyethylene glycol and allowed to harden. Starting with 20% polyethylene glycol solution, the article is then sequentially immersed in, and impregnated with, 40%, 60%, and 80% solution, followed by 100% molten polyethylene glycol. The article is hardened at room temperature. As the final step, the surface polyethylene glycol is washed. An impregnating tank capable of maintaining a temperature of 60 degrees Celsius is used.

(2) Higher alcohol method

The wooden article is immersed in methanol to replace the water with methanol. Cetyl alcohol is added to gradually raise the concentration for impregnation, and the article is hardened at room temperature. An impregnating tank capable of maintaining a temperature of 60 degrees Celsius is used.

(3) Sugar alcohol method

The wooden article is immersed in a solution containing such substances as lactitol or mannitol. The concentration of the solution is gradually raised to 80%. After impregnation, the article is removed from the solution and allowed to crystallize and harden at a temperature of 50 degrees Celsius. An impregnating tank capable of maintaining a temperature of 60 degrees Celsius is used.

(4) Fatty acid ester method

The wooden article is immersed in ethanol to replace the water with ethanol. Fatty acid ester is added to gradually raise the concentration for impregnation, and the article is hardened at room temperature. An impregnating tank capable of maintaining a temperature of 60 degrees Celsius is used.

(5) Vacuum freeze drying

The water within the wooden article is replaced with 40% to 60% tertiary butanol or polyethylene glycol solution. The article is frozen at minus 40 degrees Celsius, and vacuum

dried as the final step.

(6) Alcohol xylene resin method

The wooden article is immersed in ethanol to replace the water with ethanol. The article is then immersed in xylene, in increasingly higher concentrations, starting at 30% and working up gradually, at 60%, 90%, and 100%. The article is then impregnated with a resin such as dammar, and dried at room temperature.

3. Storage of preserved wooden articles

The chemical preservation and processing of unearthed wooden articles is performed upon careful discernment of the type (tree species) and degree of degradation of the material. The most appropriate method is selected, the prescribed process is followed, and plenty of time is taken to implement the process. However, current methods of preservation are not 100% perfect, and there is a continuous need for constant improvement and research.

Meanwhile, although chemical processing methods may strengthen wooden articles, the fact remains unchanged that these articles are fragile cultural properties. Maintaining the storage environment in an appropriate state makes it possible to preserve these properties over a long period. There is a need to store these articles in a clean, dust-free environment where there is little change in temperature and humidity and no exposure to direct sunlight or ultraviolet radiation.

V

Final Reports by Participants

Cambodia

Tech SRUN

1 - Introduction

Cambodia is a country rich in cultural properties, such as: more than four hundred of ancient monuments, numerous art objects (made of wood, clay and sandstone), many archaeological sites (pre-historical and historical sites), tangible and intangible culture.

For more than 30 years, the cultural properties of Cambodia faced to a most dangerous situation. This is the biggest problem of Cambodian nationality. So now, the Cambodian government has tried its best to create laws for protection, conservation and the establishment of an Authority for the Protection and Management of Angkor and the Region of Siam Reap (APSARA Authority = short form from Autorité pour la Protection du Site et l'Aménagement de la Région d'Angkor / Siem Reap).

In order to protect all the national cultural heritage and world cultural heritage from the destruction of war, vandalism, illegal export of art objects, looting of cultural properties, urban development and natural disaster, etc., the ACCU created the training programme on the preservation, restoration and management of cultural heritage and since 2000 this has taken place in Nara, Japan.

I was very happy and grateful to have the opportunity to take part in the 7th training course on the preservation and restoration of cultural heritage in the Asia Pacific Region, 2006, which is organized by the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU). The objectives of this course are to help me and archaeologists from the Asia /Pacific region to develop their knowledge of archaeological methods by providing opportunities to learn the latest techniques regarding the investigation of archaeological sites, conservation science, and the preservation and restoration of historic buildings. The course was based on characteristics of Japanese archaeological sites and historical monuments.

2 - Comparison and Application to Archaeological Work

2.a-Archaeological Work in Cambodia

Unfortunately, in 1975, the Cambodian situation collapsed in Pol Pot regime and over one million people were killed, including many who had higher education. Thereafter, Cambodia faced to civil war for a long time. Accordingly archaeological work has not been able to develop because of Cambodians lack of human resources. But right now, archaeological work is gradually increasing, step by step.

Recently, there are many international organizations which have researched, conserved and restored parts of the ancient historical monument in Angkor archaeological park (world heritage site).

The Department of Monuments and Archaeology 1, APSARA Authority, has the most responsibility for the researching, conservation and restoration works in the World Heritage Site.

Archaeological works in Cambodia are comprised of historical studies, surveying and mapping, excavation, classification and analysis of objects, and site reports. There are two kinds of archaeological work in Cambodia: research and rescue archaeology. Fifteen years ago, archaeological work in Cambodia was involved mainly with monument excavations and the conservation[1] of ancient monuments. Other archaeological sites, especially prehistoric sites or historic habitation areas, are very rarely considered for excavation. Moreover, it takes a lot of time and a large budget to complete such archaeological research.

For the rescue archaeology, work is carried out on very important and specific cases, such as the construction of Parvis (parking, restaurant, souvenir shop, toilet, resting place and roads) which have a limited time frame, meaning small-scale excavations, less interpretation, and incomplete results.

As for artifact conservation, for archaeological excavations this is rarely performed. This means that most art objects from excavations are not analyzed and furthermore, scientific and modern techniques are not applied during the conservation and restoration of archaeological work.

2.b-Archaeological Work in Japan

Japan has a vast variety of ancient historical monuments, and after the loss of many valuable structures during World War II and some natural disasters, Japan has been very active in the preservation, protection and management of cultural properties and sites since then. In fact, Japan is one of the richest countries with a lot of cultural heritage protection agencies, and an abundance of professional archaeologists and conservators.

Right now, we also know that many sites are registered under the UNESCO World Heritage List, and the local registry of the Japanese Government. Archaeological research in Japan is at higher standard with regard to analysis and the interpretation of archaeological data

using modern technology. This point has helped Japan become one of the most improved countries in archaeological work throughout the Asia / Pacific region, especially with their outstanding technology and methodology.

Among these many advantages, research, there are methods which are introduced in the training course, such as surveying/ measuring methods by 3D digital archive system, and data integration by GPS coordinates and GIS program for archaeological remains. Moreover, the modern technologies are applied in the archaeological work.

On the other hand, Japan has set a goal to accomplish its stated objective of improving the knowledge of the science of conservation and reconstruction, and the management of cultural properties in Asia/Pacific region. Thereafter, Japan has promoted a lot of international cooperation for the protection of cultural properties in the world. In order to rescue and preserve the cultural properties from destruction, the training is a vital resource to work from. It means that Japan has been taking care of all the former lights of civilization of each nation in the Asia/Pacific region.

3 - Training Program

The training program is very important and relevant to me because I am supplied with a lot of information relating to management methods for archaeological conservation, dendrochronological dating methods and other new scientific dating methods.

The training course focuses on conservation, archaeological research methodology and analytical methods of ancient remains, consisting of the following factors.

-Cultural heritage preservation and protection laws
-Preservation and management of archaeological sites
-Archaeological sciences
-Scientific dating in archaeology
-Preservation techniques for wooden, metal and stone artifacts
-Environmental Archaeology

Beside the above, the course also trains the participants the methodologies of rubbings, drawing, and the identification of relics and artifacts. Also taught are how to use a Total Station and drawing plane table for mapping sites.

4 – My impression

During the training course, I learned the following:

In the first week, the training course's introduction of the cultural heritage preservation protection law, by Mr. Ito, was very useful and informative for me. The lectures on conservation and utilization of heritage resources were also useful and informative to me. This lecture is not provided a global point in my country. All of the lectures provided an outline of guidelines that govern the funding, management, conservation and protection of cultural properties from an international and national prospective.

In fact, the 15 participants presented their country reports with specific archaeological problems and needs. It meant that we could share the good experiences among other countries.

In the second week, the training course was mainly concerned with introductions to archaeological science, dating methods and dendrochronology. In addition, there were lectures on survey measuring for a 3D digital archive system for archaeological remains and data integration with GIS and GPS. It is very constructive for me because these methods have not yet been applied in archaeological work in my country, and I did not know about these topics before.

In the third week, the course trained the participants in the measuring, rubbing and drawing of the pottery. Furthermore, the course showed how to use scientific preservation treatments for wooden and metal cultural properties, and how to do the transcription of stratigraphy. And also, there was an introduction of the development and utilization of archaeological sites thereon, practices not widely applied cultural properties in Cambodia.

In the four week, the course provided a vast amount of information on the introduction to environmental archaeology, and after that was an on-site lecture at the Nara Imperial Palace Site. In addition to lectures in the class room, the training course took us for three days of site excursions for input. With careful observation, we visited the Shokichi Matsuki Memorial Museum of Arts, Matsugase Daiba Site, Jomon Museum, Torihama Shell Midden, Fukui City History Museum, Ichijodani Asakura Family Museum, Asakura Family site, Azuchi Castle, Dotaku Museum and site.

After three-day excursion, I noticed that all the sites are well taken care of, and also there are excellent exhibitions at the museums to help improve and expand my understanding of

archaeological methods by observing archaeological research, preservation, reconstruction and site management.

5 - Conclusion

The training course consisted of theoretical and practical work and on-site lectures at different places in Japan which enlightened me and provided greater chance for enhancing my knowledge.

I strongly felt that the most important topics in the training course are the conservation of archaeological sites, reconstruction of historical monuments and management of the sites. Because in Japan, the conservation, reconstruction and management of historical monuments have been well conducted.

Moreover, the course also provided me with a clearer overview of the cultural heritage fields of preservation and reconstruction, for a better understanding. So, in the future, this modern knowledge and acquired skill will be effective in applications in my own developing country (Cambodia). However, careful recommendations, suggestions and monitoring can be successfully applied for a better understanding and experience for future archaeologists.

6 - Acknowledgement

I would like to thank the Cultural Heritage Protection Office Asia/Pacific Cultural Centre for UNESCO Nara, the National Research Institute for Cultural Properties, the Ministry of Foreign Affairs of Japan, the Japanese National Commission for UNESCO, the Nara Prefecture Government and Municipal Government of Nara and the international Centre for Study of the Preservation and Restoration of Cultural Properties (ICCROM) for making a difference in my career of work.

Above all, I would greatly like to thank and express my sincere dearest gratitude to Dr. Yamamoto, Director of the training course and also all of the staff and tutors of the ACCU who helped us a lot in everyday activities in Nara, and the lecturers, translators and the ICCROM representative.

The opportunity afforded to me from this course has expanded my knowledge in scientific methodology and the conservation of archaeological sites, and also provided a vast valuable experience both in working and living in Japan. And also, I would like to thank all of

participants especially my good friend Jason from Pohnpei, FSM. We helped and accompanied each other with good communication and shared data, and definitely had a wonderful experience during the training course, and happily underwent training for a better, memorable experience.

India

Vasant Kumar SWARNKAR

INTRODUCTION

The objective of this report is to comment on how the ACCU Nara training course on 'Cultural Heritage Protection in the Asia-Pacific Region 2006 (11^{th} sep-11^{th} oct.06)' can be applied to my work, and to evaluate its relevance to the heritage protection and preservation activities in India.

This training course was mainly conducted through lectures/presentations at the ACCU Nara, National Research Institute for Cultural Properties, Nara (NRICPN), Nara University; field visits and on site lectures were also arranged on heritage sites at Nara Imperial Palace Site (Heijo palace), Matsugase Daiba Site, Torihama Shell Midden, Fukui City History Museum, Ichijodani Asakura Family Museum, Shiga Prefecture Research Institute of Azuchi castle and The Dotaku Museum (The Mysteries of Dotaku), to provide a clear understanding and practical application of the methodologies presented during the class-room lectures. All subjects and topics arranged were highly relevant and within the scope of the training course, and all the lectures delivered by specialists in each discipline. The presentations were very informative, and it was interesting to observe the nature of different heritage sites of the Asia-Pacific Region, their related problems and solutions, the legislations of different countries and their management practices.

On the basis of content, the lectures can be broadly categorized under the following sub-headings: -

- Legislation and philosophical framework for the protection and preservation of cultural heritage
- Archaeological and conservation science and analysis
- Recording and data integration of heritage.
- Restoration, reconstruction and presentation of cultural heritage and site management

Legislation and Philosophical Framework for the Protection and Preservation of Cultural Heritage

The philosophical framework provided by various international charters and conventions presented during the training course are known and followed by professionals in India who are engaged in the protection and preservation of the cultural heritage. However, as indicated by professor Ito of the Japan Agency for Cultural Heritage, I understand that more

emphasis is paid in Japan to paragraph 3 of Article 7 of the 1990 Lausanne Charter, which is contrary to paragraph 3 of Article 15 of the 1964 Venice Charter, where the reconstruction of archaeological remains is favoured rather than limiting the conservation work to a level that ensures reinstatement of its original form.

The legal framework for the protection of cultural heritage in Japan is comprehensive and the most important aspect is that the Japanese law on cultural heritage is administered by a single agency, i.e., the Cultural Properties Protection Department of the Agency for Cultural affairs. This law covers not only the tangible, but also the intangible cultural heritage and places of scenic beauty and natural heritage, since the natural and cultural heritage in Japan are interwoven in an intimate manner. The steps taken for the protection and preservation of both of these aspects of heritage under one law are commendable. As Dr. Gamini Wijesurya of ICCROM has pointed out, the present approach in heritage preservation (natural and cultural) is beginning to change from a compartmentalized to an amalgamated one. As culture and nature are related to each other, we can't think about existence of a culture without considering the nature. It is also interesting to learn that the protection of traditional techniques for conservation of cultural properties is covered under the Japanese law for the protection of cultural properties. In India, the Archaeological Survey of India follows the traditional techniques for the conservation and preservation of monuments but they are not covered in the legal framework. I am surprised to learn of the practice in Japan of giving permission for development above archaeological remains after excavation and research. In my view these sites should be declared as protected sites and should be preserved for future generations and future research.

In India, the Archaeological Survey of India is responsible for the protection and preservation of the cultural heritage, with its long historical background of Acts, Rules and Regulations, as below:

The cultural renaissance of early nineteenth century witnessed enactment of the first ever antiquarian legislation in India, known as Bengal Regulation XIX of 1810. This was soon followed by another piece of legislation called Madras Regulation VII of 1817. Both these regulations vested the Government with a power to intervene whenever public buildings were under threat of misuse. However, both the Acts were silent on the buildings under the private ownership. Act XX of 1863 was therefore enacted to empower the Government to prevent injury to and preserve buildings remarkable for their antiquity or for their historical or architectural value.

The Indian Treasure Trove Act, 1878 (Act No. VI of 1878) was promulgated to protect and preserve treasure found accidentally but having archaeological and historical value. This Act was enacted to protect and preserve such treasures and their lawful disposal. In a landmark development in 1886, James Burgess, the then Director General succeeded in prevailing upon the Government to issue directions forbidding any person or agency to undertake excavation

without prior consent of the Archaeological Survey, and debarring officers from disposing of antiquities found or acquired without the permission of the Government.

The preservation of the cultural heritage entered a new era when the Ancient Monuments Preservation Act, 1904 (Act No. VII of 1904) was promulgated. This Act provided effective preservation and authority over monuments particularly those which were under the custody of individual or private ownership. As this Act has not been repealed, it is deemed to be in force. Next was the Antiquities Export Control Act, 1947 (Act No. XXXI of 1947) and the Rules thereto which provided regulation over the export of antiquities under a license issued by the Director General, and empowering him to decide whether any article, object or thing is or is not an antiquity for the purpose of the act, and making his decision final.

In 1951, the Ancient and Historical Monuments and Archaeological Sites and Remains (Declaration of National Importance) Act, 1951 (No LXXI of 1951) was enacted. Consequently, all the ancient and historical monuments and archaeological sites and remains protected earlier under the Ancient Monuments Preservation Act, 1904 (Act No. VII of 1904) were re-declared as monuments and archaeological sites of national importance under this Act. Another four hundred and fifty monuments and sites of Part 'B' States were also added. Some more monuments and archaeological sites were also declared as of national importance under Section 126 of the States Reorganization Act, 1956.

In order to bring the Act on par with constitutional provisions, and provide better and effective preservation to the archaeological wealth of the country, the Ancient Monuments and Archaeological Sites and Remains Act 1958 (No 24 of 1958) was enacted on 28th August 1958. This Act provides for the preservation of ancient and historical monuments and archaeological sites and remains of national importance, for the regulation of archaeological excavations, and for the protection of sculptures, carvings and similar objects. Subsequently, the Ancient Monuments and Archaeological Sites and Remains Rules 1959 were framed. The Act, along with the Rules came into effect from 15 October 1959. This Act repealed the Ancient and Historical Monuments and Archaeological Sites and Remains (Declaration of National Importance) Act, 1951.

The Antiquities and Art Treasures Act 1972 (No. 52 of 1972) is the latest Act, enacted on 9 September 1972 for effective control over moveable cultural property consisting of antiquities and art treasures. The Act aims to regulate the export trade in antiquities and art treasures, to provide for the prevention of smuggling of, and fraudulent dealings in, antiquities, to provide for the compulsory acquisition of antiquities and art treasures for preservation in public places, and to provide for certain other matters connected therewith, or incidental or ancillary thereto. This Act was also supplemented with the Antiquities and Art Treasure Rules 1973. The Act and Rules have been in effect from 5 April 1976. This legislation repealed the Antiquities Export Control Act, 1947 (Act No. XXXI of 1947) But these strong legislative measures do not cover natural sites and sites of scenic beauty or Natural Heritage, which are

maintained by the Ministry of Tourism, and some of them are under provincial forest department or other responsible agencies.

For this reason it is important to reconsider revising the present legal framework in India by giving emphasis to the above aspects discussed for Japanese law. The heritage protection and preservation laws of other countries like Norway, where natural and cultural heritage is covered under a single law, also need to be studied in this regard.

Archaeological and Conservation Science and Analysis

Relative dating (stratigraphy and typology) and absolute dating are widely used in India for purposes of chronology. As Prof. Tsuneto Nagatomo of Nara University of Education has stressed in his lecture, the above traditional methods sometimes may present problems in age determination. For example similar typology may occur in totally different ages throughout history. As such, the use of modern (scientific) methods is vital for dating. This will also enable a cross-check or sometimes complement the dates provided by traditional methods.

In India, Radiocarbon and TL dating have been carried out to date only on selected samples. However, as Prof. Nagatomo stressed, more than two scientific dating methods are necessary to acquire accurate dates to arrive at an acceptable result for a single archaeological context.

In India, the equipment related to Radiocarbon and TL dating are available at some institutions, but the leading organization for archaeological research, the Archaeological Survey of India, doesn't have its own laboratory for these kinds of scientific studies. These methods are expensive, and sometimes it is difficult to pay heavy amounts for the dating of many samples belonging to different parts of the stratigraphy, and also there are limited laboratories so that it takes a long time for the results. It is now required to establish a well-equipped laboratory within the organization for archaeological researches.

I am particularly impressed by the Dendrochronology developed in Japan by Dr. Mitsutani of NABUNKEN. Since India posses a wealth of wooden heritage, it is interesting to see whether this dating method could be used not only for age determination, but to study previous/ ancient restoration, repair work or even additions/alterations carried out in the past, which helps to understand the evolution and development of the structures. Since most of the tropical trees do not have an identifiable tree ring pattern (except for trees such as teak), this is a constraint in applying this technique in India.

Studies on material properties using chemical analysis have been conducted in India for pigment used in rock paintings and murals, earthen ceramics, glazed ware, and metal objects, specially bronze sculptures etc. These studies have been carried out to know their composition, source and casting technique in the case of metal objects. During this training course, I

observed some rapid techniques (some of them are non-destructive) used to carry out similar studies, specially using Fluorescent X-Ray analysis. Earlier there was no example in India of such studies, but now some institutions have taken initiatives. It is also worthwhile to explore the possibilities of carrying out joint research programs with countries like Japan, USA, and UK, where advanced facilities and expertise are available.

It was also interesting to learn, during the training course, how the living environment, the eating habits of ancient people, and the environment of ancient Japan are reconstructed through environmental archaeological research since in India there are only few examples of such research, because in tropical environments, micro-organic remains do not survive long enough to conduct this type of studies. Few studies have been initiated to understand the flora and fauna, the environment and food habits of ancient man, identifying the class of animals, and age and sex determinations of human skeletons found during the excavations, but detailed study is required. The workshop on the analysis of animal and human bones during the training provided solid potential for carrying out such research in my future work.

In Japan, methods of archaeological prospecting using radar survey, electric and magnetic survey etc., are used to explore the site's potential as well as to obtain an understanding of the site in order to proceed with excavation more accurately and efficiently. This involves not only specialized equipment, but also the skill to interpret the prospecting results, which are not available in India. But again it is worthwhile to explore the possibilities for having joint projects with countries like Japan, to initiate such a program so that Indian professionals will have the opportunities to learn and understand the importance of such methods.

This training course also provided me an opportunity to become familiar with the technique of the transcription of soil layers or sections of an excavated archaeological trench, which can be kept as a scientific record or be exhibited in a museum so that scholars as well as visitors can understand the deposit of the site. This is the most important thing that I learned during this training program, and I will try to use it in my fieldwork.

In the subject of conservation science and analysis, the main emphasis during the training was on archaeological materials and artifacts. The training provided opportunity to expose us to the multiple uses of X-ray diffraction in analyzing material composition and deposits on stones, detecting corrosion and pigments, etc., that are essential for deciding the appropriate conservation treatment. It was also important to understand the use of X-ray computerized topography (CT), with regard to the comprehensive 3D examination of the interior of objects for their preservation. With regard to the conservation of waterlogged wood, the training course provided the opportunity to learn about treatment methods such as polyethylene glycol impregnation, sugar alcohol impregnation, higher alcohol treatment, and freeze drying etc. Although waterlogged wood objects are not often found in excavations in India, however the recent commencement of underwater archaeological activities has provided

many challenges with regard to the conservation of waterlogged wooden materials especially those associated with shipwreck sites. Since equipment and proper training in relation to the above treatments are not immediately available in India, it is important to explore the possibilities of obtaining technical and financial support form countries like Japan that have experience in this field.

Heritage Recording and Data Integration

With regard to the subject of heritage recording, the main emphasis during the training was how to preserve archaeological information from artifacts and other remains in 'data form' using 3D digital archiving. This system allows the recording of measurements of all types of archaeological remains, the extraction of high precision data for research purposes, and easy operation by non-specialists. Experts using plane table and Total Station survey also gave a demonstration to trainees and showed the uses of 3D scanner, GPS survey, satellite images and photogrammetry. The Archaeological Survey of India recently has taken some initiatives for the above kinds of documentation, but a large amount of work has to be done. Applications of GIS and viewshed analysis are very important especially with regard to the heritage protection activities in India, and this field has to be developed.

Site Management and the Restoration, Reconstruction, and Preservation of Cultural Heritage

During the training course the emphasis with regard to heritage management and cultural preservation was on excavated remains. The formal, and almost all on-site lectures, and site visits were aimed at illustrating the Japanese philosophy and approach behind this subject. In the Japanese archeological context, almost all the monuments are constructed using wood, which is a fragile material for preservation and only the postholes and the basements are found during the excavations. Moreover, since most of these remains are found in a waterlogged condition, it is practically impossible to consolidate the ruins and expose them for public viewing. Therefore the Japanese authorities adopting various methods to present such findings like:

- Consolidation and exposure of excavated remains under a shelter
- The reburial of exposed remains and reconstruction of only the base of the structure at the present ground level, which is about 60 to 100 centimeters above the actual remains

- The reburial of exposed remains after curating the excavated fragile artifacts for proper protection, and reconstructing features such as wells and drains etc. at the present ground level

- The reburial of excavated remains and filling with earth to raise the ground level and reconstruct the building with the superstructure on its original location.

The philosophy behind this approach is an interpretation of paragraph 3 of Article 7 of the 1990 Lausanne Charter, where the reconstruction of archaeological remains is favored rather than limiting their conservation to a level that ensures reinstatement of their form only. However, in Indian contexts where most of the exposed monuments have either brick or stone structure, such reconstruction is not essential. The Archaeological Survey of India has adopted following principles for the preservation and conservation of cultural heritage:

- Broken or half decayed original work is of definitely more value than the smartest looking and most perfect new work.

- Every original member of the monument should be preserved intact, and the demolition or reconstruction should be undertaken only if the structure cannot be otherwise maintained.

- Annual repairs are indispensable in case of archaeological monuments.

- Hypothetical restoration can be done, if it is essential to the stability of the monument.

It is clear here that there is no place for such kind of reconstruction as done in Japan in the principles and workings of the Archaeological Survey of India, which is responsible for the protection and preservation of cultural heritage in India.

In the field of site information, the Japanese have developed a sound system of signage and printed information (brochures/ pamphlets) that provide valuable information to help visitors understand heritage sites. Since the Archaeological Survey of India is presently developing a system of signage for its protected monuments and sites, the system of signage graphics used in Japan will provide a useful guideline in this regard.

The museums visited during the field visits, especially the museum at Torihama Shell Midden site, show the high level of presentation and display techniques adopted by Japanese professionals. Such presentation and display techniques provide easy interpretation of heritage

sites, which is very much lacking in India. The museums in Japan not only the display of the artifacts and other information found from archaeological activities, but also show how archaeologists carry out scientific work from excavation to site presentation. This helps to build up significant images of the role of the archaeologist among the public. In discussions with other participants, I found that the public in many countries does not properly recognize the work of the archaeologist. Therefore the display of models related to various steps in archaeological activities, their working environment, the tools and equipment used for field activities, transcribed soil layers etc., are good methods for projecting a significant image of the archaeologist. During the site visits I studied the archaeological research and public awareness programs that are being carried out by different museums and Archaeological Research Centers. These programs (hands -on archaeology) are specially designed for children, and will contribute greatly to an awareness of their heritage.

The training course provided a great chance to hear experts like Dr. Inaba and Mr. Murakami on the burning topic of 'Risk Preparedness for Cultural Heritage,' specially related with natural disasters like earthquakes. Their study was based on practical experience and I think that each trainee got relevant and very important information for their work. India also experiences many earthquakes, but no study has been carried out for such an important issue. It will help me to work out plans for the cultural heritage located in seismic areas. A basic overview was provided of the format in regard to site management, which is used for management plans for sites in Japan. The discussion led by Dr. Gamini Wijesurya of ICCROM with regard to the subject of 'future tasks in the preservation of cultural heritage' is highly relevant for facing the future challenges of the profession. The identification of continuous improvements as the major task and response is vital, and include the following points for addressing heritage issues, as discussed by Dr. Wijesurya: revisit, research, react and result.

The presentation of Ms Patcharawee Tunprawat of SPAFA on the community-based approach to the heritage was very impressive and valuable for me. A country like India has many heritage sites which are closely related with the community or society. They are part of the people's daily life and we can't ignore this aspect. If we involve them in the protection and preservation of cultural heritage, then we can manage these sites in better fashion and also help to improve awareness among the masses.

Conclusion

The foregoing discussion clearly shows that this training course is highly relevant to the heritage protection and preservation activities in India and its application can be envisioned in

several different approaches, depending on the available technical and financial resources. Some of the techniques and methodologies can be applied immediately with available resources, while in some cases we need joint collaboration with other countries like Japan who are developed in this field. In other cases, feasibility studies need to be done in order to asses their sustainable applicability.

Due to the limitation of the time frame of this training course, it was only possible to provide a general introduction to various subjects and topics related to the course title. However, aspects of the course would have been much more effective and interactive if additional practical classes were arranged during the training, as in the case of 3D laser scanning, dendrochronology, treatment of wooden objects and workshops on the analysis of bones.

Informal discussion I had with my fellow participants revealed that most of the countries in the Asia-pacific region require in-depth training on various aspects of research methodologies and analytical methods. Therefore, I would like to suggest to the ACCU to consider holding separate training programs in the future on specific subjects such as dating methods, archaeological science and analysis, conservation science and analysis, heritage recording and data integration, site management and presentation, and museum set-up. Such an effort will no doubt help to upgrade the heritage preservation activities in the region. At the same time it is also important to upgrade the traditional techniques that are employed in heritage activities in the Asia-Pacific region, such as archaeological excavation, field documentation, condition assessment, and detail documentation before, during and after conservation. If the ACCU can also offer such courses, then training will be highly relevant and can be directly applied in many of the participant countries.

It is important to mention that the reference material available in the reading room of the ACCU Nara Office is not at all adequate for a regional center for UNESCO. Therefore, I would like to suggest that a full fledged library related to all aspects of heritage protection and preservation be established in the ACCU Nara Office and UNESCO, ICCROM, ICOMOS etc. should be requested to support the ACCU Nara Office in this regard. I am sure that the exposure of the participants to international literature (in addition to lectures, site visits etc.) will contribute to expanding their horizons in heritage protection.

I wish to state my sincere thanks to ACCU Nara for inviting me as one of the participants for this training course. It enabled me to gain valuable exposure and experience in modern research methodologies and analytical methods in relation to heritage preservation practiced in Japan. This will no doubt contribute to my professional career. This training also gave me the opportunity to interact with other heritage professionals in the Asia-Pacific region, to discuss the course issues and to share the experience. I earnestly hope that the contacts we have developed during this one-month training will help to build professional ties and cultural

links between the countries of the Asia-Pacific region. This training course also helped me to experience and obtains insight into the rich Japanese culture and cultural heritage.

Acknowledgements

I would like to express my gratitude to the Government of Japan and related agencies for their support to the ACCU Nara office in organizing this training course. I would like to express my heartfelt thanks to Mr. Yamamoto Tadanao, Director of the ACCU Nara, Mr. Toshihiko Morimitsu, Mr. Tsutomu Yamashita, Mr. Atsushi Nagai, Ms. Yasuko Otani and other staff of the ACCU Nara office for the excellent and wonderful organization during the training course. I appreciated the excellent coordination and untiring efforts of Ms. Kamida Ryo, Ms. Wakamia Yuko and Ms. Hata during all the activities. I must also thank all specialists who shared their valuable thoughts in their lectures and during site visits. I am also thankful to all participants for their co-operation and the Hotel authorities for making my stay comfortable in Japan. Finally I would like to express my special thanks to the Director General, Archaeological Survey of India, for nominating me for this valuable training course.

Indonesia

Natsir Mohammad

1. Introduction

First of all, let me take this opportunity to thank you for the chance to participate in the Training Course on the Preservation and Restoration of Cultural Heritage in the Asia - Pacific Region 2006: *Research, Analysis and Preservation of Archaeological Sites and Remains.*

The training was held from 11 September - 11 October, 2006 in Nara, Japan. It was jointly organized by Bunkacho (Agency for Cultural Affairs in Japan); the Asia/Pacific Cultural Centre for UNESCO (ACCU); the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); the National Research Institute for Cultural Properties and Nara University. It was held in cooperation with Japan's Ministry of Foreign Affairs; the Japanese National Commission for UNESCO; Nara Prefectural Government and Nara Municipal Government.

This report mainly focuses on how knowledge gained from this training can be applied when considering problems and needs for the preservation and restoration of cultural heritage in Indonesia.

2. Problems and Needs for the Preservation and Restoration of Cultural Heritage in Indonesia

My country report highlighted the preservation of the Prambanan Temple Compound after the earthquake of 27th May 2006 as one of the important issues in Indonesia. After participating in this course, I have learnt about many more issues, and hence in this final report I will extend my coverage of these issues. I have also learnt many things which I can apply to the problems and needs concerning the preservation and restoration cultural heritage in Indonesia.

Indonesia is one of the larger countries in the Asia - Pacific region; it is 1.9 million square metres in area and has 17,508 islands and more than 400 ethnic groups. There are many various cultural properties within Indonesia. The cultural heritage in Indonesia can be grouped based on chronological period: Prehistoric, Hindu, Buddha, Islam, and Colonial. Prehistoric remains include *Meganthropus palaeo and Pithecanthropus erectus/Homo erectus* in the Sangiran archaeological site, cave paintings, stone megaliths, and artefacts. Remains from the Hindu and

Buddhist periods include temples, gates, water castles, ancient towns. Examples of Islam period remains are mosques, palaces, traditional houses and burials. Remains of the colonial period include palaces, towns, stations, schools and offices. Underwater archaeological remains are also found in Indonesia such as shipwrecks, ceramics and weaponry. More than 5000 tangible cultural heritage sites have been identified in Indonesia, and three are listed as world cultural heritage sites: Borobudur Temple, Prambanan Temple Compound, and the early man site in Sangiran.

There are also many important places of scenic beauty in Indonesia. These places of cultural and natural heritage are under threat however, from development. Indonesian law doesn't provide protection for cultural scenery. Preservation efforts for cultural heritage are being conducted however, by the Indonesian government through protection, registration and identification, conservation, and restoration works.

In general, problems of preservation in Indonesia are caused by both human and natural factors. Examples of human factors that cause damage to cultural heritage sites include poorly planned development, illegal exploration of underwater archaeological remains, and the illegal trafficking of artefacts.

An example of a natural factor causing damage to cultural heritage sites is the earthquake that struck Indonesia on 27th May 2006. This earthquake caused the destruction of a lot of cultural heritage, including the World Cultural Heritage site of Prambanan Temple Compound. Another problem facing cultural heritage preservation is the physical deterioration of sites, but in Indonesia the methods and techniques of conservation science are still very limited.

Other main problems facing the preservation, utilization and development of cultural heritage in Indonesia include a lack of professionals or skilled experts, limited equipment, a lack of integration between cultural resource management and urban planning, and limited financial resources.

3. Application of the training course to my conservation work

The objective of this training course are to provide participants with a knowledge of recording and analytical methods for archaeological features and relics; principles and methodologies of preservation of archaeological sites; development and utilization of archaeological sites; and opportunity to network with colleagues from the region and share experiences.

Highlights of the training courses, which were conducted through lectures, practical sessions and on-site lectures, which are comparable can be applied to my conservation work, as an architect who works in archaeological field. Hence, how to apply the knowledge depends on

the character of the subject as based on our knowledge, and experience, and the field work and situational condition between Japan and Indonesia.

- **Conservation and Utilization of Cultural Heritage Resources**

Conservation and utilization of cultural heritage resources in Japan are more advanced. This efficacy has been achieved through dynamic protective legislation and grows from a well-established preservation system. In Indonesia, conservation and utilization of cultural heritage resources represent two very important matters in the development of urban and rural areas.

The current preservation laws in Indonesia are recent, such as Cultural Property and Site Act No. 5/1992, which refers to the former act during the Dutch Period, Monumenten Ordonantie No. 238/1931. This Law mainly focuses on the preservation of objects and sites, but is currently being revised. Several things which can be proposed as additional items are the protection of cultural scenery, an assessment system, and the categorization of the cultural properties.

- **Risk Preparedness for Cultural Heritages**

Risk preparedness for cultural heritages became an important issue after earthquake disaster which struck the cultural cities of Yogyakarta and Klaten. This disaster damaged the cultural heritage on a wide scale. The main measures have been conducted in two phases: the emergency responses and reconstruction/rehabilitation. The first phase was executed over a 3-month period, and the second phase is now being conducted. This second phase emphasizes restoration as way of maintaining physical continuity of monuments and sites in the disaster area. Currently, methods and techniques of restoration are checked and designed carefully.

Japan is a country that has often experienced disaster, especially earthquakes. This experience gave valuable Iessons in the face of disaster, and fostered risk preparedness in the management of cultural heritage.

- **Recording Survey Methods for Archaeological Features and Relics**

Recording survey methods for archaeological features and relics, as highlighted by Geographic Information Systems "GIS", can be applied to cultural heritage in Indonesia. GIS has become one of the most important systems in the preservation of spatial data. This system can be integrated with a data base of cultural heritages in Indonesia, enhancing the accuracy of positional location by utilizing Geographic Positioning System, elementary map attributes, and aerial photography. The positions of cultural heritage and sites throughout Indonesia can be monitored quickly. This method also can be used for visualization, data manipulation, and

spatial display according to the requirement. One constraint faced is the availability and cost of aerial photography maps and equipment.

Another method of analysis which can be applied is 3D scanning and photogrammetry, so that the recording of data can be done digitally as fast as they are measured.

- **Development and Utilization of Archaeological sites**

Development and utilization of archaeology sites in Indonesia has been conducted under Cultural Property and Site Act No. 5/1992. Development and utilization of sites relate to the principle of preservation and the authenticity concept: authenticity of form, material, technology of workmanship, and setting. The authenticity concept is applied to both past and living heritage. Today the authenticity concept for living heritage is growing, especially for colonial heritage in urban areas. After learning about the development and utilization of archaeological sites in Japan, an important value which can be proposed balanced aspects in integrated preservation. That is, satisfying the conservation of physical heritage, as well as maintaining academic and economic value. Development and utilization of cultural heritage can be done creatively and wisely without lessening the important cultural value. The policy and strategy of preservation should be conducted by paying attention to balance aspects.

- **Introduction to Archaeological Science**

In my conservation work, identification of the original colour of remains through pigment research could be applied in order to determine the original colour of cave paintings, traditional houses, mosques, offices, schools, etc. Dendrochronology could also be applied to wooden monuments in Indonesia. As we know, dating remains by scientific methods includes radiometric and relative methods. Dating method by using more than one method will prove better accuracy.

- **Introduction to Conservation Science**

In Japan, preservation techniques for metal and wooden artefacts are highly developed. These methods and techniques for most artefact are done by using modern equipment. On the other hand, an important aspect which requires of looking after is the cultural value of the artefact. The research, analysis and preservation of artefacts as done by the Nara University laboratory would be very difficult to apply in Indonesia, as it would require professional expertise and equipment.

The transcription of stratigrapy at the excavation near Sadaiji station is very attractive, considering how this activity represents my first experience of seeing the intake of the cultural data layer at a site on a sheet which has been rubbed with resin.

- **Introduction to Environmental Archaeology**

The highlight of environmental archaeology, in which artefacts used by humans, and animal bones and flora are correlated environmentally, were very interesting and useful. In lectures exemplifying the evolution of the human skull, one typical example is a skull representing the replica of *Pithecanthropus Erectus* coming from Sangiran Site, Indonesia. From my point of view, this area has been well expanded in Indonesia, especially in regard to the Sangiran site.

- **On site Lectures**

Much valuable knowledge was obtained particularly on the preservation and restoration of cultural heritage at the Heijo Palace and Ichijodani sites. The restoration of wooden architecture is very important for further study through studied farther by comparison to wooden architecture in Indonesia.

Restoration of cultural heritage can be executed completely or partially through comprehensive research, giving broad consideration to various aspects. The concept of complete architectural reconstruction of the main buildings at the Heijo Palace site, according to their original form is one of the important points to note in this field study, considering that in Indonesia so far, efforts to reconstruct wooden monuments have been conducted only as far as the data which have been found.

Protection of the cultural heritage by the additional component of earthquake preparedness generated great interest for further study. At the Former Imperial Building Audience Hall there are additional components having a non-rigid character among the lower structure and building pillars, representing a real example of risk preparedness. That building restoration requires great expense was vividly felt when we have time to observe the process of restoration activity.

At the moment, restoration work of wooden architecture in Indonesia is being conducted at the "Old Palace of Sumbawa". This restoration is being jointly conducted with the Japanese government (Bunkacho and JACAM). I realized that as an architect who works in the restoration field, the study of wooden Japanese architecture through the course would give me very valuable experience and Iessons for the development of restoration science in Indonesia.

In Japan, the concept of a site museum is very interesting, to be learned further. The concept of joining preservation, restoration, gardening, development and utilization was vividly felt after visiting some sites in the on-site lectures. There was much valuable knowledge that may be useful as input in the preservation, development and utilization of sites in Indonesia, especially in the Muara Jambi and Majapahit Temples Compound.

4. Conclusion

In general, in this training course on preservation and restoration of cultural heritage, participants have been provided with knowledge through lectures, practical training and on-site lectures. And through this training, participants gained exposure to future issues in the preservation of cultural heritage, especially in the Asia-Pacific region.

As known, Japan is a country with a rich cultural heritage, and it has succeeded in its preservation, development and utilization. And we have learnt how to reach this efficacy through the approach of enacting laws for the protection of cultural properties, methods and techniques of preservation and restoration, and cultural resource management. Archaeological science is highly developed in Japan. The progress of this preservation and restoration are supported by the availability of professional experts, adequate equipment, financial support, and public awareness of the importance of cultural heritage.

Finally, this training course is very important for enriching our knowledge, skill and attitude on preservation and restoration of cultural heritage, and how to apply this knowledge in Indonesia.

5. Acknowledgements

I am sincerely grateful to the ACCU Cultural Heritage Protection Cooperation Office, the Agency for Cultural Affairs of Japan (Bunkacho) and ICCROM. I would like to express my thanks to the Director of the ACCU Nara Office, Mr. Yamamoto Tadanao, to Mr. Morimutsu Toshihiko and to all the lecturers. Many thanks also to Mr. Yamashita, Mr. Nagai, Mrs. Hata Chiyako, Ms. Wakamiya Yuko, Ms. Kamida Ryo, and all the ACCU staff for the excellent and wonderful organization during the whole period of the training course.

On the Indonesian side, I would like to thank the following institutions and people for their support and kindness: UNESCO National Commission of Indonesia, Director General of Historical and Archaeological, Director of Archaeological Heritage, Mr. Endjat Djaenuderajat, Mrs. Roseri Rosdy Putri, Mr. Mardi Thesianto and all staff of the Sub Directorate of Restoration.

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Domo Arigato gozaimashita.

Iran

Saeedeh HOSSEINI

Introduction

Depending on their climate, environment, potential talents, relationships and historical experience and events, different territories and nations have presented the world different cultural heritages, all of which them belong to humanity and contain meanings and values, even if we can not identify and understand them.

Nowadays, there are many organizations and foundations all over the world which are studying and operating in the field of cultural heritage, and many universities are training specialists related to both tangible and intangible heritage. We can summarize their activities in the field of tangible heritage as the following four groups, which are definitely accompanied by archeological activities.

Firstly: conserving cultural properties as the deposit of our ancestors for the future generations.

Secondly: Making the best possible documentation for historical relics, so that complete information about them can be classified as basic data for researchers and specialists.

Thirdly: Publishing new information which sometimes leads historians to new results about the history and dating.

Finally: Presenting information on historical monuments for the people, especially the younger generation, and furthermore, featuring and introducing the relics which are found in the excavations.

In this training course I had meaningful opportunity to experience, learn and observe cases relating to the above issues in Japan, which divide into the four themes bellow.

- The basic data: definitions and theories in the field of conservation, and classification of damages which threat the cultural properties, and further, conservation problems in relation to settlements.
- The standard and latest archaeological methods for making documentation, dating and analyzing the found relics.
- The preservation and conservation methods used in Japan and their guidelines.
- Visiting and observing some Japanese archaeological sites and museums as relevant to the set of issues are mentioned above.

During these programs, I could observe Japanese's scientific and cultural benefits accruing through study, and concentrate on their cultural values and needs.

This report explains briefly my inferences about the programs of the training course, and also, my plans after finishing it.

_The basic data: definitions and theories in the field of conservation, and classification of damages which threat the cultural properties, and further, conservation problems in relation to settlements.

The earliest lectures contained a lot of useful definition and theories, most of which were familiar to me, but I could not have classified them in their proper categories. Before taking part in the course, I prepared a report about the problems of cultural properties in my country, and in that text, I mentioned that most Iranian experts are not aware of what is going on in international academies, assemblies and other scientific events throughout the world. Although there are a few who always look for the latest news, there is no system to organize this information and make it accessible for other experts, hence, the basic data, were useful to me and I am going to introduce them in the department where I work in (the Deputy of Conservation and Restoration). Furthermore I came across a special format for ranking the problems and threats of cultural heritage, and found out that my classification system for the country report (which was performed on Sep. 14) needs to be assessed again, because a special more suitable and more complete format has been prepared for general problems already by the ICCROM experts, and it is better to follow that, rather than local problems which may be categorized separately. One example was seen in the case of risk preparedness for cultural heritage, a part of the program's topics about earthquakes, which are common in my country, with regards to management plans and also the experience about protecting removable cultural properties. But in the field of Iranian cultural monuments and buildings, these problems are completely local, and so the solutions. The construction of Iranian historical monuments and buildings is massive in most cases and does not contain any particular structure for reinforcing against earthquakes. Therefore, considering the high risk of earthquakes in Iran, we can understand the high priority of comprehensive local and special conservation for this kind of architecture.

_The standard and the latest archaeological methods, for making documentation, dating and analyzing the found relics.

Editing contracts, and monitoring conservation and restoration projects, are some parts of an expert's duties in my office, and often consultants recommend using the latest technologies for surveying and dating the historical monuments and sites. The expert's shortage of information in such fields culminates in problems in editing the contracts and monitoring the projects.

For example, in Iranian historical buildings, the main construction material is brick, and for dating of this material, C14 is not an appropriate method and TL is the most accurate for brick and tile. Consequently, having knowledge about these methods is necessary for me and my colleagues.

The other related topic is the latest surveying methods (3D scanners and Photogrammetry), which are new phenomena and we have limited experience with them in Iran. As a matter of fact, in the case of domes, especially examples which contain ornamental decorations, using the 3D scanners is the only accurate way for surveying inside and outside of the architectural form; this also applies to "tomb towers" and "minars," which are large cylinder-shaped masonry constructions, and often contain decorative elements. But in Iran we have not yet drawn up such a surveying project for them, and in planning this program, we need to convince the managers about the useful results of these methods, so I asked the professor about surveying of these monuments. He agreed about the difficult condition of field work in such cases, which need extra accessories for moving the scanners around the monuments. The largest one, Gonbad-e-Kavoos (11^{th} century), is more than 50 meters high and as a unique example, needs to be surveyed as soon as possible.

The other subjects are cliff architecture monuments and especially bas-reliefs, most of which lie out in unsuitable climatic conditions and are exposed to the danger of damaging or rubbing. In such cases one of the solutions is molding and making replicas, which could even be installed in the same location. But a few groups of experts believe that such a process could damage the relics because of the molding materials' effects. If we have a digital 3D model, we do not have to touch the relic for molding process. Although some other experts believe that we do not know enough about the effect of lasers on the relics, it is better not to be an observer to more serious damage, and sometimes in the field of cultural heritage conservation experts have to integrate risk in professional decisions and their only choices may be Bad or Worse. As an illustration, I mention the bas-relief of "Cyros the Great" in "Pasargad" (inscribed in the World Heritage List).

One of the most general dangers which threaten cultural heritage monuments and sites is the development of infrastructural facilities. My colleagues and I tried to write a proposal for the former-manager of the cultural heritage organization, about the necessity of GIS for

cultural heritage protection against development programs which ignore cultural values, and we had tried to suggest a plan for buffer zones data. Afterward, the management system in the organization changed and during the two recent years the plan has been abandoned; furthermore, establishing the GIS system needs enough samples of its use to convince the new management which is not yet so familiar with problems in the field of conservation and preservation.

The other presentations in the course were manual systems for making documentation such as: plane table mapping and object drawing, which I believe both archeologists and conservators have to be skillful at, as basic methods for data collecting in spite of the new survey techniques. Especially in training programs it is better to insist on these methods and making important use of them, to strengthen the relationship between the subject matter and the researchers. I believe this not only as an expert but also as a teacher for the course of drawing.

The transcription method of soil layers in Japan, which was taught in the one day of field work, was a new and unknown method of making documentation for me, and I will transfer it to my colleagues and archaeology students.

_The cultural properties preservation and conservation methods used in Japan.

This part could be divided into irremovable and removable cultural properties. In both cases, as the first step of conservation, we need to identify the subject and its problems.

Irremovable cultural properties are historical sites and monuments, which in the previous topic have been discussed regarding their identification during the process of surveying, but before any conservation work, knowledge about the subject is not complete unless we know about all its materials. At Nara University, there was an opportunity to get familiar with some systems for analyzing the materials which can be used for paintings, coats and mortars. In Iranian architecture, gypsum should be mentioned as a key material which amazingly is available almost all over of country, and it used to be the basic material for making mortar, under coat and the well-known decorative technique of stucco work. Depending on the function, the traditional architects used to mix it with other kinds of materials, to make it water resistant, sticky or reinforced. To use incompatible materials such as cement in preservation activities could be harmful, because their chemical and physical specifications are totally different from the original construction, especially in brick buildings. Furthermore, to use cement as mortar does not let us restore the original condition of the subject. Revival of traditional processing of the mortars helps us to follow more scientific and perfect methods in the field of restoration and preservation. Although in a few cases experts try to make this kind of mortars, their results are based on a trial and error process, not according to analyzing experiments, and furthermore, depending on the climatic condition and function,

there is a wide range of these traditional materials which need to be classified. In Nara University, I talked professor Nishiyama about the case just mentioned and asked if it is possible to use the laboratory systems of Nara University for such a kind of research, and he agreed to collaborate with us.

The category of removable cultural properties contains objects, bones and the decorative and functional elements which used to act as part of an architectural body but are not in their original location anymore. As an expert in charge of the preservation and restoration of historical monuments, removable relic conservation is not an official duty for me, but taking part in the sessions was useful and I am going to transfer the information to my colleagues who work in these related fields.

_Visiting and observing some Japanese archaeological sites and museums as relevant to the set of issues mentioned above.

"What is the use of excavating?" Are we just searching for new information about what happened in the past? "Why do we conserve historical monuments?" For being proud about our ancestors? As a matter of fact, the subjects of archeology, and historical art and architecture, could be helpful if the results influence society as the prime material for the creation of and inspiration for new needs.

During my observation of Japanese historical sites and museums I found out the Japanese try to introduce the latest information in the field of archaeology to the Japanese people, and they are successful in making them interested in their cultural heritage, in every range of age and education, by using the latest technologies combined with fantastic architecture and interior design. In the Jomon museum there is a corridor in which a few objects are featured. As I passed there, the music and lights made me so impressed that I lost track of the time and the location for a moment, and I wanted to repeat, passing through that adorable atmosphere which made me walk gracefully and admire it, but we did not have enough time.

In the excavated sites, after documentation using the methods which were mentioned before, they cover all the remains and mark the walls columns and other important parts on the surface, and they have their own special method for designing, landscaping and locating the visitors' facilities. It is worth mentioning that the arrangement and management of historic sites was introduced in lecture, and then we were able to visit different samples in sequence.

As a mater of fact, a conservation project is too complicated to be done by a limited group of specialists, it is an everlasting process which needs the durable collaboration of all

groups of people to be carried out, and Japan's society leads in this way by featuring and introducing the results of archaeological activities both at the professional and general levels.

Malaysia

Adnan JUSOH

1.0 INTRODUCTION

Fist of all, I am greatly honored to have been invited to this important training course on 'Training Course on the Preservation and Restoration of Cultural Heritage in the Asia/Pacific Region 2006' – *Research, Analysis and Preservation of Archaeological Sites and Remains* from September 11, 2006 to October 11 2006 in ACCU Nara, Japan. Actually, now I am working as a *Heritage Officer* at Department of National Heritage, Ministry of Culture, Arts and Heritage Malaysia for the last five years. Definitely, it is a great opportunity for me to attend this training course because it was interesting and very useful.

I was really interested in attending this training course because it is so relevant to my job, particularly in regard to preserving and protecting our cultural heritage, problems which worry me. In order to integrate conservation awareness and concern in all archaeological activities, I believe this training course will inspire a lot of participant to become more professional, responsible, and more respectful of human beings and our cultural heritage.

2.0 CURRENT STATUS OF CULTURAL HERITAGE IN MALAYSIA

Basically, in my country our cultural heritage was protected under Antiquities Act 1976, which is responsible to the Department of Museum and Antiquities. Generally, Antiquities Act 1976 included the *Export Procedures 1976, Trades License 1976* and *Excavation License 1979*. This act provides a key role in setting the foundation for control and preservation of, and the research into, ancient and historical monuments, archaeological sites and remains, antiquities and historical objects and regulates the dealing and export of antiquities, historical objects and related matters.

However, since March 30 2006, Antiquities Act 1976 was replaced by the new act named 'National Heritage Act 2005'. The main focus of National Heritage Act 2005 is to provide for the conservation and preservation of the National Heritage, natural heritage, tangible and intangible cultural heritage, underwater cultural heritage, treasure trove and for related matters. This new act was responsible to a new department which is known as the

'Department of National Heritage', also under the Ministry of Culture, Arts and Heritage Malaysia. Actually, the main tasks of the Department of National Heritage besides dealing with heritage matters are to preserve, conserve and restore the essential icons of Malaysian heritage. Otherwise, establishing the new department is intended to implement the formulation of related acts, and to make the collection of documentation, research, preservation and development of heritage more efficiently and orderly. It gives emphases to many aspects including cultural, natural and underwater heritage. National legacy is a collection of memories of the lifestyle of people that reflects their civilization, so it must be ensured and safeguarded for future generations. In Malaysia, the protections of heritage resources are governed by federal legislation, the National Heritage Act 2005.

Until now not less than 200 potential archaeological sites have been listed throughout the country. This includes both West and East Malaysia. Principally, all sites (mostly archaeological sites) which have their own value or criteria of 'heritage' will be protected under the guardian ship of the Department of National Heritage. The government seriously ensures our heritage especially for historical and archaeological site, to remain as legacy for our future generations. The act was implemented to provide the conservation and preservation of National Heritage; natural heritage, tangible and intangible cultural heritage, underwater cultural heritage, treasure trove and for related matters for the government.

However, recently, my department has already been starting to collect all necessary data and information about our cultural heritage, including tangible and intangible heritage. Under the National Heritage Act 2005, tangible cultural heritage means areas, monuments and buildings; intangible cultural heritage means any form of expressions, languages, lingual utterances, sayings, musically produced tunes, notes, audible lyrics, songs, folks songs, oral traditions, poetry, music, dances as produced by the performing arts, theatrical plays' audible compositions of sounds and music, martial arts, that may have existed or exist in relation to the heritage of Malaysia or any part of Malaysia or in relation to the heritage of a Malaysian community.

Both tangible and intangible cultural heritage are selected by a Commissioner to propose to our Minister for declaration in the *National Heritage Register*. Fortunately, the function of the National Heritage Register was same as the existing database of our cultural heritage data files. By the way, from time to time we have done very well and the progressing more effectively. Hopefully in the future, the Department of National Heritage will provide all or most of the significant data about our cultural heritage, and general information that can be accessible to the public, tourists, students and researchers easily and conveniently.

3.0 OVERVIEW OF ACCU NARA FOR UNESCO TRAINING

The one month training course in ACCU Nara was really enjoyable, and I have obtained quite a lot of good perceptions of the people here in Japan. From my observations, the Japanese people are really aware and loving (civilized) of their important and most valuable cultural heritage sites. The Japanese people are also aware of using the scientific approaches toward the protection and preservation of their cultural heritage sites, which really provides the country with a greater vision. Impressively, they are also using the traditional methods in correlation with not only the protection of tangible materials but also their intangible cultural heritage. I personally believe it is a powerful vision, in the same way, it can also help my country in the promotion and improvement of conservation and protection work for our cultural heritage, especially the archaeological site and remains.

From my own point of view, the Japanese people are well off knowing their history and cultural heritage; from early on, the Japanese have realized the importance of their cultural heritage and the ways of dealing with various obstacles for better results, that is why they are now known as one of the most developed countries in this regard in the world. But compared to Japanese laws and methodology for protections, many improvements should be included into the National Heritage Act 2005 for better performance, which is in the interest of the Malaysian government in order for the act to be well presented to its people, and because of the importance of the protection and preservation of its cultural heritage, since the complexity is too great for their current level.

Actually, in my country we are still behind compared to the Japanese government in using scientific approaches to protect and preserve our heritage sites; this is because we are facing a lot of problems we need to take care of. Most of the problems can be identified, such as the lack of funding for development or maintenance of heritage sites in the whole country. Due to constraints on professional archaeologists in the country, to conduct the research and make progress in the confirmation of archaeological sites significantly entails a lot of responsibilities. My country has very limited and low level technologies for investigation and analysis for a variety of methodologies, and lacks public educational awareness. And lastly, my country also lacks the professional expertise for dealing with issues related to the preservation of artifacts and relics. But since it is a very important task, in my department there are a few staff members who try to conduct the program in preservation and collection of data regarding the cultural heritage for the whole country effectively. Sometimes our duty omits a few procedures just because of the need to do the urgent activities in our department. That's why all the historical sites in Japan are still preserved and maintained, because of the combination of scientific approach, modern techniques, expertise and high commitment by institutions, both

governmental and non-governmental, are involved in preserving the cultural heritage. At the same time the Japanese people are also very proud, and have the awareness and full commitment to take care of their cultural heritage for the future generations.

4.0 BENEFITS ACQUIRED FROM THIS TRAINING COURSE

According to the training course, the fifteen participants attended this training course were not only fifteen trainees but also representatives of their fifteen respective and different cultures and back-grounds. They brought with them many useful measures and typical experiences (including indigenous ones), in the protection and preservation of their cultural heritage. From the discussion on tangible matters, we learned a lot from each other about their cultural heritage sites and issues. Through our mutual relationship, our knowledge grew and was very much enriched in terms of protecting and preserving of our own respective cultural heritage possessions. The latest methods and skills we learned from each other during this training course will make us better able to look at the matters from very different perspectives and dimensions. We also have a lot of confidence in ourselves and feel capable to give out and decide on the most effective solutions for the protection and preservation of cultural heritage in our own countries.

Before I joined this program, I really had just a lot of information and knowledge about the cultural heritage, especially their methods, approaches, skill and technology. This program gave me some information about the archaeological methods such as C14, thermoluminescence technique, dendrochronology, rubbing technique, recording survey methods for archaeological features and relics which are very important in archaeological research. I was also exposed to the latest techniques that can be used in archaeological research such as Ground Penetrating Radar (GPR), Global Positioning System (GPS) and 3D Laser Scanning. I also learned about the classification of archaeological relics, measuring and drawing. The important thing during training course we have learned is the development and utilization of the archaeological sites. From these lectures I have learned a lot of knowledge about the most applicable techniques in archaeological research to upgrade the collecting of data.

In this course, all of the participants were involved in a work shop program such as the introduction to conservation science work shop; the scientific preservation treatment for cultural properties work shop (conservation science); and the transcription of stratigraphy. These work shops were conducted by some experts such as professors in Nara University, and researchers from Nara Research Institute of Cultural Properties National (NRICPN), who are

very experienced and knowledgeable in the preservation work and cultural heritage in Japan. Definitely these programs are very useful to all the participants because we are exposed to new methods and approaches in preserving and restoring our cultural heritage. At the same time, we also practiced a few latest techniques such as plane table, rubbing, drawing the object or finding from excavation, treatment of the features and relics such as wooden and bronze artifacts, bone identification, dry screening, floating, choosing the sample for analysis, where these techniques are always used in archaeological research particularly at the field site.

From the study tour, I had the opportunity together with all the participants to visit numerous cultural heritage sites in Japan, especially in Nara City, Fukui Prefecture and Shiga Prefecture, where the course was mostly carried out, and enjoyed the blossoming environment and the hospitality of the people of Japan. This program exposed me where to a few of famous historical sites in Japan such as *Matsugase Daiba Site, Torihama Shell Midden, Fukui City History Museum, Ichijodani Asakura Family Museum, Shiga Prefectural Research Institute of Azuchi Castle* and *The Dotaku Museum (The Mysteries of Dotaku)*. Also from the program, all the participants have learned a lot of information about the significance of the cultural heritage that we should be preserving. We are learning the preservation of precious monuments or castles, how to arrange and manage the historical site, how to develop the archaeological site, the principle of conservation and utilization of historical sites and how to attract the people to come and visit these beautiful places, and take some information about historical sites for the future generation. These entire things are very important to us in taking care of the cultural heritage at in our countries soon.

From this training course, I also learned how important the database of cultural heritages to our country. All the data about our cultural heritage must be completely collected as documentation. From the database we can get information very quickly, accurately and easily. Otherwise a natural disaster or something else may come and destroy our heritage site, we still have all the data completely in our database. Actually, now my department is still in the progress of building up our heritage register as a national database.

The participants could also get the latest information about the problems and needs about the cultural heritage from many countries, especially in the Asia/Pacific region where they are from. By the presentations of all the participant we were exposed to the current issues and needs in their countries for preserving heritage sites. So, this training course was very useful and gave some experience to us on how to preserve heritage sites, especially archaeological sites and remains. In this training course all the participants were also exposed through technical skills in fieldwork how to overcome the issues and problems by the professional perspective. By the way, this training course is most useful to all participants for

the application of knowledge and experience in preserving cultural heritage sites, especially in archaeological sites and remains, and how to preserve the cultural heritage sites.

During the one- month training course at the ACCU Nara, I absolutely respect the hospitality and generosity of the Nara Prefecture, Fukui Prefecture and Shiga Prefecture, because they are well-organized and managed institutions for the two long-term targets of sustainable development and protection of precious values for the young generations. All Japanese people are well aware of what is needed by various countries, especially the countries that were represented in this training, in terms of protection and preservation of cultural heritage sites. The information provided by diverse site's officials was consecutively in line with what each participant wanted for the protection of their own respective cultural heritage sites.

5.0 CONCLUSION

This program is very first-rate and gave benefits to all participants from all the different countries. By this program I really have obtained information, experience and knowledge about cultural heritage especially the techniques, skills and approaches necessary for practice in my country. From mutual discussion with all the participants, I feel there are additional benefits that will be relevant to activities that I will be working on, in terms of protecting and preserving of cultural heritage sites especially archaeological sites and remains, and that most of the valuable benefits I've learned from this training course will apply to my line of work. Hopefully, I might be able to apply and utilize the knowledge and experiences digested from this program in my country, for the preservation and restoration of cultural heritage.

Overall, this training program totally satisfied me and most importantly, most relevant for my job and country's improvement, because I got to know some information and experience concerning the protection and preservation of cultural heritage sites, especially archaeological site and remains, in my country. Actually ACCU Nara Office organized this training program very well, not only with the participants but also with various organizations that hosted most of the visits and on-site lectures. The ACCU Nara staff was well-prepared and with so much rich experience not only in terms of the objectives of the program, but also they were well informed of each participant's respective cultures. Lastly, I would like to extend my utmost gratitude to the ACCU for UNESCO at Nara office in Japan and its staff for this training opportunity.

Arigato Gozaimas
Terima kasih

Maldives

Ahmed ZAMEER

Introduction

I am Ahmed Zameer from Maldives and I work in the National Centre for Linguistic and Historical Research. My centre mainly deals with the nation's history and language. I work as an Assistant Research Officer in the Heritage Section of my office. My responsibilities include the conservation and preservation of historical sites and monuments and I also do research work on those sites and monuments. First of all, I will take this chance to thank the Asia/Pacific Cultural Centre for UNESCO for choosing me as one of the participants of this training program on the Preservation and Restoration of Cultural Heritage in the Asia - Pacific Region 2006: Research, Analysis and Preservation of Archaeological Sites and Remains. And also, I would like to thank my Institute and its authorities for their support. The training was held from 11th September to 11th October 2006. This training course was mainly based on lectures and practicals, which were held at different places such as:

1. ACCU Building
2. NRICPN
3. Nara University
4. Fukui Prefecture
5. Shiga Prefecture

Problems and Needs for Cultural Heritage Protection and Restoration activities in the Maldives.

The Maldives is a group of 1190 tiny low-lying coral islands situated in the Indian Ocean. Of these islands about 200 are inhabited. The total area including land and sea is about 90,000 sq km. The islands are small and low-lying. No island is more than a few feet above sea level. The topic of this paper is the problems and needs for cultural heritage protection and restoration activities in the Maldives, mainly archaeological sites. Cultural heritage encompasses the values, beliefs, practices, institutions, monuments, etc. of an entire group of people.

The National Council for Linguistic and Historical Research where I work in the Heritage Department is acutely aware of the need for cultural heritage protection and restoration and of the numerous problems associated with this arduous task. Today the term ‘‘Cultural Heritage’’ has undergone a change. Once it encompassed the monumental remains of cultures. Now the concept of heritage includes new categories such as the intangible, ethnographic, or industrial heritage. Today current living cultures as well as those of the past are equally vital to the heritage of a nation. In today’s high-tech world, the documentary and digital heritage is rapidly becoming part of the world’s cultural heritage. In most nations including the developing nations, cultural and educational resources are being produced and accessed in digital form rather than on paper. The need to preserve the intangible as well as the tangible cultures is very great and for a developing third world country like Maldives, the problems associated with cultural heritage protection and restoration are immense. For an island nation like Maldives, where there is more sea than land, underwater heritage is also extremely important.

This paper deals more with archaeological sites and remains that are an integral part of any nation’s cultural heritage. Archaeological sites are associated with ideas or beliefs of a past civilization. In Maldives, with the conversion to Islam there was no total destruction of Buddhist temples. Many in the capital Male’ would have been destroyed, but the sites all over the archipelago have been merely covered up and abandoned. Later some of the sites were excavated and investigated but no restoration or preservation work on them was ever undertaken. This has resulted in the loss or theft of these important discoveries.

As the islands of the Maldives are far flung and isolated, the archaeological sites are also on different islands and access to them is somewhat difficult. As the vast ocean separates one island from another, transport between them is difficult and expensive. Archaeological remains exist on most islands. Archaeological excavations and other evidence illustrate the fact that Maldives has been populated for more than two thousand years. In Maldives there are no mountains or hills. The islands are generally very flat, no more than 3 or 4 ft above sea-level. However in several islands there are hemispherical mounds about 15 – 30 ft in height. Research points to the fact that Buddhism has existed in the islands since its arrival during the mid third century BC. The mounds are what remain of the monasteries and temples which were built when Buddhism flourished in the Maldives for about 1000 years. Most of the monasteries had been constructed on large islands.

The first reference to archaeological sites in the Maldives was made in 1835. Mr. H.C.P. Bell, of the Ceylon Civil Service, stationed at Colombo in 1879, visited Maldives in 1879 and he suggested that an archaeological survey would establish that Buddhism had flourished in the

Maldives. Later in 1920 and 1922, Mr. Bell carried out some excavations, which established that there were many Buddhist archaeological sites in the Maldives dating back to pre-Islamic times.

In Maldives, there are two types of archaeological sites, namely those that are on particular islands, and those sites about which nothing is known except their existence. The main problem we face today is that resources available in the field of archaeology are very scarce. There is no skilled manpower, materials or finances to carry out excavations scientifically. The terrain and the climatic conditions of the Maldives are adverse factors when the excavated sites are kept exposed.

There are 128 known archaeological sites on 91 islands. Among them some are considered to be sites of the pre-Islamic period. Earlier excavations were carried out on the islands of Fuah Mulaku, Thoddoo, Ariyadhu and Kin'bidhoo by amateur Maldivian teams. These excavations were not scientifically conducted and resulted in extensive and irreparable damage to these sites. The ancient archaeological site of Kaashidhoo Kuruhinna Tharaagan'du is the only scientifically investigated archaeological site in the Maldives. Kaashidhoo is a large island, situated in Male' atoll, a few miles north of the Capital, Male'. The navigation teams that carried out the excavations did not bother to preserve the place.

Foreign archaeologists such as the well-known explorer, Thor Heyerdahl, and Professor Egil Mikkelsen of the University of Oslo conducted excavations on different islands of the Maldives. These excavations showed structures built about 400 years before the advent of Islam in the 12th century. Members of the staff of the National Council for Linguistic and Historical Research always worked with these foreigners in the excavation work.

Maldives being a group of islands, with more water than land within the country's boundary, underwater archaeology is immensely important. More or less the same techniques could be applied to the conditions of working underwater. In Maldives there are 48 known shipwrecks. By finding more about the wrecks more light would be shed on navigation in the Maldives and in the Indian Ocean as a whole. Historical wrecks, like vessels, aircraft and such underwater objects constitute the underwater cultural heritage. There are also submerged cities, and human objects like underwater cave paintings. This unique part of heritage should be protected from treasure seekers and looters who disregard any archaeological methods of preserving them.

Other than archaeological sites and remains there are other historical and cultural monuments that need urgent protection and restoration. The ancient mosques of Maldives,

tombstones, monuments and the artifacts in the National Museum are all part of our cultural heritage that need to be preserved for all time.

The early history of the Maldives will come to light with the proper excavation of the ancient archaeological sites found on different islands. Preservation and conservation are serious problems due to a lack of professional expertise. Cultural heritage protection is still a new and young discipline in the Maldives. We still have no qualified archaeologists or conservators. As a result of awareness programs conducted by the NCLHR gradually the populace of the Maldives is waking up to the fact that it is of vital importance to preserve our cultural heritage as a legacy for future generations. Only then can we understand our past. It is of utmost importance for the future to learn from the past.

What I learned from this training

As I have mentioned earlier, this training course was mainly based on lectures and practical work. From this training I have experienced the Japanese method of preservation and conservation and also archaeological excavation. We did exercises with the Japanese hi-tech resources. This training program is a very valuable one for my field of conservation and research. Even though it's mainly based on archaeology, I have learned new methods of artifact conservation and preservation. It has also made me aware of the fact that Maldives still needs a lot of technology and methods in this field. Though it's a one month training program, I've learned a lot of new ideas regarding the handling of historical artifacts. This information will be very beneficial to our office in the field of excavating, preservating and conserving our important artifacts. Although Maldives is lacking the necessary resources such as professionals and finances to carry out the conservation and preservation of archaeological sites and artifacts, the techniques and ideas I experienced and gained from this training can be used as a guideline whenever I work on our artifacts.

Lectures and practical work during this training were very interesting and informative. They will also be very beneficial for my future in this field. The lectures were given on:

1. **Conservation And Utilization of Cultural Heritage Resources**
2. **Risk Preparedness for Cultural Heritages**
3. **Recording Survey Methods of Archaeological Features and Relics**
4. **Development and Utilization of Archaeological sites**
5. **Introduction to Archaeological Science**
6. **Introduction to Conservation Science**
7. **Introduction To Environmental Archaeology**

8. **On site Lectures**

The practical works were held on:

1. **Rubbing methods**
2. **Drawing**
3. **Usage of GIS and GPS**
4. **Wood Identification**
5. **preservation of metal artifacts**
6. **preservation of wooden artifacts**
7. **Resin using conservation method**

Field trip

Field trip was held for three days from 4th to 6th of October 2006. During the field trip we visited important sites and museums of the Fukui and Shiga Prefectures, and we were given on site lectures in those places. On the 4th the first day of the field trip, we went to

1. Ohi town's Shokichi Matsuki Memorial Museum of Art.
2. Jomon Museum
3. Torihama Shell Midden

On the 5th, second day of the field trip, we went to

1. Fukui City History Museum
2. Yokokan Garden
3. Ichijodani Asakura Family Historical Museum

On the 6th, third day of the field trip, we went to

1. Shiga Prefectural Research Institute of Azuchi Castle
2. Museum of Shiga Prefectural Research Institute of Azuchi Castle
3. Ancient site of Azuchi Castle (on the mountain top)
4. Dotaku Museum

During these visits we were given information about the history of these places and also how these places are managed. Almost all of them are well-preserved and I would like to say that the monuments are very well managed. The museums we visited are also well managed, and the museum objects are well-preserved and protected. The buildings were mostly made of

wood and stone; some are preserved by traditional methods and some by modern methods. From this field trip, I learned the value of preserving the artifacts of a nation.

In the Maldives also, most of the ancient buildings were made of wood and coral stones. Maldivian mosques are good examples of this. After the advent of Islam in 1153 AD, mosques were built everywhere in the country and are given a high priority. The main structure of each mosque of those days was built by using wood. Almost all of them are important heritage monuments of our nation, and we give a high importance to preserve these wooden and coral stone structures. We also have stone and metal artifacts such as statues and canons. But, as I have mentioned in my country report, we find it difficult to preserve these artifacts because of the lack of modern technology and professional manpower, and also because of various other reasons. Fortunately, this training has taught me how to face these problems.

Conclusion

This training has been a successful experience due to the great effort of the ACCU staff. I would like to thank Mr YAMAMOTO Tadano, the Director General of ACCU. Special thanks also to Mr YAMASHITA Tsutomu, Ms Wakamiya Yuko, Ms Kamida Ryo and Ms HATA Chiyako for their support throughout the training. All of the staff made our stay and training very pleasant. I would like to thank all the instructors for the time and effort they gave us during this training. I would also like thank all those lecturers, conservators and archaeologists who sacrificed their time to give us knowledgeable information.

Mostly, this training program is very important for me in the effort to improve my knowledge, my skill and my attitude towards the preservation and restoration of cultural heritage in my country. I will use my knowledge which I learned from this training to make the best out of it, and to let others know how our important artifacts should be treated. I will use my knowledge in my work and research as well. From this training, I have experienced and gained a lot of new ideas and methods which are most applicable and most important for the preservation and conservation of artifacts. Thank you.

Micronesia

Jason N LEBEHN

ABSTRACT

Since the year 2000, the Asia/Pacific Culture Center for UNESCO (ACCU, Nara), in partnership with *Bunkacho* (Agency for Cultural Affairs in Japan) and the International Center for Study of Preservation and Restoration of Cultural Property (ICCROM), have been organizing courses on cultural heritage protection and inviting qualified Asia/ Pacific region participants to Japan for a better and greater (global) vision. Each year, selected participants from all over the Asia/Pacific region are welcomed to this most outstanding training in Japan for sharing and exchanging of important ideas, needs, problems/issues, and potential solutions including practical aspects of the latest technologies and methodologies in order to safeguard the importance of cultural heritages within our region for future generations.

As for this year, there are total of 15 participants from all the member countries (*Cambodia, India, Malaysia, Nepal, New Zealand, Pakistan, Republic of Korea, and Vietnam*) including *Micronesia, Samoa, Iran, Turkmenistan, Mongolia, Indonesia and Maldives*. And since the duration of training is limited in respect to the workload versus time, the group was assigned to present their country reports mainly on the problems and needs in research, analysis and preservation of archaeological sites and remains for group discussions. The training was also conducted through lectures, Museum tours, Site visits and demonstrations of Japanese methodologies and technologies, and actual hands-on works for further inputs.

I. INTRODUCTION

This report will be based mainly on the problems and needs for cultural heritage protection within the Federated States of Micronesia, and how we can utilize the situation by enhancing the knowledge of cultural heritage protection within the Asia/Pacific region throughout the performance of the training. As presented in my earlier report (FSM country report), it seems

that most of the countries share at least some or most of relevant problems and solutions as indicated:

- Development
- Natural/Human Impacts
- Legislation
- Resource/Man power Constraints
- Ownership
- Visitors

These problems may vary in some degree, or may not be applicable to other countries due to many factors such as the surroundings/environment, financial or technical support, availability of resources and management, or the problems encountered.

But Federated States of Micronesia is an underdeveloped country, seeking assistance and guidance in the form of any available resources such as this training. The opportunity is quite a difficult task for me (as the country representative for this year's training), to go through the whole training while digesting as much knowledge and relevant elements from the program as possible for better usage, and to relay to all four states of FSM. Within a very limited time and with so much to be covered, I think my ability alone may not be enough to relay the full details of the whole training to all the states, but with the concrete support of the organizations, institutes and group and staff supports, I think I might be able to absorb some of the most effective elements that might be applicable for my country. Of course, the training was designed as an ongoing/continuous improvement operation throughout the Asia/Pacific region, therefore networking and communication among the group colleagues and institutes/organizations will be a very valuable source in the near future, for updates and further information.

II. TRAINING

The four weeks of training covers a lot for the improvement and protection of cultural heritages protection within the FSM and many of the countries in the Asia/Pacific region. With the hospitality and proper arrangement of training by the ACCU, Nara, Japan, the group was able to meet the main and be able to accomplish the main objective and scope of work, with the training support

of organizations, institutes and staff, which are highly dedicated in the field of cultural heritage protection for Asia/Pacific region throughout the course. The training was so well prepared by ACCU Office that all the participants were able to meet some of the most important people in the field from the major offices, enjoyed a very welcoming orientation and ceremony followed by an excellent reception. As promised by the ACCU, the training provides a free participant round trip tickets to and from Japan, good accommodations, and a decent allowance with an extra free daily breakfast. Surprisingly, laptops plus USB drives can be borrowed, and there was free daily internet access, and three days of field trips (fully accommodated by the office).

I believe that the training covers the two most effective perspectives in enlightening and preparation for learning and doing cultural heritage protection: theoretical (lectures) and technical presentation using Japanese resources, and technologies and methodologies in correlation with the other countries (Asia/Pacific region).

So, the training basically is designed for the participants in sharing and experiencing new ideas and different approaches among the countries.

11th of September -11 of October 9, 2006.

A. Country Reports and Discussions

Power point presentations were performed by each participant mainly on the needs and problems of cultural heritage protection of his/her country for group discussions. Many different issues and needs were brought up for discussion among the group, for proper solutions and possibility of fixing such problems. Valuable recommendations and comments were shared among the group, but definite solutions were impossible due to the serious problems encountered and presented by cultural diversity, and financial and technical constraints.

B. Lectures and Hands on Work

The training lectures and institute visits provided the group with an enormous knowledge of the Japanese ways of recording, analytical methods, principles, methodologies, preservations, development, conservation, risk preparedness, management and the utilization of their archaeological sites. While at the institutes/university, we were fortunate to be able to observe and actually do some of the surveying and

preservation methodologies. The concepts of surveying and preservation in Japan were similar to those of FSM in a sense, but more advanced. The Japanese technology and methodology in most of the work is all relevant within the FSM, but some parts of the Asia/Pacific region have difficulties due to financial/ technical constraints and poor academic/ training opportunities. Such needs are irrelevant for now, since it requires greater attention from our leaders and organizations that are willing to tackle such obstacles, especially for financial and technical constraints.

There were some useful methodologies which are highly relevant to FSM now, because they are a lot simpler in acquiring the methods, and only require very cheap/ affordable gadgets or tools to perform the task. For example, doing simple site surveying with a cheap drawing table, measuring tapes and hand-held GPS instead of using a $75,000 dollar cost Total Station; or drawing relics or artifacts by using simple drawing tools and the wet rubbing method instead of a probable $1,000,000 cost scanning machine, hardware and software.

As of now, the methods which will also be newly introduced to my country are the identification and preservation of cultural heritage especially for the conservators and curating staffs in the preservation of wooden/metal artifacts, and the collection of raw outcrops of sites for the museum cross section displays.

C. Museum and On-Site Lectures

The group was scheduled for some on-site and museum visits to do some of the best (popular/ well performed methodologies and actions) to help promote the sites in Japan heritages for better preservation and conservation of valuable sites. All the museums visited were educationally well dedicated and presented and most envying for a small country like the FSM country because artifacts and relics or remains are well treated and preserved with an outstanding museum to take care of.

As for the site visits, these were by far the most excellent treat experienced among all the activities. I liked the sites so much I think the restoration work in Japan is goes too far, especially with the historical reconstructions of structures. I think a digital reconstruction or

model of a structure is helpful in terms of elaborating and presenting to the people. The actual structure need not be tampered with and can stay in its originally discovered state. I also think that all the sites should have foreign language explanations for better interpretation and presentation of the sites, because most of the sites I visited during my stay here in Japan do not seem to have much information and resources for foreign visitors, especially for tourist from abroad.

Schedule

2nd-6th of October, 2006

1. Matsugase Daiba Site
2. Torihhama Shell Midden
3. Fukui City History Museum
4. Ichijodani Asakura Family Museum
5. Shiga Prefectural Research Institute of Azuchi Castle
6. The Dotaku Museum (The Mysteries of Dataku)

III. EVALUATIONS AND RECOMMENDATIONS

After a month of observation and evaluation during the training, I would have to strongly recommend that each participant be responsible for extracting what is most relevant to his/her country, to be shared and applied within their country. As stated by Dr. Inaba, "The training does not provide recipes or solutions for each country but it is up to the participant to help conserve culture and promotes diversity in his/her perspective in relation with the countries needs and problems (more of a guide than solving problem)."

I think the duration of training is too short for the understanding and sharing of such enormous and serious ideas or issues among a vast diversity of cultural perspectives. It would be better if the training is an ongoing course among the same group, for better understanding, communication and networking. The training also encourages the participants to work together in groups and be able to share ideas or thoughts, and the swapping of valuable knowledge and skills is very effective.

The methodologies introduced during the training will be transmitted to my government after the course for more solid input from this representative. I will try and convince my government to look into the 3-D scanning principles and some of the equipment introduced, which really can make a difference among all the valuable methodologies and site evaluations, in correlation with the FSM methodologies and technologies.

IV. CONCLUSION

This training is very useful for people of the Asia/Pacific region because it provides knowledge of vast diversity, and the sharing of different approaches and solutions. It is also important for each participant to use the relevant methods within his/her country. The training must be recognized throughout the Asia/Pacific region and should increase the number of training participants and also extend the time period for a better chance of success.

V. ACKNOWDELGEMENT

I would very much like to thank the ACCU Office and all the staff and tutors in this training for their outstanding assistance and support throughout the entire training. I would not be learning and enjoying while here in Japan without them. I would also like to relay my sincere thanks to all the wonderful lecturers and people who spent all their time teaching and worrying about us by managing to coping with such a radical group such as me. THANK YOU ALL FOR ALL THE HOSPITALITY AND GENEROUSTY HERE IN JAPAN, LIFE IN JAPAN IS MUCH EASIER AND CONFORTABLE WITH ALL YOUR HELP, SUPPORT AND ASSITANCE. This course is probably one of my most memorable and exciting training experiences ever, you guys/gals are the best! I would to extend my sincere thanks to the Hotel Manager and staff especially my Japanese mamma.

Also like pretty much to thanks to the following Organizations/ Institutes:

- Department of Land & Natural Resources, Pohnpei State Government
- Division of Historic Preservation, Tourism and Parks, Pohnpei State Government
- FSM Historic Preservation and Archives, FSM Government.
- ACCU Nara-Cultural Heritage Protection Cooperation Office
- Bunkacho (Agency for Cultural Affairs in Japan),
- ACCU (Asia/Pacific Cultural Centre for UNESCO)
- ICCROM.
- Japan's Ministry of Foreign Affairs
- Japanese National Commission for UNESCO
- Nara Prefectural Government
- Nara Municipal Government

I would also thank my friends in Japan for their recognition and family-like treatment ….Mr and Mrs Kataoka, Mr Nagai, Mr Yamashida, Ms Wurana and Sain for all the welcoming parties, Ms Inaba and Mr Hiroshi and everybody for making me feeling like I am at home. I might miss some very good friends already just writing this report but I promise I will send e-mail message to every one with and add. PEACE OUT!!!!

KALANGAN AND THANK YOU VERY MUCH!!!!

Mongolia

Batbold NATSAG

The training course on Cultural Heritage Protection in the Asia/Pacific Region 2006 – "Research, Analysis and Preservation of Archaeological Sites and remains" presented information on archaeological research, analysis and preservation of archaeological sites and remains, organized by Central Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU) from 11 September to 11 October, 2006. The training course, attended by representatives of 15 countries, provided an opportunity for the study of archaeological methods employed in Japan and for comparisons to be made by the participating Asia/Pacific countries. The course enabled participants to learn from Japanese heritage professionals and to share their own experiences.

ACCU was able to organize the following training:

-Conservation and Utilization of Cultural Heritage Resources
-Risk Preparedness for Cultural Heritages
-Recording Survey Methods of Archaeological Features and Relics
-Development and Management of Archaeological Sites
-Introduction to Archaeological Science
-Introduction to Scientific Dating Methods
-Introduction to Conservation Science
-Introduction to Environmental Archaeology
-Workshops: Classification of Archaeological Relics /Measuring and Drawing/
: Recording of Archaeological Features
: Conservation Science
-On-site lectures (3 day study tour)

The training provided me with a lot of insights concerning archaeological excavation, exploration, conservation, heritage management and analysis of various excavated objects. From this training I learned that a lot of things are still to be improved in my country. I will share all of these experiences with experts in the Institute Archaeology in Mongolia, and try to convince them to follow some of the techniques to achieve better research results. I will also apply the research methods that I learnt during the training period in my own work.

By being involved in this training I have learnt much about the World Heritage Convention from Mr. Wijesuriya and think that it is compulsory to do much more promotional work about the advantages to public. For example: to include the subject of World Heritage in every

school's curriculum, to publicize through public media, the Internet, to introduce school children to local cultural and historical heritage and in them concern over their protection. As for Mongolia, the work of protecting the monuments is still lacking.

Currently the Institute of Archeology has been doing intensive registration work of the cultural monuments within the area of Mongolia and recording them on the map. Although the cultural monuments are countless in number, at present only 500 of them have been registered so far.

Mongolia joined the UNESCO Convention concerning the Protection of the World Cultural and natural Heritage of 1972, and has thus thoroughly been working to implement it.

As a result of historical and political factors our country joined this convention later. Even though active registration work of own country's heritage was not conducted at the time from 1995 there has been the close collaboration with UNESCO and the other related professional organizations. Because of having insufficient knowledge and experience in that field we have applied to some member countries like Japan, Germany, Turkey etc. for cooperation, as a result we have had perceptible progress in protecting the archeological and historical finds and monuments. As a result, the valley of the Orkhon river, having numerous monuments, was registered on the World heritage list in 2004. The Orkhon Valley Cultural Landscape, which is the birthplace of the Central Asian nomads, occupies 121,967 hectare in area and is a marvelous site containing and abundance of archeological, historical and cultural heritage and monuments documenting the nomadic lifestyle especially of the Central Asian nomads, and the origins of the region's urban civilization.

We have made a list of the historical and cultural heritage to be registered with the World heritage recently, and have been working on processing the nomination of historical and cultural monuments of Chinggis Khaan, Hoid Tsenher Cave, the rock drawings of Tsagaan Salaa river to be included in the World heritage, and are going to present it to the World Heritage Committee.

Also the lesson of "Risk Preparedness for Cultural Heritage" taught by Dr. Inaba, and Mr. Murakami was very interesting. The main factors behind the destruction, erosion, defects of those monuments in the open air are divided into 2 main groups:

1. the natural adverse effects
2. the adverse effects due to human actions

A main feature of archeological monuments of Mongolia is their being located in either the open air of the steppe, or under the ground, across all seasonal periods. Almost every monument is made of stone. The monuments located in the conditions mentioned above which

are made of stone, mud or raw bricks, have eroded due to natural causes including temperature variation, the wind, sun, chemical elements, or organic elements of animal or plant origin.

We should take into account the weather conditions of the country, which has long winters, short cool summers, many sunny days, few showers, in addition to considering the temperature variation of the air and the soil, for the protection of those monuments. In my opinion one of the simplest and easiest ways of protecting them from natural phenomena is to effect a building to keep them away from the sun, wind, rain, the birds and the animals, to remove all those plants which might harm them, to install a lighting rod, and if damaged, to take steps to restore them using chemical treatments and to make regular checks.

It is regrettable to see that there have been many cases of destruction of valuable heritage and monuments from tribal civilization because of internal conflicts, battles between the tribes and the different ethnic groups in Mongolia.

As a result of disruptive years during the establishment of Socialism, many ancient cultural monuments and the monasteries were knocked down, ruined, and the valuable items which they contained were completely destroyed, plundered or looted. Scholars are still not able to locate valuable cultural objects, and other items whose owners are unclear and which have been taken across our borders, and spread to many European countries as well.

Until the present day these cases of illegal excavation work on ancient burial sites, monuments, tombs, the ruins of monasteries, and settlement, and their destruction, and looting, and taking valuable findings across the borders in secret, or painting or scribbling on them, have continued to exist.

Therefore it is compulsory to implement these actions immediately:

- Consider the historical and cultural monuments as the priority in state management.
- Implement the provisions of the law on the protection of the cultural heritage to some degrees.
- Take sites of historical important events under state or local protection.
- To excavate the complete range of monuments which are under the threat of companies' operations and make public the scientific facts and data.
- Combat illegal actions (destroying the historical and cultural sites, stealing etc) and take countermeasures.
- In case of establishing any industry, building, mining, or the maintenance work of any road, inform the Authority of the Archeology in advance and if the site is proved to contain the archeological findings, start the actions and after completing the preservation related activities.

- On the national scale of Mongolia, register all the archeological sites and monuments. Every local prefecture should perform the inspection work in the range of its own area and introduce the archeological sites and monuments to the school children so they will be willing to protect the sites.
- Set a protection zone for historical and cultural sites, employ watchmen or guards and not allow cattle to enter the zone.
- Expand the local museums and provide them with professional staff.
- Prepare well-trained and qualified staff.

In the field of restoring archeological monuments our institute is lacking in experience, because of a deficiency of professional repairers, a lack of specially equipped laboratories or special facilities, or the lack of funds to establish such laboratories Our Institute has cooperated with 10 countries and every year performs collaborative research work. With their assistance and encouragement, we hope to establish a laboratory with the latest modern facilities.

We visited Nara University and it was really interesting to do the practice work of researching and restoring the wooden or metal objects under the supervision of Professor Nishiyama, and it would be possible to use some of the methods for wooden objects in practice in our own country.

During the training course we traveled 3 days, visiting some museums, and getting acquainted with archeological monuments. The Jomon museum that was dedicated to children was fabulous. As for my country, the promotion of archeological monuments and the other findings to the public is at an unsatisfactory level.

Overall, this training was quite interesting and inspiring. The course furnished me with comprehensive knowledge in the various fields of archaeology. The management of the training was very good. All the participants were very cooperative and friendly. I had many chances to interact with each participant during the training. I also visited various temples in Nara and enjoyed the architectural design and sculptures of various periods. I also had opportunities to understand the people, culture, religion, geography, history and the daily life of Japan.

Finally, I would like to express my gratitude to Mr Yamamoto Tadano, director of ACCU in Nara for providing me with such a great opportunity to participate in this training course. I would also like to thank all the staff members of the ACCU Nara for having been with us and for supporting for our theoretical and practical trainings.

Nepal

Saraswati SINGH

Introduction

The training course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific region gave information on archaeological research and analytical methods of ancient remains. This report is presented as a requirement of the course, and evaluates the relevance of this training programme to my work and how it can be applied in Nepal for the preservation and conservation of archaeological sites.

Excavation is the means of acquiring tangible evidence to make history in any country. Therefore archaeology is known as a most essential discipline and in Nepal, where the first archaeological research was undertaken in 1896. Nepal is known for its rich archaeological materials from the pre-historical and historical period. Many exciting remains and ruins have been discovered, yet much work still has to be done. After the establishment of the Department of Archaeology (DOA) in 1953, the work of research has continued at different potential sites.

There are more than 15 sites excavated, and among them most of the important excavation reports have already been published. Many exciting remains and ruins have been discovered from the excavation. A published excavation report explains about the contemporary socio-economic cultural history of the country.

My report concentrates mainly on archaeological research and excavation activities in and around Lumbini, Kapilvastu and Ramgram. In fact all three of these places are famous for Buddhist occupation. Many Buddhist sites are situated in this region. Lumbini is the place where Lord Buddha was born in 563 B.C.; Kapilvastu was the hometown of Lord Buddha, where he spent his first 29 years of life with his family, Ramagram is believed to be the site with the relic stupa of Lord Buddha. Many excavations have been undertaken at these sites since 1997. The excavation work has continued for 6 consecutive seasons and still is not completed yet. So it was felt that further excavation activities should be conducted along with preservation activities to expose all the possible tangible historical evidences. Many people especially interested in history and academic activities are very eager to know about the popular Buddhist period history, as well as the architecture of that period. The enhanced excavation activities in this area will certainly help to know in depth more about the Lord Buddha's era and about the Buddhism, the architecture of the period, and much more.

Since the establishment of DOA, it has been involved in different research activities in the excavation and preservation of archaeological sites within the Lumbini and Kapilvastu area. Many sites have been excavated and preserved around this area. Among them, investigation of the fortification wall of the Tilaurakot was started before last year and is still on-going and is expected to be continued for few more years till its completion. There are other important sites excavated and preserved by the DOA with partnership and assistance from other foreign institution, including Japan RISSO University and Japan Buddhist Federation. These efforts should be continued as there are believed to be many other important archaeological sites around these areas from which the scholars and other interested people will be able to learn many important facts about Lord Buddha from the period of his birth. Furthermore, it is felt that if these efforts for further excavation and preservation will continue, it will become a major resource for the development of cultural tourism in Nepal.

My Views of the Training course

I have been working in the Department of Archaeology/Nepal since 1994 as Museum Officer and have had the opportunities to participate in various excavation activities, including the preservation and protection of historical monuments, museum design, as well as supervisory activities. I have been faced with many problems regarding archaeological research and excavation methods, etc., on archaeological sites since the start of my involvement in these activities. This training has helped me to understand and get knowledge of the various subject matter, methods, and much more on preservation, excavation and conservation procedures and has helped me to solve most of my concerns/queries about it.

This training will definitely help me in my practical work when I go back to my job. I sincerely express my gratitude to the organizer of the ACCU Nara training course on Preservation and Restoration of Cultural Heritage in the Asia Pacific region 2006, Research, Analysis and Preservation of Archaeological sites and Remains, for providing me with such an important opportunity to gain knowledge during the period of the training course, which has helped me in further strengthening my knowledge, which can be utilized in the new directions in my job and in my future career. The course is further relevant to me as Nepal is one of the ancient countries already with 8 world heritage sites, where it is felt more conservation and preservation activities are required. Further, Nepal has many historical places mainly around Kathmandu Valley and other parts of the country with the potential of finding historical and pre-historical relics, where excavation work is still to be done.

Further, this training course, which began on 11th September, 2006 at the ACCU Office, Nara, with 15 participants from different countries in the Asia-Pacific region has provided us an opportunity to exchange views and ideas with the participants from different countries.

I found the introductory session with all the participants, to be very interesting. I attended a first lecture about the training course, the objectives and routine programme of training course. Then we were also given a brief synopsis of the history of Japan including its pre-historic and historic cultural chronology. All the lectures are interesting and gave us knowledge about various techniques and technology followed by the Japanese archaeologist for scientific research in the fields of archaeological exploration, excavation and restoration. I also learn about the cultural heritage preservation and protection laws adopted in Japan. I had an opportunity to learned about Japanese Ancient Monument Preservation Act which is important for me to compare with a similar act in my country. I also became familiar with excellently protected monuments and archaeological sites in Japan.

I was impressed with the lecture about conservation and utilization of cultural heritage resources by Dr. Gamini Wijesuriya of ICCROM (Rome). I also got acquainted with the different International charters recommendations and conventions regarding the guidelines for heritage conservation in the various part of the world, and how ICCROM and other International Organization are carrying out a significant role in cultural heritage preservation and protection.

The country paper presentation session was also interesting and helped me to understand different archaeological activities including heritage preservation activities of different countries, along with the cultural, geographical as well as historical development of the respective countries. I also acquired basic knowledge of archaeological sites, major research problems and issues for preservation and conservation in the Asia-Pacific region. The remarks made by Dr. Wijesuriya on the country papers were also inspiring and informative for me.

The management programme for careful research, excavation and preservation of the monuments was very inspiring. The lecture on archaeology and natural science provided a detailed information about the relationship of archaeology to other sciences. The risk management of cultural assets, the scientific dating methods i.e. C14 and thermoluminescence (TL), was also very beneficial. Data integration using GIS and GPS, and photogrammetry is also a new technology in the field of archaeological research and conservation. The workshop on scientific preservation techniques for artifacts was very beneficial. All the participants conducted the microscopic analysis of wood species and 3D laser scanning. I found that this new technology is widely used by archaeologists in Japan, but these methods are not used in

my country and so they are new to me. I also enjoyed the lecture on environmental archaeology and paleoparasitology, which are also new subjects of research for me.

Besides the lectures, we visited many temples and shrines in Nara. The maintenance of the sites is excellent and reflects the awareness of the Japanese people regarding cultural property. We really must appreciate the Japanese people and the Japanese government for their good maintenance and love for their cultural property. The three days' study tour to the various archaeological sites and museums arranged by ACCU office was also informative and interesting. We visited Matsugasa Daiba (the battery fortification) situated in Fukui City, which was very interesting. After that we visited Mikata-cho Jomon museum and Torihama Shell Midden site. We had an opportunity to view different perspectives on Jomon Period people. The museum display was also very organized and interesting. We visited Fukui City museum and Ichijodani Asakura clan ruins, situated in Fukui City, also a new experience for me as this is the first time I have seen a reconstructed conjectural architectural town built over ruins. On the third day of the study tour we visited Azuchi Castle archaeological site and Azuchi Archaeological Museum, Dotaku museum and Kabutoyama burial mound. All of these are good examples of the protection of cultural properties in Japan and were impressive.

Archaeological Problems in Nepal

Archaeology is a subject which is related to the digging of past human activities and their analysis for reconstruction of the history of humankind on the basis of material remains used by them. Therefore archaeological research plays a most significant role for acquiring materials related to the people and their societies of the past. With the limited resources, the Department of Archaeology has conducted several archaeological activities all over the country and has acquired satisfactory results within a period of three decades. All the results of research have been published through the journal *Ancient Nepal* and other publications concerned with archaeology. However, a detailed archaeological survey has yet to be carried out. The Department of Archaeology is getting some assistance from different international agencies for the exploration, excavation and preservation of archaeological sites and monuments with technical and financial support, which has helped to enhance the sites and monuments and retain their historic values. The Japan Buddhist Foundation is among them. They have done remarkable job at Mayadevi temple of Lumbini. It is felt that although we have been conducting a variety of research in the field of archaeology in Nepal, the level of research yet needs to be developed as extensively as I have witnessed in Japan.

1) Resource Constraints

(a) Human Resource Constraints:

A limited number of experts are available for conservation, excavation, and preservation, and owing to the vast scale of archaeological sites and monuments the work of conservation and preservation is not done adequately. We are still dependent on other countries for training courses. However, in Japan many training institutes are established in every prefecture where much skilled manpower is produced every year, yet owing to the vast number of archaeological sites and monuments the work of conservation and preservation is not done adequately in the country.

(b) Financial constraints:

Despite having a very high potential as a country for the preservation and its conservation of the historically important places, the Nepalese government can ony allocate less than 1% of total budget, which is always inadequate to meet the challenges of archaeological activities in the country. Nepal being among least developed countries, the government has many other priority areas, mainly fulfilling basic necessities of the people, and its scarce resources can not be invested in the conservation sector. Nevertheless, the Department of Archaeology has given top priority for archaeological activities and has taken many steps in the preservation of several monumental sites and excavated many archaeological sites with its limited resources. Assistance from the donor agencies/foreign governments in this field will definitely help for enhancing further activities in this area.

2) Old Technology

The Department of Archaeology still uses traditional technology for conducting research, excavation, preservation and protection, etc. In the field of technology we have a very few scientific instruments and skilled manpower to use modern equipment. So we need modern technology and instruments for further development. Without those facilities a country cannot develop in the field of archaeology, which is most important for constructing the history of the country, and also important for developing tourism.

3)Public Awareness

Public awareness is one of the most important factors for the protection of cultural properties. Due to the lack of adequate advocacy, and limited awareness programme, people do not take

serious interest about cultural properties in Nepal, which causes vandalism, theft and other threats to the cultural property. Even educated people have limited knowledge about important cultural properties. Therefore the Department of Archaeology is vigorously making efforts to campaign publicly to preserve and protect monuments and archaeological sites in partnership with local authorities.

4) Lack of Proper Lab facility

Archaeologist need to apply different new scientific methods to analyse the materials and results retrieved from archaeological findings. Nepal lacks proper labs for the analysis of excavated objects. We usually send samples abroad for lab analysis, which takes a long time and delays publication of the final report and the cost of lab analysis is quite high, therefore it is not possible for us to bear the expenses of the test with a limited budget. Due to this fact we are still depending on traditional methods for analyzing artifacts, dating, etc. I found in Japan they applied scientific methods and advanced instruments for their archaeological research. Therefore the results are more accurate and reliable.

Application and utilization of this training course in my country:

This training course has enhanced my knowledge both theoretically and practical. The practical training carried out during this training course will immensely help me to apply these techniques in my country for the proper preservation of the cultural heritage of Nepal. At present, due to financial constraints, our laboratories are not well equipped with modern equipment like in Japan, therefore conventional methods are being applied for the preservation and restoration of the cultural heritage of my country. However, this training course has greatly increased my knowledge and understanding of conservation problems and other matters. I have obtained a number of good ideas and now look forward to sharing them with my colleagues in Nepal, and applying them to achieve better results. This training course has provided me an excellent opportunity to meet a number of internationally known scholars, researchers as well as conservation experts, and to share with them important issues pertaining to conservation and related problems for the preservation of the cultural heritage. This exchange of views has been found very productive and now I am in a position to address these problems in more scientific way.

The methods and techniques being applied by the Japanese experts for the preservation of wooden artifacts are excellent. The application of these methods in Nepal will provide a new

lease of life for wooden architecture. However, some methods and techniques being used in Japan for the preservation of metal and iron objects, such as X-Rays and other modern machines, are highly costly, therefore it is not possible to apply the same methods in my country. However, the knowledge and experience gained during this training course has given me an advantage in utilizing these techniques in my future research work.

The visit to the different cultural heritage sites and museums in Fukui and Shiga Prefectures has proved quite interesting for understanding the cultural heritage of Japan on one hand, and for learning the conservation techniques being applied by Japanese experts on the other. Besides, during this visit we had the chance to visit a number of museums. During this visit I enhanced my knowledge about the development of Museology in Japan. I have learnt about the different techniques for the display of the objects, lighting systems in the museums, audio-video presentations, educational activities of the museum staff and other matters relating to the field of Museology. Although our museums are not very advanced like in Japan, the different techniques and methods which I have observed during the visit will help me to develop the museums on modern lines in Nepal.

Conclusion

On the whole the training programme was extremely effective, relevant and impressive. We could acquire a considerable amount of knowledge and experience from the training course, mainly on the processes of conservation, protection, heritage planning, management and various archaeological techniques. The site visits to different ancient sites in Japan gave me great opportunity to enhance my knowledge in cultural preservation/conservation and related issues. An opportunity to learn from Japanese experts and exchange ideas on archaeological and conservation issues with professionals from different countries has been very beneficial to me.

I would like to sincerely thank Bunkacho (Agency for cultural Affairs in Japan); the Asia/Pacific Cultural Centre for UNESCO (ACCU); the International Centre for the study of the Preservation and Restoration of Cultural Property(ICCROM); and the National Research Institute for Cultural Properties, the Ministry of Foreign Affairs of Japan; the Japanese National Commission for UNESCO; Nara Prefectural Government and Nara Municipal Government for providing me the opportunity to participate in the course. I would also like to thank Mr Yamamoto Tadanao, Director of ACCU, especially Mr Toshihiko Morimitsu, Mr

Tsutomu Yamashita, Mr Atsushi Nagai and Ms Yasuko Otani for their outstanding coordination during the training. Thanks also go to Ms Hata, Ms Kamida and Ms Wakamiya.

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I would like to once again thank ACCU and ICCROM for this great opportunity, and I also would like to thank the staff of ACCU office, Nara for their co-operation and help.

New Zealand

Joanna Kate WYLIE

The 2006 Asia-Pacific Cultural Centre for UNESCO (ACCU) training course on the research, analysis and preservation of archaeological remains has provided me with invaluable knowledge and practical experience which I will be able to apply to my position as Assistant Archaeologist for the New Zealand Historic Places Trust (NZHPT). The course lectures, practical lessons and site visits provided many opportunities to make comparisons with current archaeological practice in New Zealand, and consider new approaches which could be applied in my country. This report will focus however on several particular aspects of the training which I found to be of most relevance to my position within the heritage management field, notably the country presentations, the conservation science session, and the lectures, discussions and field trips illustrating the development and utilisation of archaeological sites.

Whilst the course programme provided an in-depth knowledge of the current status of cultural heritage protection in Japan, the presentation of country reports during the first week of the training programme afforded an excellent opportunity to gain an understanding of cultural heritage protection activities in the wider Asia-Pacific region, and make comparisons to the New Zealand situation. It was very interesting to note that whilst we came from countries with a diverse range of cultural heritage from temples to prehistoric rock shelters, the problems currently being faced in terms of cultural heritage protection were almost universal. These included development pressures, resource constraints, natural threats such as erosion, a lack of public awareness about heritage resources, and an inadequate legislative framework.

I found discussions on the latter point of particular relevance as New Zealand's cultural heritage legislation is often under the spotlight, and because I am currently part of an internal NZHPT working party that is examining the archaeological provisions of the *Historic Places Act* 1993 ("the HPA"), focusing of what works, what doesn't work, and how might the legislation be improved? I was very interested to note for example that Malaysia's newly introduced *National Heritage Act 2005* defines an 'archaeological relic' as any archaeological deposit that is fifty or more years old in any part of Malaysia (the HPA definition of an archaeological site has a requirement for the site to be pre-1900 AD), and that Samoa currently has no specific legislation concerning cultural heritage protection. It was a great benefit to gain knowledge about the specific workings of cultural heritage protection legislation in other countries within the Asia-Pacific region, and compare this to the New Zealand legislation. This knowledge will help me to make an important contribution to working party.

Another related aspect of the country reports session of particular relevance to current archaeological practice in New Zealand was the discussion on 'rescue archaeology' (also referred to as 'mitigation archaeology'). As mentioned in my country report and presentation, most archaeological excavations undertaken in New Zealand are done as 'rescue archaeology'. I was therefore most interested to learn about how this type of archaeology operated in other Asia-Pacific countries, compare this to the New Zealand situation, and see what might be improved upon. I noted for example that the situation in Korea appeared to be very similar to New Zealand, with rescue archaeology accounting for the majority of excavations undertaken, but that the use of mechanical excavators on excavation sites (to speed the process of excavation) would not occur in India.

The field trip to the excavation of archaeological remains at the northern end of the Heijo Palace site during the third week of the training programme also afforded an excellent opportunity to see rescue archaeology in action, and learn about the Japanese process. I was interested to learn that private individuals can apply for funding support should they undertake an activity such as house construction which would result in the requirement for an archaeological excavation, as this is something that has been discussed within the New Zealand context, but is not currently available.

Figure 1:
Archaeological excavation in northern part of former Heijo Palace site
Photo: Jo Wylie, Sept 28 2006

Another aspect of the training programme that I found to be of particular relevance to New Zealand archaeology was the conservation science session during week three of the training programme, especially the session on wood conservation. Wooden artefacts and structural remains are sometimes found within New Zealand archaeological sites, generally in wetland/swampy contexts, and pose immediate conservation needs. This has been illustrated recently by the discovery of three fragile punga (wooden) structures associated with the former occupation of Te Aro Pa, a recorded archaeological site in Wellington city, and the unearthing of two wooden waka (canoes) at separate locations in the Wellington region, one of which I was involved with in my role at the NZHPT. Conservation work is generally not undertaken by archaeologists themselves however as New Zealand has specialist conservators, and thus the session on wood conservation provided me valuable knowledge of an area that I have not previously had the opportunity to learn about. This knowledge will assist me with any future situations that I may be involved with where wooden remains are found.

Figure 2:
Remains of stern section of waka (Maori canoe), Wellington
Photo: Emma Brooks, NZHPT, Sept 15 2006

I found the most valuable and relevant aspect of the training programme to be the lectures, discussions and various field trips that focused on the development and utilisation of archaeological sites. The development and utilisation of archaeological sites is a key focus of heritage management in New Zealand, and is undertaken by various organisations, including the New Zealand Historic Places Trust, Department of Conservation, local authorities and selected charitable trusts. There are currently several archaeological site development projects underway in

New Zealand, such as the Lawrence Chinese Camp Redevelopment Project, Otatara Pa development and work at the Queen's Redoubt in Pokeno, and I have had the opportunity to be directly involved with this area of work through my position at the NZHPT. I consequently found it very useful to learn how Japanese sites are developed and utilised, and experience such sites first-hand. This provided me with the opportunity to assess a range of different approaches from *in situ* preservation and display of archaeological remains to reburial of archaeological remains with full-scale above surface reconstruction, and compare these to current approaches in New Zealand. It also provided important information about the problems that can be associated with the various methods.

The major point of difference between the Japanese and New Zealand approaches to site development and utilisation would be the reconstruction of archaeological structures and remains. Numerous examples of reconstruction were observed during the training programme such as the former Imperial Audience Hall at the Heijo Palace site, Matsugase Daiba site and the town area of Ichijodani, but New Zealand in contrast has relatively few examples of site reconstruction. Current archaeological practice in New Zealand closely adheres to the guidance provided by ICOMOS charters which are generally in opposition to reconstruction, and follows the principle of minimal intervention wherever possible. I appreciate the difficulties associated however with the application of such international charters to Japan's cultural heritage given the dominance of wooden structures as highlighted by Mr Takase, and understand the social reasons behind reconstruction, such as when public money has been used to purchase a site with no above ground remains. Whilst New Zealand does not currently have comparable examples of reconstruction, it is being proposed as part of the Lawrence Chinese Camp Redevelopment Project, and I therefore found the site visit to Ichijodani of particular interest as an example of similar project at the completion stage. The various examples of site reconstruction also highlighted and reinforced the need for thorough historical and archaeological research in order to create the most accurate reconstruction possible.

Figure 3:
Reconstructed townspeople's houses, Ichijodani
Photo: Jo Wylie, Oct 5 2006

In contrast to the aforementioned examples of reconstruction, visits to the Azuchi Castle and the Asukura Mansion site at Ichijodani revealed an alternative approach to the development and utilisation of archaeological sites, and one that I found to be more relevant to current archaeological practice in New Zealand. These sites chose to adhere to the policy of minimal intervention, undertaking only limited restoration work, and one of the benefits of such an approach is the sense of history and authenticity that is gained when observing what could be described as 'ruins' as opposed to a reconstruction.

Another aspect of the training on the development and utilisation of archaeological sites I found especially relevant was observation and understanding of the tension that can occur when trying to balance visitor needs with site preservation and integrity. This is a problem faced by many cultural heritage sites in New Zealand, especially those managed by the Department of Conservation which may also fulfil a recreational role. I found this issue to be particularly well highlighted by the field trip to Azuchi Castle, where there were several examples of the conflict between competing values. The height of the stone wall at the front of the castle entrance had been reduced to provide better visibility from outside for example, whilst the structure of the original stone steps had been retained, despite visitor complaints that they were difficult to climb. A further case in point was the damage being caused to the stone walling of the tower site so that visitors could observe the commanding view provided from this height.

Figure 4:
Walking along the stone walling of the Azuchi Castle tower site to viewing area
Photo: Jo Wylie, Oct 6 2006

One way in which visitor /public education needs can be met whilst preserving a site's integrity however is through the physical separation of the visitor experience from the site. This was well exemplified by the Torihama Shell Midden site where a museum and education centre has been located away from the site itself given the inappropriateness of creating an open air type exhibition site on such an important cultural heritage site. This is certainly an approach that has applicability to the New Zealand context, and I understand that the creation of a separate visitor education centre has been proposed for the development programme currently underway at Otatara Pa, Napier, one of New Zealand's most important cultural heritage sites.

As noted above, the lectures, discussions and field trips related to the development and utilisation of archaeological sites further provided me with the opportunity to learn about the issues associated with the various methods of site presentation from *in situ* preservation to full-scale reconstruction. I observed for example the problems that can occur with the former method, such as mould and mildew growth as seen within the Excavation Site Exhibition Hall of the Heijo Palace site. I also learnt that coastal sites such as the Matsugase Daiba site are vulnerable to the same natural threats as faced by New Zealand's coastal sites such as wind erosion, and require particular attention regarding maintenance and restoration works. This was highlighted by the soil subsidence that has occurred to part of the earthwork features at the Matsugase Daiba site, resulting in the exposure of the covering placed between the original excavated surface and introduced material.

Figure 5:
Mould growth on remains at the Excavation Site Exhibition Hall, Heijo Palace site
Photo: Jo Wylie, Oct 3 2006

This year's ACCU training course on the research, analysis and preservation of archaeological remains has been of great benefit to my professional development as an archaeologist. It has provided me with the opportunity to learn about the most recent developments and trends concerning the research, analysis and preservation of archaeological remains, both in Japan and the wider Asia-Pacific region through engagement with the other course participants. The entire course programme was of relevance to New Zealand archaeology, but I found the aspects of the programme that focused on heritage management such as heritage legislation and the development and utilisation of archaeological sites to be most relevant to my position at the New Zealand Historic Places Trust. I gained a great deal of knowledge about heritage management in the broader Asia-Pacific context which I will be able to apply to my role, and I look forward to sharing this knowledge with my colleagues and associates upon my return to New Zealand. I also look forward to continued communication and information-sharing with all the course participants, and would like to extend my sincere thanks to everyone at ACCU for making the 2006 training course such a worthwhile and rewarding experience.

Pakistan

Tahir SAEED

Introduction:

This final report is submitted after attending the 7th training course on Cultural Heritage Protection in the Asia/Pacific region, 2006 (Research, Analysis and Preservation of Archaeological Sites and Remains) held at Asia/Pacific Cultural Centre for UNESCO, Nara, Japan from 11th September to 11th October, 2006. In this report it will be discussed as how best to apply the knowledge gained from this training course to the problems and needs for the proper conservation and restoration of cultural heritage of my country. This report also evaluates and comments on the training course mainly on its curriculum that included lectures, practical field work, on-site training/lectures as well as participant's presentations and discussions. Further how the different modern techniques which are in practice in Japan and learned during this training course can be applied best in my country for future research work and conservation needs is an integral part of this report.

The cultural heritage of Pakistan is rich and varied dating back to one and a half million years from now which consists of: Pre, Proto and Historic period archaeological sites / monuments (Ca. 10000 BC – 326 BC), Buddhist settlements (3rd Cent. BC – 6th Century AD), Hindu Temples, Sikh period Havelies, British period monuments, Muslim period forts, palaces, gardens, inns, stepped wells, minarets, mosques, tombs and graveyards (7th Cent. AD – 19th Cent. AD). These specimens of the past are for all generations of mankind therefore, we are bound to the best of our ability to preserve them in the full richness of authenticity and pass on them to our successors

The ancient sites / monuments in Pakistan have suffered a lot from a variety of causes. The natural causes are numerous and varied, for instance, thick vegetation, heavy rainfall, floods and change in river courses, etc. Another major cause of decay is the action of salt-penetration. The salt-laden air penetrates into the surface and wears out the structural material. Besides, natural forces, human vandalism is also one of the common causes of damage to the ancient sites and remains. Handicapped by the problems of inadequate funds, a dearth of building material as well as skilled labour and trained personnel, it is but natural for the Department of Archaeology and Museums, Government of Pakistan to assign the priorities to these monuments / sites in its charge.

The Training Course Summery:

The training course on Cultural Heritage Protection was divided into three curricula which included: a series of lectures arranged at the Asia / Pacific Cultural Centre for UNESCO (ACCU), the National Research Institute for Cultural Properties (NRICPN), and Nara University; practical training, workshops; an on-site lecture series including a 3-day study tour to Fukui and Shiga Prefectures, and participants' presentations and discussions. During the lecture series a number of important issues on the management, preservation, conservation and restoration of cultural heritage, and different techniques/methods as how to preserve different kind of monuments/ sites, were discussed at length. The lectures given by the Japanese experts, specialists and scholars were found very informative and relevant to the preservation and restoration of cultural properties. The presentations, mainly concentrating on the Japanese experience, included the legal system for protection of cultural heritage, traditional methods of wood conservation, scientific applications and case studies of historical sites and monuments. The supplementary material provided during the training course was found very helpful and valuable for in-depth study.

Week 1: (11th September to 18th September)

The lecture delivered by Dr. Masayoshi Ito on "Conservation and Utilization of cultural Heritage Resources" (cases in Japan) was very useful for understand in the legal framework for the protection of cultural heritage in Japan. The history of the enactment of the Law for Protection of Cultural Properties in Japan, the system and category of cultural properties in Japan, the preservation system for historical sites, and the preservation and management of historic sites were described in detail by him. After the enactment of the "Law for the Protection of Cultural Properties, 1950" Japan has enacted a number of different revisions of laws such as: Intangible Cultural Properties and Folk Materials (1954), Folk Cultural Properties, Groups of Historic Buildings, Selected Conservation Techniques (1975), System of Registered Cultural Properties (1996), and the Cultural Scenery (2004), which is an exemplary model for the other courtiers.

In Pakistan, for the proper preservation and protection of the cultural heritage, an act named "Antiquities Act of 1975" provides the legal protection and under this Act 392 archaeological sites and monuments have been declared as "Protected Antiquities" out of which 7 are inscribed on the World Heritage List of UNESCO. However, there is a great need to formulate a number of pieces of legislation in the same manner as Japan, such as its Law for

Protection of Folk Art Materials, Law for Protection of Groups of Historic Buildings, Law for Conservation Techniques, Law for Cultural Scenery / Environment, etc., for proper preservation of the cultural heritage of Pakistan. Accordingly the present Antiquities Act can not meet with the current challenges being faced by the Department of Archaeology and Museums, which is solely responsible for the proper protection of the cultural heritage of Pakistan.

The lecture on "Risk Preparedness for Cultural Heritage" by Dr Inaba and Mr. Murakami was an excellent presentation based on the experience of the Great Hanshin Earthquake in Japan. This lecture provided me an excellent opportunity to learn and develop an understanding about the need for risk management of cultural assets. The major causes of damage to cultural assets can be classified as: typhoons and earthquakes, fire and lighting, war and crime, un-intentional destruction by development works, etc. The Disaster-prevention for cultural assets involves creating a plan that links, in a series, emergency actions to initiate preventive measures. This lecture enhanced my knowledge about risk preparedness for cultural heritage in the event of natural disasters.

Presently there are no specific operational guidelines to meet such kinds of problems in my Department. Therefore I have learnt a lot from this presentation. I hope that the considerable knowledge gained during this lecture will be very much beneficial for the proper preservation of cultural heritage of Pakistan in the future. Specifically, on the basis of the experiences of the Great Hanshin earthquake in Japan, as explained by Dr Inaba and Mr. Murakami, my Department will now be able to start working on the core issues of risk management, which is needed because the earthquake of 8 October, 2005 in my country also caused huge destruction, including damage to the cultural heritage.

Another important presentation was made by Dr. Gamini Wijesuriya, on the topic of "Conservation and Utilization of Cultural Heritage Resources". He highlighted the need for Conservation Planning, Heritage Management Planning, and an Integrated Approach for proper preservation of the cultural heritage of mankind. In Pakistan, the preservation measures generally involve two types of works, viz, annual repairs which include protection from human vandalism, eradication of wild growth, regular cleaning, dusting etc., and special measures comprising conservation, restoration, development of gardens etc. Normally maintenance is carried out on all category-I sites and monuments. The factors which need to be considered for proper conservation work as learnt during this lecture were found very helpful for understanding the needs and for adopting a strategic planning model for proper conservation work in my country in future.

During the last two days of the first week of the training course, all fifteen participants gave their presentations. The two-day session was coordinated by Dr. Gamini Wijesuriya. All the participants gave their presentations for about 15 minutes on the "Problems and Needs for Cultural Heritage Protection and Restoration Activities," which were followed by short discussions. This session enabled the participants to understand the conservation problems in each others countries. The participants also shared their ideas with each other on conservation and other related issues pertaining to their counties. The expert views/observations of Dr. Wijesuriya on the different issues relating to the cultural properties of the different countries made the two-day presentation session very fruitful and beneficial.

Week 2: (19th September to 24th September)

During the second week of the training course different methods of age determination of cultural relics, such as radiocarbon C14, dendrochronology, thermo luminescence etc., were learnt from the lectures delivered by Prof. Sawada and Prof. Nagatomo. In particular, the lecture on "Introduction to Dendrochronology" by Dr. Mitsutani was quite interesting. In Japan, the dendrochronological method for the analysis of ancient wooden cultural properties has been applied for many years to a wide range of subject matter, which includes archaeological artifacts, building components, wooden sculptures, works of art and handicrafts. The Japanese experts have succeeded in creating master chronologies for two species: 912 BC to 2000 AD for *hinoki* and 1313 BC to 2000 AD for the sugi tree. As compared to Japan, there are not very many wooden archaeological monuments in Pakistan. Despite this fact there has been great difficulty in investigating the conservation problems and the treatment of the wooden architecture in Pakistan, especially located in Swat and other parts of the northern areas of the country.

Since no proper methods for investigation, research and conservation techniques have been developed so far by the Department of Archaeology and Museums, the condition of this architectural heritage is gradually deteriorating. The method of dendrochronology as an identification system is presently not in practice in the Department of Archaeology and Museums (Pakistan) but this system could be applied in determining the different conservation problems of timber strength, age and species. The start of the dendrochronology technique as learnt during this training course for preservation of wooden architecture/artifacts in my country will provide a new lease for these monuments.

Dr. Kiguchi delivered a lecture on "Recording Survey Methods of Archaeological Features and Relics," and all the participants carried out practical field work by applying

different techniques as learnt from the lecture of Dr. Kiguchi and the demonstration made by him. These exercises include; survey mapping with a plane table and alidade, use of GPS (Global Positioning System), 3D laser scanning, photogrammetry with digital cameras and GIS (Geographical Information System). The use of the latest technical knowledge and sophisticated equipment is very important for the investigations and surveys in the field of archaeology.

In the Department of Archaeology (Pakistan), we are using the conventional methods of mapping (with a plane table and alidade). However, recently the Excavation and Exploration Branch of the Department based at Karachi has started the use of GPS for their archeological investigations/research work. Despite this, our Department is not yet fully equipped with GPS and other equipment required for 3D laser scanning, photogrammetry with digital cameras due to non-availability of funds. Similarly, GIS, which is a good method for visualizing, manipulating, analyzing and displaying spatial data in digital format is also not in practice due to a paucity of funds. However, the techniques learnt during the 3-day practical work will be very helpful in my future research work in my country.

Week 3 : (25th September to 1st October)

A workshop on "Classification of Archeological Relics/Measuring of Drawing & Rubbing" was arranged on 25th September under the guidance of Mr. Nishiguchi, NRICPN. All the participants of the training course carried out practical work of drawing pottery as well as working rubbings of artifacts. In Japan, the techniques used for measuring, drawing and rubbing are quite similar to the techniques currently being used in my country. These methods are not only simple but also easy to apply during the archaeological researches/investigations to get the exact form of the carvings on artifacts.

A very informative lecture on "Introduction to Conservation Science & Workshop: Scientific Preservation Treatment for Cultural Properties" was delivered by Prof. Nishiyama at Nara University on 26th September. During this lecture different chemical preservation methods for unearthed wooden artifacts were learnt which are presently in practice in Japan. The preservation method includes the use of different chemicals, such as polyethylene glycol impregnation, higher alcohol method, sugar alcohol method, fatty acid ester method, vacuum freeze drying and alcohol xylene resin method.

Similarly, different preservation techniques for metal artifacts which are currently in practice in Japan were also learnt, such as desalination method (removal of chloride ions), BTA

treatment (neutralizing chloride ions), resin impregnation (reinforces fragile iron and bronze objects), rust removal method, bonding or patching (bonding of broken pieces of iron or bronze). All the participants carried out experiments of X-Ray diffraction and PEG impregnation method in the laboratory of Nara University on 26th and 27th September under the guidance of Prof. Nishiyama. The X-Ray diffraction method is useful in the identification of the elements containing in the artifacts. The PEG impregnation method is also very useful for the identification and treatment of wooden artifacts.

In Pakistan, unfortunately our laboratories are not well equipped with modern scientific equipment and machines as compared to Japan. However a number of different chemicals are being used for the restoration/preservation of metal artifacts. The chemicals like PEG impregnation, vacuum freeze drying, xylene resin method, desalinating method, BTA treatment, resin impregnation and X-ray diffraction methods are also not in practice as these are highly costly. However, I am confident that the methods and techniques learnt in Japan by using these latest scientific machines and equipment for the identification and preservation of wooden and metal artifacts will be greatly helpful in my future research work for the preservation of the cultural heritage of Pakistan.

On 28th September, an on-site workshop on "(Conservation Science): Transcription of Stratigraphy" was held under the supervision of Prof. Nishiyama. All the participants participated actively in the excavation work at the Heijo Capital and Palace site. Participation in the actual excavation work provided me an excellent opportunity to learn the excavation techniques being used in Japan. The use of epoxy resin on the surface of the excavated remains for analysis of the complete stratigraphy (soil layers) of the site was new for me. This method is not in practice presently in our country. However, this method was found to be very good, and can be applied for obtaining significant results. The technique learnt during this exercise has helped me to understand the importance of stratigraphy which will be applied for the proper preservation of the cultural heritage of my country.

Dr Kenkichi Ono's lecture entitled "Development and Utilization for Archaeological Sites" was found very instructive in which he provided in-depth information relevant to the topic of his discussion. The "utilization factor" in the proper preservation of the cultural heritage was discussed comprehensively by him.

Week 4 : (1st October to 8th October)

The lecture by Dr Matsui Akira on "Introduction to Environmental Archeology and Survey Workshop" was found very interesting and informative, and was illustrated with the help of skeletons of humans as well as animals discovered during archaeological excavations in Japan. He highlighted the necessity of soil screening tests during excavation, as the soil contains a number of micro artifacts like shells, fish bones, animal bones, potsherds etc. which can provide a lot of important information about the environment. During this lecture basic information regarding comparative morphology and ecology of mammalian bones(osteology) was provided, which enhanced my knowledge about the identification of different bones discovered from the archeological excavation.

Unfortunately, at present there are no Environmental Archeologists or Zooarchaeologists in the Department of Archaeology, (Pakistan). As a result the important field of environmental archaeology is being neglected. However, after acquiring basic and fundamental knowledge about Zooarchaeology I am of the opinion that this field of study should be given top priority, and immediate steps need to be taken in our country so that the objective of proper preservation of cultural heritage can be achieved. Since Japan is already well ahead in this field, cooperation between the Department of Archeology and Museums (Pakistan) and NRICPN (Japan) can improve the research facilities in Pakistan.

The visit to the Heijo Palace Site on 3rd October was very informative for understanding and learning about the conservation techniques and traditional methods applied at the site. Before this study-visit a lecture was delivered by Dr Takase Yoichi. He described the history of the maintenance/conservation carried out at the Palace Site before and after the World War II. The visit to the former Audience Hall, Heijo Palace Site, Nara (8th Century AD) was very interesting and helped me learn the necessity of re-construction work which is being carried out at the Palace Site. The method of using steel or timber for reinforcement for structural stability against earthquakes was found very appealing. Besides, the use of traditional and modern methods side by side for proper analysis, examination and their application for re-construction work was found adequate and appropriate during the visit.

In Pakistan most of the ancient sites/ monuments are constructed with bricks (baked or un-baked) and stones. However, this kind of total re-construction is not in practice in my country as the Venice Charter prohibits this kind of re-constructions/interventions. Therefore minimum intervention is carried out during the conservation process and traditional methods/techniques are applied to conserve the site/monument. However, in Japan wood has been commonly used in the construction of the ancient monuments. Therefore the concept of

re-construction of ancient monuments in Japan is totally different from Pakistan. On the one hand it is good to preserve the cultural heritage for our future generations, but on the other it is feared that general visitors may obtain the wrong impression about its originality. Therefore utmost care is required while considering the total re-construction of a monument.

Despite the fact that these techniques and methods are not in practice in my county, the knowledge gained during the visit of the Heijo Palace has found very valuable. The methodology being applied in Japan for re-contruction work has helped me to understand the necessity of proper protection of the cultural heritage. This learning will be useful in addressing future challenges in the field of preservation of cultural heritage of Pakistan.

Visit to Fukui Prefecture and Shiga Prefecture from 4th – 6th October, 2006

The most important and inclusive part of our training course was the visit to the important cultural heritage sites and different museums in Fukui and Shiga Prefectures. During this visit participants were given on-site lectures by the experts of the concerned institutions/heritage sites/museums in detail. The important heritage sites and museums visited were: Shokichi Mastsuki Memorial Museum of Art at Ohi-Town, the Matsugase Daiba (the Battery Fortification Site), Torihama Shell Midden Site, Fukui City Historical Museum, Ichijodani Asakura Family Museum, in Fukui Prefecture and Shiga Prefectural Research Institute of Azuchi Castle (Site & Museum), the Dotaku Museum (the Mysteries of Dotaku) in Shiga Prefecture, respectively.

The visit to these important cultural sites has broaden the horizon of my knowledge by giving an opportunity to look and understand about the rich cultural heritage of Japan and the conservation methods/techniques being applied by the Japanese experts for its preservation and protection. It was a good experience to learn how the conservation techniques are being applied by the Shiga Prefectural Research Institute of Azuchi, for the preservation of Azuchi Castle. Besides, from the visit to different museums, such as, the Museum of Art in Ohi-Town, the Fukui City Historical Museum, the Asakura Family Museum, and the Azuchi Castle Museum, I have learnt a lot about the development of museology in Japan.

It was a very good opportunity for me to learn the latest methods and techniques applied by Japanese experts and researchers for the proper display of artifacts/relics and their preservation in these museums. The involvement of the local community in the establishment of local museums, and support from the local government in this regard, were inspiring for me. It was also learnt with great interest that museums in Japan provide opportunities for school

children to get involved: participate in their different activities and gain education and knowledge through their visits to the museums.

Though the museums in my country are not well developed, the visit to these museums has helped me to learn a lot from different points of view regarding display techniques, lighting systems, informative descriptions about the exhibits, three dimensional views of objects, audio-video systems, educational programmes for school children, arrangements for permanent and special exhibitions etc., etc. The knowledge and observations obtained through this visit will certainly help me to apply the latest techniques in the development of our museums in Pakistan.

The last lecture of this training course given by Ms. Tunprawat on "Future Issues in the Preservation of Cultural Heritage" was an excellent presentation in the context of involvement of local communities in the preservation of cultural heritage. In Pakistan, the local communities as well as the local and provincial governments are not much involved in the promotion and preservation of cultural heritage of the country is in the case of Japan. However, the presentation by Ms. Tunprawat has shown a new approach to the involvement of the local community in the preservation of cultural heritage, which enhanced my knowledge and improved my understanding about this important issue.

CONCLUSION:

The training course on Cultural Heritage Protection, 2006 has provided me an excellent opportunity to gain in–depth knowledge about the Japanese cultural heritage and its preservation /protection with the help of both traditional and modern methods. The methods and techniques for the preservation of cultural heritage learnt during this training course at ACCU, Nara, Japan will help me immensely in meeting the future challenges in the field of cultural heritage protection in Pakistan. During the training course, apart from the theoretical studies, visits to different historical sites and monuments helped me a lot in understanding both traditional and modern techniques for proper preservation of cultural heritage in Japan.

This training course has provided me with a wealth of technical information which I look forward to utilizing in my future research work. Besides, this training course afforded me an opportunity to meet with a number of international conservators, scientists, experts, and site managers. This training course has also helped me to meet, exchange views with and establish new contacts among the participants who came from the different countries of the Asia-Pacific region and gathered at ACCU, Nara, Japan.

I hope the contacts established between the ACCU, Nara and the participants, as well as among the participants themselves, will continue in the future. During the visit of different museums of Japan I have learnt the latest methods and techniques applied by Japanese experts for the proper display of artifacts/relics and their preservation in the museums. By visiting these museums I have learnt about the development of Museology in Japan and these techniques will be applied in my country in the future.

After attending this useful training course in Japan, apart from acquainting myself with the Japanese culture and customs, I have enhanced my technical and professional knowledge in the field of archaeology, which will certainly help me to serve in the Department of Archaeology and Museums in a more effective and creative way for the proper preservation of the cultural heritage of Pakistan.

ACKNOWLEDGEMENTS:

I want to express my sincere gratitude to the Agency for Cultural Affairs in Japan (Bunkacho), the Asia/Pacific Cultural Centre for UNESCO (ACCU), the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), the National Research Institute for Cultural Properties (NRICPN), Ministry of Foreign Affairs, Japan, the Japanese National Commission for UNESCO, Nara Prefectural Government and Nara Municipal Government for organizing this training course successfully and extending traditional Japanese hospitality and generosity.

I am grateful to all the organizers of this training course who not only arranged this training course successfully but also looked after all the participants during our stay in Japan. I wish to thank all of them, particularly Mr Toshihiko Morimitsu, Director, Programme Operation Department, Mr Atsushi Nagai, Mr Tsutomu Yamashita, Ms Yasuko Otani, Ms Chiyako Hata, Ms Yuko Wakamiya, Ms Ryo Kamida and all other staff of ACCU, Nara. All of them have worked excellent during this training course and deserve appreciations.

I am also thankful to Dr Fazal Dad Kakar, Director General, Department of Archaeology and Museums, Government of Pakistan, Ministry of Culture, Islamabad for providing me an opportunity to attend this useful training course and represent my country.

Republic of Korea

CHANG Eunjeong

The management of cultural heritage and relationship with public

Introduction

The subject matter of the Training Course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region 2006 is composed of four broad components, in my opinion. The first involves mutual understanding of the activities and the social circumstances related to preserving the cultural heritage in other countries. It served as an incentive for me to make contact with different cultures for the first time besides the East-Asian cultures I have felt familiar with, and to get a new angle on them.

The second component was an introduction to various methods which have been conducted in Japan to preserve the cultural heritage, which constituted the greatest part of the whole course. This component can be further subdivided into three subjects. One was the arrangement and management system for cultural property under the legal framework. Another was the application of scientific methodology to archaeological research and conservation. All lecturers tried eagerly to introduce the scientific methods such as various dating techniques, used to analyze archaeological items, and the technical methods employed in research, arrangement, and conservation. Most of all I was struck by the constant efforts to interpret the archaeological materials, which are not only the basic traditional objects such as pottery, stoneware, and metal, but also newer topics such as the bones of humans and animals, seeds, insects, and parasites. These methods are providing us with much more information about the life of past human beings. The last subject is how to manage and utilize archaeological research materials by establishing database management systems such as GIS which turns data into information. This section was practical, and was conducted in the form of workshops and lectures. And it was above all an interesting experience to meet with instances of the application of digital technology throughout the archaeological research.

The third component of the subject matter in this course was case studies introduced in the lecture room and on site, which showed the variety of cultural heritage that Japan has researched, conserved, restored, reconstructed, and managed. It had a tendency to concentrate on reconstructed buildings, so the topic of reconstruction has been one of the important issues for all members throughout course. We visited quite a few historic places during four days of on-site lectures, and this gave me many ideas for presenting archaeological sites to the public.

On the other hand, it was also a pleasure to visit privately on the weekends, some cultural heritage sites and museums that are well-organized.

The fourth component was the very significant opportunity to think over the preservation cultural heritage itself. That is to say, we asked ourselves many fundamental questions, such as what is the cultural heritage, or what should we preserve from the cultural heritage, or how we can manage the cultural heritage, or what is the meaning of preservation, or by which means, and then we tried to find answers through sharing the participants' real instances and experience. It helped us apply the perspectives and new ideas related to the themes in this course. I think it was quite a good approach.

In conclusion, I obtained several key concepts in terms of cultural heritage preservation from this course. There are many other important concepts as a matter of course, but I'd like to mention only three, which are the management, the public, and cooperation.

Management

There are a few necessary requirements for managing cultural heritage efficiently. First, it is necessary to establish a legal framework. At the same time, an executive body to enforce the law consistently is also essential. The legal system sometimes means a series of processes. The desirable legal system can organize all processes of activities to preserve cultural heritage and restrict unlawful acts of destruction of cultural properties. The activities in the processes don't include only things such as excavation, conservation, restoration, and reconstruction but also ones such as maintenance, exhibition, and cultural heritage education. In each activity one should perform one's role faithfully, and activities should be well-organized with respect to one another when they are conducted continuously.

It is also important, I think, to manage the many forms of materials related to the cultural heritage, as well as the heritage itself. As excavations, caused by development recently increase in number, materials such as plans, section drawings, photographs, artifact drawings, and field notes grow more and more in volume. This means that as the number of rescue excavations increases, many more archaeological sites themselves are faced with the circumstance of being destroyed. Accordingly, it is possible to say that archaeological materials produced from excavations are all that remains. That is the reason why we have to pay attention to managing them.

Korea has a basic law on cultural heritage management, which is called the Law for the Protection of Cultural Properties. This law has the authority to manage activities related to the cultural heritage in Korea. To manage them means the authorities have the power to regulate, to permit, and to punish in detail. And what is more, both the designation and registration of cultural property is another primary system governed by the law. On the other hand, for

enforcement of the law, a Cultural Property Committee, composed of eminent experts in various fields, is organized. And the committee actually decides on all important cases such as excavation, restoration, reconstruction, designation, and registration of cultural property.

Korea has two central government organizations relevant to the management of cultural properties, which are Ministry of Culture and Tourism of the Republic of Korea (MCT) and the Cultural Heritage Administration (CHA). The MCT, one of the central government agencies, handles affairs in the areas of culture, the arts, religion, tourism, sports, media and overseas public relations. It deals with broad areas, and is not only limited to cultural heritage.

Compared with it, the CHA was established to perform administrative work connected with the cultural heritage, and was elevated to the level of administration from its former position as a bureau of the MCT. The CHA's responsibilities as officially declared are to preserve and maintain the cultural heritage in its original condition, to cultivate tourism resources through promoting the value of cultural properties, and to increase people's enjoyment of the cultural heritage and public awareness of Korean traditional culture in the world.

They each also have several subsidiary organizations, and National Museum of Korea (NMK) and National Institute of Cultural Heritage (NRICH) being representatives, respectively. The basic responsibilities of the NMK are to keep and arrange cultural properties, to conserve them, to conduct research on the cultural heritage, to show the materials through exhibitions, and thus to educate the public about the cultural properties. It has recently placed emphasis on its relationship to the people, so various activities are organized with a view towards education, even exhibitions. It also performs functions related to museums and galleries in Korea according the Law of Museums and Galleries. Accordingly registering and supporting them has recently become another important responsibility of the NMK.

The NRICH focuses on the research and conservation of the cultural heritage as its basic responsibility. Therefore, it has performed archaeological excavation, publishing works such as an archaeological dictionary, research on the historical record, restoration of the cultural heritage, and so on. On the other hand, with respect to the objects being conserved, there is a difference between the NMK and the NRICH. That is, whereas the NMK conducts the collection of objects even in the case of monuments, the NRICH has continued to conserve cultural monuments as they stand at their original locations, or even to reconstruct them.

These organizations take charge of separate parts of the process of managing cultural property. The excavation processing system of Korea can be taken as an example. In Korea, field survey and rescue excavation if needed should be conducted before development, according to the Law for the Protection of Cultural Properties. In such cases, the expense of the research is charged to the developer. To start an excavation, a research organization has to submit an application along with an excavation plan, and get permission from the CHA. Then, it is determined whether the site is to be preserved or not, after finishing the excavation in the

case of a rescue excavation. If it is decided to be preserved, the plans for development should be revised. And the site can be designated as a historic site by either the central or local government, if it is recognized that the site has specific important value to be preserved. The research organization should hand in the report of excavation in two years. Otherwise, it is possible to put a restraint on the organization, or take some other measures. The CHA is authorized to permit establishing a research organization and conducting excavation, through the Cultural Properties Committee. It also deals with matters related to decisions for the preservation of a site and for designation as cultural property.

On the other hand, all artifacts from excavation come into national possession basically, and the central government has the authority and responsibility for managing them. Accordingly, after completing all relevant legal procedures, the NMK is charged with keeping them in general. From that point on excavated artifacts, meaning movable cultural properties, are registered as collections of the NMK and managed under the NMK's own system, having separate categories and representing a new operating system compared with what they were under before. In contrast, the management of the site or the monument remains charged to other bodies, the CHA or NRICH. So a process of dividing the artifacts from site begins, and it is hard to convey all information about them from the excavation to the museum in most cases. Especially, as the number of rescue excavations has increased rapidly and most of them have been conducted by non-public research cooperation, the management of large amounts of information from excavations becomes the most important issue. How can we manage the data efficiently, faithfully? Sometimes even research cooperation themselves are not able to manage data sufficiently. So there is a very urgent need to establish an integrated management system for all information from historical sites by a governmental organization. The endeavor to establish a database system for applying GIS is very inspiring for Korea, I think, even though it is but partly completed now.

Public

Management for preserving the cultural heritage is an activity that mostly happens in a formal sphere. More important and continuous activities related to cultural heritage happen in informal spheres. That is the reason why we should have an interest in our relationship with the public. The public can become our best partner or an opposing power for preserving cultural heritage. And every activity for preserving cultural heritage needs a considerable budget, which means it is essential for the people to agree on spending the funds. Therefore, we have to do our best to make them understand the value and meaning of cultural heritage, and have them participate in the activities for preservation.

In this regard, museums can provide a good example for doing such things. The NMK has performed various public activities such as exhibition and education. We organize many kinds of programs for different group such as children, students, adults, the elderly, foreigners, and the handicapped. We have also a specific program in which we visit a local area, for example a small village far away from town, for which we are equipped with some exhibitions of replicas and things such as rubbing implements. And our most popular program is a hands-on museum called the Children's Museum of the National Museum of Korea. It is an archaeological museum where children can see, touch, and feel the past through hands-on activities. The same sizes and shapes of the items displayed at the museum are available for children to touch and experience.

However, as I mentioned before, I feel the situation is still insufficient because most activities of museums have a tendency to be divided from sites, even though we have other programs such as on-site lectures. One point that was deeply impressed on my mind in this course is the relation between the archaeological field site and the museum. Many archaeological sites have their own museum or are utilized as on-site museums. Moreover, the process of a reconstruction or an excavation is open to the public on a large scale and is being utilized as a chance for education. An experience in one museum was also very impressive for me, which allow people to touch some artifacts such as a stone coffin that had finished with conservation treatment. And it also made me think to see that an archaeological research institute such as Kashihara has its own museum and organizes good exhibitions with artifacts they have excavated. On the other hand, I'm sure that the concept of community archaeology is very useful issue.

International Cooperation

Most countries in the Asia-Pacific region suffer from an insufficiency of funds and experts for preserving the cultural heritage. Moreover, religious problems and political conflicts, natural disasters, lack of awareness on the part of people caused by poverty are also very serious problems that we have. It is impossible to find perfect solutions to them right now, because we have different kinds of problems with different backgrounds. Therefore it is essential to cooperate with one another, and share our information and experience. The importance of international networking is the most invaluable lesson learned from this course for me.

In closing, I'd like to express my appreciation to all of the lecturers in this course, the nice staff of the ACCU, and the other participants.

SAMOA

Soonaalofa Sina AH POE

1.0 INTRODUCTION

This report is written as a requirement for the completion of the course. It contains four parts focusing on relevant aspects of the training course that can be applied for the preservation and management of Samoa's heritage sites and cultural heritage stored at the Museum and Archives.

The first part is the evaluation of the course on the effectiveness of teaching methods. The second part focuses on selected topics that can be applied to improve the preservation condition of cultural heritage of Samoa in the Museum and Archives, as well as managing the preservation of heritage sites. The third part contains a brief summary of an observation task on the relevance and the feasibility of adopting high-level technology, costly equipment and advanced research techniques and methods for the preservation and restoration of cultural heritage in Samoa. The fourth part looks at bridging the gaps which separate the level of preservation and restoration between Samoa and fourteen other countries represented at the training course.

The training course was delivered using the following methods, lectures, presentations and discussions, practical trainings and on-sites lectures.

2.0 EVALUATION OF THE TRAINING COURSE

The training course took place over four weeks and it comprised many different topics concerning the preservation and restoration of archaeological sites, relics and remains. Methods used to deliver this course range from lectures, workshop, on-site lectures as well as presentations and discussions.

The teaching methods proved to be effective and interactive. Theoretical written information was conveyed and opportunities were available for hands-on practical experiences with several preservation and conservation methods. Opportunities for discussions and questions also proved to be effective.

The overall outcome of the training course was beneficial for me. I have acquired a vast amount of knowledge and information on methodologies and processes for the preservation, restoration and management of archaeological sites and remains. However, there is no doubt about the fact that some of the methodologies and processes learned from the course cannot be applied to my own country due to limited access to resources, finances and professionals. Nevertheless, irrelevant methodologies and processes will not be fully ignored but will be archived for future reference.

One most important outcomes of this training course is the establishment of a network and the sharing of experiences amongst professionals from fifteen different countries.

3.0 RELEVANT ASPECTS OF THE TRAINING COURSE

This part of the report focuses only on selected topics that are not only relevant, but can be applied to improve the preservation of Samoa's cultural heritage in the Museum & Archives as well as the management of heritage sites.

It was evident from the lectures and practical exercises and on-site visits that key resources for achieving an advanced level of development are access to human resources and finances. Japan's level of development in the preservation and restoration of cultural heritage is far more advanced. In contrast, Samoa's level of development is still in its juvenile stages. Considering Samoa's underdeveloped economic status, such high levels of technology and preservation methodologies as used in Japan cannot be applied. However, there have been a number of basic and cost effective concepts that can be applied to the current plans and activities of preserving Samoa's cultural heritage in the Museum and Archives as well as heritage sites.

The key resources that differentiate the level of development between Japan, other Asian countries and Samoa are considered 'gaps'. Bridging these gaps is discussed in part 5.0.

3.1 Risk Preparedness

Risk preparedness is a crucial process that all cultural heritage institutions should be prepared for. There is no doubt that every country is more or less

affected by disasters of any kind whether from natural forces or human interference. Much was learned from experiences of the great Hanshin Earthquake, which affected the Kobe Prefecture. From Mr Murakami's experience with the Kobe earthquake, risk preparedness should consider the following;

- To have a network of experts and professionals
- Having preventive measures is better that response
- That preventive methods is maintenance
- Documentation is very important
- Rescue teams should be aware of resources
- Heritage can help reduce risk from disaster

Heritage being an aid during disasters proves to be true. For instance, a category 4 cyclone struck Samoa in 1991 and families and villagers in the village of Falealupo, in the Island of Savaii, sought shelter under an ancient rock construction that is now an official Samoan Heritage Site and a tourist attraction. They were able to use this structure as home until there were able to recover from the emotional experience of losing their homes, and resources were available to rebuilt their homes.

Much was learned from several case studies on risk preparedness.

3.2 Methodologies for the Classification of Unearthed Artefacts and Relics: Measuring, Drawing & Rubbing

Learning about the different methodologies that can be used for the classification of archaeological relics was very useful. The methods introduced during this session prove to be cost effective and suitable for adoption by Samoa. Skills and knowledge required to implement such process are not necessarily those of a trained expert, but can easily be done by any museum or heritage professional by following instructions.

3.3 Chemical Preservation and Processing of Wooden Artefacts

Common artefacts that can be found in Samoa at an archaeological site or in the museum range from wooden artefacts, pieces of potteries, stone and bone tools.

The Museum of Samoa is currently not engaged in implementing any chemical preservation process due to the lack of resources and finances. Also the museum has not encountered a situation where such action is needed. However, the different processes introduced by Professor Yoichi Nishiyama also prove to be cost effective and easy to carry out. It was crucial to learn that in the absence of such processes, the true forms of unearthed artefacts will not be restored. Therefore, such methods will be referred to when required.

3.4 Conservation and Management of Historic Sites & Remains

On-site lectures that took place in museums and on archaeological sites were meaningful in my experience as many conservation and management ideas were obtained. I was excited at witnessing well-reconstructed sites and the conservation and maintenance plans that are carried out. Again, the preservation of cultural heritage in Samoa cannot be carried out the same as in Japan, but such observation provokes ideas and ways to improve Samoa's situation by the effective use of locally available resources.

4.0 OBSERVATION

A realisation dawned on me early on during the training course that some aspects of the course cannot be applied in my country due to the lack or resources and finances. For a brief I was disappointed, but that was dealt with quickly by deciding to make observations on the relevance and the feasibility of adopting high technology, costly equipment and advanced researches and methods for the preservation and restoration of cultural heritage in Samoa. Coming from a small island nation such as Samoa with very basic resources and the lack of trained professionals makes this experience a worthwhile observation.

My observations concluded with the belief that the resources used for the preservation and restoration of cultural heritage in Japan are not necessarily suitable for the needs of Samoa. Only a small percentage of what was learned in this training course can be adopted, but to reach a satisfactory level of preservation development requires maximum awareness and effective use of locally available resources. My observation of this training course was a worthwhile experience.

5.0 BRIDGING THE GAP

The presentation of country reports provided a clear insight into each participating country's status of preservation and restoration. These presentations revealed gaps that differentiate the level of development in the preservation of cultural heritage between the Asia and the Pacific Regions. Out of the fifteen participants, only three representatives were from the Pacific Region, Samoa, Federated States of Micronesia and New Zealand. Small island nations such as Samoa and the FSM have minor issues concerning their efforts to raise awareness of the importance of preservation and restoration of archaeological sites and remains, whereas some Asian countries are dealing with major and serious issues like earthquakes, tsunami and war. Such issues have maximum effect on the survival of cultural heritage.

There are many gaps that should be bridged, but I would only like to touch base with some that differentiate the preservation and restoration development levels between the Asia region and a small island nations in the Pacific region such as Samoa.

5.1 Resources:

As already mentioned, the lack of human resources and finances are considered as draw backs in the preservation and restoration of cultural heritage in Samoa. This gap was identified when comparing to other Asian countries and the status of preservation and restoration development. Ideas provoked from attending this training course to bridge this gap, should be that heritage professionals and officials in Samoa identify preservation and restoration needs of cultural heritage. An initial step to obtain resources to fulfil such needs should be sought within Samoa before seeking assistance from outside experts. It is also recommended that local resources are used effectively.

5.2 Professionals:

The lack of trained professionals in the cultural heritage field is another gap, which needs to be bridged. A country's cultural heritage cannot possibly manage by one or two trained professionals. Although there are experienced officials working in the cultural heritage field in Samoa, there is a need for more trained professionals. Attending this training course has convinced me that there is a difference between working as a trained professional and an untrained

official. Asian countries have access to many local and overseas professionals and experts.

5.3 Awareness

The lack of awareness is another contributing factor to the vast difference between the levels of preservation and restoration developments between Japan and Samoa. The two countries are incomparable, but Samoa can benefit by learning from Japan and other developed countries preservation and restorations experiences. Samoa should also be cautious on considering only what is suitable to address local needs. As mentioned in some lectures and case studies, raising awareness is crucial in the preservation and restoration process. Such implies that experts and communities will be able to understand and gain mutual respect in order to work together on maintaining and preserving cultural heritage.

5.4 Training Needs

Different training needs between Asia and the Pacific regions were evident from the country reports and presentations. As stated earlier, a small island nation such as Samoa has minor issues concerning the preservation and restoration of cultural heritage compared with of Indonesia and other Asian countries. In fact, Asian countries have monuments and ancient structures that are more than thousands years old, therefore their preservation and restoration plans have long been established. In contrast, Samoa as a small island nation in the Pacific does not have monuments or large ancient structures, but only heritage and religious sites and other small historical structures, which date back several hundred years.

It is therefore recommended that there be a separate training course, which caters for specific training needs of small island nations in the Pacific region excluding New Zealand and Australia. Using Samoa's current status as an example, a training need would be for the identification and the effective utilisation of local resources.

ACKNOWLEDGEMENT

On behalf of the Ministry of Education Sports & Culture and my country Samoa, I would like to acknowledge the organisers of this training course for 2006; the Agency for Cultural Affairs in Japan, Asia/Pacific Cultural Centre for UNESCO (ACCU) Office in Nara, the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), the National Research Institute for Cultural Properties, Japan's Ministry of Foreign Affairs, the Japanese National Commission for UNESCO, Nara Prefectural Government and Nara Municipal Government.

I would also like to convey my humble appreciation for inviting me to participate at this month long training course. Much has been learned and valuable experiences were gained. A professional network has been established and we will continue to exchange our experiences from our professions and assist each other when necessary.

This training course was a colourful gathering of professionals from fifteen different countries, an experience of tremendous value in which significant observations and assessments were made for the safeguarding of cultural heritage in Samoa.

Special thanks are extended to the ACCU Office, the Director, Professor Tadanao Yamamoto, Mr Toshihiko Morimitsu, Mr Tsutomu Yamashita, Mr Atsushi Nagai, Ms Yasuko Otani and staff for your warmth and hospitality shown during our stay in Japan. Thank you for your time, patience and, courtesy. To our two special tutors who made our stay more comfortable, thank you so much for your patience and your efforts to attend to our individual requests.

Turkmenistan

Maksat HOJAMMAYEV

I. Organizers

The training Course on Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region 2006 was organized jointly by Bunkacho (Agency for Cultural Affairs in Japan); the Asia/Pacific Cultural Centre for UNESCO (ACCU); the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); and the National Research Institute for Cultural Properties.

It is in cooperation with the Ministry of Foreign Affairs of Japan; the Japanese National Commission for UNESCO; Nara Prefectural Government and Nara Municipal Government, and was held from 11 September (Monday) to 11 October (Wednesday), 2006.

A total of 15 participants from all the member countries of UNESCO were selected for this year's training course. These people are engaged directly in the excavation of archaeological sites, and the preservation, restoration and development of archaeological features. They are from:

Cambodia, India, Malaysia, Nepal, New Zealand, Pakistan, Republic of Korea, Vietnam, Micronesia, Samoa, Iran, Turkmenistan, Mongolia, Indonesia and Maldives.

II. Acknowledgements

First of all I would like to express my gratitude to the organizers of this very useful training course. It is a great honour for me because I am the first participant of this Training Course from Turkmenistan, and I believe that I will not be the last participant either. I hope that ACCU will invite other experts from the conservation and restoration field from my country in the near future.

It is very pleasant for me to be in Japan and take part in this training course where I could have an opportunity to share experiences with my colleagues from different countries of the world.

While staying in the friendly country of Japan for one month I have made a lot of friends. I am deeply grateful to all the lecturers and to those who assisted us during the training course. And of course, particular thanks to: UNESCO, ICCROM and others for funding and organizing this training course and more particularly, Mr.YAMAMOTO Tadanao, Director of ACCU and also the staff of ACCU whose names are too many to be mentioned here. Finally I hope that all participants will continue communication, and share their experiences about the protection of cultural heritage in the future. I express my best regards to all of the participants for helping me during this training course. I also sincerely wish for ACCU to continue and improve this fruitful training course and collaboration in the future.

III. Introduction

There are so many archaeological sites and architectural monuments in Turkmenistan from different periods in history. The Turkmen Government pays great attention to the preservation and conservation of the national cultural heritage for the future generations. We have legislation titled the "***Protection of historical-cultural monuments of Turkmenistan***" which was adopted in 1992.

Nowadays in our country there are eight State historical-cultural reserves, which have been created to protect the most significant sites and monuments in Turkmenistan.

They are:

1. ***Ancient Merw***
2. ***Kunya-Urgench***
3. ***Old Nisa***
4. ***Abiverd***
5. ***Ancient Dehistan***
6. ***Gokdepe Fortress***
7. ***Sarahs***
8. ***Atamurat***

As a result of close cooperation with UNESCO, two State historical-cultural reserves in Turkmenistan ("***Ancient Merw***" in 1999 and "***Kunya-Urgench***" in 2005) have been included in the World Heritage List of UNESCO in the last six years. All necessary documents for the inscription of the State historical-cultural reserve **NISA** to the World Heritage List of UNESCO have been fully prepared and submitted to the World Heritage Center of UNESCO for the further consideration.

IV. The problems and needs of conservation & restoration of mud brick structures after excavation

The conservation and restoration of mud brick structures are one of the main problems all over the world. The protection of mud structures from rain and snow is very difficult in Turkmenistan. After each rainfall some mud brick walls crack and we have to make some repair work to the walls. After each excavation some conservation and restoration works must be done in future. This situation shows that mud structure preservation is one of the main problems. Every year experts from UNESCO come to our country and together with their Turkmen colleagues elaborate new approaches the conservation of mud brick structures.

A new laboratory was created in "***Ancient Merw*** " and also in the "**Nisa**" park in 2005, as a result of a joint project elaborated between the Ministry of Culture and TV and Radio Broadcasting of Turkmenistan together with UNESCO Tehran Cluster Office and CRATerre-EAG. The laboratory helps to analyze the differences between ancient and modern bricks before conservation and restoration.

We tried various methods of conservation, but they did not give good results and we decided to use the local methods of conservation. For example:

- adding the straw into the soil from the excavations and water.

The soil for conservation of a certain architectural structure should be selected from excavation spoil heaps of the same construction. Following the CRATerre expert's advice the plaster for conservation may be prepared also by:

- mixing clay with cow dung (like it is done in the Ukraine) to give more viscosity to the plaster:

In this case the plastering cover of walls keeps its protective function longer and does not crack.

Laboratory activities

Nowadays in the territory of Turkmenistan six international archaeological expeditions are in progress. Their aim is not only to excavate, but to protect and conserve ancient architectural remains, restore artefacts for museum collections, and prepare an archaeological plan of the site.

In 2006 an excavation and preliminary geophysical survey using an electromagnetometer and magnetometer has been completed for most of the area of the citadel Old Nisa, inside the fortification walls. The survey has been carried out by experts of the University in Siena (Italy) in collaboration with the “Centro Scavi di Torino”.

The use of electromagnetometer side by side with a magnetometer will give the possibility of more precise data, therefore allowing a more accurate map of the area. The final objective is to produce two maps for the investigated area, one related to the electric conductibility and the second related to the magnetic one; these data will help to identify the anomalous zones and therefore future archaeological objectives.

V. Workshops

During this training course, cultural heritage professionals gave very useful lectures about:

- Conservation and Utilization of Cultural Heritage Resources
- Risk Preparedness for Cultural Heritage
- Recording Survey Methods of Archaeological Features and Relics
- Development and Management of Archaeological Sites
- Introduction to Archaeological Science
- Introduction to Scientific Dating Methods
- Introduction to Conservation Science
- Introduction to Environmental Archaeology

The introduction to Japan's cultural heritage protection systems and presentation of the conservation of wooden architectural heritage in Japan by qualified professors was very useful for understanding of the general history of cultural heritage properties in Japan.

And we also had an opportunity to take part in practical training on:

- Classification of Archaeological Relics
- Measuring and Drawing
- Rubbing
- Recording of Archaeological Features



In Nara at the National Research Institute for Cultural Properties, Mr.Kiguchi Hiroshi taught us the usage of Geographical Information System (GIS) and Global Positioning System (GPS). I am sure that I will apply these experiences in my country.

VI. Study Tour

During the course (from 4 to 6 October) the participants had an opportunity to visit some very popular historic heritage sites and museums of the Fukui and Shiga Prefectures of Japan. Japan is one of those countries that is well equipped with modern technology and technical knowledge. The study tour was very well organized by qualified staff of ACCU under the supervision of Mr.Toshihiko MORIMITSU. The trip was conducted by bus.

1. Matsusugase Daiba Site
2. Torihama Shell Midden
3. Fukui City History Museum
4. Ichijodani Asakura Family Museum
5. Shiga Prefectural Research Institute of Azuchi Castle
6. The Dotaku Museum (The Mysteries of Dotaku)



During the study tour, I saw the Japanese experiences of development and management of archaeological sites and relics. And of course it gave me more ideas to develop the archaeological sites in Turkmenistan as tourist attractions.

VII. Conclusions and recommendations

As for the conclusion I would like to mention that it will be very useful to add some lectures to the training course about how to preserve mud brick structures if it is possible in near future. It will be very helpful knowledge for those participants who have mud architecture in their countries and who are more engaged in that field.

Vietnam

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CONSERVATION OF THE THANG LONG IMPERIAL CITADEL SITE AT 18 HOANG DIEU, HA NOI:

I. Acknowledgements

My sincere thanks go to Mr YAMAMOTO Tadanao – Director of ACCU, Mr MORIMITSU Toshihiko – Director, Programme Operation Department of ACCU and all staff members of ACCU for availing me of this opportunity to visit Nara, Japan, to attend **the training course on preservation and restoration of cultural heritage in the Asia – Pacific Region 2006**: *Research, Analysis and Preservation of Archaeological Sites and Remains*, as well as helping me during the time I was in Japan.

My first impression was of the enthusiastic and careful approach of the work of ACCU members. Since before this training course started, when I was still in Viet Nam I had received very good information about the training course 2006 that ACCU sent to me. And during the training course, we received the ACCU's enthusiastic support, the course schedule, photocopies of lecturers' papers, on-site lectures, etc., so we all had full information and materials. I feel that this training course was well-organized and its program was designed very thoughtfully, embracing a wide range of problems related to the management and preservation of historic sites in Japan with reference to international concepts and experiences.

I would like to thank all the lecturers who provided us with their experience, knowledge and issues on theory and practice on the preservation of Japanese archaeological and historical sites, and artifacts. It will be useful resource for me to apply to my job.

I also wish to thank the Vietnam National Commission for UNESCO and Mr. Dang Van Bai – general Director of Department of Cultural Heritage, Ministry of Culture and Information for approving my attendance at this course.

During one month in Nara, useful lectures and practical workshops helped me get more new knowledge on the management, conservation and promotion of historical sites in general, archaeological sites in particular. However, in this final report I only present partly what I have gained from this training course with regard to the conservation of archaeological sites in Viet

Nam, with a focus on the conservation of the Thang Long Imperial Citadel site at 18 Hoang Dieu, Hanoi.

II. Introducing the value of the Thang Long Citadel site

From December 2002, the Vietnamese government has allowed archaeologists to excavate the site at which it intends to build the National Assembly House and the new Ba Dinh Conference Hall at 18 Hoang Dieu, Hanoi. Archaeologists have excavated on a large scale (about 19,000m^2) and gained important results. Many architectural remains and millions of artifacts have been found.

This site is the place where the history and culture of Thang Long – Hanoi and Vietnam have gathered over 13 centuries (from the 7th century up to now).

This is the first time in Hanoi, as well as the first time in Vietnamese ancient architectural history, of finding a complex of structures with high value, especially the structure of the ancient Thang Long Imperial Citadel.

There are many senior international delegations which have visited the site and gained high appreciation of the cultural-history value of the Thang Long Imperial Citadel at 18 Hoang Dieu, Hanoi, such as French President Jacques Chirac, Former Japanese Prime Minister Junichiro Koizumi, the UNESCO general Director, etc.

III. Preservation of the Thang Long Citadel site and its artifacts

1. Preservation of the site

In July 2006, Vietnamese Government assigned the Ministry of Culture and Information the task of collaborating with relevant organizations and being responsible for the proposal of methodology in the field of conservation of Thang Long Citadel site at 18 Hoang Dieu, Hanoi.

Since the excavation, the Ministry of Culture and Information has paid more attention to the collection and extracting of great ideas from the scientists, and to public relations regarding methods of conservation for Thang Long Citadel site. The Ministry of Culture and Information has proposed three methods, as follows:

- Method 1: Preserve all of the excavated areas (19,000m^2) and building an open air museum.
- Method 2: Select for maintenance some areas with very important and typical architectural structures and objects to conserve, together with artifact exhibitions, leaving the rest to be covered with sand.
- Method 3: Cover of all the excavated area with sand (most scientists do not agree with this method and probably such a methodology or approach will not be used).

Based on our analysis and estimation of Vietnam's conditions regarding techniques and budget at the moment, most scientists agree to choose Method 2. The Ministry of Culture and Information will suggest some areas needing selection for conservation and building an open air museum. The decision on how large the scale, whether the entire 9,000 m^2 having valuable remains will be conserved, or less than 9,000 m^2, will depend on the government budget. The other excavated areas, after recording and documenting (describing, measuring, drawing, taking photos and filming…) will be covered with sand and soil for growing lawns or grass, restoring the landscape to make the site become a cultural-historical park.

With the above proposal, in the future we have many things to do at the Thang Long Imperial Citadel site.

During the ACCU training course, the lecture of Mr. TAKASE Yoichi on "**The history, Maintenance, and Restoration of Heijo Palace from Past to Present**" helped me to understand very well about all the maintenance methods devised by the Nara National Cultural Properties Research Institute, as follows:

1. Covering the whole area, including building platforms, with lawns or grass similar to the restoration practices during the Taisho era.
2. Building sheds covering excavated remains for visitor observation.
3. Construction of full-sized models of buildings on the same location where they were reburied.

This precious experience in maintaining and restoring the Heijo Palace give me new ideas on the conservation of Thang Long Citadel site at 18 Hoang Dieu, Hanoi.

The lecture of Mr. Kiguchi on "**principles of 3D scanning survey and application**" is very useful, if Thang Long Citadel is done with this technique it will help to introduce this excavation to visitors and researchers enable them to fully understand about Thang Long Citadel site.

We also were introduced to the transcription of stratigraphy by Prof. Nishiyama; this technique is not difficult but it is quite new for me. In my own point of view, displaying cultural layers for an archaeological site with transcription of stratigraphy will promote good understanding for visitors.

During the 3 day field trip to Fukui and Shiga prefectures I had the opportunity to visit various excavated sites with very good protection and preservation of their remarks, also giving me good examples of post excavation preservation.

Through participants' reports in the training course, 15 participants from 15 different countries presented a lot of experience on management and preservation of cultural heritage in each country. Their problems and needs in the protection of archaeological sites in such a way as to accord with actual conditions of their countries were very useful for me.

2. Preservation of artifacts

The quantity of artifacts in this excavation is estimated to be in the millions, including bricks, tiles and architectural decorative materials, stones, ceramics, iron, wood.

During the training course, I was provided with basic information on the conservation of artifacts of various materials. The lecture of Prof. Nishiyama on the preservation of wooden and iron artifacts with practical training at Nara University's laboratory helped me obtain new knowledge on the preservation of these easily-damaged artifacts with both traditional and modern preservation techniques.

If all the artifacts of Thang Long Imperial Citadel site are preserved carefully like that, I believe that we will have success in the conservation of Thang Long Citadel artifacts to keep for future generations.

3. Some work that has been done to conserve Thang Long Citadel site at 18 Hoang Dieu, Hanoi

We have been collaborating with national and international experts step by step to study, research, scientifically document, protect and conserve the site and artifacts, as follows:

- Giving priority to protect and conserve excavated architectural structures and artifacts, and limit bad effects on them;
- Studying the value of excavated architectural structures and artifacts;
- Building temporary storage and installing equipment to protect excavated artifacts;

- Scientifically conserving special artifacts such as human and animal bones, iron and wooden artifacts;
- Documenting and classifying excavated architectural structures and artifacts;
- Entering data of excavated remains into computers to support research and use them in future;
- Building temporary roofs to cover excavated areas.

4. Advantages and disadvantages of conservation of Thang Long Citadel site at 18 Hoang Dieu, Hanoi

a. The Thang Long Imperial Citadel site at 18 Hoang Dieu, Hanoi is closely related to the Hanoi ancient capital and other surrounding historic sites and may become World Cultural Heritage in future. People support the conservation of Thang Long Citadel site because this work meets the need of people who want to see impression of the thousand year history of Hanoi.

b. Since excavating the site, many international experts have visited, researched and attended conferences on the conservation of the Thang Long Citadel site. The Japanese government has been sending experts to Hanoi to collaborate with us in conserving the site and training technical staff.

c. Some disadvantages and problems of open air conservation of the Thang Long Citadel site:

Firstly, the architectural remains of Thang Long Citadel all lie from the depth of 1m to 4m, in adverse environmental conditions which easily deform and destroy the remains and artifacts such as high humidity, moss and mould, horizontal water penetration, and underground water.

Secondly, at present Vietnam lacks experience in the conservation of open air archaeological sites.

Thirdly, the Thang Long Citadel site located in the Ba Dinh political centre of Hanoi city. The conservation solution has to carefully consider not only the technique professional skills, but also the political, historical, cultural, natural, environmental and security requirements.

IV. Conclusions

The ACCU training course offered many experiences and methods to apply to preserving archaeological and historic sites. I have tried to select some of the methodologies and techniques in order to apply them to my job, along with information about the Japanese system of management and preservation of cultural heritage as well, and share this experience with other professionals working in the fields of management and conservation of archaeological sites.

For conservation of Thang Long Imperial Citadel, it will take us many years to do all the above work. Our need at the moment is to rapidly train a group of technical staff and specialists on management, protection and preservation of Thang Long Imperial Citadel at 18 Hoang Dieu, Hanoi. And I hope we will have other opportunities to learn more experience from Japanese experts in the fields of research, analysis and conservation of archaeological sites and remains.

I feel that the one month training course at the ACCU office reached a successful conclusion. I hope that the contacts we have developed during this training course will help to build professional ties and cultural links between the countries of the Asia – Pacific region. Once again, I would like to thank ACCU for giving me a good chance to attend this useful training course.

N.V.C

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Group Photo at the closing ceremony (11 October, 2006)