Training Course on Preservation and Restoration of
Cultural Heritage in the Asia - Pacific Region 2004

Archaeological Research Methodology and Analytical Methods for Ancient Remains

27 October – 26 November, 2004, Nara, Japan

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

National Research Institute for Cultural Properties

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 the cooperation of the Agency for Cultural Affairs, Nara Prefecture, and Nara City. Since then our office has been engaged in the protection and study of cultural resources through training courses, international congresses and the production of databases, and has also used public symposia as a way to spread information about heritage to local citizens.

The ACCU Nara training courses have comprised a significant part of the work of heritage protection and research, and this was the fifth such course we have held. On this occasion, the course on "Archaeological Research Methodology and Analytical Methods for Ancient Remains" was held in association with the National Research Institute for Cultural Properties and ICCROM (International Centre for Study of Preservation and Restoration of Cultural Property) from October 27 to November 26, 2004. Thirteen participants from the Asia-Pacific region were trained in the management and analysis of buried cultural properties during this course.

Nara is surrounded by many heritage sites and archaeological excavations are always being conducted in the vicinity. For this reason we are blessed with many facilities for conducting excavation and research, as well as museums and exhibits to display the discoveries. The 2004 ACCU training course has made full use of Nara's resources with lectures, and practical workshops on organic artifacts, the use of computers, and *shukei* (site restoration).

I believe that the discussion and talks 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.

During this training course we received cooperation from many organizations and institutions including Nara Prefecture, Nara City, Nara University of Education, the University of Tsukuba, the Gangoji Institute for Research of Cultural Property, the Ishikawa Archaeological Foundation (Ishikawa *Maizo Bunkazai* Centre), the Fukui Prefectural Archaeological Research Center, the Mikata Jomon Museum and the Ooi Town Museum. I would like to conclude by thanking all of these institutional bodies for their help and involvement.

USHIKAWA Yoshiyuki
Director
Cultural Heritage Protection Cooperation Office,
Asia-Pacific Cultural Centre for UNESCO (ACCU), Nara

Contents

Introduction

1. General Information
2. Programme Schedule

1.　General Information

Training Course on the Preservation and Restoration of Cultural Heritage in the Asia - Pacific Region 2004
－Archaeological Research Methodology and Analytical Methods for Ancient Remain－
(27 October – 26 November, 2004, Nara)

1. Organizers

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

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

Sponsored by: the Japanese Agency for Cultural Affairs

2. Background

There are a variety of steps involved in the initial investigation of an archaeological site and its subsequent preservation.　The standard procedure involves the following: after an archaeological site or heritage resource has been discovered, it is given official recognition by its governing bodies. Subsequent to this, partial exploratory digging is undertaken, which then proceeds to full-scale excavation, if necessary.　The artifacts and excavated material are analyzed in relation to their historical context, in other words, their associated archaeological features and structures; the artifacts are separated by material and/or type (i.e. pottery, bone, stone, glass, etc., and known typological categories), catalogued, treated with preservative if necessary, analysed, and then placed in storage. Preparations may then be made for exhibition in museums and other locations.　The results of the excavation are eventually published in an official site report.　The actual excavation site and associated features are restored and curated for presentation to, and access by, the public.　This list, with some variation, includes just a few of the steps and accompanying tasks involved.

The methodology relating to the investigation and research involved in each step is in a state of continuous improvement.　However, 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 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.

The decision that training sessions designed for the development of such individuals should be held in Nara came from a proposal that was made at the Expert Committee for Programs for the Preservation of Cultural Properties in the Asia Pacific Region, held in March 2000, and co-sponsored by the ACCU Nara office and the Japanese Agency for Cultural Affairs.　In order to follow-up on that proposal, the

Asia/Pacific Cultural Centre for UNESCO, the Agency for Cultural Affairs, and ICCROM will work together to sponsor the training session (mentioned in the title of this document), in accordance with the UNESCO guidelines stating that the necessary skills and knowledge must be provided to countries that are party to the UNESCO World Heritage Convention.

3. Dates and Venues

Course dates and duration: October 27(Wed.) to November 26 (Fri.), 2004

Venues: ACCU Cultural Heritage Protection Cooperation Office,

(Nara Prefectural Government “Horen” Office, 757 Horen-cho, Nara City);

Facilities of various cooperating organizations; Archaeological and historic sites in Japan, etc.

4. Objectives of the Training Course

Cultural heritage and archaeological research naturally focuses on sites and their associated features, architectural remains, and artifacts as their primary subject material. Excavation is a means of obtaining the largest quantity of accurate information from these materials. On the other hand, there are also several types of information that only become available through the steps involved in organizing the artifacts after excavation, such as the verification of manufacturing techniques and artifact function, in addition to many other analytical techniques.

Our purpose shall be to conduct training in regard to these methodologies 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. Furthermore, we shall use this training session as an opportunity for mutual debate, information exchange, and network building by archaeological experts from the Asia Pacific region.

5. Training Curriculum

Lectures

-Introduction to the Methodologies of Archaeological Site Investigation

-Introduction to Archaeological Science

-Survey Recording Methods in Archaeological Site Investigation (i.e. theodolite and GPS use)

-Site Data Integration (i.e. GIS systems)

-Environmental Archaeology and Methodologies of Investigation

-Methodologies in Preservation Science and Engineering

-Methodologies Relating to Archaeological Site Preservation and Restoration

-Methods of Archaeological Site Development and Management

-Additional techniques will also be presented in the session

Presentations and Discussion

-Presentation of the Present Status of World and Cultural Heritage Resources, and Exchange of Views for each Country Represented at the Training Course.

-Recapitulation of the Training Session
-Additional presentation and discussions will also be included in the agenda

Practical Training and On-site Lectures
-Observation, Identification and Analysis of Faunal Remains (Animal Bones) organization and Analysis
-Case Study of Archeological Site Preservation, Development, and Utilization (3-day study tour)

6. Participants in the Training Course

(1) The training course is offered to the following 36 signatory countries listed in the UNESCO World Heritage Convention. Applications are acquired by UNESCO National Commissions or UNESCO liaison offices who are required to submit the following documents for those individuals nominated no later than **30 / July 2004**: letters of recommendation written by the head of the organization to which a nominee belongs, profile of the nominee, and report on their major achievements. Fifteen individuals will be selected as training course participants from among the nominees.

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, 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 architectural remains, and who can make effective use of the results of the Training Session upon returning to their home country.

2) those who have an adequate command of English, the standard 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 can submit documents required (i.e. a recommendation by NATCOM, and reports) within the deadlines outlined;

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

6) those who were not previous participants in the training course organized by ACCU.

7. Notification of Screening Results

After consideration with the other organizers, ACCU will select 15 people (one person per nation only) around mid-August from among the applicants. After selection, the UNESCO National Commissions for 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 used throughout the course.

10. Documents Required for Application

(1) Application Form (Form 1)

(2) Report Relating to Cultural Heritage Preservation (Form 2)
-The report should mention present and previous work engaged in by the applicant.

(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 of the Training Course shall be borne by the ACCU, as follows:

(1) Traveling expenses:

Each of the participants (excepting those from Australia, Republic of Korea and New Zealand) shall be provided an economy-class air return ticket from the international airport nearest to 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 October 27 (Wed.) to November 26 (Fri.), 2004. Arrangements for accommodations will be made by the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO.

12. Secretariat

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2. Programme Schedule

			Morning (9:30 – 12:30) (Lecturer / *Venue*)	**Afternoon (13:40-16:40)** (Lecturer / *Venue*)
October	26	Tue	Arrival	
	27	Wed	Opening Ceremony: Orientation Session Introduction to World Heritage in the Nara City Area (*ACCU*)	
	28	Thu	Cultural Heritage Preservation and Protection Laws in Japan (Mr. Isomura / *ACCU*)	International Cultural Heritage Preservation & Protection Laws (Dr. Magar / *ACCU*)
	29	Fri	Heritage Management at ICCROM and Conservation (Dr. Magar / *ACCU*)	Introduction to Dendrochronology (Dr. Mitsutani / *ACCU*)
	30	Sat		
	31	Sun		
November	1	Mon	Country Report Presentations by Participants I / Discussion (Dr. Magar / *ACCU*)	
	2	Tue	Country Report Presentations by Participants II / Discussion (Dr. Magar / *ACCU*)	
	3	Wed	National Holiday	
	4	Thu	Introduction to Archaeological Science (Prof. Sawada / *ACCU*)	Introduction to Scientific Dating Methods (Prof. Nagatomo / *ACCU*)
	5	Fri	Introduction to Conservation Science (Staff of Conservation Science Laboratory NRICPN / *NRICPN*)	
	6	Sat		
	7	Sun		
	8	Mon	Survey Measuring Methods with a 3D Laser Scanner (Mr. Tsukamoto / *ACCU*)	
	9	Tue	Work Shop: Introduction to Environmental Archaeology (Dr. Matsui and Staff / *NRICPN*)	
	10	Wed	Work Shop: Pollen Analysis and Palaeobotany (Dr. Matsushita and Staff / *NRICPN*)	
	11	Thu	Work Shop: Analysis of Animal Bones 1 (Dr. Matsui and Staff / *NRICPN*)	
	12	Fri	Work Shop: Human Osteology and Physical Anthropology (Dr. Hashimoto / *NRICPN*)	Work Shop: Introduction to Paleodiet and Paleoparasaitology (Dr. Kanehara / *NRICPN*)
	13	Sat		
	14	Sun		

	15	Mon	Data Integration by GIS and GPS (Mr. Kaneda / *NRICPN*)
	16	Tue	Landscaping and Management of Archaeological Sites (Mr. Yano / *ACCU*)
	17	Wed	On Site Lecture (Noto Kokobun-ji Temple site, Nara Period)
	18	Thu	On Site Lecture (Ishikawa Maibun; Ishikawa Prefectural Archaeological Research Centre, Ichijo-dani: Reconstructed Site of Medieval Town)
	19	Fri	On Site Lecture (Torihama Shell Midden Site and Museum, Matsugase *Daiba*)
	20	Sat	
	21	Sun	
	22	Mon	Preservation and Monitoring of Cultural Heritage (Mr. Takase / *NRICPN*)
	23	Tue	National Holiday
	24	Wed	Future Tasks in the Preservation of Cultural Heritage Ⅰ Discussion (Dr. Wijesuriya / *ACCU*)
	25	Thu	Future Tasks in the Preservation of Cultural Heritage Ⅱ Discussion (Dr. Wijesuriya / *ACCU*)
	26	Fri	Closing Ceremony

NRICPN : National Research Institute for Cultural Properties, Nara (*Nabunken*)

Proceedings

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

1. Opening Ceremony

The 2004 training course began with the opening ceremony on October 27th, 2004 with the thirteen course participants, ACCU staff, and distinguished guests from the Japanese Agency for Cultural Affairs, the National Research Institute for Cultural Properties, Nara Prefectural government, and the Nara Municipal government, all assembling at the Kasugano-so reception hall. The opening addresses were given by Dr. USHIKAWA Yoshiyuki, Director, ACCU Nara Office, Mr. TANABE Ikuo, Head, Centre for Archaeological Operations, National Research Institute for Cultural Properties, Nara, Ms. OHNUKI Misako, Director, Cultural Division ACCU, Mr. SODEYAMA Yoshiyuki, Head, Office for Planning of Cultural Properties Protection, Bunkacho (Agency for Cultural Affairs, Japan), Mr. ASAI Masato, Director, Kansai Science City Cooperation Division, Nara Prefectural Government, and Mr. MORISHITA Keisuke, Deputy Director, Cultural Assets Division, Board of Education, Nara City. Following the speeches, the participants introduced themselves and a group photo was taken with staff and guests.

Finally, the participants proceeded to the Nara Prefectural Offices to meet the Deputy Governor of Nara Prefecture, Mr. NISHIO Tetsuo. Explanations of the immediate heritage sites around Nara City were given that served to orient the participants with the area. It also impressed upon them the unique nature of the cultural landscape and World Heritage environment so prevalent in this historic place. An impressive view from the top of the government building enhanced the feeling of place and history of the participants' new home for the next month.

Dr. Ushikawa, Director of ACCU Nara, giving the opening address

Dr. Tanabe, from the National Research Institute for Cultural Properties

Ms. Ohnuki, Chief of the ACCU Culture Division

Mr. Sodeyama, from the Bunkacho, (Agency for Cultural Affairs, Japan)

Mr. ASAI, from the Nara Prefectural Government

Mr. MORISHITA from the Nara Municipal Government

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 by Dr. Yasushi Nishimura (ACCU Nara) regarding the course theme, objectives, logistics, and requirements. Following this presentation Mr. Diab (ACCU Nara) presented a discussion about daily life in Japan for visitors and held an open question period.

Meeting with the Deputy Governor of Nara Prefecture, Mr. NISHIO

2. Summary of Lectures

Training courses at ACCU include lectures, discussions, workshops, laboratory work, and field excursions. Summaries of the lectures for the 2004 course are presented in note form below.

Cultural Heritage Preservation and Protection Laws in Japan. (28 Oct.)
Mr. ISOMURA Yukio, Agency for Cultural Affairs

- The first lecture of the course was a historical review of the development of cultural heritage protection and conservation legislation in Japan from the 19th century to 1929 (when the laws were significantly updated), and up to the present.

Key issues included:

1) the need to understand facts about heritage sites to make appropriate protection evaluations;
2) the creation of a standard for site management for proper conservation/protection;
3) the need to evaluate authenticity;
4) a discussion of management plans that are usually created by local governments in Japan, and subsidized by the Ministry of Cultural Affairs.

- Examples of participant questions included: what were the penalties for destroying or looting sites? What is the procedure for archaeological site assessment in Japan? Finally, a suggestion was made to review an actual example of a Japanese site management plan.


Mr. Isomura gave the first lecture on cultural protection laws.

International Cultural Heritage Preservation & Protection Laws. (28 Oct.)
Dr. Valerie MAGAR, ICCROM

- Lecture themes included: 1) management methods and activities at ICCROM; 2) what is heritage conservation? 3) Why should sites be preserved? 4) What are specialists actually conserving? The key points of the lecture included the following:

1) an appeal to erase barriers between architects, archaeologists, and conservators for the improvement of heritage management,
2) the philosophy of conservation; a shift from “top-down” to “bottom-up” local decision-making, and the adaptation of heritage protection to diverse cultural regions, and
3) a review of international charters and conventions for protecting cultural heritage, for example, key documents include the following: Athens Charter (1931), Vienna Charter (1964, marking the formation of ICOMOS), the creation of the UNESCO World Heritage Convention (1972), and last year’s Nara Convention and Yamato Declaration (2004).

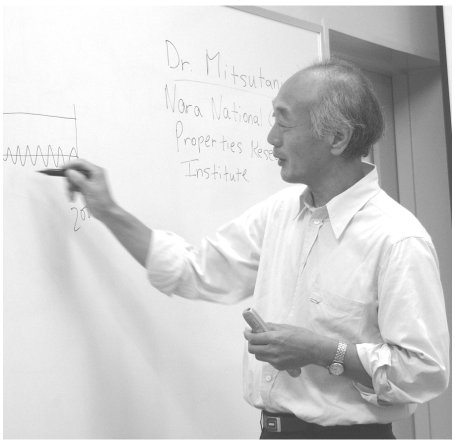
Heritage Management at ICCROM and Conservation. (29, Oct.)
Dr. Valerie MAGAR, ICCROM

- An explanation was provided for ICCROM's heritage management method, and ICCROM's 6 management steps for the protection of heritage sites were outlined: *location documentation, 2 levels of assessment, management policy, and 2 levels of strategy.*
- Good management plans are needed for the long-term goals of a site, *not* one based on a "cook-book" approach. A "simple is best" philosophy should be coupled with the use of time-honoured solutions and methods.
- Site stakeholders should be identified immediately as they have legitimate ownership of a site and can proactively manage and conserve their own sites.
- Conservation does not lie solely in high-tech scientific solutions.
- Don't be overconfident: avoid the belief that the problems and values of a site are well known as unexpected pitfalls may be encountered during conservation.

Dr. Valerie Magar (ICCROM) gave 2 days of lectures and summarized the country report presentations.

Introduction to Dendrochronology. (29 Oct.)
Dr. MITSUTANI Takumi, National Research Institute for Cultural Properties, Nara.

- Review of fundamentals of dendrochronology, or tree-ring dating.
- Tree-ring research conducted in 4 Asia-Pacific countries so far: Japan, Korea, China, and Thailand.
- Contributions of dendrochronology include: (1) accurate calibration of radiocarbon dating chronology, (2) reconstructing palaeoclimate, (3) ascertaining secondary rebuilding of wooden structures, (4) resolving debates on the dating of artifacts, (5) revealing the value of antiquities and ancient artifacts, (6) the distribution or transfer of items based on cross-dating, and (7) providing accurate dates for the construction and modification of wooden structures.



Dr. Mitsutani explaining how to read tree-rings, and the principle of cross-dating.

Country Report Presentations by Participants I (1-2 Nov.)

Day I

The agenda for the next two days consisted of the participants' country report presentations, entitled, "Problems and Needs for Archaeological Research and Record of Activities". Presentations were given by Mr. Sopheap (Cambodia; key point: Angkor Wat preservation), Ms. Moldakhmetova (Kazakhstan), Mr. Souksavtdy (Laos; key point: Champasak Site Management Plan), Dr. Gunchinsuren (Mongolia; key point: extensive international collaborations), Mr. Kunwar (Nepal), Dr. Darmody (New Zealand; key point: excessive CRM work), and Mr. Hassan (Pakistan; key point: lack of trained personnel and facilities). Recurring issues for many participants dealt with the threat of development projects that have obliterated cultural heritage sites, the need for heritage awareness and public archaeology, and a lack of funding and trained personnel.

Dr. Darmody presented a report on the status of heritage protection in New Zealand.

Country Report Presentations by Participants II

Day II

The second day of participant presentations began with Mr. Araho (Papua New Guinea), followed by Ms. An (Korea), Ms. de Leon (Philippines), Mr. Cooray (Sri Lanka), Ms. Yukongdi (Thailand), and Dr. Tri (Vietnam). Dr. Magar (ICCROM) attended both days and summarized significant points running through the presentations. She also raised issues for future improvement, for example: outlining conservation priorities; site zoning; international collaboration and translation of results; a lack of trained personnel; conservation budgets; public archaeology concerns (i.e. pamphlets, videos); and storage and documentation.

Mr. Cooray gave a presentation about UNESCO World Heritage properties in Sri Lanka.

The presentation by Mr. Araho from Papua New Guinea included many images from tentative World Heritage sites.


Prof. Sawada from Tsukuba University.

Introduction to Archaeological Science (4 Nov.)
Prof. SAWADA Masa'aki, Institute of Art and Design at Tsukuba University

- Modern archaeology utilizes a variety of highly technical methods such as materials analysis (i.e. x-ray fluorescence), archaeometry, and techniques for palaeoenvironmental reconstruction and conservation science.
- Descriptions of methods were presented through examples from Dr. Sawada's research at, 1) San'nai Maruyama (house floor sediment analyses), 2) Chinese stone statue conservation, and 3) Easter Island Moai damage from SiO2 crsytallization; conservation of Moai by injecting polymer agents and water repellant chemical directly into the stone.

Introduction to Scientific Dating Methods (4 Nov.)
Prof. NAGATOMO Tsuneto, Nara University of Education

- Dating methods include relative dating (stratigraphy), absolute (historical data), and scientific methods (radiometric). Some methods are useful for dating contexts millions of years old years while others are useful for dating sites from much later periods.
- **Numerical methods** include both a) *Radiometric* (<u>isotopes</u>: radiocarbon, potassium-argon, uranium; <u>radiation damage</u>: fission track dating, luminescence) and b) *Non-radiometric* (chemical changes: amino acid, obsidian hydration). **Relative methods** include, for example, archaeo/palaeomagnestism and dendrochronology.
- Cautions: dating may include incorrect assessments: 1) samples must be clean and from good contexts, 2) ensure that samples represent the age of an archaeological event and not the sample alone (i.e. charcoal is easily contaminated; rodents move cultural material), 3) use at least 2 methods as a cross-check, 4) some methods are more appropriate for certain materials and site ages (i.e. early hominid sites can use potassium-argon while later prehistoric sites should use AMS C14), 5) Dating is only a chemical and statistical technique and subject to error.


Prof. Nagatomo presented an experiment on radiometric dating.

Introduction to Conservation Science (5 Nov.)

Dr. KOEZUKA Takayasu, Dr. KOHDZUMA Yohsei and Dr. FURIHATA Junko, National Research Institute for Cultural Properties, Nara


Dr. Kohdzuma giving a lecture on conservation science.

The day was spent at the National Research Institute for Cultural Properties in Nara (*Nabunken*) with a lecture and demonstrations in the seminar room by Dr. Kohdzuma. He reviewed standard as well as some newer progressive conservation techniques, mostly dealing with wood and metals conservation. An experiment was conducted by participants showing the deterioration of copper through chemical leaching using a flat piece of copper. The afternoon activities consisted of a tour and explanation of equipment and techniques in the conservation laboratory.

- Waterlogged wood conservation methods include: polyethylene glycol impregnation, sugar alcohol impregnation, and freeze-drying. Chemical changes and characteristics of waterlogged wood were explained such as shrinkage through drying.

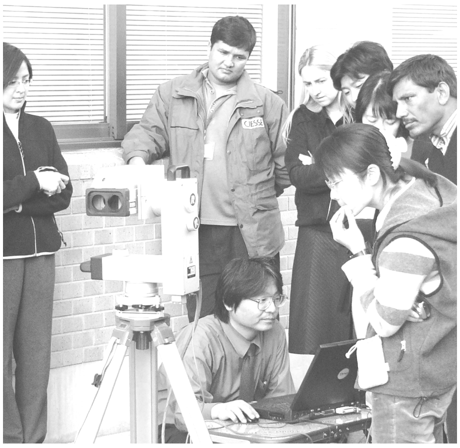

Dr. Furihata explains an instrument used in the conservation laboratory at the National Cultural Properties Institute.

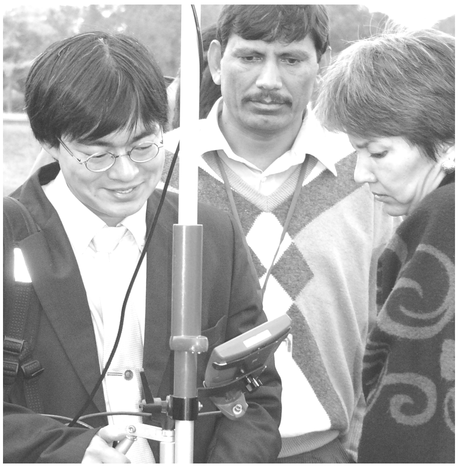

Dr. Koezuka conducting an experiment on the conservation of bronze and copper objects.

Survey Measuring Methods with a 3D Laser Scanner. (8 Nov.)

Mr. TSUKAMOTO Toshio, Gangoji Institute for Research of Cultural Properties

- The creation of digital archives is useful for recording cultural remains (buildings, artifacts, tombs, fine art, and documents) through the use of 3-dimensional laser scanning.
- Digital archive technology and non-contact 3-dimensional shape measurement systems, method, and theory have been developed by the medical and clothing industries.
- 4 ways to digitize records: stereo, holography, replica, and x-ray CT. Texture mapping means creating an image very close to the original in 3-dimensions.
- A Vivid Rangefinder camera was demonstrated both inside (on a stone object) and outside (on a building).


Mr. Tsukamoto demonstrating the laser scanner used to produce 3D digital models.



Mr. Kaneda with Handheld GPS, at the Heijo Palace site

Mr. Yano's lecture covered landscape management and reconstruction.

- Problems with digital technology include storage & retrieval difficulties, data fabrication, and standardization.
- Positive aspects include information storage in a digital format for future use, and adaptations for the public in museums. .

Data Integration by GIS and GPS (15 Nov.).
Mr. KANEDA Akihiro, National Research Institute for Cultural Properties, Nara

- GIS is a system that integrates and uses spatial and related information, and layers different variables on a series of computer-generated maps. It has been used to manage traffic information, urban planning, geographic and archaeological research.
- There has been a longer research history with GIS methods and theory in the U.S./Europe than in Japan.
- In archaeology GIS can manage inventories, store, search and process information, visualize spatial data, conduct analyses, and create historical site databases.
- Case studies presented in the lecture included restoration of the *Jobo* moat (Heijo Palace), *Kofun* keyhole tomb database (Yamato Plain), remote sensing (Henan, China).
- Global Positioning Systems (GPS) are based on measurement principles. There are two basic types: 1) Code Positioning (Stand Alone Positioning / differential DGPS; and 2) Carrier Phase Positioning (Static/Kinematic).

Landscape Management of Archaeological Sites" (16 Nov.)
Mr. YANO Kazuhiro, Planning Institute for the Conservation of Cultural Properties

- Discussion of the Japanese concepts of "*Hozon*" and "*Seibi*" = preseveration, restoration and utilization. A presentation was given of the history and theory of archaeological conservation in Japan. A step-by-step explanation of a "Site Management Master Plan" was outlined.
- Three guiding principles for the restoration of historic architecture in Japan include: 1) the learning of history, 2) creation of local symbols, 3) establishing a base for cultural tourism.
- Cultural and aesthetic values must be considered in any reconstruction. Two functions exist in this regard: experimental research, and interpretation (discussed in the Venice Charter, 1964).

- Limit flaws in historical accuracy that can spread erroneous images to the public.
- Restoration and exhibition of historic architecture in Japan is conducted with the idea that authenticity of form, materials, structures, and methods should be preserved whenever possible. *Fukugen* = repair with restoration.
- Heritage sites discussed: San'nai Maruyama, Suzaku Gate, Jiao He city (Silk Road), Daming Palace (China), Bulguksa Temple (Korea).

Preservation and Monitoring of Cultural Heritage.
(22 Nov.)
Mr. TAKASE Yoichi, National Research Institute for Cultural Properties, Nara

The UNESCO World Heritage site of Heijo Palace, the first ancient capital of Japan (8th century), was the venue of this lecture by Mr. Takase. The site is managed by the Japanese Agency for Cultural Affairs. The lecture began in the Heijo Palace Museum located on the ancient town grounds. An explanation was given of the history of excavation (the first map was made in 1852, excavation began in 1959), museum dioramas, aerial photos, and exhibits. The lecture continued outside where the participants were guided through the 1.3 by 1 km Palace grounds consisting of reconstructed buildings, an in-progress excavation of the Imperial Audience Hall, open partial reconstructions, and large site maps. Participants inquired about the partial reconstruction as opposed to full reconstruction of buildings, and the accuracy of the fully reconstructed Suzaku gate (based in part on Chinese examples). The afternoon session entailed a discussion about restoration and maintenance. Mr. Takase compared European brick and stone buildings to Asian wooden buildings. Maintenance entailed the following key aspects: covering the entire palace with grass or lawns, building sheds covering excavated remains, full-sized restored buildings. Future initiatives include more guided tours, kiosks, educational cooperation programs with schools, and events/symposia. There was a lively discussion period following the tour. Example of questions included: how do you restore the appearance of original buildings (Pakistan), how are different construction phases restored and presented (Sri Lanka), how do you justify authenticity based on excavation (Nepal).


Mr. Takase, in front of the ceramic tile map at the Heijo palace site

Future Tasks in the Preservation of Cultural Heritage (24, 25 Nov.)
Dr. Gamini WIJESURIYA, ICCROM

Dr. Gamini Wijesuriya of ICCROM (Rome) presented a lecture and workshop entitled "Future Tasks in the Preservation of Cultural Heritage." This workshop continued over two days. A discussion of the changing status of preservation and its tasks and responses was undertaken. The following is a summary in note form:

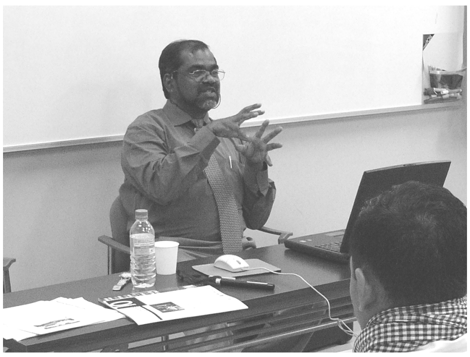
- Changing Status and Preservation:
  1) Threats to heritage are increasing.
  2) Views on preservation are changing.
  3) Approaches to management are changing.
  4) Discussion of the "<u>conservation with no boundaries</u>" philosophy.
  5) Continuity of the "past living in the present".
  6) Threats to heritage include: natural and human.
     - human threats = development and legalities
     - ethnic affiliation
     - religious issues
     - political issues, such as armed conflict
  7) Changing definitions of archaeology.

- Heritage Preservation Potentials:
  1) Tourism
  2) Poverty alleviation
  3) Development
  4) Self-generated funding

     Examples: Sri Lanka, Pompeii

- Tasks and Responses include:

  * The *"Circle of improvement"* is vital to improving and changing the cultural heritage management system in every country. It is comprised of the following:
  - Continuous improvements – the **4 "R's"** and the **3 "P's"**
    - <u>**R**evist, **R**esearch, **R**eact (resources, be realistic), **R**esults</u>
    - <u>**R**evist includes the: **Principles** of conservation, **P**rocesses (procedures), **P**ractices</u>


Dr. Wijesuriya from ICCROM

- A challenge was made by Dr. Wijesuriya to all participants to think about 5 GAPS in the tasks and responses for each country. Participants worked in groups to address this issue.

- 6 Processes are involved in site inscription according to the UNESCO World Heritage Convention:
  1. Countries become “State Parties”, then sign the convention, and pledge to protect cultural and natural heritage
  2. The State Party:
     - makes a tentative site list (of “outstanding universal value” and sends nominations
  3. The UNESCO World Heritage Centre:
     - Checks the nomination file and sends it to ICOMOS and IUCN
  4. ICOMOS/IUCN:
     - Sends an expert to evaluate the status of protection and management of the site.
     - Technical reports are prepared and recommendations sent to World Heritage.
  5. World Heritage Bureau:
     - Examination, request for more information, and recommendations to committee
  6. World Heritage Committee:
     - May ask for further information
     - May refuse or inscribe the site on the World Heritage List

Examples of World Heritage Criteria for some Significant Sites

WH SITE	PERIOD	COUNTRY	WH CRITERIA *
Imperial Palace	Ming Dynasty	China	3, 4
Ban Chiang	Neolithic	Thailand	3
Luang Prabang	13-19th C.	Laos	2, 4, 5
Taxila	Prehistoric	Pakistan	3, 6
Lumbini	Prehistoric/Historic	Nepal	3, 6

*World Heritage Criteria:

3. unique testimony to a cultural tradition or civilization living or disappeared;
4. an outstanding example of building, architecture, technological ensemble or landscape, illustrates (a) significant stage(s) in human history;
5. outstanding example of traditional human settlement/land-use representative of culture(s), especially when it is threatened;
6. directly associated with events or living traditions, ideas, beliefs, artistic and literary works of outstanding universal significance.

- Key point = Discussion of National Guidelines in each country and areas for improvement.

- World Archaeological Congress passed a new resolution to have archaeologists and conservators visit sites as a team and work together.

- The "Conservation with no Boundaries" concept was created from the New Paradigm in World Heritage Sites with the addition of both Cultural AND Natural heritage sites.

- Exercise: An exercise was conducted in 2 groups of 4, and 1 group of 5 people investigating the "P"s of revisting:

Principles, Processes/Procedures/Practices. Six heritage management problems, tasks or questions were set up for the participants discussion groups:

- Group Exercise Results:
  1. Existing guidelines for site protection/management need to improve especially in the area of legislation, public/community involvement in decisions about site protection;
  2. an acknowledgement of diversity in communities and countries;
  3. a desire for a more systematic approach to legislation;
  4. For P3, all groups felt the need for heritage property to be subsumed under the central government but some aspects should be under local government;
  5. more protection for intangible cultural heritage;
  6. define all of the variables of what an archaeological site actually is;
  7. legislation needed to preserve cultural "layers" or cultural diversity as different religions in one country. For P1ii: penalties and fines should be levied for destruction/theft/etc. of heritage, give monetary compensation for reporting sites; legal advisors should assist in the preparation and interpretation of the laws (i.e. New Zealand); government integration across agencies allowing consistency in purpose. In otherwords, if everyone strives for the same thing, they will work together.

Group exercise on cultural heritage preservation.

Concluding the session with Dr. Wijesuriya's comments.

- Operational guideline preparation and their adaptation to each heritage (i.e. ethnic) context for each country is one of the primary points that came out of this lecture. A key question for discussion remains: can a charter with conservation principles be created that is applicable on a global level, or should their be individual charters unique to each country?

- Examples during the lectures were drawn primarily from many sites around Asia, such as Sri Lanka (i.e. Kandy: Temple of the Tooth) Nepal, Iran (i.e. Bam), Indonesia, and many others.

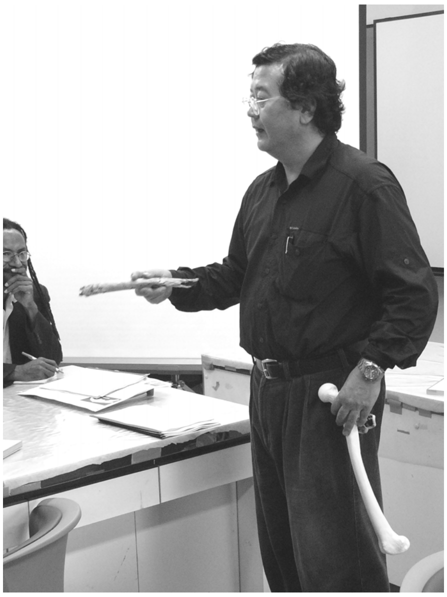
3. Workshops and Laboratory Methods

- Environmental Archaeology
- Human Osteology and Physical Anthropology
- Toilet Archaeology, Palaeodiet and Palaeoparasitology

A series of lectures and laboratory workshops were conducted over a three-day period at the Nara National Cultural Properties Research Institute (*Nabunken*) on environmental archaeology. These lectures and workshops were given by specialists in zooarchaeology (the analysis of faunal remains), physical anthropology and human osteology, palaeobotanical analysis, and palaeoparasitology.

Introduction to Environmental Archaeology (9 Nov.)
Dr. MATSUI Akira, National Research Institute for Cultural Properties, Nara, and Mark DIAB (ACCU and Research Associate, National Research Institute for Cultural Properties)

Basic training in faunal (animal) osteology, zooarchaeology (faunal analysis), and comparative mammalian osteology were conducted by Dr. Matsui, and Mr. Diab. Two days were allotted for this training as it is a necessary component of participants' future work. Dr. Matsui began the first day with a lecture on environmental archaeology, which includes all earth science and biological scientific studies dealing with the investigation of past human societies. The purpose is to attempt to discover how societies lived and what ecological changes they went through during every period of human history. The foci of environmental archaeology concern ecological, social, and economic reconstruction. It is one of the most multidisciplinary fields in academic research, incorporating methods, techniques, and theory from a plethora of disciplines, such as dendrochronology, pollen analysis, cultural anthropology, chemistry, vertebrate and invertebrate biology, geoarchaeology, geology, GIS, and others. Dr. Matsui presented examples from his research on *Jomon* salmon exploitation, toilet and dietary analysis in archaeology both Heijo and Fujiwara palaces, and the origin of the domestic dog in Asia and Japan. In the afternoon, a lecture and lab on osteology and anatomy, and comparative osteoarchaeology of different classes of vertebrates was given. The osteological characteristics of mammalian orders and selected species was also reviewed. Participants examined, drew, and recorded key anatomical differences between vertebrate classes and species and learned the fundamentals of osteology.



Zooarchaeology and environmental archaeology lecture with Mr. Matsui.

Pollen Analysis and Palaeobotany (10 Nov.)
Dr. MATSUSHITA Mariko

Pollen analysis laboratory and lecture conducted by Dr. Matsushita.

The workshop and laboratory exercise in palaobotanical analysis was oriented towards the preparation and identification of preserved microbotanical remains from archaeological sediments. The participants worked in 4 groups of three to four people. Previously prepared slides were examined for rice grains pollen, barley, and other pollen remains indicative of early agriculture. General stages in the recovery and examination of plant microfossils are: 1. Sampling in the field and subsampling in the lab; 2. Analysis which includes: a. maceration in 5% KOH and humic acid removal, b. gravity separation, c. mineral removal, acetolysis, dyeing with safranine, slide preparation; 3. microscopic examination; 4. constructing pollen diagrams of results. Participants agreed that the step-by-step laboratory method was invaluable and sampling for microbotanical remains would be something they would try to incorporate in their excavation procedures in the future.

Analysis of Animal Bones (11 Nov.)
Dr. MATSUI Akira and Mr. Mark DIAB

The activities for today included the continuation of the workshop on the analysis of faunal remains and comparative mammalian osteology. Archaeological material was also examine comprising mostly horse, cow, and pig as these species are important with regard to early domestication of many sites in the Asia/Pacific region and earlier periods. Participants were given a lecture on key issues in zooarchaeology, such as: quantification and bone fragment counting units, taphonomy, cultural and non-cultural modifications on bones, and biometrics to determine hunting and butchering patterns. Following this an exercise was performed where participants had to identify faunal remains from an archaeological site. Deer long bones from a *Jomon* site were examined to learn basic cataloguing protocols for archaeofauna, and non-cultural and cultural modification signatures. Taphonomy was then discussed as well basic identification and cataloguing of fish, bird, and mammal bones using archaeological samples. Participants were then given a tour of the dendrochronology laboratory at *Nabunken*. An examination was undertaken of the calibration curve for Cedar and a description was given


Workshop and lecture on zooarchaeology and mammalian Osteology with Mr. Diab.

of a machine used for reading tree ring cores. An explanation was also given of a new X-ray computer tomography machine used to analyze the internal characteristics of artifacts.

Tree-ring data showing calibration curve at the dendrochronology laboratory.

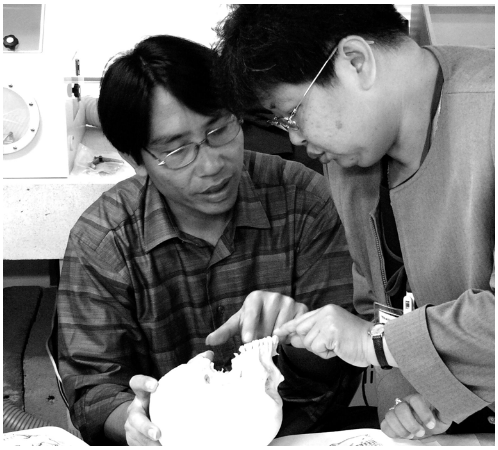
Human Osteology and Physical Anthropology
(12 Nov.)
Dr. HASHIMOTO Hiroko

A basic introduction to human osteology was conducted. This involved learning the basics of the human skeleton, including the following topics: sex determination (morphology of the pubic bone, skull attributes, robusticity) and age determination (epiphyseal fusion, tooth eruption sequences, bone measurements) based on metrics and non-metric traits; dental anthropology; and variation in the human skeleton among different ethnic groups. Participants worked in groups learning anatomical orientation, anatomy of the skeleton, and identifying landmarks for sex and age discrimination.

Lecture by Dr. Hashimoto explaining the differences between male and female crania.

Introduction to Palaeodiet and Palaeoparasitology
(12 Nov.).
Dr. KANEHARA Masa'aki

Palaeoparasitology is a research field with immense value but with few researchers in Japan and other countries. The origin of palaeoparasitology as a discipline was initiated with the discovery of features ascribed as areas for human bodily waste disposal, or toilets. Hence, in Japan, the field has come to be known as "toilet archaeology".



Participants examining a human skull.

The important points during the lecture included the following: ditches surrounding early towns were used for excrement disposal, followed by cesspit type toilets and then flush toilets. Excavation of toilets and ditches has been carried out at both of these sites. These toilets were excavated with the intention of discovering evidence related to, 1) ancient dietary habits such as consumption of aquatic, marine, and land animals, 2) ancient health issues such as the incidence of disease or parasites affecting humans in the past, 3) plant sources available during these time periods as well as used as medicinals (possibly to

Dr. Kanehara giving instruction on the identification of palaeoparasites.

Identification of parasites using microscopes

control sickness related to infection form parasites); this is know through pollen analysis found from the toilet sediments. Different parasites have been recovered from these toilets suggesting the consumption of pork, beef, and fish products. Fecal-borne disease was apparently an ongoing problem during this time as evidenced by the presence of whipworm and ascarid roundworm eggs. The significance of roundworms becomes clear when it is known that they only appear with the beginning of rice agriculture, and not in earlier periods. This has now become an important signature of rice domestication in the archaeological record.

Images and slides of parasites were described to the participants. Following this, they were given prepared slides of whipworm eggs, roundworm eggs, pork/beef tapeworms, fish tapeworms, and liver fluke eggs and attempted to identify them under the microscope. The identification of pollen grains and insect parts was also attempted but the focus was on clear identification of parasites. Participants attempted to count the number of parasites found using 10x magnification. They were instructed to count using the gradations on the visual field of the microscope and report their final counts.

4. On-site Lectures

Restoration and Open-Air Reconstruction of Archaeological Sites (17 - 19 Nov.)

17 Nov.

Noto Kokobun-ji Temple Complex

(Noto Peninsula, Ishikawa Pref.)

The participants visited the Noto Kokobun-ji Temple Site and museum in Ishikawa Prefecture. The site is an open-air, partially reconstructed temple complex first built in A.D. 840. Participants toured the small museum that had dioramas with descriptions of the original buildings and actual beams and posts along with excavated iron tools. The temple compound, approximately 200 metres by 150 metres, lies adjacent to the museum with a reconstructed entrance gate and wall. The other buildings are represented only by reconstructed bases and platforms. The local community was active in the planning of the restoration and conservation project from the initial stages. This temple reconstruction is considered to be a successful model of an archaeological/historical restoration management plan and implementation. Many participants had a vested interest in some of the reconstruction techniques as they area faced with similar features and materials on the sites they work at in their own countries.

Discussing the scale model of the Kokubun-ji temple before visiting the site.

Observation of the temple's stone foundation.

18 Nov.

The Ishikawa Archaeological Foundation and Museum (Kanazawa, Ishikawa Pref.)
Guided by Mr. HAYASHI Masanobu, Mr. YUJIRI Shuhei and Mr. FUKUSHIMA Masami, The Ishikawa Archaeological Foundation

This centre is a legally incorporated foundation with a mandate to conduct rescue archaeology, public archaeology, research and excavation report publication, artifact storage/curation, and conservation. Public and educational archaeology and the awareness of heritage protection is an important focus, with many demonstrations and workshops available for the public. The director of the Institute gave a welcome speech and introductory remarks about the history and

Mr. Hayashi explaining the organization of the Ishikawa Archaeological Foundation.

Explanation of the artifact storage room.

Kiln for experimental firing of *sueki* wear.

The Ichijo-dani museum suffered heavy flood damage 2 months prior to our visit. Panels show the damage and reparations.

design of the foundation. The institute also includes a small two-story museum, and large open-air museum consisting of outdoor dwelling reconstructions and a functioning earthenware/brick kiln, the artifact collections, cataloguing laboratory and offices, conservation laboratories, field documentation archives, and a library. All of the participants were impressed that an archaeological centre far from any large city or capital centre could be so self-contained and well equipped. The temperature-controlled collections storage warehouse and computer-based cataloguing system is still rare for many museums in the Asia/Pacific region. After a tour of the collections, conservation labs, and cataloguing area, the participants were taken on a tour of the open-air museum. This consisted of reconstructed *Jomon*, *Yayoi*, and *Nara* period pit houses and a functioning kiln where all of the centres replicas are still made. Finally, a tour of the public archaeology building was provided with an explanation by the chief archaeologist. Several tables are set up with different materials used to teach prehistoric technology to children and adults, such as ceramics production, flint knapping, refitting (with puzzle pots fitted with magnets), textile/basketry making, and faunal analysis. The visit ended with a fire-making demonstration using a fireboard and a hand drill made of wood; several participants joined the demonstration and were successful in producing flames from the fireboard.

Ichijodani Asakura Clan Historic Site and Fukui Ichijodani Prefectural Museum (Fukui pref.)
Guided by Mr. YOSHIOKA Yasuhide, Fukui Prefectural Archaeological Research Centre

This historic village is designated as a National "Special Historic Site" (under the "Monuments" and "Historic Sites" sections of the Cultural Properties Scheme by the Japanese Agency for Cultural Affairs). This is a

Medieval Castle town with a reconstructed main street and drainage gutters. Samurai retainers and merchant residences and workshops with associated craftworkers homes (and even outhouses) line the reconstructed main road of the historic settlement. Ongoing excavations (since 1967) have revealed the town complex along with a temple. The large *Daimyo* residence consists of complex architecture with many rooms and an associated garden. In addition, there are three other gardens in the vicinity that are designated as National "Special Places of Scenic Beauty". Participants were guided around the historic village, and across the river to the gardens and Daimyo residence, with explanations by Mr. Yoshioka regarding the restoration techniques and logic behind the site's design. Several months prior, heavy rains caused the river to overflow and flood the valley and town, including the Ichijodani Museum, which was filled with 30 cm of standing water. This created an emergency situation and the museum was closed while volunteers salvaged the precious objects and undertook cleaning and reparations.

19 Nov.

Mikata *Jomon* Museum (Mikata Town, Fukui Pref.)

Guided by Mr. KOJIMA Hideaki, Mikata *Jomon* Museum

In the morning the group visited the renowned Torihama site, an important *Jomon* period (12 000-2300 B.P.) prehistoric shell midden and settlement. The Mikata *Jomon* museum based on the site is built as a grassy mound with large circular white columns protruding from the top making it an interesting landmark. The museum, built in the 1990's, is based primarily around the theme of *Jomon* settlement and lifeways at the Torihama site, an early to middle period Jomon settlement. The museum is an excellent example of an interpretive centre/museum based solely, and successfully, on a single theme from a single prehistoric site; this concept is a rarity among museums in many parts of the world. Torihama is a wet site famous for its excellent preservation, having yielded dugout canoes, basketry, knitted textiles, rope, and some of the earliest examples of lacquer technology painted on wooden bowls, combs, and bows. The participants examined the exhibits arranged according to various themes regarding lifeways such as subsistence, watercraft, technology, plant use, dye production, lacquer technology, and environmental reconstruction. Examples of ancient ceramic musical instruments,

At the Mikata Jomon Museum (trying the ceramic flute).

Faunal identification using bones excavated from the nearby Torihama *Jomon* site.

particularly flutes were tested by participants. Additionally, an exercise on faunal identification and cultural modifications using excavated mammalian bones (i.e. deer, wild boar, monkey) put some of their training into practice. Participants expressed an interest in applying some of the ideas regarding exhibit design in their own historic sites and museums.

Matsugase *Daiba* Battery Platform (Ooi Town, Fukui Pref.)
Guided by Mr. TANAKA Ei'ichi, Museum of Ooi Town

A tour and explanation of this historic military feature was provided by Mr. Tanaka from the Ooi Town Museum. The purpose of the battery, built around the 1850's (the exact date of construction is unknown), was to protect this part of the coastline of Japan during the Edo period when shipping and trading activity increased markedly. The entire battery was reconstructed without any excavated features left intact. The cannons are all bronze replicas rather than iron so that they will preserve longer when exposed to salt water spray from the ocean. "*Daiba*", or gun battery, is the Japanese word for a small artificial island projecting from the mainland serving as a fortification or a cannon battery platform. The battery is comprised of two main complexes or "barbette", where the cannons were situated, with gunpowder storage rooms dug into the earth at either end of the semi-circular battery. Older barbette were built on higher elevations along the hillslope with cannons placed in a straight line rather than circular. The reconstructed battery investigated by the participants lies along the coast up a 2 metre embankment 10 metres from the water. Two barbette were excavated in the 1980's with the purpose of collecting structural details for accurate restoration. Historical documents from paintings and drawings, and diaries written by feudal lords also aided reconstruction.

Standing on the reconstructed bank of the *Daiba* battery.

Country Reports by Participants

Cambodia

AN Sopheap

Archaeologist,
Preventive Archaeological Unit
Department of Monuments and Archaeology
APSARA Authority

REPORT ON THE HISTORY OF THE ANGKOR WORLD HERITAGE SITE

From the 1980's to the 1990's the great archeological site of Angkor (the royal city from the 9th century to the 14th century) was threatened by illegal looting. About halfway between this time, in 1989, His Majesty King Norodom Sihanouk, the King of Cambodia, surveyed the situation, and subsequently appealed for the international community, and UNESCO, to protect the vulnerable and highly threatened site of Angkor. Meanwhile, the opening of Cambodia to the international community since the 1990's, has helped to enhance the rebuilding of the national infrastructure and to reinforce national management capacities. Unfortunately, these actions have simultaneously rendered the country more vulnerable to diverse forms of exploitation that are destructive to the long-term well-being of Khmer society. With its uniquely rich cultural and environmental heritage, Angkor has become a prime target of such exploitation. The rapidly expanding international illegal art market is bloated with objects from this virtually unprotected open-air museum. Pillaging as well as logging continues, largely unhampered by inadequate protective measures. The list of abuses is long.

In December of 1992, after years of preparation on the part of the Khmer authorities in collaboration with the international community, Angkor was inscribed on the UNESCO World Heritage List. The World Heritage community made an exceptional decision to temporarily lift normally required inscription conditions pertaining to national mechanisms for site protection and accepted the request on the following criteria:

i) Angkor represents a unique artistic realization, a chef d'oeuvre of the human mind

ii) It has exerted a strong influence on the development of architecture, monumental arts, and the organization of space during a given period in a specific cultural region;

iii) It gives unique testimony on past civilizations;

iv) It offers a remarkable example of a type of construction or architectural group illustrating an important historical period.

In the context of Cambodia's still precarious yet promising situation in the preparatory stage of the 1993 elections (the first to be held in three decades) Angkor was further declared as a "World Heritage Site in Danger". The site was to maintain this status for a probationary period of three years during which conditions relating to the precise delimitation of the site and its buffer zone, and to the establishment of national, legal and administrative frameworks to protect the designated area were to be fulfilled in view of permanent inscription. The committee subsequently asked UNESCO to immediately begin work on an in-depth study of the site and its surrounding region as a first step in assisting the Cambodian government in fulfilling these conditions within the allotted time.

Permanent inscription on the UNESCO World Heritage List will allow Angkor to be preserved as both a National and World Heritage Site. In the present situation, the Khmer Government cannot assume sole responsibility for protection and management of the site. Likewise, the international community can recognize Angkor as a World Heritage Site only in honouring it as a facet of specifically Khmer culture, and thus, in working under National directives for coordination in all aspects of site management. This implies true international involvement in preservation and development within a context of mutual collaboration directed towards developing National capacities. Thus, it has been from the viewpoint of the confirmation of permanent World Heritage Site inscription that the Royal Khmer Government has striven over the past three years to fulfill the conditions necessary for viable site management. It has been assisted in this effort by UNESCO and other international agencies, as well as private and government bodies, and great progress has already been made in forging appropriate National and international structures.

A response was needed to deal with a high level of coordination regarding diverse National domains, concerns in genuine cultural heritage protection, and the creation in August 1993 of the Supreme Council on National Culture. Thus, a National inter-ministerial committee assuming the responsibility for the protection of cultural heritage through out the country dramatically increased Cambodia's administrative capacities in the domain. Moreover, National responsibility for safeguarding the cultural heritage was mandated by Articles 69, 70 and 71 of the Constitution of Cambodia promulgated in September of the same year. The subsequent creation in October of an International Coordinating Committee for the Protection and Development of Angkor, based in Phnom Penh, has given concrete form to the coordination of international engagements within this nascent national framework.

Numerous in-depth studies of the region, notably the Zoning and Environmental Management Plan (ZEMP) prepared by UNESCO in collaboration with the Royal Khmer Government immediately following the 1992 World Heritage Committee decision, and the various urban and institutional development studies, carried out since 1994, have significantly increased understanding of the issues at hand. Drawing upon these and other recent studies to update and complement past scientific research carried out in the region, the Royal Khmer Government has formulated plans for the long-term protection and management of the Angkor site. These plans are based on a global project for integrated development of the Siem Reap region as a whole.

Decisive legislative measures have been taken in view of initial policy implementation. The most important of these measures are undoubtedly the definition and demarcation of protected zones for the Angkor site, the adoption of a law for the protection of cultural heritage, and the creation of a National authority for the protection and management of the designated regions. This authority, known as APSARA, is responsible for the continued formulation and implementation of protection, conservation and development plans, and the coordination of the National and international projects at Angkor. These legislative and institutional frameworks mark the beginning of a new active role Cambodia will take, responding to the call of her own people in the voice of her King, as well as to that of the international community, in managing Angkor as a National and World Heritage Site for generations to come.

In December of 1995, the UNESCO World Heritage Community confirmed Angkor's permanent inscription on the World Heritage List, thus acknowledging the three years of progress made toward establishing National responsibility in site protection and management.

Since Angkor was on the temporary List of World Heritage Sites in December 1992, the World Heritage Committee recommended that the Cambodian government abide by the four principal conditions:

1 — To establish a ***Law for the Protection of Cultural Heritage****:* The law was adopted by the National Assembly in December 1995 and signed by His Majesty the King on January 1996.

2 — To create the ***Cultural Heritage Police Corps****:* a special unit of the French police (service de cooperation technique internationale de police-SCTIP) and UNESCO have worked in collaboration with the Ministry of the Interior since 1994 to train police agents in the special surveillance and search technique as well as deterrence, pursuit and arrest methods, to devise the most suitable infrastructures for diffusing information and recovering stolen cultural property from within as well as beyond the national borders. An elite police brigade composed of more than five hundred agents trained specifically for the protection of cultural property in the province of Siem Reap has proven itself efficient in the field.

3 — To establish the ***Protected Cultural Zones*** *in the Angkor Region:* A Royal Degree approved by the H.M.the King in May of 1994 defined the perimeter of the protection of the Siam Reap province and the nature of the four national categories for site protection and the corresponding management regulations.

The Angkor region is divided into five different protection zones:

Zone 1: Monumental Sites are areas that contain the most significant archaeological sites in the country and therefore deserve the highest level of protection. They may be quite small in area, but in the case of Angkor, large areas can be managed under this category, given the density and importance of the monuments and archaeological remains in the region.

Zone 2: Protected Archaeological Reserves are areas rich in archaeological remains that need to be protected from harmful land use practices and the consequences of inappropriate development. They will most frequently surround Monumental Sites, providing protection to adjacent areas of known or possible archeological importance, much of which, in most cases, may not be clearly visible above ground. The principle use of the zones in this category will be to act as a buffer protecting the site.

The three main Monumental Sites and the Protected Archaeological Reserves identified in the region are those of Angkor, Rolous and Banteay Sri. Together they comprise an area of more than 350 square kilometers.

Zone 3: Protected Cultural Landscapes are areas that should be protected based on their traditional appearance, land use practices on the part of the past or present occupants, varied habitats, historic buildings, or man-made features from the past or present that contribute to cultural values or reflect traditional lifestyles and patterns of land use. Cultural Landscapes may also safeguard viewpoints and relationships between significant features that contribute to their historic or aesthetic value. Cultural Landscapes are protected by regulations that control harmful or disruptive agents.

Zone 4: Sites of Archaeological, Anthropological or Historic Interest include all other important archaeological sites, but of less significance than Monumental Sites. However, such sites still require safeguarding for the purposes of research, education or tourism. These sites are protected by certain regulations. These regulations are similar to those that apply to the Protected Archaeological Reserves. Other sites may be included in the future.

Zone 5: The Socio-economic and Cultural Development Zone of the Siam Reap Region, comprising the whole of Siam Reap province. Guidelines will be provided that will encourage sustainable development and assess its impact on the environment, with a view towards preserving cultural and natural heritage.

At the present, boundaries surrounding Monumental Sites (zone 1) and the Protected Archaeological Reserves (zone 2) sites are being created to control the area.

4 —To establish ***an Authority for the Protection and Management of Angkor and the Region of Siam Reap***: The APSARA Authority was created by a Royal decree in February of 1995. Responding to the enormous cultural, scientific, tourist and thus, economic importance of the sites, and to questions of territorial management, APSARA Authority assumes three levels of management responsibility: political, technical and operational.

The International Level of the APSARA Authority

The external working mechanisms allow APSARA to collaborate directly with international government and non-governmental agencies to coordinate the actions undertaken in many domains. All international projects in the Province are submitted to the International Coordinating Committee and its Technical Committee for discussion. Presided over by delegations from France and Japan, with UNESCO as acting Secretariat and Cambodia as the other permanent member, these committees assemble participants from over 30 different nations and international organizations at quarterly sessions to help in Phnom Penh or Siam Reap. Through this structured partnership with the international community, national technical capacities are gradually strengthened.

International Assistance for the Safeguarding the World Heritage in the Angkor Region

Since Angkor was registered on the UNESCO World Heritage list, it has accepted help from the international community. The following is a listing of the international governmental and private organizations working in the Angkor region:

SOPHIA: Sophia Asia Center for Research and Human Development

Restoration project of the western causeway of Angkor Wat temple
Conservation and archaeological research project at Banteay Kdi temple.
Archaeological research project of the ancient kiln site at Tani village.

JSA: Japanese Government Team for Safeguarding of Angkor

Restoration and archaeological research project at Sour Prot temple.
Conservation project at Bayon temple.
Restoration project of Northern library of Bayon temple.
Restoration project of Northern library of Angkor Wat temple.

NARA: Nara National Research Institute for Cultural Property

Archaeological research project of the ancient kiln site at Tani village.
Conservation project at Western Top temple.

EFEO: Ecole Française d'Extrême-Orient

Restoration project of Terrace leapper King in Angkor Thom complex.

Research project of the territorial management of Angkor Sites in the ancient time.

FSP: Fond de la Solidarité Prioritaire (French government)

Restoration project of Baphun temple.

Research project of Angkor Thom City.

Training program for APSARA

GACP: German Apsara Conservation Project

Conservation project of apsara and bas-relief at Angkor Wat temple.

Conservation and restoration project of Preah Ko temple, corporation with APSARA Authority.

CSA: Chinese Government Team for Safeguarding of Angkor

Restoration project of Chau Say Tevada temple.

BSCP: Banteay Sri Conservation Project

Conservation project of Banteay Sri temple.

ASI: Archaeological Survey of Indian

Conservation and restoration project of Ta Phrom temple.

IGES: Italian Structural Geotechnical Engineering

Conservation and restoration project of Pre Rup temple.

Restoration project of the laterite stap of the moat of Angkor Wat temple.

WMF: World Monuments Found

Conservation project of Preah Khan temple.

SIDNY:

Archaeological research project of the hydraulic system in Angkor region.

The development of the Angkor World Heritage Site

- 1992-1994: Angkor was on the contemporary List of World Heritage.
- 1995: Angkor was considered to be “Fragile” World Heritage.
- During 10 years, from 1994 to 2004, Angkor was developed considerably, thus, the World Heritage Committee has removed Angkor from the “fragile” list, and now considers "Angkor to be in a “developed situation".

Internal work of the APSARA Authority

For the protection and management of the Angkor Region, the APSARA Authority has created five main departments:

- Department of Monuments and Archaeology
- Department of Tourism Development of Angkor
- Department of Urbanism the Towns and of the Tourist City
- Department of Water and Forest
- Department of Social and Economic Development

Department of Monuments and Archaeology

The most important Department is the department of Monuments and Archaeology that has the greatest responsibility for all of the sites.

The Department of Monuments and Archaeology has created three main Units:

- The Maintenance Unit: responsible for the conservation and restoration of the temples. To collaborate and control the international organization working in Angkor region.
- The Landscape Unit: responsible for the protection and the management of environmental landscape surrounding the temples.
- The Preventive Archaeological Unit: responsible for the protection of the archaeological sites. To conduct the preventive archaeological research on-site that for development. Additionally, this unit collaborates and controls the international organizations working in Angkor region.

The Preventive Archaeological Unit

Angkor was registered on the UNESCO list of World Heritage Sites on the 14th of December 1992. Consequently, the APSARA Authority was created by Sub-decree Number 00NS in order to protect and manage the region of Angkor. Article 8 of the Sub-decree states that any activities concerning the development in the Angkor region must give priority to preserving archaeological remains, and preventive archaeological excavation must be conducted prior to engaging in any construction activities. With reference to this article, the APSARA Authority set up a Preventive Archaeological Unit of 12 archaeologists in the Department of Monuments and Archaeology in June 2001, in order to compromise the archaeological issues caused by diverse development projects and especially the management project of the Parvis (the management of space located in front of monument for providing tourists services – waiting rooms, public restroom, souvenir shops, restaurants, car parking and so on) of the principal monuments in the Angkor complex.

Aims

The Preventive Archaeological Unit's aims are to preserve as much of the Angkor site as possible from damage from any development, and also to generate future research in the form of archaeological samples and important data recovered from ancient settlements and activities around the temples which were a part of the Angkor civilization.

Objectives

1-To evaluate the archaeological potential of the zones concerning the development project of the Parvis, and then to suggest solutions and recommendations for implementing the sites. In the case the excavations yield important archaeological structure, the site has to be preserved carefully and confirmed clearly that it could not be developed within the Parvis area.

2- The Preventive Archaeological Unit must conduct salvage excavations on the historical sites being threatened by any development projects in order to safeguard archaeological data.

Task Achievements 2002-2004

Up to this point the Preventive Archaeological Unit has been conducting salvage archaeological excavation at sites in the Angkor complex in order to achieve its aims and goals which are to preserve every archaeological site. The following is a list of the status of some sites:

- Parvis of Angkor Wat temple is completely finished.
- Parvis of Banteay Sri temple is completely finished.
- Parvis of Wat Tang Tok only the sector of the public restroom has been completed.
- Parvis of Banteay Kdi temple only the sector of the public restroom is complete.
- Parvis of Phreah Pithu group only the sector of the public restroom is complete.
- Parvis of Ta Keo temple only the sector of the public restroom is complete.
- Parvis of Ta Som temple completed only the sector of the public restroom

- Parvis of Phnom Bakheng completed only the sector of the public restroom and the sector for the parking.
- Parvis of West Baray completed only the sector of the public restroom.
- Parvis of Neak Pan completed only the sector of the public restroom and the sector for the parking.
- Parvis of Beng Mala temple completed only the sector of the public restroom.
- 16 Police Heritage Quarters are completely finished.
- Balloon recreation in frond of Angkor Wat temple is completely finished.
- Archaeological surveillance of the rehabilitation project of the National Roads N-6, which contain ancient bridges, is already done.
- Archaeological surveillance of the new road built across the north west side of Angkor Park is already done.
- Archaeological surveillance of the new canal built in front of Angkor Wat temple is already done.
- To collaborate and control the international organizations working at Angkor.

Planning project for the year 2005

A new project has already been planned for the year 2005 by archaeologists and other experts concerned in order to appropriately arrange research schedules according to the time and requirements of any new construction needed on archaeological sites. Some new projects for the management of the Parvis are as follows:

- Parvis of the west side of Preah Khan temple
- Parvis of the west side of Ta Phrom temple
- Parvis of the east side of Ta Phrom temple
- Parvis of the south west side of West Baray
- Parvis of the Banteay Samre temple
- Parvis of the Phreah Ko temple
- Parvis of the Lo Lei temple
- Parvis of the Kbal Spean site

Preventive Archaeology Methods:

The development project of the Parvis in the Angkor region requires close collaboration between the Preventive Archaeological Unit and the Landscape Unit. This collaboration is in its early stages and the teams are currently in the process of choosing the location of each Parvis. When the location has been chosen, the Landscape Unit will designate a plan for its location and the following research will be done by the Preventive Archaeological Unit. This is particularly important for determining the significance of the site and assisting with decision-making.

i). Documentation study

Obtaining information about a site is the first step in the research process, and necessary for assembling all known information about a locality. This can include the previous recording of sites, all documentary evidence, and local knowledge including oral traditions. In the Angkor complex case, major elements of the whole area have been recognized as having archaeological potential, thus, the main task is to check information about each site and related areas that had been partly studied by French scholars during the colonial era though, however, this has not yet been done in detail.

ii). Surface collection

This task is basically done on-site by archaeologists conducting surface survey and the compilation of information concerning archaeological and topographical remains, and the surrounding environment of the site. During that time, if remains are found and the site has high potential and cannot be developed for any reason, we will request to change the location of construction. However, this location will be researched the next time and the team will look for another possible location nearby.

iii). Handle auguring

Handle auguring can provide a quick, convenient understanding of buried features, stratigraphy and other archaeological site information. Handle auguring is conducted from the surface to the natural layers. The auguring distance depends on the location. For the general location we use a distance of 5 meters from one augur to the next, and for the constructed area we use a distance of 3 meters. Each sample is composed of 20 cm to 20 cm of sediment. The next task is for both archaeologists and geologists to analyze the sediments and record the information in a paper file.

iv). Excavation

Based on the results of the auguring, we will conduct excavation to complete the archaeological data that we processed from the augur sample. It is necessary to conduct excavations at the location where new construction will be built. The excavation method is as follows: removal of the soil layer by layer, the recording the data and collecting the artifact, followed by photos, and finally, stratigraphical drawing and topographic mapmaking.

v). Interpreting and analyzing the data

The evidence must be critically analyzed and from it a synthesis of the history and development of the site should emerge. At this point, the missing evidence should be identified, along with extra work, which might be required to explicate any further site significance. The crucial evidence, on which assessment is based, can then be presented.

vi). Studies of the Artifacts

The findings from the excavation site (mostly ceramics) are cleaned and brought to the office for the study. Unfortunately, the APSARA Authority does not have ceramic experts, so all of the ceramics from the site are kept in storage awaiting future study.

vii). Report writing

The report scientifically describes the aims and objectives of the project, research activities, data analysis, and results. Reports are then submitted to the Director General and other experts for consideration and to offer any solutions.

viii). Evaluation of the value of the archaeological sites

Discussions with other experts, in particular archaeologists as well the director of APSARA in charge of Archaeology, always consider possibilities for any new construction in Angkor Park. If there is low archaeological potential at a site allowing construction, the environment surrounding the site still must be respected. In case of moderate archaeological potential, and construction is possible, it is done under close supervision and there are specific conditions. If a locale has high archaeological potential, construction is not permitted and will be undertaken only after future research. However, some recommendations and solutions will still be discussed in order to arrive at an appropriate method to apply to the Angkor site.

ix). Surveillance

After the potential archaeological site has been evaluated the construction company can begin work. The company must inform our Unit of their work so that we can closely monitor their process and any possible detrimental effects.

"Archaeological Salvage Excavation of the management of the Parvis around the principal monuments in the Angkor area":

A case study of the public restroom at the Parvis of Preah Pithu site

A request from companies and travel agencies regarding tourism facilities at the Angkor Park have led APSARA to take action regarding a research project plan in order to construct buildings less harmful to site. In the case of the Preah Pithu site, they plan to build a public restroom (Sector 1 and 2), waiting room (Sector 3), amenagements navettes (installation shuttle buses) (Sector 4), and road (Sector 5) to facilitate tourism services (Fig.1).

In figure 2-5 an example of a salvage excavation undertaken at the public restroom area of the Parvis of Preah Pithu group can be seen. This is a site located at the northwest corner of the Preah Pithu group. At present, the Preventive Archaeological Unit is researching the Parvis of the principal temples. Except the Parvis at Angkor Wat and the Banteay Sri temple (where excavation has been completed) a risk map was established at the site (Fig.2-5).

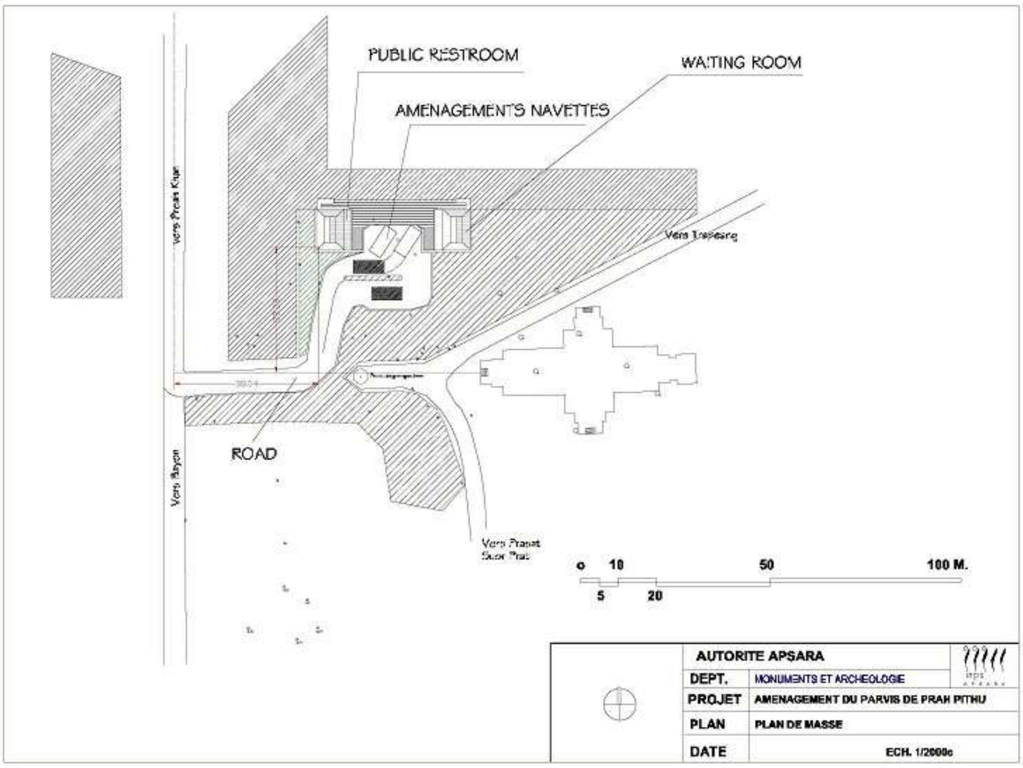


Fig. 1. Plan of the inside management of the Parvis Phreah Pithu, Location C

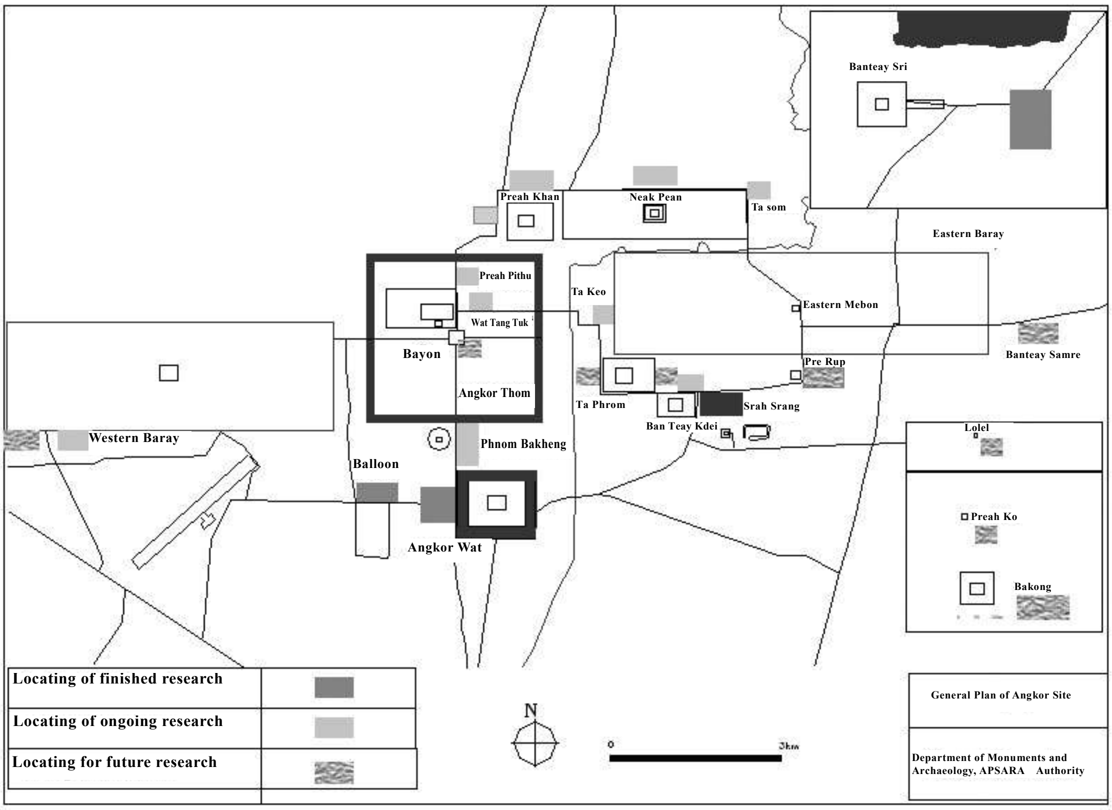


Fig. 2: General Plan of the Angkor Site

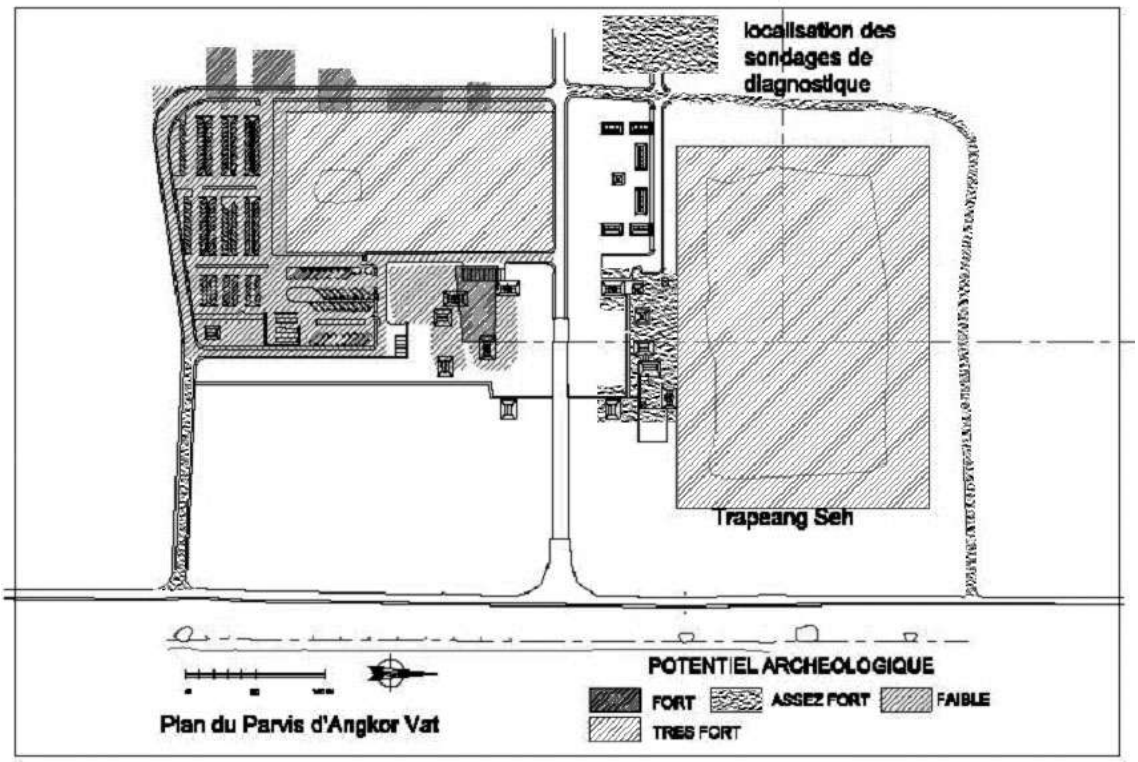


Fig. 3: Map of potential heritage areas at risk at Angkor Wat Parvis,

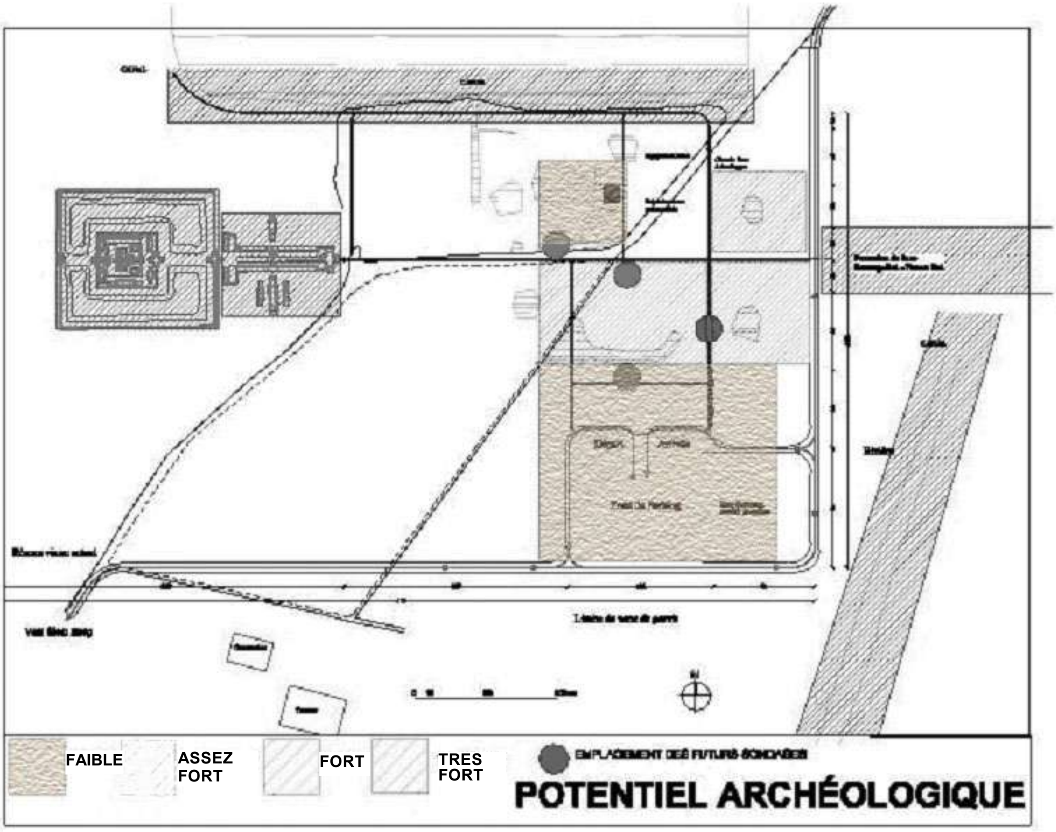


Fig. 4: Risk Map of Banteay Sri Parvis

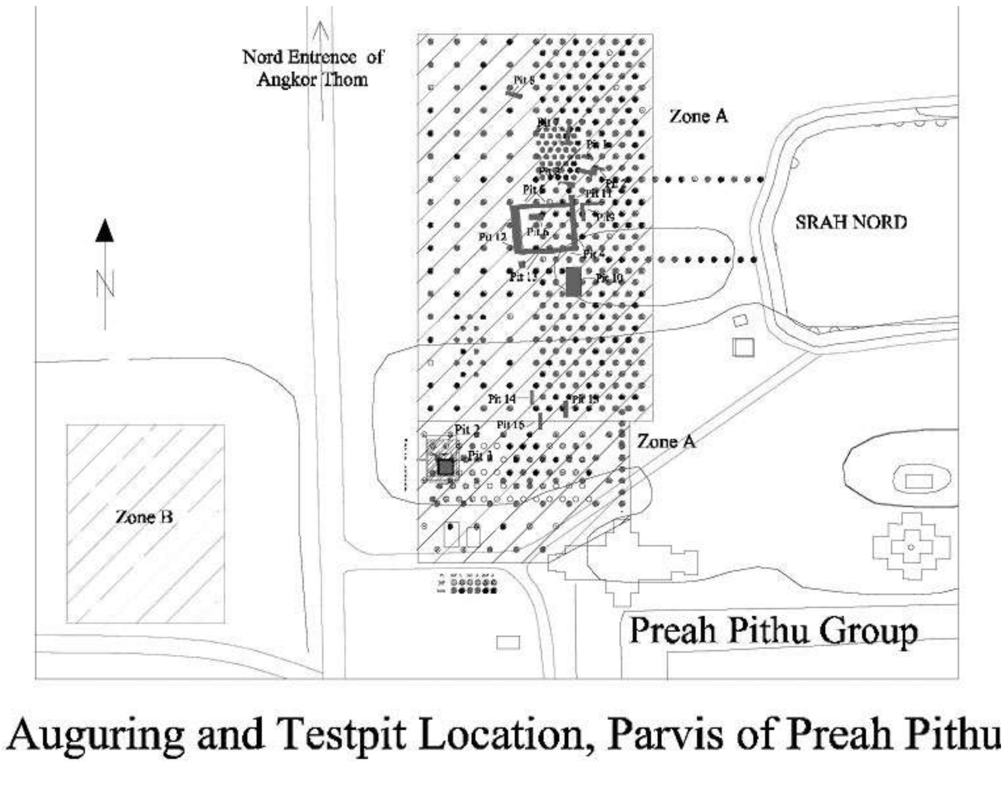


Fig. 5: Auguring and Test pit Locations, Zones A and C

Aims

The aims of the study at the Preah Pithu site are to preserve all of the remains as well as recording new data in conjunction with the construction projects in order to create the best possible compromise.

Objectives

- To identify archaeological potential at the site.
- To compare archaeological remains to other sites.
- To assess the finding of archaeological data at the site.

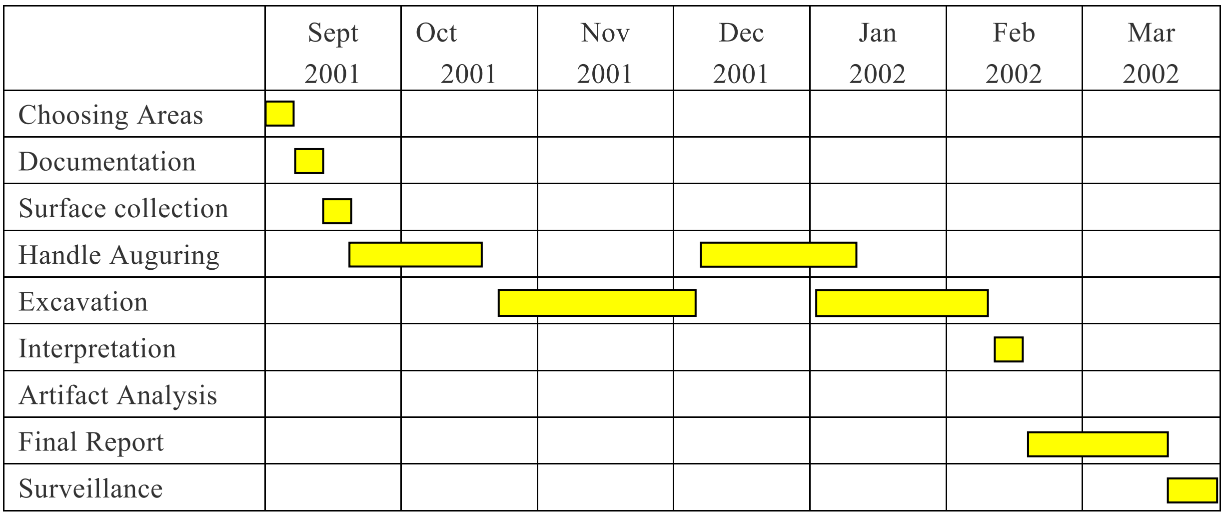
Research Methodologies and Techniques

Some techniques such as documentary study are important for supplementing field data such as excavation, surface collection of artifacts, and handle auguring. However, site maps already exist from previous years fieldwork and do not need to be produced.

Time Schedule

Since the time frame for the field research and data collection process was limited, a carefully planned time schedule was set up to coordinate the various steps necessary during the research period. The data collection took place from early August 2001 to the beginning of March 2002 by the Preventive Archaeological Unit.

Time frame of the work schedule



Participants

Salvage excavation was carried out from 4 September 2001 to 23 March 2002. Researchers that participated on the project are listed below:

- An Sopheap: archaeologist, Preventive Archaeology Unit
- So Peang: archaeologist, Preventive Archaeology Unit
- Un Moninita: Archaeologist, Preventive Archaeology Unit
- Net Simon: Archaeologist, Preventive Archaeology Unit
- Ros Visoth: Archaeologist, Preventive Archaeology Unit
- So Pot: Archaeologist, Faculty of Archaeology
- Lim Hak: Topo, Fond de la Solidarité Prioritaire (FSP, French Gouvernement)
- Marc Fraingiat: Archaeologist, Consultant of Archaeological Preventive Unit, FSP.
- Jean-Baptiste Chevance: Archaeologists, Consultant of Archaeological Preventive Unit.
- 43 fieldworkers and excavators

Findings and data analysis

Area Selected

The development project for the entire Parvis site in the overall Angkor site and the Preventive Archaeological Unit has worked closely with the Landscape Unit to choose the Parvis location. We chose the site that posseses the lowest archaeological potential and does not destroy the environment around any of the monuments.

The first location selected by the Preventive Archaeological Unit and the Landscape Unit for the Parvis (location A) was a 13,000 square meter area located on the west side of the Preah Pithu pound. We began by clearing the forest for auguring. According to the results of the auguring we opened same test pits and found many important ancient structures including the terrace of the surrounding laterite wall and basement, laterite floors with many post holes, roof tiles, laterite steps, water drainage systems, and settlement traces with potsherds and charcoal (Figures 6-10). We assume that Location A was probably an ancient settlement quarter of the capital of Angkor Thom that contained high archaeological potential and could not be developed like Parvis.

Since Location A contained an important archaeological structure, we decided to shift the Parvis area to Location B, an area of 4,000 square maters located towards the west entrance of Angkor Thom. As we started to clear the forest at Location B, we found important laterite structures, probably a Buddhist terrace dating from the middle period, from 14th to 18th

Fig. 6: The water drainage system, Location A

Fig. 7: Fragment of roof tiles on top of the lalerite basement, Location A

Fig. 8: Rectangular laterite building blocks, Location A

Fig. 9: Laterite steps, Location A

Fig. 10: The laterite floor found in a pit at Location A

Fig. 11: Scattered laterite blocks at Location B

century (Figure.11). This location B was also assumed to be of high archaeological potential, similar to Location A. Thus, the Parvis area had to be relocated again. A 2,000 square meter area, Location C, is located close to the western part of Location A and was finally chosen for the Parvis area (Fig. 12).

The first section of this site currently being excavated will, in the future, become the location of public restrooms. Before discussing the finds from this excavation, we would like to introduce some features of the site.

Profile of the Study Area

Parvis of Preah Pithu is located in the compound of Angkor Thom, with the glorious Royal Palace of King Jayavarman VII (13th century) and located beside the Preah Pithu temple group, a site that was first built in the 12th century.

The west side of location A and B contain a ditch running along the north-south entrance of Angkor Thom. At the southern end of Location C, there is a 6 meter-long dike running east to west. To the northeast is a pond and the Preah Pithu temple group. In location A, many holes from the illegal looting of antiquities were found.

We found many potsherds, sandstone, and laterite stone fragments. In 1939, Henri Marchal, a French archaeologist, found 3 or 4 laterite structures in the area of Location A. We have also found ancient traces after clearing the forest.

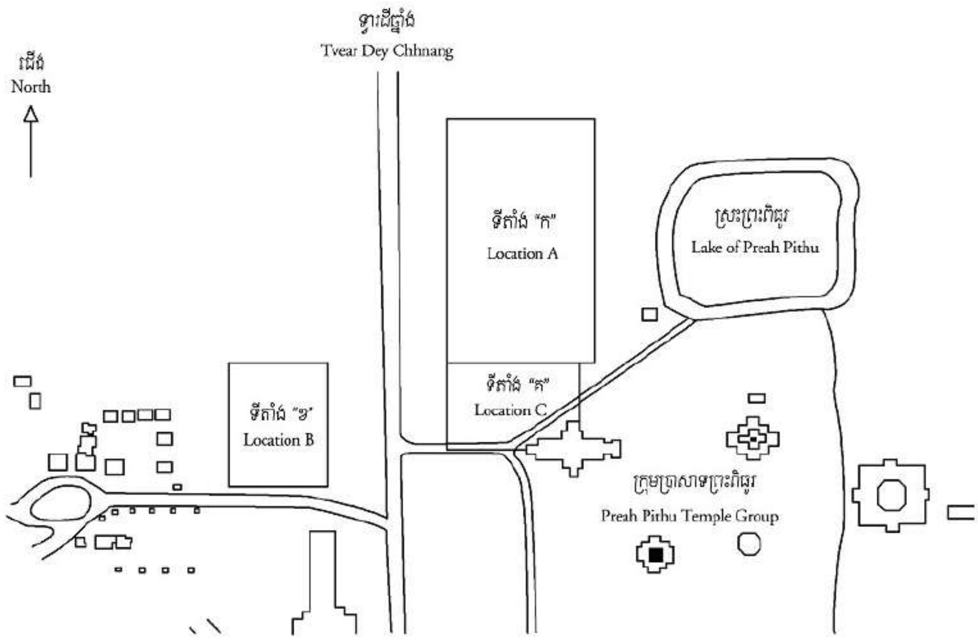


Fig. 12: Plan of alternative Parvis area of the Preah Pithu group

Handle auguring

We made 404 drillings to two meters' depth with a distance of 5 meters from one drilling to the next. Sixteen pits were excavated in Location A. In Location B, the forest was cleared, while in Location C, 120 drillings were undertaken and a salvage excavation was carried out at the site of the planned public restroom (Figs. 13,14).

Fig. 13. Examining augur samples for analysis

Excavation

We excavated to 2.80 meters depth where many sediment layers were found. We noticed four different layers. The following is a description of these sediment layers beginning with the bottom layer (Figs., 15, 16):

Fig. 14. Excavation of the Public Restroom Area

Fig. 15: Photo of the sediment layer of a pit wall at Location C

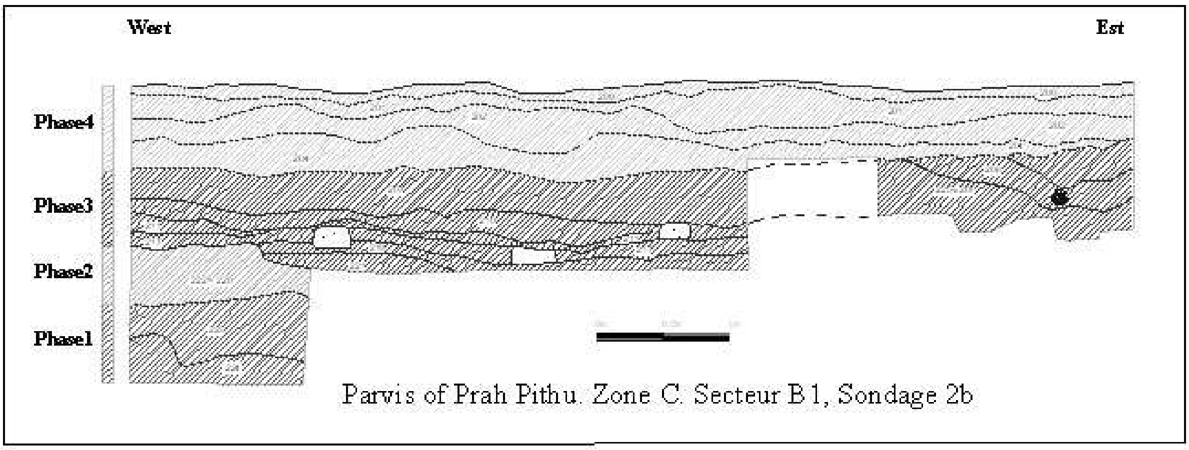


Fig. 16: Drawing of sediment layer in the excavation pit at Location C

-1st phase (2.80 meters to 2 meters in depth): There are a few levels of sediment that lie on top of each other. The lowest level is a hard pink sandy soil with a few potsherds and many laterite fragments. We assume that this lower part contains evidence of human occupation. An upper level consists of hard gray clay soil mixed with yellow oxidized soil, and there are some potsherds and small sandstone fragments. This level also indicates that there was human settlement.

-2nd phase (2 meters to 1.7 meters in depth): This layer consists of small sandstone fragments lying on a thin pink sandy layer. According to the elements found in this phase we assume that it was the first human activity of the management of this area as it is even and flat.

-3rd phase (1.7 to 1 meters in depth): This phase contains many sediments consisting of smooth grey and brown sand, mixed with some grey grainy sand. We also found potsherds, sandstone and laterite fragments, and charcoal. We think that the ancient occupants filled up this area and constructed buildings on it as we found traces of laterite, sandstone blocks and holes for columns (Fig. 17). At the upper part of this layer, there is a large hole, that was dug at some point in time and then filled up with many broken ceramic fragments.

-4th phase: This upper phase consists of smooth grey sandy soil, potsherds, sandstone and charcoal. We assume that this phase represents a later ancient occupation as well as recent use.

Fig. 17: Holes for columns

Fig. 18: Building the public restroom at Location C

Evaluation of the archaeological value of the sites

According to the results of the excavations, many artifacts were found at Location A and B, and therefore, the recommendation is to protect this area and prohibit any construction. At Location C we found traces of laterite and sandstone foundations to which we assign moderate archaeological potential. However, we decided to build the public restrooms at this place as there was simply no other alternative (Fig. 18), but we added conditions for the construction company so that their work would not affect the ancient remains. As construction proceeds, the company must inform our Unit of their work so that we can closely monitor their process and any possible detrimental effects of their work.

Satellite Photo of the Angkor World Heritage Site

Conclusion

In conclusion, salvage excavation for the development project of the Parvis in the Angkor region is important in order to protect and preserve the buried heritage. Ongoing excavations are uncovering new artifacts that may explain settlement patterns in the past around the temples. This research is crucial to our understanding of the history of each site. Unfortunately, some places of worship in the Angkor region are currently being damaged or altered without prior permission from the APSARA Authority. To address this problem, the Preventive Archaeology Unit was created to take urgent measures to conserve ancient structures. The main task of our Unit is to set up protected zones, share information about the importance of archaeological remains with local people, and oversee private companies that are working on development projects.

In order to protect and preserve places of worship and ancient sites in the Angkor region, we strongly suggest that any planned future development projects, especially large scale endeavours, should apply for approval and cooperate with the APSARA Authority.

BIBLIOGRAPHY

Ang Choulean, Eric Prenowitz and Ashley Thomson, (1998) ANGKOR, Past, Present and Future, APSARA Authority

ANGKOR, et dix siècles d`art khmer, 1997

BULLETIN OF THE STUDENTS OF THE DEPARTMENTS OF MONUMENT OF ARCHAEOLOGY, N.3, July 2004.

Sharon Sullivan and Matin Blazejowski: Cultural Heritage Management Workshop, 18th April 2001.

Kazakhstan

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PROBLEMS AND NEEDS FOR ARCHAEOLOGICAL RESEARCH AND RECORD OF ACTIVITIES IN KAZAKHSTAN

Presently there are approximately 24000 monuments and sites that have been recorded in the territory of Kazakhstan, ranging from prehistoric archaeological sites to monumental buildings, defensive structures, historic towns and vernacular architecture. Two hundred and fifty of them have the highest National listing, being inscribed on the List as Monuments of History and Culture of Republican (i.e. National) Significance. More than 8000 monuments and sites are included on the List as Monuments of History and Culture of Local Significance. All the other known monuments and sites are registered in the local Tentative Lists of Monuments of History and Culture. The absolute majority (about 80 %) of cultural properties in Kazakhstan are represented by archaeological sites from different periods from Paleolithic times to the Middle Ages. Respectively, 8 of 10 properties inscribed in the Kazakh UNESCO WH Tentative List are archaeological sites. They are:

1. Petroglyphs within the Archaeological Landscape of Tamgaly (inscribed on the UNESCO World Heritage List in 2004);
2. Archaeological sites of Otrar Oasis (to be nominated in 2006);
3. Megalithic Mausolea of the Begazy-Dandybai Culture;
4. Barrows with Stone Ranges of the Tasmola Culture;
5. Petroglyphs of Eshkiolmes;
6. Petroglyphs of Arpa-Uzen;
7. Turkic Sanctuary of Merke;
8. Paleolithic Sites and Geo-morphology of the Karatau Mountain Range.

The Tentative UNESCO World Heritage List will be revised during the next two years with the inclusion of 6 more archaeological sites.

In Kazakhstan archaeology is the main source of historical knowledge. It is a science that studies past societies primarily through their material remains. The main method of archaeological investigation is excavation. It is not surprising that excavation brings to light new discoveries as well as the permanent removal of sites. The accelerating pace of research in archaeology is illustrated by developing methods which create new methods of investigation. There are seismic and acoustic methods, methods of electrical resistivity and magnetic survey, neutron scattering and thermography, etc. All these methods belong to the non-destructive ones. But, despite the growing popularity, the only way to confirm the accuracy of remote sensing techniques and actually document the remains of these sites is to excavate them. In facing the necessity of excavation on one hand and attempting to avoid destruction on other hand, there is only one acceptable solution to this problem – documentation and conservation. Documentation in this sense is a set of methods used for reflecting-visualizing, and the preservation and presentation of reality discovered and often destroyed during excavation. Conservation of the unearthed archaeological remains means their physical preservation, allowing the possibility of bringing the messages of past societies to people of the present and future generations.

During the last decade, international support and co-operation played an invaluable part in the building of national capacity in the fields of protection, research and conservation of the Kazakh cultural heritage in general, and in the improvement of documentation and conservation methodologies and techniques for archaeological heritage in particular. Examples of international assistance are the current UNESCO/Japanese Trust Fund Project for the Preservation and Restoration of Otrar Tobe, the medieval Silk Road site (started in 2001, presently under completion), and the UNESCO/Norwegian Trust Fund project on Management and Preservation of the Tamgaly Petroglyph Site (started in 2004).

Tamgaly

The cultural significance of the Archaeological Landscape of Tamgaly derives from several factors making it outstanding amongst all the most important rock art sites of Central Asia. Within the whole of the archaeological complex of Tamgaly, concentrated in an area of 900 ha, there are remains of more than one hundred well preserved sites of different types dating from the XIV c. B.C. to the beginning of the XX c. A.D. There are approximately 5000 petroglyphs grouped in several sites constituting the most important part of the archaeological landscape. Petroglyphs are mainly concentrated in the canyon of the Tamgaly River, a primary landmark in the sacred area. The oldest depictions created from the XIV-XIII century. B.C. are most outstanding. The site is representative not only of the artistic mastership and conceptual contents of the petroglyphs of this period, but also of the role they played in the formation of cultural landscapes. The burial grounds, settlement sites, cult structures, stone quarries, etc. are located around the canyon area and clustered in groups according to their function. The topography of the site as a whole demonstrates a sustainable functional structure of the cult complex with the isolated sacred zone and the peripheral residential area. The present level of knowledge allows us to regard the cultural archaeological landscape of Tamgaly as an exceptionally representative example of the development, within a limited area, of the traditional forms of husbandry, land use and social organization of the pastoral peoples in the arid zone of Central Asia through several thousand years. The rock art of Tamgaly Gorge - in the context of the other archaeological remains, the landscape and the natural and cultural surroundings - can be assessed as being of outstanding significance not only in Central Asia, but also within a global perspective.

Several years of scientific excavations, documentation and research related to Tamgaly within a variety of scientific fields, have yielded a number of reports and publications, in addition to many primary documentation material. Still many questions need to be answered, and the necessary documentation material is not yet complete. Continued data catchments and scientific treatments are of great importance in order to provide the necessary background for all future activities. Special attention is given to documentation related to conservation issues and to safe conservation practices. Due to several negative natural and anthropogenic factors, the surfaces of petroglyphs need particular attention and care.

The major part of the documentation is related to and/or correlated to petroglyphs. It consists of:

- Archaeological registration and mapping;
- Topographical plans of the location of petroglyph groups, other archaeological structures and the distribution of natural features;
- Indexed photographic and/or graphic panoramas of groups with petroglyphs;
- Indexed parallel photographs and graphic representations of surfaces with petroglyphs;
- Tracings based on rubbings of surfaces;
- Standardized descriptions of the condition of petroglyph surfaces and images;
- Standardized descriptions of archaeological, geological, botanical, zoological, tourist related and other features.

Besides, it is accompanied by drawings and written reports from archaeological excavations, special maps and reports concerning geology, botany, landscape studies, geo-morphology, geo-chemistry, etc., and also by the condition records in both graphical and verbal forms. The documentation material for Tamgaly is structured into four levels: Site (in geo-archaeological context) – Group (locality) – Surface (surface, fragment, boulders) – Image (figure). The scope of this structure includes and combines all documentation data (archaeological, geological, geo-morphological, landscape, etc.), related to the four levels, and of relevance to all questions, measures and practices (planning, interventions, monitoring). All existing data are soon to be entered into a database, for easy access, data correlation, and practical application. The documentation from studies within several fields of science gives the premise for all on-site measures directed towards conservation and safeguarding of the natural and cultural values. The multi-disciplinary geo-archaeological approach to scientific research and methodology applied in Tamgaly since the beginning of the 1990s, has allowed for the collection of a considerable amount of scientific material, without having to do a lot of excavations. Taken together, at the present time this makes Tamgaly one of the best and most thoroughly studied rock art sites in Central Asia. This experience, enriched through international participation and co-operation, should serve as the scientific and methodological basis for the education and training of specialists in the field of research and management of rock art sites in the region.

Otrar

The oasis of Otrar, located in the marginal zone between settled and nomadic cultures in western Central Asia, has had a unique historical importance as an agricultural, commercial and cultural centre for more than 2000 years. Furthermore, it has been the object of large-scale archaeological excavation and historical studies from 1969 until now. Otrar oasis, currently on the UNESCO Tentative World Heritage List, is an outstanding archaeological site that deserves recognition throughout the world.

Otrar town (Otrar Tobe) is the largest mediaeval hillfort in Kazakhstan and covers an area of 170 ha. Founded over two thousand years ago, the oasis of Otrar rose to prominence at the beginning of the Christian era, only to fall under the Mongol invasions and then to rise again during the Middle Ages. It has the typical features of a mediaeval Central-Asian Silk Roads town: a citadel, shahristan (the central town itself), rabat (suburbs) and adjoining fields, everything being surrounded by walls. As a central point along the Silk Roads, Otrar has great historical significance for the Kazakh nation, as well as being a cultural-heritage property of great contemporary interest to historians and visitors alike.

The oasis is in a marginal zone, between what has historically been a nomadic area to the north, and a predominantly sedentary one to the south, and this has had a marked effect on its development. It is also a point at which several strands of the “Silk Roads” converge. The oasis constituted a peaceful agricultural, commercial and cultural complex, and served as a first step in attracting northern nomads, settling them, and thus, importing elements of nomadic culture into the sedentary societies. This is reflected in the town's planning, architecture, pottery and jewelry. It would be hard to find a better location in the whole of Central Asia on which to build and develop a flourishing centre of trade and culture. However, today, most of the landscape has been reduced to semi-desert, the towns are in ruins, and the irrigation systems no longer functions.

Archaeological excavations have brought to light the general plan of the territory, as well as its irrigation system, suburbs, and the earthen ruins of the towns. By studying the remains of the houses, canals and roads, it is possible to observe the evolution of the interaction of cultures stage by stage, from their very beginnings to the period of final decay when the Eurasian route lost its importance and the towns their economic role. In its role as a contact zone between two cultures, the Otrar oasis can be compared with oases of Eastern Turkestan such as Turfan, and Kashgar. However, during the Eurasian Middle Ages, Otrar played an even more important role, being the door not only through which passed an east-west, but also a north-south circulation of goods and cultures.

The UNESCO/Japan Trust Fund Project conducted scientific recording and documentation of the site and set up a computer-assisted scientific documentation system to conserve the excavated structures, and to enhance national and local capacity for the management, preservation and conservation of the cultural heritage through the provision of in-service training to national experts and craftsmen in conservation regarding international standards, thus, guaranteeing that further excavation will always be documented properly and combined with future conservation activities. The package of documentation produced during the period of 2001-2004 was the result of a joint. The archaeological and conservation teams, consisting of both national and international experts, created the package that comprises topographic maps, archaeological documentation and detailed conservation recording of all structures before, during and after intervention, using advanced techniques and electronic equipment. The documentation process was the basis of both archaeological and conservation work, contributing to a better understanding of the site and its values.

It is hoped that the above-mentioned projects will serve as a model for other cultural heritage sites in Kazakhstan in the future.

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Department of Museums and Archaeology

Ministry of Information and Culture

1. Introduction

Laos has a complex and diverse cultural heritage, reflecting its history, its many ethnic groups and the pattern of population movement within the Southeast Asia region. Despite many factors that cause the deterioration and destruction of cultural assets, the important parts of the remains are still preserved today, therefore, our duty and responsibility lies with the question of how to keep our ancestral heritage safe and make it last in order to hand it over to future generations.

Laos has listed 15 sites of historic and cultural significance on the National Heritage List, of which 2 of them have already been inscribed on the UNESCO World Heritage. Luang Prabang Historic City was listed in 1996, and in 2001 Vat Phu and the associated Ancient Settlement of Champassak Cultural Landscape was nominated as a second World Heritage site in Laos. Many archaeological sites throughout the country are still being surveyed and identified. Archaeological research in Laos is still in its infancy and considerable research into its history and ethnography is still to be undertaken. Much of its tangible heritage is very much a living one, although it has some significant archaeological sites, such as Vat Phou Champassack (Southern Laos), Plain of Jars, Upright stone park (Northern Laos) and Souvannakhomkham Ancient City (Northern Laos).

2. Previous research activity

Salvage Excavation at Pha Phen Limestone Outcrop, Khamkeut District, Bolikhamsay Province (central Laos).

Excavations in Laos were conducted very recently. They took place between 12 August to 2 September 2004 at Land Parcel 1A of Hydroelectric Nam Theun 2 Project Area, Khamkeut District, Bolikhamsay Province (central Laos). The professional staff from the Department of Museums and Archaeology is composed of 3 archaeologists: Mr Thongsa Sayavongkhamdy, Mrs Phimmaseng Khamdalavong and myself in collaboration with 2 other officials from the local authority. There are 3 target spots to be excavated, they are: Pha Phen 1, 2 and 3 (PP1, PP2 and PP3).

The archaeological salvage project has produced two major discoveries, namely a Neolithic primary burial in a perfect state of preservation and a Palaeolithic habitation at the PP1 site and the PP3 site, respectively.

The PP1 Site

At PP1, a human skeleton was discovered at a depth of 1.40 m from the ground surface. This skeleton represents a primary burial with the body in a crouched (or flexed) position, which was quite common during the Neolithic Period. It appears to be a male of over forty years old. *In-situ* observation suggests he was quite tall (between 1.75 to 1.80 m) and seemed to be in good health before he died. He could have been a group leader or someone of high status in the community. This assumption is based on the fact that the place where he was buried is quite an outstanding site that was presumably selected by the whole community. Validation of this location as "outstanding" is based on the fact that it is a noticeably wide rock shelter. Second, it is located high above ground level, thus, overlooking the surrounding plain, and third, it is inserted in a splendid outcrop that could have been a landmark at that time. Finally, it is oriented to the west which has always been the preferred direction for resting the dead. Several archaeological remains found in association with this burial suggest that this was a Neolithic Sepulchre. Further study will provide more information concerning his physical appearance as well as his genealogical affiliation. His lifestyle, nutrition, health, DNA and the cause of his death can also be investigated. A sample of his bones can also be accurately dated by radiocarbon dating (C14).

This Neolithic sepulchre has now been transferred to the National Museum at Vientiane for appropriate conservation and a more detailed analysis. Based on its scientific significance and the fact that it is such a historical discovery, a special exhibition should be organised for a public viewing and a wide dissemination of knowledge.

Fig. 1: A human burial unearthed from the PP1 site.

Several chambers in the cavity at the back of the rock shelter have also been investigated. In one of them, human remains (bones and teeth) and more than 500 shell beads are scattered around several broken pots that were found on the floor. This clearly suggests the practice of a secondary burial ceremony which differs from the primary one because it consists of re-opening the tomb, collecting some bones, putting them in a ceramic pot accompanied with some offerings and finally depositing these pots inside a cave or burying them in a sacred place. Secondary burial was a common practice during the Neolithic Period as already observed from archaeological excavations previously conducted at Tam Hua Phu, a Neolithic cave at Ban Thin Hong, Chomphet District, Luang Prabang Province and in particular at the Plain of Jars of Xieng Khuang Province. The decision, on the part of the sites ancient occupants, between the primary and the secondary burial remains unclear. Potsherds, polished stone tools, animal bones used as food offerings and some other minor archaeological materials adjacent to the burial have also been recovered, documented and transferred to the office of the Department of Museums and Archaeology for further study and detailed documentation.

The PP3 Site

Several conchoidal flakes, a time marker of the lithic Industry from the Paleolithic have been unearthed at PP3 where two test pits have been opened, one inside the cave and another at the adjacent rock shelter. These flakes are a significant discovery and provide evidence of human occupation at this location since the Paleolithic Period. Animal bones and teeth have been found in relatively large quantities. Faunal remains can reveal the type of fauna exploited on the site after further study is undertaken. With this discovery the history of human settlement in this area is pushed back to more than 10,000 years from the present time and the Prehistory of the Southeast Asia becomes better documented and illustrated.

Human occupation during the Neolithic Period is represented by two colourful stone beads, typical cord marked potsherds, polished axes/adzes, cooked animal bones and other stone artifacts. This yields some evidence as to the possible permanency of the sites and the possible continuation of its use from the Paleolithic to the Neolithic. Another indirect but significant bit of information extracted from PP3 is the sacred character of the PP1 cave; this means that rock shelters and caves at the eastern side of the Pha Phen outcrop were used for regular habitation

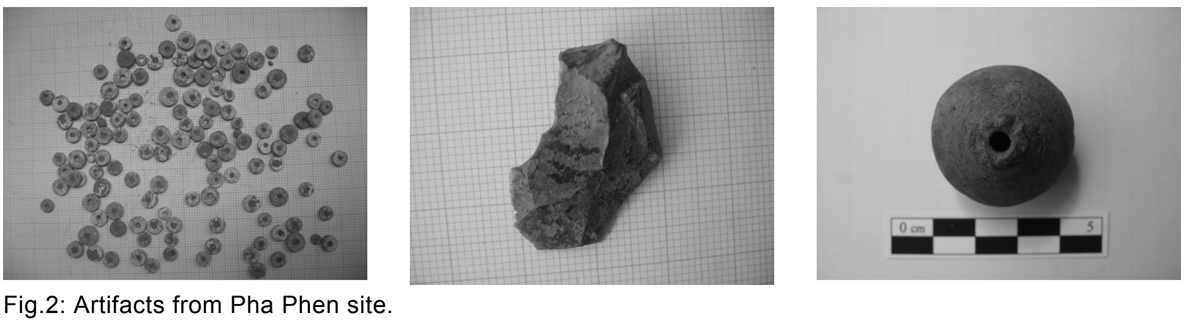

Fig.2: Artifacts from Pha Phen site.

while the PP1 cave was intentionally reserved for a more ceremonial function as illustrated by the Neolithic sepulture and the deposit of secondary burials inside the cave chambers (see above).

The PP2 Site

One 3 x 2 m test pit was opened at PP2 but it did not produce any results. The digging was stopped by the presence of numerous large limestone blocks which have detached from the ceiling of the rock shelter. To reach the archaeological deposit which is expected to be beyond 1.2 m of depth, these heavy and large blocks (ranging from at least 300 Kg to more than a ton) will be removed by proper equipment such as a mechanic excavator or a small crane truck. The site is not accessible to any of these machines since it is surrounded by planted paddy fields. As the floor is fully covered with these blocks, any further attempt at test pitting would only find more similar limestone blocks. The living floor was presumably very damaged and disturbed by these falling blocks. Artefacts were probably broken and dispersed. Additional weight brought in by these blocks would have also contributed to sinking the original living floor. The presence of a stream nearby could have also favoured underground water which could have complicated the stratigraphy and redeposited some organic materials related to the prehistoric occupation. If excavation is conducted after the blocks are removed, any archaeological materials encountered have probably been disturbed; this taphonomic problem would be harder to interpret and understand. While similar archaeological materials are less disturbed and easier to recover, at PP3, further investigation should be directed to the associated rock shelter.

Problems and needs

There are several difficulties encountered during the salvage operations and also in the previous work. Since our staff is limited in number and lacks multidisciplinary skills, all of the field data recording was conducted by ourselves. We are familiar with the traditional methods of site mapping by compass and measuring tape, and it often takes more time than if we had transits or other surveying equipment. In addition, some accuracy is also forfeited. The artefacts recovered during excavation are numerous and varied. Identification is lengthy due to a lack of personnel and equipment. Recording, sorting, data processing and publication of these objects requires new technology and knowledge in order to upgrade our archaeological facility. Post excavation conservation is quite important as well, however, we have very limited laboratory facilities to support our research. It is my hope that the ACCU Training Course will help us to solve many aspects of our research and heritage management issues.

Mongolia

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SCIENTIFIC PROJECTS BEING IMPLEMENTED BY MONGOLIAN ARCHAEOLOGISTS SINCE 1990

The territory of Mongolia is rich with archaeological resources partly owing to its position as a cultural and economic centre for successive nomadic civilizations from many periods. In addition, and as a result of this position, it served as a place of diverse human occupation extending into remote antiquity.

The Mongolian Institute of Archaeology within the Mongolian Academy of Sciences (MAS) is the primary organization conducting archaeological research at the state level. It is widely held that the study of Mongolian Archaeology began in 1889 when the Russian scientist N.M. Yadrintsev discovered a monument with “unreadable” ancient Turkish inscriptions from the Orkhon river valley. He then visited the settlement of Kharkhorum city, the capital of the ancient Mongolian Empire, and subsequently made a scientific investigation of it. Just after the Mongolian revolution at the end of 1921 a Scientific Committee (the foundation of the present MAS) was established and a historical cabinet started to conduct its activities under the authority of the Institute. Archaeological research and the registration of sites and historic places has been conducted ever since that time. We have cooperated and cultivated relationships with many foreign scientists and organizations regarding research on ancient and Middle Age and Central Asian ancient nomad history and culture. For instance, the Mongolian-Soviet joint research association was founded in the 1920s. Since 1967, this association has grown into a permanent cultural joint expedition that has conducted productive research for over 20 years. However, it must be emphasized that international collaboration with the Archaeology branch has been conducted within a limited sphere since 1990 due to certain political conditions in Mongolia.

Despite the political problems, in 1990 the democracy created convenient conditions for international researchers interested in Mongolian history and culture. As a consequence, we have been actively cooperating with Japanese, Korean, American, Russian, French, German, Turkish, Belgium and Italian research organizations and universities. The Mongolian Institute of Archaeology at MAS has been implementing joint scientific projects with these countries and about 10 expeditions are initiated annually. Therefore, I would like to briefly introduce the scientific projects being implemented jointly with other countries.

In 1990-1993, the "Gurvan Gol" Mongolia-Japan Project discovered the tomb of Chinggis Khan. Detailed archaeological, aerial and territorial geophysical surveys were conducted. Other discoveries included the identification of settlements, tombs, monuments, scripts, inscriptions, and petroglyphs from the Stone Age period up to the 15th century AD. Site maps were created from all excavated features. Even though we determined the location of the tombs and burial sites of Chinggis Khan and other kings of the Mongolian Empire, all of the research results and invaluable documents, facts and information found here highlighted this area of Mongolia as an historically important region. The results were also important in that they were highly appreciated by the Mongolian people. In the course of only three years the project team surveyed approximately 40 000 kilometers of road, spent a total of over 300 days in the field, registered 3586 open tombs and burial sites, and completed archaeological reports [1]. As a result of the project we have published detailed reports for every scientific branch that participated in the project.

In 1992-1996, a major scientific project entitled the "Eastern Mongolia" Project was implemented jointly with Dankook University in Korea. The project team conducted a detailed survey on the Mongolian–Korean culture, indications for ethnographic reliance, language and cultural connections. The survey results were published in 5 volumes in Korean, Mongolian and English. The survey research revealed settlements from the Neolithic period, Bronze Age petroglyphs, square tombs, remnants of settlements, tombstones, ancient inscriptions and many other facts. Perhaps the most important survey results were the remains of the settlement that was given the name of the "City of Korea" by the local population. There is an old legend stating that "Korean people processed wood and made paper from it". Under the auspices of the survey, we investigated the presence of a past Korean community based on these types of sources. Indeed, we have found some indications of paper processing from an area named Tsant. In addition, we carried out excavations in the territory of Dariganga soum, and Sukhbaatar aimak to help shed light on Sumt genealogy [2].

The "Mongolian Stone Tool Project", which focused primarily on survey work, was a joint Mongolian-Russian-American effort. The Russian Institute of Archaeology and Ethnography of the Siberian Branch of the Russian Academy of Sciences and the Department of Anthropology of the Arizona University in Tucson, USA were partners in this joint expedition with the Mongolian Institute of Archaeology. The project conducted excavations at "Tsagaan Agui" Cave in the territory of Bayanli Soum, Bayankhongor Aimak. As a result of this project, the presence of humans in Mongolia was extended back from 200 000 B.P. years to 730 000 B.P. During the field work, the expedition team discovered an open settlement occupying about 10 000 square kilometers in Tsahiurtyn Khundii on the border of Bulgan Soum in the South Gobi

Desert of Aimak and Bogd soum in Uvurkhangai aimak. The complete report of the research was published in three volumes in English, Mongolian and Russian. The research is currently ongoing in Northern Mongolia [3].

As a consequence of the field research on the “Altai” project implemented in 1995 with the assistance of American (Department of Art Studies of the Oregon University, USA) and Russian (Institute of Archaeology and Ethnography of Siberian Branch of the Russian Academy of Science) scientists, many petroglyphs have been found in Khatuu, Aral tolgoi, Tsagaan Us, Khar Us, Baga Oigor, Tsagaan Salaa, in the Mongol Altai Mountains. The scientific importance of the petroglyphs is such that it should occupy a major place not only in Mongolia, but also in all of Asia. The research results of this project have been published in 2 volumes with the support of UNESCO [4].

A Japanese team from The Osaka University of Foreign Languages and the Mongolian Institute of Archaeology collaborated on a project entitled, “Inscription”. This project was conducted between 1996 and 1998 and focused on Mongolian, Runi, Sogd, Uigur, Nanhiad inscriptions and discovered 12 monuments that attracted further research interest. Results of a portion of the research were published in 1999 by the Society of Central Eurasian Studies [5]. The project research is currently ongoing. This year it conducted research in the territory of the Gobi Altai Aimak and several new settlements from ancient cities were revealed.

From 1993 to 1999, the “Egiin Gol” project was carried out as a joint UNESCO French Desert Institute and MAS initiative with the purpose of conducting surveys and locating archaeological sites in the vicinity of the future Egiin Gol Power Station. Results of this project yielded many new findings including two bronze helmets from the first square tomb in Mongolia, a stone pot for melting copper, writing accessories found from the Xiongnu tomb, a bone bridle, a gold covered stone inlay hat and accessories, a bone hair stick, and an image of a cart in birch bark. Many reports were published documenting this research [6].

With the assistance of the Regional Archaeology Research Center at the French Ministry of Culture, a Mongolian-French joint Paleolithic research team has worked in Central and Northern Mongolia since 1997. They revealed a Paleolithic period settlement in the Egiin Gol basin. The project team has conducted excavations at Durulj 1 for 4 years. This site comprises 2 settlements. It is the first stratified multicomponent settlement (a site with many cultural layers) in the northern part of Mongolia. Surveys were conducted to determine stone tool production technology and to ascertain the chronology (dating) of these sites as well as many other types of research; the survey results will eventually be published. During the excavation 1791 artifacts were found from Durulj-1, and 3300 stone tools from Durulj-2 from different depths. Three samples were submitted for radiocarbon dating and yielded the following results: 29910+-310 BP, 29540+-390 BP and 31880+-800 BP. Establishing a chronology for the region is very important for determining chronology for other sites and regions based on artifact typologies [7].

Since 1997, the “Mon Sol” project has been jointly implemented with the Mongolian National History Museum and Korean National History Museum to conduct excavation and research in the territory of the Central Arkhangai aimaks. Under the project auspices it has successfully conducted detailed surveys on square tombs of the Bronze Age, Xiongnu tombs in Morin tolgoi of Altanbulag soum, Central aimak, Khudgiin Tolgoi in Battsengel soum, and Arkhangai aimak for 5 years. The results were exhibited for in April and July, 2002 in Korea and Mongolia. The project team has also organized a scientific symposium in Ulaanbaatar in 2003 and 2004 to review the research results [8].

From 1996 to 2000, the “Northern Mongolia” project was jointly implemented by the MAS and the University of Michigan. The team conducted a detailed archaeological survey of the area where the “Egiin Gol” power station will be built. The survey was planned by using a trans-section method and GPS instruments for the identification of sites. During the survey over 20 tombs were excavated [9].

In the summer of 1999, the Mongolian-American Center of Euro-Asian Nomadic Studies conducted a major expedition at the “Bairam Tombs” in the Bairam Mountain pass of Bukhmurun soum and Uvs aimak for over 2 months. First, the team excavated larger graves in the permafrost regions of Mongolia (2400 meters above sea level), a very important area for scientific research and practice. Various artifacts discovered included 3 arrowheads, a wooden box containing vases with bells inside, stone spoons, over 4000 anklebones from large and small cattle. The main goal of the survey was to prove that major graves in the territory of Mongolia are not only basic tombs, but some were also constructions for sacrifices [10].

Since 1999, the “Kharkhorum” project has been ongoing as a joint effort with “KAVA” team comprised of the German Institute of Archaeology and Bonn University. Under the auspices of this project Geo magnetic, geodetic, mapping, archaeological survey and excavation have been conducted in the settlement area of Kharkhorum city, the ancient Mongolian capital city. Presently, the Mongolian-German joint expedition researching the ancient Kharkhorum city settlement is excavating foundations from the 64 columned palace built during the Ugudei King period, which is the area of the city center where the trade and handicrafts district existed. The expedition has revealed many building tools, metal and jewelry, a comparatively large golden bracelet, bronze and cast iron containers, over 200 coins, a bronze seal with a square Mongolian inscription (with the number “1372”), and many other rare artifacts. During the excavation we have found remnants of the wall and floor of the King’s Palace, and major boilers that produced building materials in Kharkhorum city during the 13th century. The projects are being implemented under continuing sponsorship from the president’s of both countries [11].

Since 2000, the joint Mongolian-French "Nomadic Empire" project has excavating a large tomb in the Gol Mod territory of Khairkhan soum and Arkhangai aimak. Despite the tombs partial destructgion, a few golden accessories, remnants of vases and containers were found inside. These artifacts are currently being analyzed at the laboratory. French creators have produced a documentary movie about the excavation process. The opening ceremony of the movie was held in 2002 in both France and Mongolia [12]. From 2003 the project researchers have begun to excavate the next major tomb and this year (2004) the main part of the tomb will be opened.

Since 2000, the Bilge Khan and Kultegin commander's sacrifice features in the Orkhon river valley have been excavated under the auspices of the project "To excavate, restore and preserve some monuments and artifacts of the Turkish period in Mongolia" jointly implemented by the Turkish International Cooperation Agency (TICA). During the 2001 field season excavations, a major artifact representing sacrifice and offerings was found belonging to the Eastern Turkish Empire. This attracted considerable interest from many Turkish researchers and archaeologists. Over 2000 artifacts were found, such as a golden King's crown, gold and silver engraved "rounds", a sacrifice bottle decorated with jewelry, and a silver plate. These artifacts are displayed in the Mongolian National History Museum [13].

Since 2001, a scientific project has been implemented jointly with the Institute of Chinese Studies with support from the Richard Lug Fund of the Kingdom of Belgium to study artifacts from the Xiongnu period and the Bronze and Iron Ages. The field research team has excavated tombs and graves from the Xiongnu, Bronze and Early Iron Ages in the territory of Buregkhangai soum, and Dashinchilen of Bulgan aimak. During the excavations, various significant artifacts were found such as the first bronze adze in the territory of Mongolia. In addition, Belgium RTVF TV produced a documentary film of the excavations and research.

Since 2001, the "Khanuin Khundii" scientific project has been implemented jointly with the Anthropology Department of Pittsburgh University, USA. Under the auspices of the project, research was conducted in the territory of the Khanuin Gol river basin in Undur Ulaan soum and Arkhangai aimak. Several New tombs belonging to Xiongnu aristocrats were discovered.

Since 2001, the "Shine Zuun" scientific project has been carried out with Kokugakuin University and Niigata University in Japan. Chinggis Khan's Aurag Palace settlement has been the focus of research. Preservation has begun in the Kherlen Khuduu Aral in Delgerkhaan soum and Khentii aimak as well as the "Aurag" site that lies within 100 to 500m protection zones. These zones were clearly determined so that excavation could begin in buildings located in the central and northern parts of the settlement (16).

Since 2002, the "Gobi Geoarchaeology" project has been continuing through a joint agreement with MAS and the Italian National Scientific Institute. In September 2002, a geoarchaeology survey was conducted in the territory of Bayankhongor and Uvurkhangai aimaks. In 2003, the territory of Bogd soum, Bayankhongor aimak was named as a permanent research location.

Cooperation with foreign research organizations and scientists is of great importance to Mongolian science. Examples of the benefits of international collaboration include the processing of samples for the construction of a reliable cultural chronology for Mongolian prehistory and to conserve and restore artifacts. Furthermore, and possibly of greater significance, is the opportunity to send Mongolian scientists and researchers (both junior and senior personnel) abroad for further scientific and technical development for both long and short periods, and to collaborate on publications with international teams.

BIBLIOGRAPHY

1. Archaeological Research. A report on the joint investigation under the Mongolian and Japanese "Gurvan Gol" historic relic project, (1992) pp.6-21, Tokyo
   - D.Tseveendorj, Sh.Kato, D.Bayar and others, (1994) Archaeological Research. A report on the joint investigation under the Mongolian and Japanese "Gurvan Gol" historic relic project, pp.4-17, Tokyo
   - B. Tsogtbaatar, (1999) Ustiin amnii dorvoljin bulsh(in Mongolian):"Mongol nutag dakh' tuukh soyoliin dursgal. Sedevchilsen lavlakh, pp. 160, Ulaanbaatar,
2. Mongol-Solongosiin erdemtdiin khamtarsan, (1992) "Dornod Mongol" tosliin 1992 onii archaeologiin sudalgaa (in Mongolian and Korean): Mongol-Solongosiin khamtarsan erdem shinjilgee-1, Seoul
   - Mongol-Solongosiin erdemtdiin khamtarsan, (1993) "Dornod Mongol" tosliin 1993 onii archaeologiin sudalgaa (in Mongolian and Korean), Mongol-Solongosiin khamtarsan erdem shinjilgee-2, Seoul
   - Mongol-Solongosiin erdemtdiin khamtarsan (1995) "Dornod Mongol" tosliin 1994 onii archaeologiin sudalgaa: Mongol-Solongosiin khamtarsan erdem shinjilgee-3, pp. 111-154, Seoul
   - Mongol-Solongosiin erdemtdiin khamtarsan (1995) "Dornod Mongol" tosliin 1995 onii archaeologiin sudalgaa (in Mongolian and Korean): Mongol-Solongosiin khamtarsan erdem shinjilgee-4, Seoul
   - Korea-Mongol Joint Studies-5, (1997), Hyean Publishing Co., Seoul

- B. Tsogtbaatar, J. Gerelbadrakh. Budariin chuluunii khadnii zurag (in Mongolian): Archaeologiin sudlal, tom. XVII, fasc. 8, pp. 66-72
- B. Tsogtbaatar, (1999) Mongold tsaas uildverlej baiv (in Mongolian): "Manai Mongol" No. 2, Ulaanbaatar

3. A.P. Derevianko, J.W. Olsen, D.Tseveendorj and others, (1996) Archaeological Studies carried out by the joint Russian-Mongolian-American expedition in Mongolia in 1995. pp. 327, Publishing center of the Institute of Archaeology and Ethnography SB RAS , Novosibirsk
   - A.P. Derevianko, J.W. Olsen, D. Tseveendorj, B. Gunchinsuren and others, (1998). Archaeological Studies carried out by the joint Russian-Mongolian-American expedition in Mongolia in 1996, pp. 347, Publishing center of the Institute of Archaeology and Ethnography SB RAS, Novosibirsk
   - A.P. Derevianko, D. Tseveendorj, V.T. Petrin, B. Gunchinsuren, (1999) Neolith Yugo-Vostochnogo fasa Gobiiskogo Altay (in Russian), 96 p, Ulaanbaatar
   - A.P. Derevianko, J.W. Olsen, D. Tseveendorj, B. Gunchinsuren and others, (2000) Archaeological Studies carried out by the joint Russian-Mongolian-American expedition in Mongolia in 1997-1998, pp. 381, Publishing center of the Institute of Archaeology and Ethnography SB RAS, Novosibirsk
   - A.P. Derevianko, A.N. Zenin, J.W. Olsen, D. Tseveendorj, V.T. Petrin (2002), Paleolithic assemblages from Flint Valley (Gobi Altai), Publishing center of the Institute of Archaeology and Ethnography SB RAS, Novosibirsk
4. E. Jacobson, V.D. Kubarev, D. Tseveendorj, (2001) Mongolie du nord-ouest Tsagaan Salaa & Baga Oigor, Repertoire des petroglyphes d,Asie Centrale, Fasc. 6, t.1, pp 481. t.2, pp 256, Paris
5. T. Moriyasu, A. Ochir, (1999) Provisional report of research on historical sites and inscriptions in Mongolia from 1996 to 1998. The Society of Central Eurasian Studies, Japan
6. D. Erdenebaatar, Ts. Turbat, U. Erdenebat, E. Kryubezi, P-H. Jiskar, P. Myurai, L. Khai, (1998) Burkhan tolgoin khunnugiin bulshnii sudalgaa (in Mongolian): Archaeologiin sudlal, tom. XVIII, fasc. 8, pp. 92-107, Ulaanbaatar
   - D. Erdenebaatar, (2000) Khunnugiin archaeologiin sudalgaa (in Mongolian): Archaeologiin sudlal, tom. XX, fasc. 6, pp. 61-93, Ulaanbaatar
   - D. Erdenebaatar & others, (2000). The man, the woman and the hyoid bone; from archaeology to the burial practices of the Xiongnu people (Egyin Gol valley, Mongolia) – ANTIQUITY 74, pp. 532-536
   - D. Erdenebaatar, Ts. Turbat, U. Erdenebat, (1999) Khunnugiin ueiin shine oldvoruud (in Mongolian): Archaeologiin sudlal, tom. ÕIÕ, fasc. 7, pp. 64-73, Ulaanbaatar

- Ts. Turbat, (1998) Mor’toi negen orshuulga (in Mongolian): Archaeologiin sudlal, tom. XVIII, fasc.12, pp. 130-134, Ulaanbaatar
- Ts. Turbat, (2001) Khunnu bulshnaas garsan uisen deerkh teregnii zurag (in Mongolian): Ulsiin Bagshiin Ikh Surguuliin Erdem shinjilgeenii bichig, tom. II, fasc. 2. Ulaanbaatar
- Yu.S. Khudyakov, Ts. Turbat, (1999) Drevnetyurkskoe pogrebenie iz Elst-Khutula (in Russian): Cul’turnoe nasledie drevnikh tsivilizatsii, tom. II. Izdatel’stvo Instituta Archaeology I Ethnography SB RAS, Novosibirsk

7. B. Tsogtbaatar, P. Bertran, J. Jaubert, M. Olive, (1998) The Palaeolithic site of Moil`tyn am (Harhorin, Mongolia) Thirty years after A.P. Okladnikov: Paleoekologiya pleistotsene I culturi kamennogo veka Severnoi Asii I sopredel’niikh territorii, tom. II. pp. 210-227, Izdatel’stvo Instituta Archaeologii I Ethnography SB RAS, Novosibirsk
   - B. Tsogtbaatar, J. Jaubert, (2000) The Early Upper Palaeolithic of North Mongolia (Dorolj 1, Egiin gol): comparison with Altai data, Krasnoyarsk
8. Mongol-Solongosiin khamtarsan sudalgaanii tailan II. (Mongoliin Morin tolgoin khunnugiin ueiin bulsh) (in Mongolian and Korean), (2001), pp. 348, Seoul
   - Korean-Mongolian joint expedition in Mongolia 1997-2001. (“Mon-Sol” tusliin 5 jild zoriulsan uzesgelengiin katalogi” (in Mongolian and Korean), (2002), pp.110. Seoul
   - Mongol-Solongosiin erdem shinjilgeenii ankhdugaar simpoziumiin iltgeliin emkhetgel (in Mongolian and Korean), (2003), Seoul
   - Mongol-Solongosiin erdem shinjilgeenii khoyordugaar simpoziumiin iltgeliin emkhetgel, (in Mongolian and Korean), (2004), Seoul
   - Mongol-Solongosiin khamtarsan erdem shinjilgee, sudalgaanii tailan-III, (Khudgiin tolgoin khunnugiin ueiin bulsh) (in Mongolian and Korean), (2004), Seoul
9. Ch. Amartuvshin, M. Hall and U. Erdenebat, (1999) X - ray fluorescence analysis of pottery from Nortern Mongolia: Journal of Radioanalytical and nuclear Chemistry, Vol. 240, No.3, pp. 763-773, Akademiai Kiodo, Budapest
   - Ch. Amartuvshin, U. Erdenebat, W. Honeychurch (1999) Egiin goliin sav nutagt shineer oldson khoyor suurin (Archaeologiin khaiguuliin ekh khereglegdekhuuneer) (in Mongolian): Archaeologiin sudlal. tom. XIX, fasc.8, Ulaanbaatar, pp. 74-81
   - U. Erdenebat, (1998) Egiin goliin savd maltsan mongol bulshnii tukhai (in Mongolian): Archaeologiin sudlal. tom. XVIII, fasc. 12, Ulaanbaatar, pp 130-134
   - W. Honeychurch, Ch. Amartuvshin, (2003) An Examination of Khunnu Period Settlement in the Egiin Gol valley, Mongolia: Archaeologiin sudlal, tom. XXI, Ulaanbaatar

10. D. Tseveendorj, Ya. Tserendagva, A. Enkhtur, (1999) Mongol-Amerikiin khamtarsan "Bairamiin bulsh" kheeriin shinjilgeenii angiin tailan (in Mongolian), Shinjlekh Ukhaanii Akademiin Archaeologiin khureelengiin gar bichmeliin san khumrug, Ulaanbaatar
11. K. Sagaster, (1999) Die mongolische Haupstadt Karakorum (in German): Beitrage zur allgemeinen und vergleichende Archeologie, Band 19, S. 113-128, Mainz
    - W.W. Wurster, (1999) Bericht uber die Tatigkeit der Kommission fur Allgemeine und Vergleichende Archalogie des Deutschen Archaologischen Instituts im Jahp 1998 (in German): Beitrage zur allgemeinen und vergleichende Archeologie, Band 19, pp. 383-402, Mainz
    - W.W. Wurster, (2000) Bericht uber die Tatigkeit der Kommission fur Allgemeine und Vergleichende Archalogie des Deutschen Archaologischen Instituts im Jahp 1999 (in German): Beitrage zur allgemeinen und vergleichende Archeologie, Band 20, pp. 295-297
    - H. -G.Huttel, (2000) Das Zerbrochene bergen. Die Mongolisch-Deutsñhe Karakorum – Expedition (in German), Band 9, pp. 40-44, Mongolische Notizen
    - Editors: Helmut R.Roth-Ulambayar Erdenebat, Co-editors: Ernst Pohl-Eva Nagel, (2002) Qara Qorum-City (Mongolia). I, Preliminary report of the excavations 2000-2001: Bonn Contributions to Asian Archaeology, Vol. 1, 83 pp. 21 plates, Institute of Pre-and Early Historical Archaeology Bonn University. Associate Member of the Center for Asian Studies Bonn CASB. Bonn
    - Editors: Helmut R.Roth-Ulambayar Erdenebat. Co-editors: Ernst Pohl-Eva Nagel, (2002) Qara Qorum-City (Mongolia). Preliminary report of the excavations 2000-2001: 2nd revised and enlarged, Edition, 122 pp. 21 plates. Bonn
    - U. Erdenebat, (2002) Khar Khorumaas shineer oldson negen tamganii tukhai(in Mongolian): Shinjlekh Ukhaanii Akademiin Medee, No. 1, pp. 52-56, Ulaanbaatar
    - B. Sum'yabaatar, (2002) Khar Khorinii tamganii bicheesiig tailan unshsan n' (in Mongolian): Shinjlekh Ukhaanii Akademiin Medee, Ulaanbaatar
    - D. Bayar, U. Erdenebat, (2003) Ikh Mongol ulsiin niislel Khar Khorum khotiig archaeologiin talaar sudalsan n': Archaeologiin sudlal, tom. XXI, Ulaanbaatar
12. Mongold khiisen shine neeltuud. Gol mod 2000-2001(in Mongolian and French), (2002) Paris
    - D. Erdenebaatar, À. Francis, Ch. Årool-Erdene, N. Batbold, M. Bryan, (2002) Umard Khunnugiin yazguurtnii bulshnii sudalgaa(in Mongolian): Tuukhiin setguul.', pp. 20-28 Ulsiin Bagshiin Ikh surguul, Ulaanbaatar
13. Album of the Turkish monuments in Mongolia, (2001) TIKA, Ankara..

- Mogolistan daki Turk Anitlari Projesi 2000 (in Turkish), (2002) Tili Galismalari-TIKA, Ankara
- D. Bayar, (2002) Bilge Kagan's memorial complex: Olon ulsiin mongolch erdemtnii VIII ikh khural. Iltgeluudiin tovchlol., Olon Ulsiin Mongol Sudlaliin Kholboonii nariin bichgiin darga nariin gazar. pp. 28 Ulaanbaatar
- D. Bayar, Ch. Amartuvshin, A. Enkhtur, J. Gerelbadrakh, (2003) Bilge khaanii takhiliin ongonii sudalgaa (in Mongolian): Archaeologiin sudlal, tom. XXI, Ulaanbaatar
- À. Enkhtur, (2003) Shineer oldson khashlaga chuluun ongonii tukhaid (in Mongolian): Archaeologiin sudlal. tom. XXI, Ulaanbaatar

14. A. Francis, D. Erdenebaatar, N. Batbold, M. Bryan, (2002) A Xiongnu cemetery found in Mongolia. Antiquity 76, pp. 637-638
    - D. Erdenebaatar, N. Batbold, A. Francis, M. Bryan, (2003) Khunnugiin bulshnaas oldson tamgatai shagai (in mongolian): Tuukhiin sudlal, tom. XXXIII. fasc. 17. Ulaanbaatar
15. N. Shiraishi, Sh. Kato, D. Tseveendorj, B. Tsogtbaatar, (2002) Mongol-Japanii khamtarsan "Shine zuun" tosliin 2001 onii kheeriin sudalgaanii tovch tailan(in Mongolian and Japanese), Niigata
    - D. Tseveendorj, B. Tsogtbaatar, (2002) Chinggis khaanii Ikh Aurag ordiin maltlaga sudalgaanii ur'dchilsan ur dungees: Chinggis khaanii mendelsnii 840 jiliin oid zoriulsan erdem shinjilgeenii baga khurald tav'san iltgel, Ulaanbaatar
    - N. Shiraishi, Sh. Kato, D. Tseveendorj, B. Tsogtbaatar, (2002) Avargiin balgasiin maltlaga sudalgaanii ur dungees: Olon ulsiin mongolch erdemtnii VIII ikh khural. Iltgeluudiin tovchlol, Olon Ulsiin Mongol Sudlaliin Kholboonii nariin bichgiin darga nariin gazar, Ulaanbaatar
    - N. Shiraishi, Sh. Kato, D. Tseveendorj, B. Tsogtbaatar, (2003) Mongol-Japanii khamtarsan "Shine zuun" tosliin 2002 onii kheeriin sudalgaanii tovch tailan (in Mongolian and Japanese), Niigata
    - N. Shiraishi, Sh. Kato, D. Tseveendorj, B. Tsogtbaatar, (2004) Mongol-Japanii khamtarsan "Shine zuun" tosliin 2003 onii kheeriin sudalgaanii tovch tailan (in Mongolian and Japanese), Niigata

Nepal

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ARCHAEOLOGICAL ACTIVITIES, RESEARCH AND RECORDING PROBLEMS IN NEPAL

Nepal lies between latitudes 26'22 and 30'27 N and longitudes 80'4 e. and 88'12 E. It is a small country that is geographically situated between two larger Asian countries. China lies on its northern border while India is situated to the south, east and west respectively. The total geographic area of Nepal is 47181 square kilometers, 19% of which comprises the Himalaya Mountain Range, 68% composed of hilly country, and 13% composed of *Terai*, or hot tropical plains and flat land.

Nepal is rich in tangible and intangible cultural heritage and also famous for ethnic diversity. So far, 59 ethnic communities have been documented by anthropologists, ancient monuments, sculptures, and paintings. Inscriptions, coins, religious practices, dance, festivals, rituals, customs and traditions are all part of the cultural heritage of Nepal.

Nepal is also rich in archaeological sites. Many archaeological sites are scattered all over the country, demonstrating that Nepal is also rich in ancient cultures and civilizations.

Archaeological Research

Archaeological research in Nepal began in March 1985 with the discovery of the pillars of Niglisagar and the Lumbini by A. Fuherer and Khadga Sumser. These two Ashokan pillars describe the visit of emperor Ashoka to this region and also demonstrate that Sakyamuni Buddha was born in Lumbini. P.C Mukherjee, an Indian archaeologist explored and excavated the Lumbini and Kapilvastu. After the exploration and a brief excavation he proved that Tilaurakot was the ancient Kapilvastu and Lumbini was the birthplace of Sakyamuni Buddha. He also explored many archaeological sites around Lumbini and Kapilvastu. After P.C Mukherjee, archaeological activities could not be conducted for a long period. From 1933 to 1939, Kaiser Sumser conducted some work in Lumbini but this work was not done in a scientific manner. After the restoration of democracy in 1950 A.D. many offices were opened by HMG Nepal for good administration and the welfare of the people of the country. HMG Nepal also established the Department of Archaeology for the exploration, excavation, documentation, and preservation of the archaeological sites, ancient monument, and art objects in the country. H.M.G Nepal also promulgated the first ancient monument preservation act in 1956 in the official Gazette. After the establishment of the Department of Antiquities (DOA) many archaeological, prehistoric and historic sites were explored, excavated and documented. The DOA also prepared an inventory of cultural heritage around the Kathmandu valley and a preliminary survey of the all the monuments and archaeological sites in the country. Various explorations and excavations have also been conducted with the support of different Institutions around the world from 1962 to 2004. Some of this research has revealed many unsolved questions regarding the history of Nepal.

Major Excavated Sites in the Country

The Terai region is very important for archaeological activities. Major archaeological site from this region include, Rupandehi, Kapilvastu and Nawalparasi, the District of Lumbini Zone, the Bara District of the Narayani Zone, the Bhedeari of the Kosi zone and the Kichehaka Badha of the Mechi zone. All of these areas and sites have seen exploration and excavation.

Lumbini

With the discovery of the Ashoka pillar by Khadga Sumser in 1886 A.D. Lumbini was accorded its deserving glory within the Buddhist world and also became an important pilgrimage centre for followers of Buddhism. After the work of A. Fuherer and K. Sumser, P.C. Mukerjee excavated at Lumbini and discovered many remains representing various periods. Many excavations have been conducted at Lumbini by the Nepal DOA among these is the latest excavation at Mayadevi temple that has revealed a stone marker at the exact point where the Lord Buddha was born. The marker stone was found placed in one of the fifteen chambers constructed auspiciously and monumentally. The marker stone was in an untidy state and placed in a precarious location during the time of emperor Ashoka's visit. He gave the stone proper respect. In addition to the marker stone the excavation has yielded remains of several architectural phases of the temple stretching from the time of the Mauryan Gupta period and up to the 18th and 19th century. All the excavated remains including the marker stone and the Mauryan structure are preserved *in-situ* inside the newly constructed Mayadevi temple. The marker stone is placed separate from other remains and protected by a bulletproof glass case.

Kapilvastu

P.C Mukerjee identified the fortified mound at Tilaurakot and recognized the ancient town of Kapilvastu, the capital of Suddodhan. In 1962, 1966-67, and 1966-71 various excavations were conducted. During these excavations, a wide moat, eastern and western gateways, a structural complex, various type of pottery, and coins and art objects have been found. The architectural remains of Kapilvastu are preserved and kept *in-situ*. The archaeological objects are also kept at the site museum of Kapilvastu.

Ramagrama

Ramagrama lies sixty kilometers east of Lumbini. The mound was noticed by Dr. Hoey in 1899 and S.B Deo recorded the mound as a stupa in 1964 and recommended it to be excavated prompty. DOA started to dig the mound in 1997. This year, 2004, is the fifth season of work at the site. An abundance of information about the history of the stupa have come to light as a result of these excavations. The core of the stupa has not been touched because of the sentiment towards its sanctity. Four distinctive phases of the stupa are known based on the excavations:

Mauryan
Sunga
Kusan
Gupta

The site was abandoned as a religious enclave following the final phasel

Grey ware PGW and NBP ware are the major pottery types known from the site. Beads, bangles, and art objects of various periods are the major findings of the excavation. The final report of the excavation and a plan for the conservation of the stupa is continuing and will be finished this year.

Gotihawa

Situated in the Kapilvastu District, the Gotihawa site was excavated jointly by ISIAO and DOA. It is known as the nirvana stupa of Krakuchhad Buddha. During the excavation the stupa was uncovered and many archaeological objects have been found. The stupa is going to be preserved in the coming years and the objects discovered here are kept at the Tilaurakot site museum.

Kichakbadh and Khoksar

Recently, Archaeological excavation has been done at Kichakbadh and Khoksar and will be continued this year. Various kinds of pottery, art objects, and a wall structure have been found during the past excavation which has not yet been completed.

Simraungardh

ISIAO excavated at Simraungardh which is a large ruin from the medieval capital city situated in the central Terai region of Nepal. The site is spread over an area of 7.5 Km north south and 4.5K.m east west respectively. Ruins of the fortification wall are found surrounding the site. Inside the fortification wall about 50 small villages covering five village development committees have been settled for more than a century and the rest of the area is extensively cultivated. Various artifacts have been discovered from the excavation. The Upper level of the site has been completely destroyed by extensive habitation and the only remaining are the archaeological ruins alone. In this situation, the only possible measure of conservation is to try our best to stop further destruction.

Mustang

The trans Himalayan region of Nepal is located just beyond the Himalayan range and geologically it is the part of Tibetan plateau. This region is comprised of very rocky and pebble conglomerate cliffs, snow capped mountains, and is generally a sandy and barren landscape. The region is drained by the Trans Himalayan river, the Kaligandaki which is the source of the Saligrama (the object revered by Hindu as the symbol of lord Visnu). Along the Kaligandaki river there are serious ancient caves that are termed "cave cites" and several ruins of habitation sites in the vicinity. Some of the caves and sites were excavated from 1992 to 1997 with German teams cooperating with the Nepal DOA. The most important achievement from the archaeological research of this Trans Himalayas region is the construction of the dendrochronological calendar, or the master sequence of the dendro–dating. In addition, a mummified body of an infant was also found and dates from the 4th to the 2nd century B.C.

Khola

The Khola site is situated on the border of the Kaski and Lamjung district of Nepal. This site is located in a high mountain region. In April 2000 a two week excavation was undertaken at Khola by an archaeologist from English Heritage and another from the Cambridge Archaeological Unit together with an archaeologist from the Archaeology Department of Nepal. In the course of the excavation 121 features were excavated and 48 major structural features were identified and recorded. A large amount of pottery, iron objects, fossil coral beads and decorative pottery were also recovered from the excavation. The radiocarbon dates determined that Khola is a medieval site. Through anthropological and ethnographical research, it was demonstrated that this was a small Gurung village. The Gurung are one of the many ethnic groups living in the western region of Nepal. For some reason, they abandoned the village and it deteriorated and was buried.

Sinja Valley excavation

Sinja is situated in the Jumla district of far western Nepal. In October 2000, a two week excavation was undertaken with an archaeologist from the Cambridge archaeological unit and the DOA of Nepal. Due to the short time frame and the condition of the area it was decided that the team would excavate an earlier terrace at the site. Four trenches had been excavated at the bottom of the structure and the team was able to determine the complex plan of the hill. During the excavation 52 features were excavated and 45 features were distinguished and recorded. During the excavation 345 sherds, glass fragments and some metal work was recorded. The structure seemed to be a royal palace of the Malla dynasty of the medieval period. Local traditions about the presence of a palace during the medieval period were elucidated. The radio carbon dating also situated the site within the Medieval period.

Hadigaon

Hadigaon is situated at the center of Kathmandu Valley, and is the oldest town in Nepal. ISIAO explored and excavated the site in (1984-1989 A.D). Various type of pottery, bricks, structures, and art objects were discovered in the excavations. The final report of the excavation has been published and the archaeological objects are deposited inside the DOA storehouse. To protect the site from encroachment and vandalism a compound wall around the site was build. The excavated trenches are filled with earth to protect the fragile architectural remains and keep them safe and intact. The earliest date for the site was found to be the 2nd century B.C.

Deopatan, Bhandarkhal, Patuko, Dhumbarahi are other major archaeologist sites in the Kathmandu Valley.

The Problem of Research and Recording in Archaeology

Archaeological research is essential in any attempt to reconstruct ancient societies and cultures. Archaeological excavation is actually a process of destruction and the excavated site cannot be rebuilt again as it originally looked. Thus, scientific recording and research is necessary for rebuilding ancient human societies in order to learn about our ancestors.

Nepal is rich in archaeological sites. Numerous archaeological sites belonging to different periods and cultures are identified within the territory of Nepal. Archaeological research in Nepal started only in the last part of the 19^{th} century. A Fuherer, K. Sumser and P.C Mukherjee were the pioneers of Nepalese archaeology. Fuherer was the first scholar who published on the archaeological remains of Lumbini and the Kapilvastu region. But the work of Furherer and K. Sumser was not scientific. After Furherer, P.C Mukherjee conducted extensive explorations and a few excavations at Lumbini and the Kapilvastu region. His report was published in 1901 A.D. It was the first scientific archaeological research in in Nepal. His work was based on scientific principles but it was short term research. After this work archaeological research could not be conducted for a long time and only after 1950, research in this field started again by HMG Nepal and various international institutions. After 1950 archaeological research increased rapidly and the government of Nepal played a vital role in this endeavor.

The Department of Archaeology established the main research objectives for the investigation of an archaeological site. Until today, a lot of archaeological research has been conducted and also published by the DOA and various institutions around the world. However, detailed archaeological surveys throughout the entire country have yet to be undertaken. Therefore, the accurate number of archaeological sites in the country is currently unknown. The limited surveys that have been conducted along with a few accidental events brought some archaeological sites to our notice. Of these, very few are excavated and others remain unexcavated. All explored sites, both excavated and unexcavated, are the subject of thorough study and conservation. Because our obligation regarding archaeological sites is not only to explore, explain and excavate, but also to publicize the importance of heritage to the present generation in a scientific manner. Many research projects have been conducted within the territory of Nepal. Among them some are conducted using scientific methods whereas others were conducted using traditional and obsolete archaeological methods. Several years ago an archaeological research and recording system was developed with the support of various archaeological institutions around the world and highlighted unsolved questions regarding the history of Nepal. Although we have many archaeological sites in Nepal the discipline has yet developed a thorough scientific approach. The Following list includes the main problems related to research and recording systems in archaeology in Nepal:

1. Lack of training institutes
2. Lack of scientific equipment
3. Lack of skilled manpower

4. Indifference of the public towards the discipline
5. Lack of laboratories for analyzing archaeological remains (i.e. artifacts).
6. Lack of knowledge of archaeology at the policy-making level.
7. Problems with chronology.
8. Lack of investment and funding for archaeological research.
9. Lack of motivation.
10. The use of traditional and obsolete recording systems.
11. The use of traditional and obsolete methods for exploration and survey.
12. The use of traditional and obsolete methods for excavation.

Archaeology is an important discipline in Nepal, however we have no training institutes for imparting the proper knowledge of this subject. Since we know archaeology is a practical subject, we also know that without field training, the investigation, analysis, presentation and management of archaeological sites and heritage will continue to decline and we will lose valuable knowledge. In Nepal, so far, no archaeological training institutes are available. Thus, we have to depend on international researchers for training. Because of the problems mentioned above we have no trained and skilled manpower to analyze pottery and to create maps and drawings of features which are major tasks required for excavation. Without trained manpower high quality research results cannot be expected. Archaeologists are expected to conduct every aspect of the preparations for excavation and report writing. This is why it takes a long time for the publication of reports following excavation. We also lack scientific instruments without which perfect research is not possible.

Archaeologists in Nepal are deprived of the modern means required for archaeological and scientific research. In addition, we also do not have proper manpower to operate scientific equipment. Owing to these problems we have to follow traditional, and obsolete, methods for survey and excavation. Likewise dating is a major part of archaeological research. Without which proper archaeological research is worthless. So far we do not have a laboratory to process samples for dating. We must depend laboratories located outside of Nepal. This problem compels us to use relative dating for the dating of archaeological objects. The cost of dating samples is also very costly and not possible for us to bear within the limited budget allocated for excavation. Therefore, dating archaeological objects is a significant problem.

Recording systems are also too basic owing to a lack of proper scientific instruments and training. The scarcity of funding is also a major problem for archaeological research. The government allocates very little money for research, and thus, it is impossible to purchase scientific instrument for recording, drawing and photography. A lack of knowledge about the importance of archaeological research by the policy makers is most likely one of the major causes for the lack of funding for archaeological research. Nepalese people are also indifferent towards the discipline; this does not create any support for archaeological activities. Thus, these are the major problems and barriers regarding archaeological research in Nepal. If we solve these problems, Nepal would be a paradise for archaeological research.

Future Strategies

1. Preparing archaeological research manuals.
2. Identifying new archaeological sites.
3. Adopting new technology with the support of international archaeological institutes.
4. Using new instruments for drawing, photography, and planning.
5. Opening training institutes under the control of the DOA.
6. Conserving archaeological sites using scientific conservation methods.
7. Using new methods for exploration and excavation.
8. Preparing archaeological conservation manuals.
9. Developing archaeological sites as tourist destinations.
10. Artifact analysis from various sites.
11. Scientific study of ceramics from various archaeological sites in Nepal.
12. Adopting new technologies for exploration.
13. Requesting international universities and institutes to provide training to DOA archaeologists.
14. Involving M.A. students from Tribhuvan University in fieldwork.
15. Providing training to the local people describing the importance of heritage and archaeological sites.
16. Organizing awareness programmes at various levels about the historical, cultural and religious importance of archaeological sites.

New Zealand

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1. Introduction

This report looks at the problems and needs of archaeological research in New Zealand ("NZ") and provides a record of activities. It has been written for the Cultural Heritage Protection Cooperation Office, Asia/Pacific Culture Centre for UNESCO in Nara, Japan, as a requirement of the 2004 training course, on the preservation and restoration of cultural heritage in the Asia/Pacific Region (archaeological research methodology and analytical methods of ancient remains).

Archaeology is a relatively young discipline in NZ, with the first scientific investigations of human occupation sites undertaken in the early nineteenth century. People continued to study the past in the early twentieth century, but only a limited amount of excavation and analysis was involved (Wilson et al. 1987:12). In the 1950's the NZ Archaeological Association was formed to promote and foster research and by 1951 the country's first radiocarbon laboratory, in Wellington, was producing dates (Heritage NZ in press). Archaeology also became an established discipline at Otago and Auckland universities (Wilson et al. 1987:15).

In 1975 archaeological site protection was first recognised in legislation. The Historic Places Amendment Act made it unlawful to destroy an archaeological site and established a process for the controlled modification of sites and recovery of information (Barber 2000:23). During the 1970s and 1980s most archaeologists were based in universities and museums, or employed by the NZ Historic Places Trust ("NZHPT"), and there was an emphasis on archaeological research (Wilson et al. 1987:15, 146). This began to change in the 1980s as opportunities for contract archaeology increased and was advanced further in the 1990s, with the introduction of two significant pieces of legislation¾the Resource Management Act 1991 ("RMA") and the revised Historic Places Act 1993 ("HPA"). Archaeological research became dominated by private archaeological consultants, who were employed predominantly by developers, to satisfy the requirements of the RMA and HPA.

This caused a fundamental change in the direction of archaeological research, in terms of who did archaeology, how it was funded, and what it addressed. Private consultants working for developers played a greater role than previously, when public funded institutions dominated research. This had serious implications for the production of quality research, as any archaeological consultant working in the industry will tell you, and they are quick to identify the issues. First, the decline in research and second the lack of reporting and publications from archaeological investigations. Some have gone as far as saying that cultural resource management has been responsible for "dumbing down" archaeological research. In some areas, NZ archaeological research is of world-class standard producing significant outcomes, however the majority of research is cultural resource management based and suffering as a result.

This issue was foreseen as early as 1982, when American archaeologist Ross Cordy wrote an article in the New Zealand Archaeological Newsletter, about the "serious flaws" in the American system and "hoping that this discussion might help prevent a repetition of errors" (Cordy 1982:277). As NZ developed legislation protecting archaeology, Cordy noted that addressing the problems experienced in America Pacific "will critically affect the direction that archaeology in New Zealand will take at least for a decade" . While Cordy accurately predicted the problems for NZ archaeology, he underestimated the timeframe. Now 22 years on Cordy's two main points relating to the American Pacific, are entirely relevant to the situation in NZ:

(1) the historic preservation programme does not have a very good record of preservation and recovery of valuable information and (2) contract archaeology has generally hindered research progress and the field of archaeology (Cordy 1982:277).

This report examines these two problems, which continue to plague archaeological research in NZ, and uses the Bay of Plenty region to illustrate the issues. Part two provides the geographical and historical background, briefly describing the topography of NZ and summarising popular themes in archaeology. Part three outlines the legislation for the protection of archaeological sites in NZ and describes the role of the NZHPT. Part four raises the issues and problems for archaeological research when it is driven by cultural resource management, with examples from the Bay of Plenty. The implications for archaeological research are discussed, with part five providing a summary.

2. Background

2.1 The New Zealand Landscape

Located in the south-west Pacific, NZ consists of two main islands, (North and South), with Stewart Island and other smaller islands lying offshore (figure 1). The North Island is divided by mountain ranges running through the centre, with rolling farmland on both sides down to the coast. The Volcanic Plateau dominates the central North Island, with an active volcanic and thermal area. The South Island is characterised by the massive Southern Alps, with rolling farmland to the east in Otago and Southland, and the vast Canterbury Plains (www.nz.com).

Fig. 1: Map of New Zealand

NZ has diverse landscapes with extensive plains, glaciers, fiords and rugged mountains in the South Island and rolling hillsides, subtropical forest, and a volcanic plateau in the north. Mountains form approximately one-fifth of the North Island and two-thirds of the South Island, and the country has over 15,000 kilometres of coastline (www.nz.com).

NZ has a land area of 270,534 sq km with a total population of 4 million people and its largest cities are Auckland, Hamilton, Wellington, Christchurch and Dunedin. Over the last three years the country has experienced a property boom, with increasing demand for coastal land and an overall rise in development.

2.2 Archaeology in New Zealand

NZ was the world's last major land mass to be settled and although its history may be considered short by world standards, it has a rich record of heritage sites. NZ archaeology studies Maori (Polynesian) occupation, dating back 800-1000 years, and the more recent historic period from 1800AD. There are over 55,000 recorded archaeological sites, the majority of which relate to pre-European Maori occupation, with a greater concentration in coastal and river systems in the north and north-eastern parts of the country (www.lawas.co.nz; www.nzarchaeology.org; Wilson et al. 1987:148).

One of the major recurring themes in NZ archaeology has been the cultural origins of the first settlers and the date of first settlement. Archaeologists have looked at cultural change, particularly the local origins and timing of development of the distinctive Maori culture. Research has focussed on the environmental impact of Maori occupation, in terms of vegetation change and extinction of birds such as the moa. Other topics have included economic change, the role of horticulture, warfare, tools, and resources (Howe 2003:176-182; www.nzarchaeology.org).

2.3 Typical Site Types

The most common Maori site types are described below.

Pa

A pa is a fortified place built by Maori, as a refuge from attack during times of war and as secure places to store food. Pa were probably used periodically, in combination with more open settlements. The earliest date for defended sites is the 16th century, however pa continued to be built and occupied until the early 19th century (NZHPT 2004a). The archaeological remains of pa are often obvious in the landscape (figure 2). Pa sites have banks and ditches, typically located on naturally defensible high points, such as the end of a steep sided ridge or coastal headland. Pa can often be recognised from their profile on the skyline, with a distinctive flat platform and the "v" shaped notch of a defensive ditch. Pa were also built on the edge of swamps or even on flat land (NZHPT 2003, 2004a).

The earthworks we see today on hilltops and headlands are only part of the fortifications that once existed. From a variety of historical and archaeological sources we know that pa were defended by palisades. In addition, earthworks such as scarps, ditches and banks were constructed to make defences more effective (Gumbley n.d; NZHPT 2003). There are currently some 6,500 pa sites recorded in NZ and there is a greater concentration in the North Island (97% above latitude 45°05'S) (Walton 2001:47).

Gardening Sites and Storage Pits

When people from Tropical Polynesia came to NZ around 800 years ago, they brought a range of plants from their homeland. Those known to have survived are the kumera, yam, taro, gourd, a tropical cabbage tree and paper mulberry. Gardening practices were dictated by climate and these tropical plants found survival impossible in southern parts of the country. There is a greater concentration of sites in the warmer northern parts of the North Island, and there is no evidence south of Banks Peninsula (NZHPT 2004a).

Fig. 2: Traditionally named Karangaumu, this well-preserved pa site is located in the Papamoa Hills Regional Heritage Park, Tauranga

(Photo: R Darmody, 2004)

Fig. 3: A typical example of a rectangular pit, which has been excavated in Tauranga

(Photo: L Furey 2004)

Techniques were developed to adapt Polynesian gardening practices to NZ. Storage pits were invented to protect kumara seed stock and food supplies from NZ's cold wet winters. Pits are rectangular (figure 3) or circular depressions and are found in many different situations including within pa, on flat land, ridge tops, natural terraces on spurs, artificial terraces and on hills. Pits are found singly, in clusters, or in long lines.

Archaeological excavation has shown that surface pits were 4-6m long by 2-3m wide and could be up to a metre deep. Originally they would have been covered by a pitched roof (NZHPT 2003).

Subterranean pits are found in parts of the country where the substratum is easy to dig and is able to hold its shape (figure 4). Subterranean pits may be either a bell type with an entrance at the top, or cave type with an entrance at the side (NZHPT 2003).

Fig. 4: Photograph of a half-sectioned subterranean pit (rua) at Hamarana, near Rotorua in the Bay of Plenty (Photo: M Campbell, 2004)

Other gardening sites include evidence of cultivated soils, stone-field gardening systems, borrow pits, and complex systems of ditches and drains.

<u>Terraces</u>

A terrace is an area that was artificially levelled by Maori to use as a garden or to live on. Investigations have shown that terraced sites usually include evidence of houses, food storage pits, and designated food preparation and cooking areas. Archaeologists have also found groups of postholes on terraces, understood to represent food drying platforms (NZHPT 2003).

<u>House Floors</u>

Evidence of house floors and other structures is mostly in the form of post holes, hearths, and variation and constraints in soil colour (Wilson et al. 1987:96). The basic rectangular design is very simple and small houses are more common than larger ones (Wilson et al. 1987:99).

<u>Midden</u>

Middens are a common feature in NZ archaeology, occurring in 70% of recorded Maori sites and there are approximately 20,000 recorded with NZAA. They are places where food remains, such as shellfish, bird and fish bones, ash and charcoal from fires, and discarded tools were dumped. Shell middens are found almost anywhere in coastal NZ and can be seen as low mounds or eroding from sand dunes, river banks or road cuttings (figure 5) (NZHPT 2004a).

At the simplest level, a shell heap identifies where a group of people have processed shell fish for a meal. Larger shell heaps may be the result of year round occupation, or seasonal activities associated with resource gathering and food preserving, which occurred regularly at one site over a number of years (NZHPT 2003).

Fig. 5: A typical example of a Bay of Plenty midden site, located on the edge of Ohiwa Harbour
(Photo: R Darmody, 2003)

<u>Ovens</u>

Ovens represent the remains of cooking activities and can be identified by signs of blackening or burning, usually in association with fire cracked rock (NZHPT 2003).

2.4 Historic Period Sites

A major shift in archaeological approach over the last 20 years has been the recognition of NZ's 19th century historic period sites. The variety of historic sites is as great as the range of activities that characterise the early years of predominantly European settlement. These include pre-1840 sites, relating to the earliest period of European settlement and include Christian missions, trading establishments, sealing camps, shore whaling stations, timber cutting sites, and agricultural sites (Walton 1999:77). Other sites relate to gold mining, industries, townships, and the NZ Wars (redoubts, timber stockades, block houses, and Maori fortifications) (figure 6). Sites of minorities who have traditionally been under-represented in written records have been explored through archaeology, particularly relating to Chinese settlement (www.nzarchaeology.org.nz). There has also been a greater emphasis on historic sites in urban environments, located under our towns and cities, as well as buildings archaeology.

Fig. 6: Te Porere Redoubt, an NZHPT managed property near Turangi. It was built by followers of the Maori prophet and warrior, Te Kooti and was the scene of the last major engagement of the NZ Wars in 1869 (Photo: R Darmody, 2004).

2.5 Information on Archaeological Sites

The main source of national archaeological site data is held by the NZ Archaeological Association ("NZAA"). A volunteer organisation of professional and amateur archaeologists, NZAA established a paper-based site recording scheme in 1957 and it currently contains over 55,000 records.

NZ is divided into 20 filing districts where the paper-based records are kept, with a duplicate copy held in a central file. There is a computerised database of key information known as CINZAS (Central Index of NZ Archaeological Sites), which serves as an index to the paper records. CINZAS does not contain all of the information on the site record form, or any plans, diagrams, photographs, field notes or artefact drawing, which the regional files hold.

The site recording scheme is the most comprehensive database of archaeological sites in NZ. Since the advent of the RMA and the HPA, the site recording scheme has been used increasingly in planning and statutory matters for site identification, management and protection. The database is the primary resource used by the NZHPT in managing archaeological sites (www.eds.org.nz).

2.6 Data Limitations

The data held in the NZAA Scheme has a number of limitations. There are a greater number of Maori prehistoric sites than historic or non-Maori sites in the files, but there are regional exceptions to this. The records vary in quality as many different individuals and agencies have contributed to them. The database was not established for planning and regulatory purposes and many of the older files lack the precision necessary for these functions. Grid references are only precise to +/- 100 metres and provide one point for a site that in reality may extend some distance. It is not sufficiently tied to cadastral surveying to identify whether sites lie on particular land parcels and is not a complete national survey. The database also retains the records of sites that have been destroyed. For these reasons it is considered and used as a guide to the presence of sites and fieldwork is required to clarify the location, extent, age and significance of a site (www.eds.org.nz).

In recognition of these limitations, NZAA initiated a national project to upgrade the information in the scheme in line with its expanded use for planning purposes. NZAA is also exploring ways of making the database web-based.

3. Archaeology and New Zealand Legislation

3.1 Historic Places Act

The Historic Places Act 1993 (“HPA”) provides for the identification, protection, preservation and conservation of the historic and cultural heritage of NZ. The HPA protects all archaeological sites whether recorded or not, from damage and destruction. Under section 2 of the HPA, an archaeological site is defined as a place associated with pre-1900 human activity, which is able to be investigated by archaeological methods to provide evidence relating to the history of NZ.

3.2 Authority Process

The NZHPT is the national statutory authority responsible for archaeological site protection. The HPA contains an authority process for any person wishing to do work that may affect an archaeological site. Section 10 of the HPA directs that an authority is required from the NZHPT if there is “reasonable cause” to suspect an archaeological site may be modified, damaged or destroyed in the course of any activity. An authority is required whether or not the archaeological site is recorded, the land on which an archaeological site may be present is designated, a demolition permit, resource or building consent has been granted, or the activity is permitted under District or Regional Plans.

One of the NZHPT's roles is therefore to manage the process of permitting modification or destruction of archaeological sites, through the issuing of authorities. The Trust processes 250-300 authorities annually, with demand steadily increasing each year. Although most authorities are granted, the NZHPT's regional archaeologists work with developers in the early planning stage prior to lodging an application, to encourage the avoidance of important archaeological sites. The cost and timeframe involved is also an incentive for applicants to design projects that avoid archaeological sites where possible (www.eds.org.nz).

When granting an authority, the NZHPT usually imposes conditions for the mitigation of destruction, relating to archaeological research and following tikanga Maori protocols. The authority may not be actioned unless the recipient also holds the necessary RMA consents for the project and authorities expire after five years (www.eds.org.nz).

3.3 RMA and Cultural Heritage

In 1991 the government passed the Resource Management Act ("RMA")¾a single piece of legislation for the management of land, water, soil and air, to balance environmental protection and development. This was a new approach to environmental management, which decentralised decision making to local and regional councils (www.eds.org.nz).

The RMA requires local authorities to consider and include archaeological sites when carrying out their functions, including the Resource Consent process. Councils need to recognise and provide for archaeological sites as part of the integrated management of resources in plans and policy statements (www.eds.org.nz).

Under the recent amendment to the RMA (2003), the recognition and protection of historic heritage, which includes archaeological sites, is a matter of national importance (section 6f). Historic heritage is to be protected from inappropriate subdivision, use or development. This sits alongside section 6e, the relationship of Maori and their culture and traditions with their lands, water, sites, wahi tapu and other taonga. Under section 7f the finite characteristics of natural and physical resources, need to be taken into account for archaeological site management.

The RMA requires councils to consider and include archaeological sites when carrying out their functions. In doing so however, local authorities have employed a variety of different approaches, some better than others. Despite these differences, there has been an overall increase in the volume of archaeological work being undertaken. In many cases developers have been required to obtain archaeological assessments as part of the application documentation for resource consent.

3.4 HPA and RMA

If an archaeological site will be damaged as part of a proposal associated with a resource consent application, the developer must apply to the NZHPT for an archaeological authority prior to the work taking place (NZHPT 2004b:43).

The interaction of protection under the HPA and the RMA often causes confusion. The provisions of the RMA through the resource consent process are intended to be pre-emptive, by allowing the effects land use changes to be considered. By contrast, the NZHPT's mechanisms for archaeological site protection under the HPA are reactive, often brought into play only after complex and expensive development proposals have been worked through in detail. Resolving the requirements of the HPA after those of the RMA, rather than in tandem with them, is common in NZ resource management. This tends to be time-consuming, resulting in unnecessary delays and expense for the landowner and sometimes without the owner's desired outcome.

4. Cultural Resource Management and Archaeological Research

4.1 Research Focus

The focus of archaeological research in NZ is largely dictated by the needs of cultural resource management. The majority of archaeological contract work is undertaken when a proposal for development is going to affect a heritage site. As predicted by Cordy in 1982 the NZ system of site protection, under the HPA, does not have a good record of preservation and the recovery of valuable information has been variable. Furthermore, the increase in contract archaeology has in some cases prevented research progress (Cordy 1982:277). This section will look at what this actually means in practical terms for archaeological research and uses the Bay of Plenty as a regional example to highlight the issues.

4.2 Bay of Plenty

The Bay of Plenty lies east of the Kaimai-Mamaku Ranges and south of the Coromandel Peninsula (figure 7). The 12,247 square kilometres of land sweeps from Lottin Point in the east to Waihi Beach in the west. Inland the region is bounded by the watersheds of the river catchments, which flow into the Bay of Plenty including the Rotorua Lakes. Over the last 150 years the Bay of Plenty land cover has changed significantly. Almost half the land area is now covered in indigenous forest, with nearly a quarter each in exotic pasture and production forests. The remainder of the land is in mixed scrub, water, horticulture, coastal sand, wetlands, cropping and bare land. Only 0.8% of the land in the Bay of Plenty forms urban areas with the main population centred in Tauranga city, with urban centres at Rotorua, Whakatane, Opotiki, Te Puke, and Katikati (www.boprc.govt.nz)

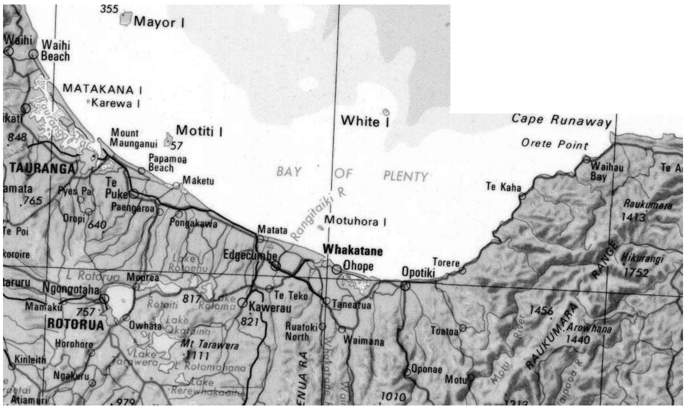

Fig. 7: Map of the Bay of Plenty, east coast of the North Island,

The Bay of Plenty landscape is strongly influenced by water and includes lakes (Rotorua Lakes), rivers (Motu, Kaituna and Wairoa), harbours (Tauranga and Ohiwa), estuaries, wetlands, and a long varied coastline. Geothermal resources are also a feature of the region's natural heritage, including volcanoes, geysers, thermal waters, and mud pools (Mount Tarawera and White Island) (www.boprc.govt.nz).

4.3 Bay of Plenty Archaeology

There are over 8000 archaeological sites recorded in the Bay of Plenty, many relating to Maori occupation, but also representing people of other cultural origins. Compared to other parts of NZ, the Bay of Plenty is a landscape rich in sites relating to all aspects of the past, some of national/international significance.

The overwhelming majority of archaeological sites are located near the coast or in the vicinity of water courses, such as rivers and lakes. Other key determinants of site location include the distribution of food sources, and areas suitable for cultivation of crops, such as kumara, which need free draining soils and frost-free conditions. A distinctive feature of archaeological


Fig. 8: The hills surrounding Ohiwa Harbour are covered in pre-European Maori archaeological sites
(Photo: R Darmody, 2003)

site distribution in the Bay of Plenty are the very large and complex pa sites, found in strategic locations overlooking extensive areas of cultivation and open settlements (figure 8) (EBOP 2004).

4.4 Bay of Plenty Authorities Processed by the NZHPT

Over the last three years 94 authorities have been granted by the NZHPT for the modification, damage, or destruction of archaeological sites in the Bay of Plenty. There has been a significant increase over the last two years, as the number doubled between 2001 and 2003 from 22 to 45, this 105% increase has occurred predominately over the last year. There was a 23% increase in the 2001 to 2002 period from 22 to 27 and a 67% increase in 2003 from 27 to 45.

Development for which authorities are sought can be divided into four categories: residential, commercial, council works, and forest harvesting (table 1). Over the last three years residential and commercial development have accounted for 65% of the authorities granted. There was an increase in the development of residential subdivisions in 2002 and again in 2003, as the property boom entered its recovery phase. The nature of the Tauranga landscape, where properties are most sought after, requires large-scale earthworks to be carried out in preparation for high-density residential use, and this has been particularly destructive for archaeological sites.

The number of authorities processed by the NZHPT does not correlate with the actual number of archaeological sites modified or destroyed. One authority may cover a large number of both recorded and unrecorded archaeological sites. The number of authorities granted for forest harvesting is also misleading in terms of site damage, as much work involves the removal of mature trees from archaeological sites, which assists in their long-term preservation.

Table 1: Percentage of Archaeological Authorities Processed Annually in the Bay of Plenty from 2001-2003 by Activity.

Year/Activity	Residential %	Commercial %	Council Works %	Forestry%
2001	36	5	18	41
2002	52	19	10	19
2003	69	4	9	18

4.5 Issues for Archaeological Research

The problems of inadequate research and lack of quality reporting in an environment dominated by cultural resource management, can be broken into four main issues:

1. The emphasis on regions where present economic development is greatest.
2. The lack of research strategies and inadequacy of information recovered.
3. The use of technology in NZ archaeology.
4. The lack of public appreciation for archaeology.

These issues are discussed below, using examples from the Bay of Plenty.

Issue 1: There has been an emphasis on regions where present economic development is greatest

Large areas of NZ have received limited research attention because there has been limited development. In Canterbury, Challis (1996:39) lamented that “few themes of importance in Canterbury are well understood” and existing archaeological information is misleading

> …because of limitations in the quality, reliability, and representativeness of the data. The interpretation of sound data is constrained by inadequate understanding of the broader context (Challis 1996:40).

With the emphasis on cultural resource management, the volume of archaeological work has been greatest in areas where development is occurring, and this means Northland, Auckland and the Bay of Plenty are the focus of much attention. These are also the areas of NZ that have the greatest concentration of pre-European Maori sites. Visually, the archaeological sites are obvious in the landscape in these regions, however by comparison Challis (1996:40) notes the “comparatively minor visibility” of sites in the Canterbury landscape, and that it has been regarded as a low priority for archaeological research programmes.

The features of archaeological site location in the Bay of Plenty mean that sites are vulnerable to loss through land development. People continue to occupy the most desirable locations¾the coast, near water, near food sources, or the strategic location with a view (EBOP 2004). In the late 1970s and 1980s land was in high demand for horticulture, and large areas were landscaped for kiwifruit orchards. However since the mid-1990s pressure from development has come in the form of housing subdivisions, particularly in Tauranga and areas surrounding Tauranga Harbour such as Omokoroa. Large numbers of archaeological sites and whole landscapes have been destroyed as a result.

Issue 2: Are NZ archaeologists answering meaningful questions about the past?

The NZHPT takes the view that all sites contain some information of value to an area's history and once destroyed this information is irreplaceable. It is therefore important to identify these sites, protect them until the valuable information is recovered and ensure that this collection is adequately done (Cordy 1982:281).

The quality of research and reports from archaeological consultants has varied greatly, with the worst ones failing to record vital information and not considering research problems (Cordy 1982:283). At present there is no minimum academic qualification for archaeologists operating in NZ and no mechanisms for certifying archaeologists (Walton 2002:233). There are no statutory or self-regulating professional mechanisms for the monitoring of archaeological work. Under the HPA, the NZHPT has the ability to approve persons responsible for carrying out the archaeological conditions on an authority. However, the NZHPT has no power to monitor archaeological work undertaken for resource consent or authority applications, nor can it impose quality control procedures over general archaeological practice. Despite this, the NZHPT frequently has to deal with the repercussions of inadequate archaeological assessment and investigation (Barber 2000:33). In the Bay of Plenty, consultant archaeologists working in the region tend to be highly qualified and experienced, but this is not the case in all parts of NZ.

Archaeological consultancy is a difficult field to enter. Graduates at both Otago and Auckland universities are primarily trained to further their academic knowledge, which increases the number of academically trained archaeologists, however few job opportunities exist. Graduates are more likely to work as consultant archaeologists, but first must gain experience and a client base (Druskovich 1999:295). This means working for other consultants and accepting that they may not be in full-time employment during the first years. They also have to be prepared to go where the work is, which can mean living away from home for extended periods of time (Druskovich 1999:296). Conversely, experienced consultant archaeologists are in high demand, which also causes problems, as some take on more work than they can professionally manage. In the Bay of Plenty there have been situations where frustrated developers have deliberately damaged archaeological sites, because they could not get their consultant archaeologist to start work when they wanted them to. The large number of outstanding excavation reports from some consultants, also illustrates this. This situation has been made worse by the current economic situation, where residential sections are in high demand and Tauranga is expanding at a galloping pace.

Quality suffers through a lack of time for adequate research and from not addressing appropriate questions. The conditions on an archaeological authority granted by the NZHPT therefore need to ensure it allows sufficient scope for the recovery of meaningful information and analysis (Cordy 1982:283). The NZHPT has been aware of this problem and is placing stricter conditions on archaeological authorities. It is now common for an authority to be granted with the requirement of a section 15 investigation, for a detailed excavation of a site, prior to the development commencing. The project archaeologist is required to produce a research strategy, which must be approved by the NZHPT. The strategy directs investigations, analysis and monitoring work, towards specifically defined questions, which can be answered by information from archaeological sources. These archaeological sources include archival and historic records, in-ground and buildings archaeological material, and the analysis and interpretation of artefacts and other material found.

The greater use of research strategies has worked well in the Bay of Plenty. The NZHPT held a meeting with consultants operating in the region in 2003, to look at what the important themes and questions for local research were. It was recognised that many smaller excavations recovered little information, however they were of incremental value, if wider questions could be addressed over time. Methodology and approaches to gathering and analysing data were also discussed. Often consultants work in isolation and lack professional support, however the bringing together of archaeologists provided an opportunity for a cohesive approach to research in the Bay of Plenty.

There are instances when the consultant and/or NZHPT archaeologist realises more work is needed. Where an authority has been granted with simple monitoring requirements, a condition is normally included that allows the project archaeologist to notify the Trust when a full investigation is needed. This is in relation to section 15(1) of the HPA and applies to sites where an archaeological investigation could provide significant information, relating to the historical and cultural heritage of NZ. Any earthworks that may affect the site must cease until the NZHPT has given its response. In other cases, where a full investigation is in progress, additional work can cause time delays and increased costs. The project archaeologist employed by the developer can find themselves in a difficult position, caught between providing a service to their client and fulfilling the NZHPT's authority conditions. However the NZHPT has the ability under section 20 to undertake a review of authority conditions, if additional work is required.

Under authority conditions, the NZHPT can also require management plans to be prepared for large-scale projects. These provide operational guidelines and procedures for day-to-day activities that may affect archaeological sites during earthworks for an activity, such as a subdivision or large roading project. The plan must be submitted to the NZHPT for approval prior to work commencing. As a minimum plans include:

a) procedures for any archaeological investigation or monitoring;

b) the role, responsibility and level of authority of the approved archaeologist(s);

c) protocols for the unexpected discovery of archaeological material;

d) timeframes for archaeological work;

e) requirements for stand down periods to enable archaeological work;

f) the responsibilities of contractors with regard to notification of archaeological sites; and

g) mechanisms for dispute resolution.

Issue 3: The use of technology in NZ archaeology

Archaeology has become an increasingly high technology science

…with the dawning of the new millennium, we are entering a new archaeological world. The past half century has seen archaeology come of age, become a sophisticated science (Fagan 2003:89)

The greater use of technology from other disciplines such as mathematics, geology, ecology, biochemistry, physics and computer science has produced major advances in how we understand the human past (Fagan 2003:89; Heritage NZ in press). With computer modelling, mitochondrial DNA analysis, pollen analysis, stable isotope analysis, oxygen isotope analysis, and a range of dating techniques including radiocarbon, thermo-luminescence, obsidian hydration, archaeology has become more specalised, creating the need for multi-disciplinary teams. Technology is also advancing field techniques, with global positioning systems (GPS) allowing greater accuracy in mapping and fieldwork, and ground penetrating radar (GPR) to detect anomalies in ground soil structure (Heritage NZ in press).

Use of technology in archaeological work relating to cultural resource management varies greatly. In the Bay of Plenty, archaeological inspections and surveys of properties make use of aerial photographs for identifying sites and GPS for recording purposes. Technology used for archaeological excavations is generally limited to mapping equipment (alidade or electronic theodolite are most common). A typical methodology for the excavation of a midden site in the Bay of Plenty's Papamoa Dune Plains, would be for the site to be trenched using a hydraulic excavator to investigate soil profiles. Following this, areas of ground are stripped using an excavator in spits (for instance 10cm). Archaeological features are then closely examined by hand and recorded, with samples taken for later analysis (figures 9 and 10) (Gumbley and Phillips 2004:1).

The study of material recovered from excavations is becoming more advanced with the use of specialists for detailed analysis of organic, animal and lithic material. In the Bay of Plenty charcoal samples are sent to the Anthropology Department, University of Auckland, to identify the vegetation at a site at the time it was occupied. Midden is analysed by archaeologists to determine the relative proportions of fish and shellfish. Radiocarbon dating is undertaken at the University of Waikato's Radiocarbon Dating Laboratory. Soil samples are sent to the University of Waikato for palaeoenvironmental information to be obtained by analyising plant phytoliths, pollens and spores. In particular, soil samples are examined for the presence of kumara and other starch residues to answer questions relating to whether extensive and distinctive soil modifications found at Papamoa are associated with kumara cultivation. Analysis of material from a recent excavation directed by Warren Gumbley and Ken Phillips at Papamoa, provided some of the first results to directly confirm kumara cultivation on the dune plains (Gumbley and Phillips 2004:10).

It is becoming more common for archaeological geophysical surveys to be undertaken in NZ, although it is still considered expensive and the results are often inconclusive. The non-intrusive survey of subsurface features, using remote sensing equipment can detect anomalies in ground soil structure, indicating where archaeological material may be located. The use of a ground penetrating radar at the site of the Bell Block, Taranaki, successfully directed excavations to the site of an 1850s defended settlement (Heritage NZ in press). However, the results of a recent geophysical survey of a development at Papamoa, in the Bay

Fig. 9: An excavator stripping an area of ground exposing archaeological features, under the supervision of an archaeologist (Papamoa)
(Photo: R Darmody, 2004)

Fig. 10: Excavation of a defensive ditch from a pa site at Te Puke, dating to the second half of the 18th century
(Photo: R Darmody, 2003)

of Plenty, were not so conclusive. A developer commissioned a survey to determine if a burial ground (urupa) was present within the proposed area of the subdivision. Ground penetrating radar (GPR) was used with the aim of identifying grave shafts (Geometria 2004:6). NZ archaeology does not have hard underground structures like building foundations and roads, making it more difficult to detect anomalies in ground soil structure. The survey did not locate any graves but may have found an archaeological terrace site and a series of recent features (Geometria 2004:6). In this instance the results of the geophysical survey did not justify the costs of undertaking it.

Issue 4: Limited public appreciation for NZ's past

The general public has limited knowledge and understanding of NZ's archaeology, which has serious implications for protecting the past. People see archaeology as the study of ancient cultures and do not consider their own country is old enough to bother with. They also have a lack of appreciation for Maori history. The Bay of Plenty public are living in a rich archaeological landscape, surrounded by spectacular sites. Despite this, most people are unaware of what an archaeological site is until they buy or sell a property that has archaeological issues. The NZHPT receives a variety of responses to these enquiries, the majority of which are negative towards heritage.

Developers tend to consider archaeology as an annoying and expensive exercise, which they are forced to undertake as part of the planning process. Archaeology is not considered to add value to their project and they attempt to comply with the conditions of an authority in the quickest and least expensive way. The public are rarely allowed access to view an archaeological excavation in progress and completed archaeological reports are difficult to access.

Cordy (1982:289) understood the need for public understanding when he advised that

> ⋯the public must receive benefits ¾both in preserved sites they can visit and in books and artefacts…they can read and see.

The NZHPT's response in the Bay of Plenty has been to undertake public education programmes with local authorities, the general public and school children. Three separate programmes have been developed over the last three years and they continue to be worked on and operate with success. The aim has been to provide accessible information through brochures, workshops and public lectures about the Bay of Plenty's archaeological resources, to educate the public and facilitate greater site protection through increased awareness.

5. Conclusions

Like the United States, Australia and other countries in the world, NZ experienced an increase in contract archaeology following the introduction of legislation advocating site preservation. Cultural resource management dominates this country's archaeological research and a significant amount of work has been undertaken and paid for by the private sector. Archaeologists are no longer working in a research atmosphere.

The value of this work has varied greatly and the emphasis on RMA and HPA requirements has had serious implications for archaeology as a whole. Large areas within the country are being completely ignored, as research is centred where development is greatest. The quality of research has also varied with a general failure to recover vital information and consider appropriate research questions. The potential to make greater use of technology, and utilising multi-disciplinary teams of specialists to analyse material from excavations, is also an issue for archaeological research. While the NZHPT has a role under the HPA to approve persons carrying out the archaeological conditions of authorities and to monitor conditions and reports, it has no power to impose quality control procedures over general archaeological practice (Barber 2000:33).

Unfortunately NZ has not learnt from the experiences of other countries, like the United States, where the benefits of preservation and contract work were seriously questioned in the 1980s (Cordy 1982:289). Not only are we at risk of loosing our overall research focus, but also there is an apparent lack of public understanding for what it is we do. The greatest concern for archaeology is the lack of public appreciation and knowledge about NZ's past. The general public must be made aware of the important archaeological resources of this country, if we are to achieve better protection for sites.

BIBLIOGRAPHY

Barber, I., (2000) "Archaeological Heritage Management Reform in New Zealand: What Happened?", Archaeology in New Zealand 43(1):22-36.

Challis, A. (1996), "Needs for Archaeological Research and Site Protection in the Canterbury Region", Archaeology in New Zealand 39(1):39-47.

Cordy, R., (1987) "The Dangers of Historic Preservation and Contract Archaeology", New Zealand Archaeological Association Newsletter 25(4):277-289.

Druskovich, B., (1999) "Contract Archaeology: A Guide for Students", Archaeology in New Zealand 42(4):295-299.

EBOP, (2004) "Environment Bay of Plenty Land Information Staff,

Archaeological Training, Course Notes", unpublished report, Environent Bay of Plenty, Whakatane

Fagan, B., (2003) “Some Musings on Generation Change and Archaeology’s Future”, Archaeology in New Zealand 46(2):87-96.

Geometria, (2004) “Archaeological Geophysical Survey: Tuihana Residential Development, Papamoa”, unpublished report for Waimea Consultancy Limited, Tauranga

Gumbley, W. n.d. “Application to Register Papamoa Hills Cultural Heritage

Landscape as a Wahi Tapu Area”, unpublished report for NZHPT Bay of Plenty Branch Committee.

Gumbley, W. and P. Phillips, (2004) “U14/3113 and U14/3116: Report on Archaeological Investigations Papamoa, BOP”, unpublished report

Heritage New Zealand, in press, NZHPT Magazine, Wellington

Howe, K.R., (2003) The Quest for Origins, Penguin Books, Auckland

NZHPT, (2003) “Protecting Archaeology”, Brochure, New Zealand Historic Places Trust, Tauranga

NZHPT, (2004a) Archaeological Brochure Series, published by New Historic Places Trust, Wellington

NZHPT, (2004b) Heritage Management Guidelines for Resource Management Practitioners, New Zealand Historic Places Trust, Wellington

O’Keefe, M., (2003) “Professional Archaeology¾The Next Frontier”, Archaeology in New Zealand 46(1):33-36

Walton, T., (1999) Archaeological Site Recording in New Zealand, NZAA Monograph 23, Auckland

Walton, T., (2001) “The Burden of Defence in Prehistoric New Zealand”, Archaeology in New Zealand, 44(1):47-57

Walton, T., (2002) “GPS Use and Archaeological Site Recording”, Archaeology in New Zealand, 45(4):293-296

Wilson, J. ed., (1987) From the Beginning The Archaeology of the Maori, Penguin Books, Auckland

Websites

www.boprc.govt.nz

www.eds.org.nz

www.lawas.co.nz

www.nzarchaeology.org.nz

www.nz.com

Pakistan

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I. Introduction

On the horizon of the northeastern part of the globe Pakistan appeared as a shining star among the many countries of the region only 56 years ago when it acquired independence. It is also a country consisting of many nations within as it is a land of multicultural people inhabiting a diversity of landscapes and geographic surroundings. It is an ever-fascinating country and one of those fortunate nations possessing one of the most ancient civilizations of the world. Its cultural and social history dilated over last six thousand years. The imprint of its remarkable ancient past and glorious history still exists in the form of innumerable settlements, monuments and sites.

The Department of Archaeology and Museums is the only organization with the sole responsibility to preserve and manage the moveable and immovable cultural heritage of Pakistan. The prime objectives of its scientific studies are logical interpretation, proper presentation and meaningful presentation. Pakistan is exceptionally rich in its archaeological and architectural heritage possessing innumerable sites and monuments spread all over the length and breadth of the country. The appreciation and realization of their preservation is indeed a later phenomenon where the various agencies of the government took steps to protect at least some of the more important and better-preserved sites and significant artifacts. The Department oversees the management and preservation of over 398 sites and monuments including 6 world Heritage sites, and also protects a number of sites and monuments of obvious archaeological potential.

The National Museum and thirteen site or house museums with thousands of antiquities, artifacts, other remains, and art books on display and in the reserve collections also come under the fold of its activities. There is a central archaeological laboratory with three laboratories dealing with specific types of conservation located at four main stations running under the supervision of well-trained and educated professionals in their relevant fields. The conservation and presentation of sites and monuments fall to the duty of two main circles with various sub-regional Offices. In Karachi there is a full fledged Exploration and Excavation Branch under the direct supervision of a Director with a Northern Wing at Lahore. Both of them consistently carry out archaeological survey, exploration and excavation in the country. In order to fulfill one of the imperative obligations which is to train archaeologists, museum experts and conservators, as well as laboratory technicians, the Pakistan Institute of Archaeological

Training and Research (PIATR) at Lahore has functioned under the canopy of the Department of Archaeology and Museums, Government of Pakistan since 1988.

1. Establishment of A Documentation Centre

Systematic recording and documentation must be undertaken to provide a baseline before starting any kind of research in any field. In the study of ancient buildings detailed documentation of their architectural features and decorative elements forms the cornerstone for future research. Perhaps it is the only field most neglected so far in Pakistan. Keeping in mind the dearth of trained personnel in the field of systematic and scientific documentation of monuments, a well-equipped documentation center staffed with energetic officers and officials from the Department has just been established this year. This centre is effectively and actively continuing with the documentation of the Shish Mahal or Shah Burj Complex at Lahore Fort. The Documentation centre serving as a central repository at the National level is also aimed at undertaking documentation projects of the largest and most complex magnitude.

2. Islamabad Museum

The Department of Archaeology and Museums has never stagnated its efforts to provide the highest quality museum to the Pakistani nation and always strives to the best of its capacity to establish new museums in the country. Islamabad, the capital of Pakistan, was in need of a museum where the whole spectra of cultural heritage of Pakistan could be represented. The Islamabad Museum was founded in 1994 in a rented building but it could only be maintained for five years and in 1999 it was closed and all of the objects were placed in storage. On September 28th, 2003 the museum was reestablished- An effort was made to narrate the cultural story of mankind in Pakistan through the ages.

The Museum houses objects, which tell the history of Pakistan from the Old Stone Age to the period of the ever-great Mughal Emperors.

II. Exploration and Excavation

Exploration and excavation is one of the integral parts of the different functions of the Department of Archaeology and Museums. It is the only function through which the Department can collect the antiquities to enrich its museums or to bring to light the concealed aspects of its rich cultural heritage. The work was undertaken through carefully formulated programmes and plans to be run independently by the Department or in collaboration with foreign missions. To recover artifacts scattered on the surface and to record the activities of ancient man, vast areas were combed and exploration was conducted in Sindh, NWFP and Punjab provinces. The excavations are mostly done on protected cultural property or on the sites where already excavations are already going on by different foreign archaeological missions or local universities/institutions. Ten foreign Missions have been issued licenses to conduct archaeological excavation and exploration in the country during the current year.

1. Salvage Excavation In Taxila Valley

i. Bhir Mound

Sir John Marshal excavated Bhir Mound Taxila for more than two decades and uncovered the first historic city of the Achaemenid period, and he revealed considerable evidence from this work. Sir Mortimer Wheeler conducted further excavations at Bhir Mound in a more scientific and systematic way, however, he found nothing new. Dr. Muhammad Sharif from the Department of Archaeology and Museums made an effort by having a few trenches in selective areas but his results were no different that those of Marshal and Wheeler's. The question of what period the city actually belonged to, what did it look like, and how did it develop remain unanswered. Thus, the present excavation at Bhir Mound was begun to search for the answers to such questions, however, foremost in mind was the construction of a stadium on this protected World Heritage site during the previous reign. A team of young archaeologists, started salvage operation during the years 1998- 2002 and presented their report. Sir John Marshal does not exclude the possibility of human activity in Taxila Valley going back to prehistoric periods but on the basis of his findings he does opine that the human activities at Bhir Mound hardly goes beyond 6th-5th centuries B-C. However, excavations have clearly revealed a pre-historic phase that has been tentatively dated to the time frame of the 11th to 6th centuries B.C. Thus a complete sequence of chronological events can now be reconstructed on the basis of excavation results drawn from Sarai Khola and Hathial.

ii. Jinnan Wali Dheri

Jlnnah Wali Dheri is located in the Taxila valley and situated about 10 Km. from the Taxila Museum on the left bank of the Haro River. The site was badly plundered and disturbed by unauthorized diggers and sculptures hunters. The Department of Archaeology and Museums started salvage operation/observations in the last few years for its protection. The excavation was mainly dealing with the monastery and stupa area. The exposed structure belongs to the 4th-5th century A.D. and stands three meters high with a thickness of 1 .2 meters. These structures have Diaper and Semi-Ashler masonry.

This excavation was much interesting due to the recovery of stucco mural paintings in different colours, having images of Buddha and Bodhisattva exposed in the main entrance of the monastery walls. This is one of the most important discoveries in the Taxila Valley. All the exposed structures, minor antiquities and mural stucco paintings have been preserved for the next generation.

2. Excavation At Takhat-l-Bhai District Mardan

The Buddhist site of Takht-i-Bhai located in the Mardan District of NWFP was first excavated in 1907 by D.B. Spooner and during 1910-1911 operation was followed by Mr. Margraves. However only about 10% area of the site was excavated which revealed the important site from the present Buddhist period. This year, under the project entitled the "Development of sites and monuments from Taxila to Swat", the remaining major area of the Takht-i-Bhai was excavated and a number of antiquities and pieces of ad were recovered. Besides this, three votive stupas were also exposed. The other remains consist of two rooms with a front porch, a niche on the wall and a flight of stairs leading to the second story.

III. Exploration

Archaeological exploration is a persistent duty that the Department of Archaeology and Museums is actively performing every year with funds allocated for this purpose. Besides the departmental ventures some foreign missions are also engaged in exploring sites and monument with ancient value. Archaeological explorations in all of the four provinces of Pakistan are part of the regular programme and development scheme. These projects record hidden and unknown cultural relics throughout the country and are still in progress despite considerable published research.

1. Swabi District, NWFP

Last year an extensive survey was carried out in the Swabi district of NWFP. The rich cultural heritage of this district is represented by Buddhist stupas and monasteries, most of which were originally robbed by treasure hunters. However despite this barbarian destruction 140 new sites of Buddhist affiliation were identified principally in the Kushan period. All the principal structures and antiquities have been found through survey, and have been properly documented for their protection. The detailed report on the important discoveries of the Swabi District have been published by the Department of Archaeology and Museums. The title of this monograph is “Swabi and its Cultural Heritage: The Archaeological Survey and Documentation of Cultural Wealth”.

2. Northern Areas of Pakistan

The Pak-German Archaeological Mission has also been exploring and documenting the petroglyphs and inscriptions in the Northern Areas of Pakistan since 1981. Up until now about forty thousand rock carvings and inscriptions of different scripts have been recorded and documented. The survey work in the Northern Areas of Pakistan is still in progress.

Several special exhibitions of the antiquities and works of “ad” from Pakistan were mounted and sent abroad to introduce the cultural heritage of the country. During the last years two exhibitions were sent to Japan and the U.S.A.

IV. Preservation and Conservation

The Department of Archaeology is responsible for the preservation and presentation of the cultural heritage of our hoary past. Conservation is a continuous slow process and no levy can be allowed without risking the disintegration of sites and monuments. This vital function can be performed by two Circle Offices, for example, the Northern Circle of Archaeology in Lahore and the Southern Circle of Archaeology in Hyderabad with various Sub-Regional Offices. Ttrained staff are appointed to look after these monuments, and they are also responsible for their conservation. The preservation and restoration as well as the maintenance of archaeological sites and museums falls under the jurisdiction/control of the Circles and sub-regional offices. The visual manifestations of the past demand (from the experts) that their originality must not be impaired or compromised. At the same time they must strengthen their fabric, conserve architectural features, and preserve any embellishment and decoration. The job is, therefore, of a very sensitive and delicate nature. A thorough study of structures are made and the material closely examined before planning any such venture.

Financial Limitations

The results of all undertakings in this field have been rather satisfactory. For the purposes of preservation and restoration of archaeological sites and monuments during the last financial year, the Government of Pakistan has allocated a sum of Rs.87.15 million In the Regular Budget as well, 86.979 million has been earmarked under the Development Projects. During the current financial year the Government of Pakistan has allocated Rs.93.924 million under the Regular Budget and Rs.97.442 million under the Development Projects for the conservation and Development of the cultural heritage of the country. There are 16 Development Projects in progress intended for the maintenance, preservation and conservation of the monuments and archaeological sites.

Shish Mahal or Shah Burj at Lahore Fort is a remarkable building of Shah Jahan's era. During the recent past it was plagued by chronic problems, for example, some serious cracks and sagging of its ceiling were occurring. Many efforts were made to keep a tight rein on the problem but those efforts could not move beyond some temporary remedial measures. This year, with the financial assistance of UNESCO, two experts meetings were called for the conservation of Shish Mahal and for the development of a master plan for Lahore Fort. These meetings reached successful conclusions and certain systematic plans have been finalized to preserve the Shish MahaI. The initial work, for example, documentation, cleaning of the ceilings, provision of materials, capacity building and chemical analysis are in currently in progress. The whole task is scheduled to be completed within the current year. Besides the presentation of Shish Mahal the development of a master plan for Lahore Fort was the second task put before the experts during the meeting; the initial work in this regard has been completed.

V. Problems

The dearth of trained hands always remains a major problem for the Department. In order to overcome a shortage of trained manpower in all fields related to archaeology, many courses have been arranged at the Pakistan Institute of Archaeological Training and Research. Recently, a course on the Epigraphic study of the Makli Monuments and sub-regional training courses regarding the Biological Chemical Degradation of Stone/Brick monuments in Pakistan was completed. In the latter course 15 students, including 5 foreign students, were trained.

The Government of Pakistan has however, been cognizant of the problem throughout this period. In order to overcome the shortage of technical manpower, further improvements were made from time to time for better and efficient management of the Department. Many officers and officials were sent abroad for training and higher education. This manpower has poven to be the backbone of archaeological service in Pakistan.

Efforts have always been made to carry out conservation using similar types of material and identical binding matters. It may be stated that our approach has been orthodox, perforce through the absence of proper laboratories and workshop facilities. We are now trying to improve the work by establishing advanced laboratory facilities and capacity building in the different fields of archaeology.

Papua New Guinea

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ARCHAEOLOGICAL RESEARCH, CAVE ART PRESERVATION, AND HERITAGE MANAGEMENT ON THE HUON PENINSULA OF PAPUA NEW GUINEA.

Summary

This report describes urgent documentation work carried out on cave art sites threatened with destruction on the Huon Peninsula of Papua New Guinea through a discussion of, (a) the physical, chemical, and biological factors induced by a combination of human and naturally occurring agents and, (b) the impact of alternate perceptions of the cave art that are likely to render the value of the cave art as unimportant in the minds of the local population. The upshot of this is that rock art conservation and promotion becomes less important, ultimately resulting in the destruction of the cave art through neglect, ignorance, and a lack of appreciation. This result is likely due to the rock arts' situation/location within a landscape that is subject to alternative interpretations and meanings that downplay the cave art's traditional and artistic value. The end result is a replacement with alternate meanings based on scientific results, archaeological research, and local land use patterns (i.e. gardening and cultivation, grazing, and grassfires set by local occupants as a hunting strategy).

Current and future plans to conduct research and documentation of the rich cultural and natural heritage of the Huon Peninsula is underscored by the fact that:

(1) the oldest site for human habitation in New Guinea and the Pacific, dated to 40,000 years is located at Bobongara, which is indicative of the close articulation between the physical landscape and cultural dimensions,

(2) the Huon Peninsula terraces represent the most complete set of relict coral terraces anywhere in the world, reflecting the effects of glacio-eustatic sea level changes over the last 500,000 years, and

(3) plans for nomination to the UNESCO World Heritage List due to its "universal" appeal based on scientific, cultural, and aesthetic values.

This report is the result of a fruitful relationship between the Papua New Guinea (also abbreviated as "PNG") National Museum and the Smithsonian Institution to which the latter has already contributed to the preservation of the cultural and scientific heritage of the Huon Peninsula by assisting the author in urgent field documentation (described below). In addition, a "Short Term Visitors Award" granted by the Smithsonian Institution enabled the following research to be conducted:

(i) the completion of parts of the documentation work previously begun on the Huon Peninsula, in 2000, and 2001,

(ii) formulation of plans to produce a booklet on the research results.

Further financial assistance is being sought through collaborative research with other international institutions and researchers as a follow up on the documentation and preservation of the Huon Peninsula cave art heritage that was first initiated in July of 2002.

Background

Archaeological Context

The interest in the dating and preservation of the Huon Peninsula cave-art has to be understood within the context of the earliest evidence of human habitation in Papua New Guinea, -Bobongara, a 40,000 year old site on the Huon Peninsula-and events in other parts of Sahuland. The Bobongara date equates with sites of similar antiquity found on the Australian mainland. These early dates are not unexpected because Australia and New Guinea were once a part of the Greater land mass called Sahuland for much of the 50,000 years of history and connection as a single continent.

The 40,000 year date on the Huon Peninsula hints at the potential for the discovery of more sites of this age in locations adjacent to Bobongara, given the numerous well preserved cave sites now located on the raised relict terraces.

The terraces provide a unique stepping stone for the discovery of sites with excellent archaeological potential and cave art in well sequenced flights of these ancient geological formations. Archaeological investigations on this ancient landscape can be used to understand how the human occupation of these sites articulated with the time of inception of cave art and other cultural practices such as the manufacture and trade in pottery, obsidian, wealth items such as dogs teeth, ocher, and other indicators of prehistoric subsistence patterns and technology found in the area (Lilley 1986, Araho 1997, 1996, Muke 1984, Groube et al 1986).

Given the long prehistory (and history) of contact and exchange between Australia and New Guinea, the distance to travel was not a barrier for people with a range of cultural traits, including painting skills. It confirms the possibility for the early development of art in Sahuland as indicated by the 60,000 year old date for rock-art in the Kimberly Ranges of Australia. This rock art provides a proxy date for similar developments in the early evolution of artistic skills on the Huon Peninsula of New Guinea. The ongoing archaeological and cave art recording is designed to complement the scientific work that has been ongoing on the Huon Peninsula.

1.2. Geological Context

Geologically the Huon Peninsula is a stretch of land that pokes into the Vitiaz Strait, on the northern part of the main island of New Guinea. The entire 80 kilometer stretch of the Huon coast is tectonically active and is being uplifted at rates of up to 3 metres per 1000 years (Chappell 1974). Along this coast are flights of ancient coral terraces rising from the coast inland. The terraces represent the most complete set of relict coral terraces anywhere in the world that reflect the effects of glacio-eustatic sea level changes over the last 500,000 years. The terraces are akin to an open textbook and within its pages lie the secrets of this part of the earth's climatic history.

The research potential of the area has attracted scientists from all over the world interested in understanding the behaviour of the earth's pat climatic patterns. Scientific investigations along the entire coast have been ongoing for over 30 years focusing on the dating of the terraces (Chappell 1974, 1994), understanding the palaeobiology of the reefs and ancient reef communities (Pandolfi 1996), conducting geomorphological studies, and investigating the evolution of small valley systems, and tectonic problems (Ota et al 1993, Pandolfi et al 1994).

On these relict terraces are found sea-cut caves which have been dated using the Thorium/Uranium method of dating by Bloom (et al 1974). These well dated caves range in age from 6,000; 20,000; 40,000, 80,000, 120,000, 200, 000, and 300, 000 (Chappell 1974).

Initial archaeological interest in the early 1980's then was focused on better understanding the nature of the 40,000 year old habitation site in the Bobongara area of the Huon Peninsula, and to extend the survey to areas in the vicinity to recover surface finds of waisted axes (Groube et al 1986). Other associated studies included archaeological excavations on a shell midden located on the edge of the broad flats of a former Holocene lagoon, dated to 6,000 years (Digim'Rina 1986) and ethnohistoric work on the study of Japanese WWII remains in the Wandokai caves (Silata 1986, Araho 1997).

Problems and Issues

Administrative and Political Context

Due to a number of fundamental problems in the Papua New Guinea National Museum, the task of documenting the rich cultural and natural heritage of the Huon Peninsula and Papua

New Guinea in general is becoming more difficult to undertake each year. Much of this has to do with a variety of reasons including the difficult financial situation that the country is going through which is thus reflected in the scaled down operations- including research-at the Papua New Guinea National Museum.

Despite the fact that the Huon Peninsula is a world famous area for a range of scientific, cultural, and aesthetic reasons, and is being considered for future nomination to the World Heritage List, it does not attract the kind of research funding that befits an area of scientific renown, from the Papua New Guinea National Government.

The PNG National Museum-though empowered by an Act of Parliament called the National Cultural Preservation Act (1967) - has no teeth because its ability to carry out its legislative functions have eroded over time. The problem is that the details of the Act itself are obsolete making it fundamentally weak. This is due directly to the fact that the National Government has not funded any efforts at strengthening or revamping it to tackle modern threats to cultural heritage protection. This is despite the fact that the PNG Musuem is the primary government agency responsible for cultural heritage sites on the Huon Peninsula. Not only has downscaling regarding funding affected museum activities, but the recent theft of basic equipment at the PNG National Museum, such as computers, has meant that research results and

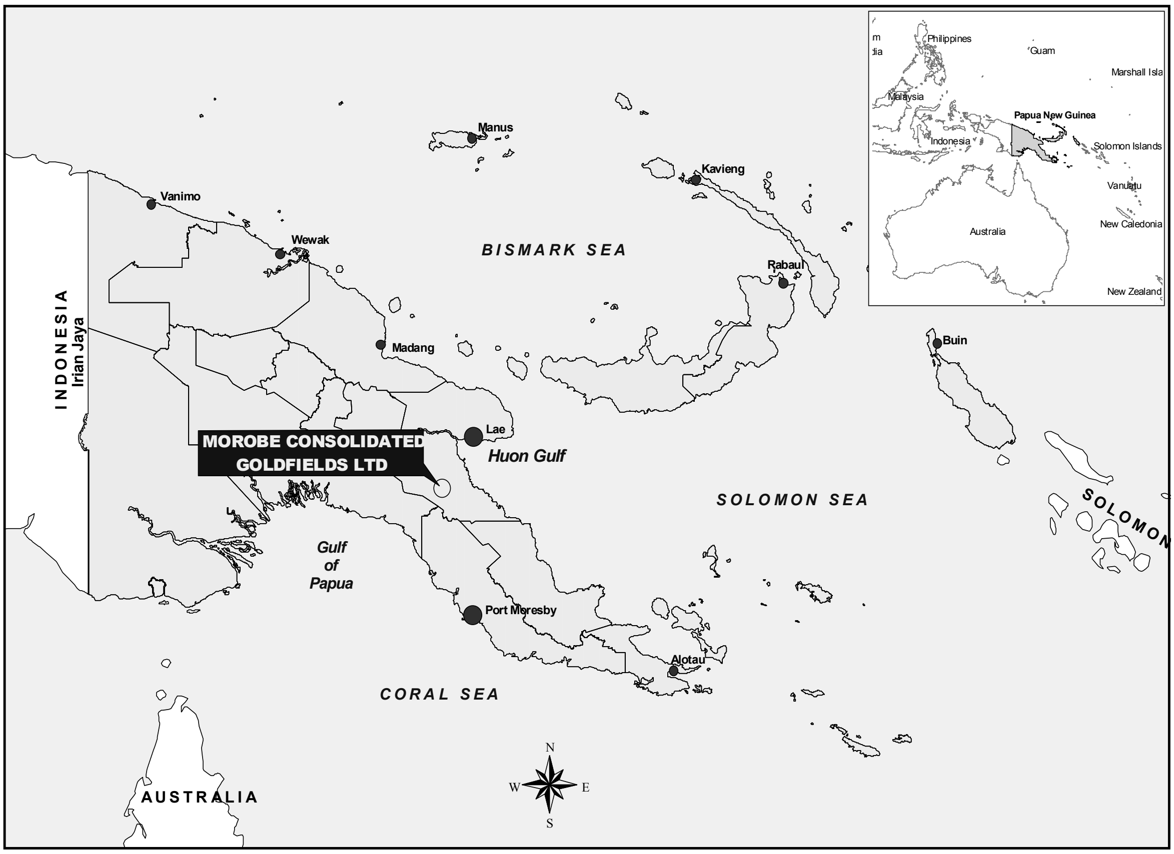

Fig. 1: Map of Papua New Guinea. The arrow indicates the position of the Huon Peninsula.

publications are not being produced on time and are not readily available.

Given the above scenario, it is hoped that the participation during the Training Course on Preservation and Restoration of Cultural Heritage in the Asia/Pacific Region will highlight the need for more research and requests for technical and administrative assistance for the Huon Peninsula area of Papua New Guinea.

Given the critical financial situation the assistance of overseas institutions such as the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU) is important in continuing the task of recording and preserving the natural and cultural heritage of the Huon Peninsula. It is within this context that the problems and issues of cultural heritage on the Huon Peninsula are being discussed.

Results of Previous Collaboration

The results of the documentation work on the cave art began initially with assistance from Dr. John Chappell of the School of Earth Sciences at the Australian National University in early 2000, followed by another trip in the same year. In 2001, Dr John Pandolfi of the National Museum of Natural History at the Smithsonian Institution in Washington D.C. also assisted in documenting the cave art. The results described here follow from the assistance provided by both institutions, except for specific instances mentioned in the report.

In 2000, and 2001 two field trips funded by the Smithsonian Institution through Dr. John Pandolfi of the National Museum of Natural History (NMNH), specifically for travel assistance and field logistical support and supplies enabled the author to record a range of problems associated with cave art preservation on the Huon Peninsula of Papua New Guinea. A number of observations emanating from those investigations set the context for my activities at the NMNH while visiting there under the Short Term Visitors Scheme (STVS) in June of 2002. These included the continuation of the field reports which are presented here, as well as the initiation and compilation of future plans for heritage preservation on the Huon Peninsula while based in the Smithsonian Institution in June of 2002.

The Huon Peninsula field trip component involved:

(a) carrying out archaeological field surveys and recording the cave art at Kanome, Nunzen, and Kanzarua in the northwest part of the Huon Peninsula,

(b) making an assessment of the archaeological potential of cave sites that possess cave art,

(c) attempting to understand the perceptual problems emanating from the different perceptions of the same landscape.

(d) explaining the nature of the scientific work being carried out on the Huon Peninsula to various stakeholders.

Below is a summary of the results of the Smithsonian-assisted projects resulting from the 2000 and 2001 field investigations, thus demonstrating the success of the 'collaboration' between the Papua New Guinea National Museum and the Smithsonian Institution. The results of these two field seasons are part of a larger report that was submitted as part of the Pre-application document to the National Geographic Society Conservation Trust, in 2003, for the funding of further research and recording of cave art sites on the Huon Peninsula.

The application failed in the first round of consideration but will be upgraded and re-submitted for re-consideration for further funding based on the results achieved so far.

The Results of the 2000 and 2001 Fieldwork Seasons

Physical, Chemical, Biological Impacts

During the 2000 and 2001 field seasons it was noted that preservation of cave art heritage sites on the Huon Peninsula of Papua New Guinea suffer from the threat of physical, chemical and biological factors induced by a combination of human and naturally occurring agents and processes.

Fire

Fire was observed as an example of human-induced impact on the state of the rock-art with a number of side-effects. Fire was started by people during hunting or gardening activities. Most of the art and other sites are surrounded by tall grass so that grass fires can easily reach the sites. The effects on the art stem from the heating of the exposed surfaces of the vertical walls on which the art is located, by the intense heat generated by the fires. Most of the art sites are located on caves and cliffs hundreds of metres above the sea and face the east, in the direction of the prevailing winds which fan and drive the grass fires upwards to the higher terraces on which the cave art sites are located. The intense heat generated by the wind often reaches very high temperatures, thus heating up the coral walls on which the art is located to very high temperatures, resulting in the flaking off of the surface on which the art is located, and with it the art, thus destroying it.

While the effect of grass fires is episodic, the long term effect of constant heating of the coral surfaces by the sun is unknown, but the combined effect of both will have had a lasting effect on the status of preservation of the cave art now found on the Huon Peninsula.

Smoke from grass fires and people using the caves have deposited soot over the art so that it is now a problem to clearly define the outline of the art from the natural background. In some cases art has been completely obliterated posing serious preservation problems.

3.2. Grazing

Another source of human induced impact on the preservation of the Huon Peninsula cave art complex is the damage wrought by grazing cattle on the art, and on sites with archaeological potential, as well as the numerous culturally significant sites that exist on the Peninsula.

Cattle belong to the Matiti people are being grazed on the upper terraces, but tend to wander onto land belonging to Nunzen people on whose land the cave art sites are located. Since cattle began dying from causes assumed to be supernatural in nature the owners have been accusing the Nunzen landowners of killing their cattle, leading to conflicts between the two groups. Nunzen people are unhappy that Matiti/Zakwep villagers have also been aggressively intruding onto their land and letting their cattle roam around causing property damage.

In some of the caves where art is present it was noted that cattle have been using the caves to sleep or take shelter often resulting in the defacement or complete obliteration of the art by rubbing and smudging and the deposition of fecal matter against the painted walls.

Impact of Surface Run-Off

A potential issue for future consideration concerns the nature and degree of the impact of expanding gardening practices such as tilling, to unimpacted areas, and how this will impact on the natural drainage patterns of surface run off of excess water which now affects the chemical and physical preservation of the cave art.

Currently water and humidity-apart from the effect of heat flaking of natural surfaces on which the art is depicted- is one of the main agents responsible for the damage to art. Rate of excess surface run off is consistent with the pattern of rainfall on the Huon Peninsula so in times of heavy rainfall water flows over the art resulting in the deposition of a black and white film, which over time has obliterated some of the designs.

Summary of Impacts on Cave and Archaeological Sites

The range of problems associated with the preservation of the rock-art sites varies depending on the kind and degree of impact but a preliminary inventory of the sites disclosed the following preservation concerns as follows:

a. cave floor disturbance and damage by cattle sleeping and rubbing on the dry cave floor.

b. rock-art on the surface of cave wall flaking off, requiring urgent technical investigations and advice for its preservation and future sustainability as part of the cultural landscape.

c. art too faded and/or diffused to see which could be the effect of the physical or chemical effects (Chippendale pers. com).

d. art is legible now, but subject to further deterioration if subject to continuous rubbing by cattle.

e. construction of bees nests on top of the art.

Some of the caves have good soil deposits with excellent archaeological potential, but their preservation is threatened because of the heavy disturbance that has been caused, (in some cases) to the soil deposit within which archaeological material is buried.

Archaeologists require cultural material excavated from undisturbed contexts from which an accurate prehistoric picture of the Huon Peninsula can be constructed.

Impact of Alternate Perceptions

The impact of alternate perceptions on the part of local people is another factor influencing the way people perceive the importance of the cave art because of its location within a landscape that is subject to alternate uses, interpretations, and meanings. This ultimately may downplay the cave art's traditional and artistic value, and replace it with alternate meanings such as the scientific value, archaeological research, the local land use patterns (gardening and cultivation, grazing, burning of the grass for hunting, etc.). Therefore the likelihood exists that the value of the cave art may be considered unimportant in the minds of the local population. Therefore, its conservation and promotion becomes less important, ultimately resulting in the destruction of the cave art through neglect, ignorance, and a lack of appreciation.

In 2000, two local community meetings were held, one in Wandokai and another in Hubegong, while in 2001 a meeting was held with landowners at Kanome to explain the importance of the scientific and cultural significance of the research being carried out on the Huon Peninsula. These meetings also served to highlight the importance of heritage sites such as the cave art.

Recording the Cave Art

Preliminary investigations have resulted in the recording of art on plastic sheets, holding discussions on the management issues raised above, and carrying out public awareness on the cultural and scientific importance of the Huon Peninsula. The public awareness campaign which has been on going for some years now often coincides with periodic visits by scientists and archaeologists with interested landowners, individuals and other ethnic groups from the Huon Peninsula.

The recording of the art is a recent initiative begun in 2000, resulting from the extension of other field investigations aimed at recording the range and extent of cultural heritage sites. The purpose is for proper planning to be put in place for future projects in the region. For example, the recording of the cave art mentioned in this report follows from a survey conducted in the Nunzen area towards the NW corner of the Huon terraces. The purpose of that survey was to identify sites of archaeological and cultural significance. The survey recorded a range of complex cave art painted in black and/or red and in some cases associated with cave burial and ancient pottery. The depiction included a range of zoomorphic images including frogs, fish, zigzags (or lightning) and humans handprints (Appendix A: Figures 1-9).

Preliminary classification and naming of the sites has begun, following the general name of the area, namely Lekewa, such that of the three sites containing art all three have been numerically ordered, hence Lekewa 1, Lekewa 2 and Lekewa 3. Detailed descriptions of the sites, its owners, and cultural significance have been recorded, but the images now exist only as drawings on plastic transparency sheets.

All of this information will eventually be transferred to the National Archaeological Site Registry maintained by the Prehistory Department of the Papua New Guinea National Museum in Port Moresby. All such sites of cultural significance are protected by the PNG National Cultural Property Preservation Act (1967).

Future Plans: 2005-2010

Completion of Documentation Work

Access to adequate facilities is imperative in order to complete the documentation work that I have begun on the recording of the archaeological and rock-art heritage of the Huon Peninsula. More work still remains to be completed from results emanating from each field observations in 2000 and 2001 due to the theft of computer and printing facilities at the Prehistory Department in the Papua New Guinea National Museum.

Seeking Technical and Financial Assistance

There is a need to raise the awareness and interest of scientists who might be willing to continue collaborative research on the Huon Peninsula, as well as provide technical assistance and advice on the preservation of the deteriorating state of cave art. In addition, financial assistance to effect plans to record and preserve the art is urgently required.

Draft Proposal to the National Geographic Society and Other Funding Agencies

There is also a need to begin working on a draft proposal for the funding of further research into the preservation of the rock-art and conducting archaeological excavations to determine the antiquity of human settlement on the Huon Peninsula. Additionally, it is important to understand how this articulates with the chronology, and the cultural and social evolution of cave art heritage on the Huon Peninsula. This has to be finalized as soon as possible in order to submit funding proposals.

Book Design

There is also a lack of basic technology required to access and convert images from existing databases well as the use some of my own material that exists as slides. Overseas colleagues also possess material which provided the initial basis for the preliminary design/format of the book that is being planned for the dissemination of the research results. The current design is in its conceptual stages, with a few images of the scientific and cultural heritage work being carried out on the Huon Peninsula. PowerPoint files have been created as a first step with the assistance of Allegra Jabo, Technical Assistant at the Department of Palaeobiology at the Smithsonian Institution in 2002. When it is completed, the book will have sections devoted to archaeological, anthropological, recording and preservation of rock-art, issues dealing with landscape and site management. The scientific-geological, dating, and palaeobiology will be an important part of the documentation of the natural and cultural heritage of the Huon Peninsula.

Much of the information needed for the book depends on the kind of material and images that have been accumulated over time by archaeologists and anthropologists who have been working on the Huon Peninsula for a number of years. Some of this material is scattered in overseas museums and organisations in Japan, Australia, America, and in the National Museum in Papua New Guinea which needs to be accessed for the compilation of the book.

Although the key players involved in carrying out cultural and scientific work have not been contacted yet it is hoped that they will participate in the production of this booklet. It will include simple texts with good visual imagery designed to communicate the main ideas and the results of the research on the Huon Peninsula as a way of giving something back to the people of the Huon Peninsula and Papua New Guinea.

Hopefully this will educate all stakeholders to better appreciate the importance of the scientific, cultural, and historical heritage of the Huon Peninsula.

Proposal to Seek a Writing Scholarship for 6 Months

The completion of the above mentioned projects will be conducted in two stages:

1. Assistance is being sought for a 6 months Short Term Visitors Program similar to the one offered by the Smithsonian Institution in 2002. This is aimed at completing the research proposal, writing the drafts of the Huon Peninsula book, giving seminars and holding discussions with scientists to plan future collaborative research on the Huon Peninsula.

2. Conducting further archaeological excavations and cave-art recording on the Huon Peninsula.

Future Plans for Research on the Huon Peninsula: 2005-2010

More research needs to be carried out targeting specific objectives. Obviously arresting destruction to the cave art and its preservation will require technical investigations to identify the particular physical or chemical agent(s) responsible for the deterioration of the art in order to ensure its future preservation and sustainability. Tasks planned for the recording and preservation of the art and its history will include:

(a) mapping, recording, and dating the art through archaeological excavations,

(b) analysis of the evidence pertaining to the evolution of the antiquity of art in the area,

(c) the collection and analysis of paint samples used to draw the art in order to determine if the pigments in the paint react to environmental conditions such as those found on the Huon Peninsula.

(d) The discussion of management issues in association with the traditional, and contemporary planning of the landscape and its use will be a primary objective of future plans for cave art conservation, preservation, and sustainability on the Huon Peninsula.

However, the success of this plan will depend on the success of the application to the National Geographic Conservation Trust, and plans for future collaborative research that is currently being finalized.

Conclusions

This report describes the results of activities concerning ongoing archaeological and cave art research on the Huon Peninsula of Papua New Guinea.

Cave art conservation on the Huon Peninsula is faced with problems at two fundamental levels, including:

(1) problems of conservation in the field and,

(2) the lack of administrative and financial support to mount the research and investigations needed to counter the problems of preservation.

The field observations note a range of preservation issues including physical, chemical, biological, and perceptual problems associated with the alternate interpretations of the Huon Peninsula landscape. All of these contribute to the problem of cave art preservation on the Huon Peninsula.

The administrative and financial problems have to do with the inadequate financing of research, recording, and carrying out preservational programs that are needed to instigate methods and procedures to mitigate the effects agents that threaten the preservation of cave art heritage on the Huon Peninsula.

Given the problem of funding and documentation of the cultural heritage (including the cave art) of the Huon Peninsula, collaborative research is needed for the preservation of a unique physical and cultural landscape which now has an appeal universally recognised scientifically and culturally to warrant its consideration for nomination to the World Heritage List.

The current positive results are an extension of a long standing research interest in the area spanning over 30 years and raising the prominence of the Huon Peninsula through detailed investigations of the physical nature of the landscape and its implications for interpreting past climatic patterns.

But this same physical landscape is inseparably entwined with the evidence of human action on it so that the 40,000 year old date now cited as the earliest date of human existence in the Pacific (between New Guinea in the west and the US in the east) is a testimony to this. The fusion together of the physical and cultural on the same Huon landscape elevates the prominence of the area into an area of truly world significance and justifies the concern for a balanced and considered approach to the promotion of this unique physical and cultural landscape.

Entities such as the cave art are a limited cultural resource whose destruction, if not arrested will diminish the overall physical and cultural integrity of the Huon Peninsula landscape.

But in order to properly plan for future scientific investigations research funding must continue particularly with the likelihood of rapid population increase in the area, and with it the impact of a range of alternate meanings, uses, and perceptions of the same landscape as needs change so that existing concern for the physical and cultural patrimony of the area may be downplayed through ignorance, neglect and abuse.

Education, at various levels, will have to play an important role to ensure that stakeholders understand the complex issues at hand. The opening of the Huon Field Museum is a positive step in the right direction in educating the local people about the importance of the Huon Peninsula's cultural and natural heritage as they are the key custodians of the sites on whose land this cultural heritage exists.

SELECTED BIBLIOGRAPHY

Araho, N (1996), Obsidian Stemmed Tools from West New Britain, Papua New Guinea. Unpublished Master of Philosophy Thesis, Submitted in Fulfilment of the requirements for the Master of Philosophy degree at the University of Sydney, Australia.

Araho, N. (1997), Results of the excavation of two sea-cut caves in the Holocene Reef Face at Wandokai, Finschaffen District, Morobe Province, Papua New Guinea. Subthesis submitted in fulfillment of the requirements for the Bachelor of Arts in Honours, Department of Anthropology and Sociology, University of Papua New Guinea.

Bloom, A.L, W.S.Broecker, J.M.A.Chappell, R.K.Mesollella (1974) Quaternary Sea Level Fluctuations on a tectonic coast: New 230 Th/234 U dates from the Huon Peninsula, Papua New Guinea.

Chappell,J.M.A (1974) Geology of coral terraces, Huon Peninsula: A Study of Quaternary tectonic movements and sea level changes. Geological Society of America Bulletin, No.85.

Digim'Rina, L. (1986) Archaeological investigations on the Lower Terraces of the Bobongara area, Huon Peninsula. A Sub-thesis submitted in fulfillment of requirements for the Bachelor of Arts in Honours, Department of Anthropology and Sociology, University of Papua New Guinea.

Groube, L., J. Chappell, J.Muke and D.Price (1986), A 40,000 year old human occupation site at Huon Peninsula, Papua New Guinea. Nature, Vol.324, pp.453-55.

arding. T.G. (1967) Voyagers of the Vitiaz Strait, Seattle, University of Washington Press.

Lilley, I (1986). Prehistoric Exchange across the Vitiaz Strait, Papua New Guinea. Unpublished Ph.D thesis, Australian National University.

Muke, J.D (1984) The Huon Discoveries: A preliminary report on the stone artefacts and a comparative analysis of the distribution of waisted tools in Greater New Guinea. A sub-thesis submitted in partial fulfillment of the requirements for Bachelor of Letters Degree, Department of Prehistory and Anthropology, The Faculties, Australian National University, Canberra.

Ota, Y; J.M.Chappell; R.Kelly; N.Yonekura; E. Matsumoto; T.Nishimura; and J. Head (1993). Holocene Coral Reef Terraces and Co seismic Uplift of Huon Peninsula, Papua New Guinea, Quaternary Research 40, pp 177-188.

Ota Y, and J.M.A Chappell (1996) Late Quaternary Co-seismic Uplift events on the Huon Peninsula, Papua New Guinea, deduced from coral terrace data. Journal of Geophysical Research, Vol.101,No B3 pp: 6071-6082.

Pandolfi J.M, Best M.M.R, Murray S.P (1994),Co-seismic event of May 15, 1992, Huon Peninsula, Papua New Guinea: comparison with quaternary tectonic history, Geology, Vol.22.pp:239-242.

Pandolfi J.M.(1996) Limited membership in Pleistocene Reef Coral assemblages from the Huon Peninsula, Papua New Guinea: constancy during global change. Palaebiology,Vol 22 (2) pp:152-176.

Tilley, C. (1994) A Phenomenology of Landscape: Places, paths, and monuments. BERG, Oxford/Providence, USA.

Philippines

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ARCHAEOLOGICAL RESEARCH IN THE PHILIPPINES: A HISTORY OF ACTIVITIES AND PROBLEMS IN UNDERTAKING SCIENTIFIC STUDIES

Introduction

Despite a relatively long history of archaeological survey and artifact collection in the Philippines, 'scientific' archaeological research remains quite young. Most of the archaeological exploration and collection that began in the late nineteenth century and continued until the early 1940s was virtually unscientific and unsystematically excavated. Moreover, attempts to classify and chronologically order artifacts were not based on scientific analysis of artifacts and provenience but rather on biased perceptions of established Old World typologies. Methodologies for archaeological excavation only started to become systematic and scientific in the 1950s. Methods and techniques gradually evolved with the advent of debates and scientific developments in Europe and North America. New theoretical concepts, such as the 'New Archaeology', were introduced by American researchers, in addition to scientific research frameworks and methods of local archaeological research. Today, archaeological research methods, and techniques of artifact analysis have come a long way since earlier periods of investigation in the Philippines.

Despite a relatively long history of archaeological research in the Phillipines, there are problems that have continually hindered the development and practice of scientific archaeological research. This prevents both the archaeologists and the public from learning all that can be learned about the past through archaeological research. This report attempts to look at the problems of undertaking scientific archaeological research in the Philippines. Before I look into these problems however, I will first examine the development of archaeological research in the Philippines, and second, I will examine how archaeological research is being conducted in present.

The Development of Archaeological Research in the Philippines

Before 1900

The beginning of archaeological research in the Philippines is attributed to the work of Alfred Marche, a French explorer and naturalist, who undertook the first deliberate collection of prehistoric cultures in the Philippines (Beyer 1947, Evangelista 1969, Hutterer 1987, Solheim and Gaynor 1978). Marche explored several caves and open sites in various Philippine islands and collected human skeletal remains, Chinese pottery, shell ornaments, glass, bronze and gold, wooden coffins and burial urns (Marche 1970). The Marche collections, which are now deposited both at the Trocadero Museum in Paris and the Museum of Madrid, were accumulated in the course of scientific research that was not primarily directed towards archaeological objectives. This was mostly the case during this period where prehistoric cultural materials were collected in the process of other research and collection activities.

Other European scholars who undertook research and exploration activities during the late nineteenth century included Feodor Jagor and Alexander Schadenberg. Jagor, a German ethnologist, encountered prehistoric burials and log coffins in Samar island while conducting his other investigations. His investigations of these remains are published in Travels in the Philippines (Jagor 1875). Schadenberg, a German chemist, investigated caves on Samal Island in 1881-2 and found log coffins and earthenware jars, Chinese porcelain, various ornaments and skeletal remains (Schadenberg 1885). Other scholars said to have conducted explorations and collections of an archaeological nature include Dr. Jose Rizal, J. Montano and Paul Rey.

Archaeological activities during these early years can hardly qualify as archaeological research and can be said to be antiquarian in nature (Santiago 2001). Hardly any scientific methodologies were employed in the collection of materials and practically no analysis and interpretation of archaeological materials was conducted. The archaeological materials collected simply provided glimpses into prehistory and contributed little to the development of theories and scientific methods for future research on Philippine culture history prior to the arrival of the Spanish colonists in the Philippine islands.

1900 -1950

The coming of the Americans at the turn of the twentieth century brought about crucial developments that led to the emergence of archaeology as a scientific discipline in the country. Scientific inquiry into the Philippine islands and its populations became institutionalized with the creation of the Bureau of Non-Christian Tribes, later renamed into the Bureau of Ethnological Survey which was tasked with learning the location, distribution, and subdivisions of living societies and cultures. This brought about an academic climate which encouraged ethnographic studies such as Merton Miller's The Bataks of Palawan in 1905, Emerson Christi's The Subanuns of Sindangan Bay in 1909, and Roy Barton's Half-Way Sun in 1930 (in Evangelista 1969).

Despite the academic climate that persisted for most of the early years of the American colonial period, the first systematic archaeological work in the Philippines was conducted only in 1922-25. Carl Guthe, headed the University of Michigan Philippine Expedition that aimed to conduct archaeological reconnaissance of the southern half of the Philippine archipelago and to undertake continuous and extensive discovery of intrusive Asiatic ceramics usually in connection with burial sites (Guthe 1927). Guthe excavated in the Visayas and northern Mindanao investigating a total of 542 sites. He accumulated some 31 cubic tons of archaeological materials mainly from surface collections, a number of small excavations, and from commissioned excavations undertaken by local agents. Although, he conducted only a small number of excavations, Guthe kept records of the sites he excavated and the artifacts he collected from them. Aspects of Guthe's fieldwork were published in four brief papers (Guthe 1927, 1928, 1934, 1937). The Guthe collection, now deposited at the Museum of Anthropology of the University of Michigan, has been studied by several scholars of Philippine prehistory (Aga-Oglu 1948, 1955, 1961, Dizon 1988, Solheim 1957, 1959a, 1959b, 1964).

Arguably the most important figure in the development of Philippine archaeology is H. Otley Beyer, a trained chemist and geologist, who is credited as being the Father of Philippine Archaeology (Ang 1968). Beyer first arrived in the Philippines in 1905 occupying the post of ethnologist at the Bureau of Science. He later accepted the task of heading the Department of Anthropology at the University of the Philippines for forty years from 1914 to 1954 (Lynch 1967). He was generally interested in Philippine anthropology and culture history but only became involved in archaeology when, in 1926, construction of the Novaliches Dam began and exposed prehistoric materials. Beyer conducted archaeological work mainly in Rizal, Bulacan and Batangas Provinces. In addition to these, he mostly collected archaeological materials from various parts of the Philippine islands. Beyer's collection activities went on for almost three decades halted only by the advent of the Second World War that destroyed a portion of the hefty collection. The Beyer collection was dispersed after his death in 1966 but a few remained at the National Museum.

Beyer developed theories on migration, a chronological model for Philippine prehistory and artifact descriptions and typologies that were published in a number of general papers and monographs. Most well-known of these publications include an outline of archaeological finds by province (Beyer 1947), a reconstruction of the Philippine Neolithic in relation to East Asia and the Pacific (Beyer 1948) and a pictorial prehistory of the Philippine islands (Beyer and Veyra 1947).

Beyer failed to use scientific methods in conducting his archaeological activities, thus his work has been repeatedly criticized (Coutts and Wesson 1981, Evangelista 1967, Fox 1978, Jocano 1967). His work was seriously flawed primarily due to the absence of stratigraphic control and provenience. His failure to publish site reports of his archaeological activities is another important weakness of his work. Because of these shortcomings, Hutterer (1987:239) says that Beyer's work has "no further value today…that his interpretive frameworks, which entails an elaborate series of migratory movements of racially and ethnically distinct populations into the Philippines, has stood the test of time very poorly." Beyer's simplistic model for interpreting archaeological data was also criticized by Coutts and Wesson (1981) particularly on its being founded on traditional belief, such as those relating to the settlement of the Philippines by peoples from nearby Southeast Asia, the presence and/or absence of type fossils in the archaeological record, and cross-cultural comparisons.

However, one must keep in mind that Beyer was a product of his time. Early Southeast Asian scholars and Beyer contemporaries such as Heine-Geldern, Colani, van Heekeren and van Stein Callenfels, also constructed cultural sequences and chronologies within a culture historical/ diffusionist framework (see Hutterer 1976). Migration and diffusion theories were 'de rigeur' during their generation and it would be quite unfair to fault their and Beyer's work from the point of view of the present. Today's scholars have the advantage of scientific, theoretical and methodological advances inaccessible to the early scholars.

1950 - 1980

During the 1950s there emerged a younger generation of scholars who joined the National Museum and made revolutionary contributions to the development of Philippine archaeology (Solheim 1970). The National Museum, under the leadership of Robert B. Fox who worked with such scholars as Alfredo Evangelista and Avelino Legaspi, all of whom had worked with or received training from Beyer, conducted a great number of archaeological explorations and excavations beginning in the 1950s. It was during this time that the National Museum emerged as a leader and overseer of archaeological research in the Philippines where it gradually 'gained control, direction and coordination of archaeological research in the country (Ronquillo 1985:74).' Archaeological research ceased to be initiatives of individuals (as in the case of Beyer) and became an institutional activity.

Some of the important archaeological research undertaken during these years include the Tabon Cave, Palawan archaeological project and the Early Man Project at the Cagayan Valley, northern Luzon (Ronquillo 1985). The Tabon Cave archaeological project was conducted from 1962- 1966 by Robert B. Fox and National Museum staff at the Tabon Cave Complex on Palawan island, western Philippines (Fox 1970). The archaeological project provided the earliest fossil evidence of modern man's existence in the Philippines. Tabon Cave initially appeared to be a jar burial site with the recovery of some 200 jars, covers and smaller vessels scattered on the surface. However, systematic archaeological excavation revealed assemblages of stone tools, flakes, tiny bones of birds, bats and small mammals, scattered charcoal and ash from cooking fires on the ancient floors and more significantly, the earliest fossil remains of man, Homo sapiens, in the Philippines. Radiocarbon dates from charcoal obtained from associated cultural layers date the remains, now known as Tabon Man, to 22,000 to 24,000 years ago (for updates see Detroit et al. 2002).

Fox employed rigorous archaeological methods and control such as mapping, grid establishment, stratigraphic control, measurement of location and depth of artifacts from the datum plane. Fox maintained stratigraphic control over the excavation using both the arbitrary level method (of 5 and 10 cm) and the natural or stratigraphic layer. Fox analysed the archaeological remains recovered from the site, primarily grouping the stone tool assemblages into types. He also undertook similar analysis on the pottery and identified the faunal remains.

In the 1970s, several archaeological activities of the national Museum focused on the Cagayan Valley in northern Luzon. Dubbed as 'The Early Man Project,' it identified over 100 Pleistocene sites in the valley which revealed fossilized remains of large extinct mammals such as elephas, stegodon, rhinoceros, crocodile, giant tortoise as well as stone tools such as flakes and cobbles (Ronquillo 1985). The National Museum turned to geologists to address important geological and geomorphological issues.

Based mostly on the analysis of archaeological materials and context, various chronological and typological frameworks have been developed (Fox 1970, 1978, Fox and Peralta 1974, Jocano 1998, Solheim 1981). These frameworks have had their share of criticisms (Coutts and Wesson 1981, Hutterer 1987).

Another important archaeological research project that emerged during this period is the research on jar burial sites and prehistoric pottery by Wilhelm G. Solheim II. An American anthropologist, Solheim arrived in the late 1940s and worked in several parts of Southeast Asia. Among the sites Solheim excavated in the Philippines were the Batungan Mountain and Kalanay Cave site in Masbate, Fuga island in Cagayan and Batan island in Batanes. Based on pottery forms and decoration types, Solheim defined prehistoric pottery complexes in the Philippines (the Kalanay- Novaliches-Bau-Loboc) which he later broadened into the Sa-Huynh-Kalanay and the Bau-Malay (Solheim 1957, 1959a, 1959b, 1964). He incorporated in this definition his analysis of the Guthe collection in Michigan. Solheim published several works of which the most important to Philippine prehistory is the Archaeology of Central Philippines: A Study Chiefly of the Iron Age and Its Relationships, which was first published in 1964 and just recently revised (Solheim 2002). Given the broadness of the traditions he defined, the limited archaeological evidence, and the highly conjectural nature of his theories Solheim's works has also been criticized (Coutts and Wesson 1981, Hutterer 1987, Mijares 1998).

During this time, innovations derived from the physical and biological sciences began to be incorporated into archaeological research methodologies. The main obstacle to its use was the lack of funds and trained scientific personnel. From the science of atomic physics, radiocarbon dating was applied to date organic materials found in the archaeological record. Among the first archaeological sites to utilize this absolute dating method was the Batungan Cave site excavated by Solheim in 1952-53 (Solheim 1968) and the Bato Cave site in Sorsogon that was excavated by Fox and Evangelista in 1957 (Fox and Evangelista 1957). Since then, radiocarbon dating has been increasingly used to give absolute dates for many Philippine archaeological sites. Radiocarbon dates though were processed in foreign laboratories.

Geological and geomorphological studies also became consolidated within archaeological research. It was during the excavations by Fox and Evangelista in the 1950s that stratigraphic profiles of archaeological sites began to be recorded. This was a very significant development in Philippine archaeological research. As Daniel (1975) said there can be no real archaeology with no geology. Stratigraphic sequences, both horizontal and vertical, in an archaeological site is deemed highly important as it provides a means for relative dating as well as understanding a site's natural and cultural formation.

The most high profile project that made use of geological and geomorphological studies was the palaeolithic sites found in the Cagayan Valley in northern Luzon (Fox 1978). In 1978, Carl Vondra and his geological team conducted geological studies at the Liwan Plain, in Cagayan Valley 'to define the Plio-Pleistocene terrestrial sequence in the Cagayan Valley basin, demonstrate the in situ association of artifacts and Pleistocene fauna, the age of artifacts and the Plio-Pleistocene environments of the Valley (Vondra and Mathisen 1978). This research, along with other archaeological investigations (Bondoc 1979), has indeed shown an association between stone tool artifacts and fossil remains.

Beginning in the late 1950s, through Fox's initiative, the National Museum increasingly standardized archaeological field techniques and adopted systematic excavation methods. Jesus Peralta, who succeeded Fox as head of the National Museum anthropology division, published Field Manual for Archaeology (Peralta 1978) to standardize archaeological fieldwork, i.e., checklists, field methods, forms needed, etc. Even though the manual is already outdated after over two decades since its publication, this publication was crucial in establishing archaeology as a discipline.

Towards the end of the 1960s and much of the 1970s, archaeologists from abroad came in steadily increasing numbers to conduct archaeological research with new concepts and methodologies. The development of 'Processual' or 'New Archaeology' in the Anglo-American countries that was espoused by Binford's New Perspectives in Archaeology (1968) and Clarke's Analytical Archaeology (1968) in the 1960s had finally found their way to the local archaeological scene. It was mainly American archaeologists who introduced the processual concepts in Philippine archaeological research.

The list of foreign researchers who conducted archaeological research using processual methodologies is quite lengthy but among the more significant research that utilized the processual methodology were the works of Longacre and Hutterer. William Longacre, in his study of Kalinga pottery, employed an ethnoarchaeological approach. Longacre (1981) examined contemporary Kalinga pottery believing that 'aspects of behavior and organization of people are subtly encoded in stylistic correlates in materials they make and use.' Aside from studying the primary and secondary uses, Longacre also studied the Kalinga pottery making culture. Using statistical principles, specifically formulae for deriving standard deviation and coefficient of variation, among measurements (height, width and diameter of aperture) of pottery, he derived the degree of standardization and variation of pottery manufacture in Kalinga culture. He demonstrated that stylistic micro-traditions emerge as a result of learning frameworks present in Kalinga culture.

Another processual archaeologist, Karl Hutterer, conducted archaeological work in Bais, Negros Oriental Province in Central Philippines beginning in 1976 (Hutterer and Macdonald 1982). The Bais Anthropological Project is an intensively designed and executed approach in processual archaeology. Hutterer (1987:247) describes the project as a 'subsistence settlement investigation that involves statistically designed survey, excavations and a variety of environmental and ethnoarchaeological investigations.' The project has so far yielded 'extremely valuable information on changing settlement patterns (changes in site numbers, sizes, densities, placement, etc.) over a period of time as well as the first components of an archaeological sequence based on an understanding of the settlement system.'

1980 - Present

While processual archaeology was mostly conducted by foreign archaeologists, towards the end of the 1970s until the 1980s, Filipino archaeologists began to use its concepts and methods particularly in connection with their post-graduate research in foreign universities. Examples of this research included the technological and functional analysis of stone tools from Rabel Cave in Peñablanca, Cagayan Province (Ronquillo 1981), the locational analysis of prehistoric island settlements in central Philippines (Henson 1983), and the Philippine Iron Age (Dizon 1988).

After acquiring their master's and doctoral degrees, Filipino archaeologists returned to pursue research back home. In 1981, Wilfredo Ronquillo returned to the National Museum after completing his master of science degree in anthropology, major in archaeology at the University of Pennsylvania. He later went on to head the Archaeology Division of the National Museum. Florante Henson after obtaining his doctoral degree from the University of New York at Buffalo also came back to the National Museum in 1983. Henson left the Museum in 1990 to pursue other interests. Eusebio Dizon, who left in 1980 to pursue his master's and doctoral degree at the University of Pennsylvania, returned to the Philippines in 1988 to join Ronquillo at the Archaeology Division of the National Museum.

The new knowledge on theoretical and methodological approaches to archaeological research revitalized Philippine archaeology. However, problems of funding and lack of trained archaeologists limited the extensive problem-oriented researches that the new 'processually trained' archaeologists envisioned to undertake. Thus, archaeologists continued to conduct researches within traditional frameworks working on rescue archaeology and individual sites in Butuan (Bautista 1990), Calatagan (Bautista 1995, de la Torre 1996a), and Surigao de Norte (de la Torre 1996b).

Toward the end of the 1980s, archaeologists from the National Museum began to undertake archaeological impact assessment (AIA) projects throughout the country. Foreign archaeologists also continued to undertake research in several parts of the country such as Hidefumi Ogawa's long-term work on shell midden sites in Cagayan Province (Ogawa 2000), Tsang Che-hwa's research on prehistoric Philippine and Taiwan relations also in Cagayan Province (Tsang and Santiago 2001) and Bellwood's research on Austronesian migraton during the Neolithic (Bellwood et al. 2003).

In addition, archaeological work on underwater archaeological sites became institutionalized with the creation of the Underwater Archaeology Section in the National Museum brought on by the discovery several underwater archaeological sites and its looting by treasure hunters. Several important underwater archaeological shipwrecks were archaeologically excavated in partnership with local and foreign proponents such as the remains of the San Diego, Pandanan, Lena Shoal Junk, Investigator Shoal and the Royal Captain.

In 1995, the Archaeological Studies Program at the University of the Philippines was created to ensure that a steady crop of archaeologists can be looked upon as a continuing source of fresh talent. More recently, a new crop of archaeologists completed post-graduate studies in foreign universities. Victor Paz completed his doctorate degree in archaeology from the University of Cambridge in England and is now Director and faculty member at the University of the Philippines Archaeological Studies Program. Armand Mijares, a National Museum researcher completed his master's studies at the University of New Mexico in the United States and subsequently pursued a doctorate degree in archaeology from the Australian National University.

Archaeology in the Philippines Today: Research Methods and Analytical Techniques

The varied experiences in the past, relatively recent developments in scientific equipment and updates on methodologies by recent postgraduate scholars have led to the current state of how archaeological research is currently conducted in the country. Archaeological research has become more standardized particularly in terms of methods of archaeological exploration, excavation and artifact analysis.

Archaeological Exploration

National Museum archaeologists usually undertake archaeological explorations in response to reported archaeological sites or finds. Once in the area, the informants can easily show where the archaeological materials are found and archaeologists can check, make test excavations if needed, if the site does indeed contain archaeological materials. If found positive for prehistoric material, the archaeologists, informants and local government can work together to look for financial resources especially needed for logistical requirements for the archaeological excavation of the site.

There are cases however when funds are available for exploratory surveys. Archaeological exploration for land archaeological sites is normally done with walking surveys strategies of which depend on the size of the survey area, existing roads and terrain. Archaeologists particularly look for prehistoric cultural materials such as stone tools and ceramics on the ground surface and archaeologists usually bring along archaeological sample kits which is useful for interviewing people/informants in local areas.

Both traditional and relatively recent methods are used to locate sites on topographic maps. Equipment and materials usually carried by archaeologists include a 1:50,000 topographic map of the area explored, a Global Positioning System (GPS) receiver, a pocket transit and corresponding protractors and rulers. GPS coordinate readings however, sometimes have an approximately 15-meter margin of error and if used on small islands, GPS location readings can be problematic. If this is the case, traditional techniques of triangulation that use simple pocket transits and topographic maps are used.

Geographic Information Systems or GIS have not yet been fully integrated into archaeological research. GIS is a significant development in archaeological mapping, recording and analysis that has yet to be incorporated into Philippine archaeological research. While GIS and remote sensing equipment has been used in other science studies, its potential for archaeological research has yet to be tapped. Computer (hardware and software), maps, differential GPS receivers, and other equipment have yet to be procured and built into research methodologies.

Archaeological exploration for underwater archaeological sites is a different matter in terms of equipment used. Several kinds of apparatus are used for varied purposes. Navigational/locational equipment consists of differential GPS receivers. Survey equipment includes depth sounders, side-scan sonars and magnetometers Archaeologists normally search for magnetic anomalies in the seabed hoping that they are created by shipwrecks containing trade ceramics (that cause the magnetic anomalies). Once found, anomalies are analysed/identified in order to determine whether these are archaeologically significant. After which, Scuba divers check whether anomalies are indeed archaeological or just naturally occurring. Once confirmed for archaeological materials, underwater archaeological excavation can commence.

Archaeological Excavation Procedures

The methods and procedures for archaeological excavation in the country have evolved from simple unsystematic digging/hunting of the early years to the systematic methods currently used today. Today archaeological excavation is being undertaken in both land and underwater sites. Although conditions and environment vary greatly, excavation principles in both land and underwater sites follow similar general processes.

The procedure for archaeological excavation on land sites begin with setting of a datum point where all measurements for the site, i.e., site maps, grid maps, excavation squares, artifacts, etc, will be based on. Site mapping equipment includes any of the following: theodolite, alidaide and plane table, mini transit, and total station. Most field archaeologists prefer the mini transit or alidaide and plane table for reasons of convenience. The theodolite, total station and associated equipment are heavier to carry as compared with the mini transit or alidaide.

After determining the best area to excavate considering research objectives, test squares can be prepared for excavation i.e., cleared of vegetation and rocks, laid out with strings, etc. Strategies for excavation follow general archaeological excavation procedures varying only in technique and approach that are based on archaeologist's objectives and preferences. Squares are excavated either by arbitrary levels or spits using standard archaeologist tools of mason and margin trowels, archaeological picks, brushes, buckets, etc. to gradually expose artifacts, ecofacts and features. Excavated soil undergoes dry sieving and depending on research objectives, all artifacts and ecofacts are collected. Prior to collection however, archaeological materials are measured three dimensionally (depth, north-south and east-west coordinates) to record its location in the square. Of the materials gathered, some will only be weighed and counted and returned to the site while others will be collected for further analysis. Soil samples per level are also collected for wet sieving which is good for obtaining botanical and faunal remains.

Of utmost importance is documentation of excavation findings per level or spit in excavation forms, noting artifacts and its concentrations, positive and negative features, soil texture, consistency, color, and other observations. Stratigraphic sequences are also recorded because this is particularly important for understanding site formation and archaeological interpretation. Munsell Color Charts are used to determine color. Documentation through drawings, photographs and video are also made. After this, excavation squares and then backfilled.

Organization of collected archaeological materials is also undertaken during fieldwork. Artifacts and ecofacts are sorted, weighed and counted, inventoried, and accessioned. It is important to segregate significant artifacts/ecofacts while on the field.

In underwater archaeology, despite having conditions obviously unlike land archaeological sites, archaeological research generally follows the same methodological process. The main difference lies in the equipment used. Once a site has been identified as positive for archaeological remains, underwater archaeological excavation begins. All activities are launched from a shipping vessel outfitted with special monitoring and communication equipment. Archaeologists use Scuba diving gear. As opposed to land archaeological sites where sites are only partly excavated, underwater archaeological sites require total excavation. This is because underwater sites and artifacts are usually threatened by looting.

As with land sites, site and grid maps are also prepared in underwater sites. Excavation equipment utilized includes water dredges and air lifts to gradually expose the shipwreck. Lifting equipment include pulleys and crates. Sieving is also done to ensure all possible archaeological materials are collected. Sometimes robotic equipment is also used especially for deep sites. As with land sites, photo and video documentation of the excavation process as well as archaeological features and artifacts. Inventories and accessioning of materials are also undertaken.

Underwater archaeological research is usually carried out by the National Museum in partnership with proponents who have technical and financial capabilities.

Analysis of Archaeological Remains

In the Philippines, it is customary to undertake preliminary analysis of all collected archaeological materials. Faunal remains are generally identified according to genus and species. Artifacts such as ceramic and lithics are sorted into groups/types. Chronologies usually rely on relative dating from Chinese ceramics but absolute dates using radiocarbon/AMS dating techniques are also used especially in very important sites and if funds are obtained.

Recently, there have been more attempts to undertake scientific analysis of archaeological materials by Filipino archaeologists such as Victor Paz, Lee Neri, and Armand Mijares, in the process of conducting their post-graduate researches both at local and foreign universities. Paz (2001) conducted scanning electron microscopy (SEM) analyses of both macro-botanical remains such as parenchymatous tissue and phytolith samples to understand patterns of early plant utilization throughout northern Wallacea. Neri (2003) studied obsidian flakes recovered from northern Mindanao and undertook XRF analysis to determine sources of such. His study showed that the obsidian flakes found at Huluga were not from the Philippine volcanic sources but from sources external to the Philippines islands. The volcanic sources however, are as yet undetermined. Mijares (2004) studied prehistoric interaction between upland and lowland populations in Cagayan Province, northern Luzon using pottery. He particularly used petrological analysis on pottery to show exchanges among upland and lowland population circa 4000 BP. Mijares is also currently receiving training on soil micromorphological analysis.

Collaborative work with foreign archaeologists and institutions has helped in furthering the science of archaeological research. For example in 2001, National Museum archaeologist Dr. Eusebio Z. Dizon worked with Florent Detroit, Francois Semah, Christophe Falgueres and Sebastien Hameau, prehistorians from the Laborataire de Prehistoire du Museum national d'Histoire naturelle et Laboratoire d'Anthropologie de l'Universite de la Mediteranee in France. They analyzed excavated human fossil samples retrieved from Tabon Cave, Palawan Island in western Philippines and subjected them to Uranium Series Dating (Detroit et al. 2002). Results of scientific dating techniques verified modern man's existence in the Philippine Islands to 47,000 BP.

Another recent collaborative research project by the National Museum with foreign institutions is the on-going Batanes archaeological project. Beginning in 2002, Peter Bellwood, one of the leading archaeologists in Southeast Asian prehistory, and based at the Australian National University (ANU), worked together with New Mexico-trained archaeologist Eusebio Dizon on archaeological research in the northern Philippines. The research aimed to understand the migration of the Austronesian speaking peoples during the Neolithic period some 5000 years ago (Bellwood et al. 2003). Apart from the usual archaeological data collected, palaeoenvironmental data was also gathered to understand the environmental context of the archaeological sequences and to investigate possible agricultural plant use associated with the Neolithic. Sediment coring was undertaken in lake and swamp sediments where pollen, spores, and charcoal are used as basis for reconstructing palaeoenvironmental records. Phytolith analyses of soil profiles was also undertaken.

Although these cases represent research of a scientific nature involving the analysis of archaeological remains they are the exception rather than the rule for archaeological research in the Philippines.

Problems and Needs in Undertaking Scientific Archaeological Research in the Philippines

There are several factors that limit the use of scientific methodologies in archaeological research in the Philippines.

1. Foremost of these is inadequate financial resources. Archaeological research requires substantial amounts of funding for all research activities from exploration and excavation to analysis. Furthermore, other activities such as conservation, exhibition and publication, also require more money. Most archaeological research in the country is undertaken mainly by the Government through the National Commission on Culture for the Arts (NCCA), the National Museum and other state institutions such as the University of Philippines - Archaeological Studies Program. For several years now, the Philippine Government has been hard pressed financially and it is no surprise that research, conservation and presentation of archaeological heritage is always low priority in annual government budget allocation. Most of the problems that affect scientific archaeological research in the country are mostly a consequence of inadequate funds.

   Despite these conditions, archaeological activities are still being undertaken. Local archaeologists and institutional officials are resourceful enough to seek financial assistance from various sources such as private corporations, foundations and government officials who have discretionary funds. If archaeological research in a particular area is necessary, archaeologists often request financial assistance from provincial and local government officials as well as local non-government organizations and patrons. It goes the same with museum exhibitions. Big private corporations actively support the National Museum and have donated funds for the renovation and maintenance of exhibition galleries.

   Particularly for the archaeological excavation of Philippine underwater sites, the National Museum usually works with partner-proponents who have the technical and financial resources to undertake such capital intensive operations. This is particularly important for the timely protection of underwater sites that are threatened by looting and treasure hunting. Proponents can easily mobilize needed resources to protect archaeological heritage.

2. The lack of trained specialists to undertake scientific methods in the research and analysis of archaeological remains is another drawback to archaeological research. The analysis of environmental data from Philippine archaeological sites is still very limited. While we have archaeologists who undertake analysis of faunal remains and some botanical remains, there are no local archaeologists who specialize in the analysis of ancient micro-botanical remains such as pollen.

   This problem began to be addressed in the mid-1990s with the creation of a post-graduate archaeology program at the University of the Philippines. Several students have already graduated with diplomas and master's degrees in archaeology. Many graduate students have conducted specialized studies on scientific analysis of artifacts such as lithics, beads, and ceramics. Further, there are also other scholars studying in foreign schools who are receiving further training on methods for analysis of archaeological remains. Nevertheless, despite the increasing number of trained specialists, it seems that more specialists are still needed to undertake scientific analysis of ancient remains.

3. There is also a need for more specialized laboratories and equipment to undertake analysis of archaeological materials. Equipment donated to the National Museum in the 1980s such as a scanning electron microscope and atomic absorption spectrometer are already obsolete or out-of-order. Further, the people who have received training on its proper usage have already left the Museum. Equipment requires funding and technical expertise and the institution lacks it currently.

   In order to address some of these specialized needs, local archaeologists, as mentioned above, have made collaborative research projects with other foreign and local institutions. For example, with French archaeologists and prehistorians in the analysis and dating of the Tabon Cave human fossil remains and with Australian based archaeologists for the archaeological and palaeoenvironmental research in northern Philippines. Radiocarbon dates are also obtained from collaborative partners such as the Academia Sinica in Taiwan, the Australian National University in Australia and more.

   Recent grants to the University of the Philippines Archaeological Studies Program have allowed it to obtain a Lithics Laboratory equipped with solorex, both high power (500x) and low power (60x) microscopes integrated into computers and photographic equipment. This is especially important for undertaking microscopic analysis on stone tools. Further, some graduate students are starting to tap equipment from other colleges with the University of the Philippines such as the National Institute of Geological Sciences, Chemistry Department.

Several other ancient materials such as pollen remains are left unstudied. Unless someone is interested to undertake research in this area, efforts to find funding sources for equipment will not progress.

4. Sometimes it is unfortunate that the process of archaeological excavation needs to be compromised especially in the light of rapid urban development. Urban development such as road or building construction oftentimes put archaeological heritage sites in danger of destruction. Archaeologists have to undertake rescue archaeology within a short time frame and more often, research strategies are compromised.

   For example, with respect to recent rescue archaeology work within the Intramuros, in the historic Walled City of Manila, particularly at the Beaterio de la Compania de Jesus, archaeologists were informed too late to stop a planned building construction. When archaeologists arrived at the site, large, deep holes were already dug in the ground where some have already been cemented for building foundations. Plus construction workmen were already at the site with their buck hoes, cement mixers and cranes. It is a rich historical site but historical developments on the particular area are quite unclear. Thus aside from determining site formation processes and understanding the stratigraphical sequences, archaeologists needed to retrieve as much archaeological data from the site. The archaeologists had to coordinate their activities and planned excavation areas with the construction foreman. Unfortunately plans cannot always be followed – i.e., equipment such as buck hoes broke down when needed at particular schedules, miscommunication among construction crews resulted in them pouring concrete on a chosen research square/hole and several other incidents - and the archaeologists needed to adjust and compromise their research strategies.

5. Another factor that can sometimes affect scientific archaeological research is the unstable political situation and potential armed conflict. There are some sites in the Philippine islands that are yet unexplored and unexcavated because of communist insurgency or terrorism. Mindanao, the second largest island of the Philippines, is still largely unexplored because of such reasons.

   One archaeological site that was excavated in the early 1990s, Ayub Cave in Saranggani Province, Mindanao contained unique anthropomorphic pottery (Dizon and Santiago 1996). The area has an unsettled political climate and it would be very risky to work there. Archaeologists had to negotiate with insurgents from the Moro National Liberation Front (MNLF) who controlled the area. Archaeological excavation was then undertaken under great pressure regarding time as well as safety. If the reported archaeological materials were not so spectacular, it would not have been excavated for reasons of the threat to personal safety.

6. In most areas of the Philippines, there is an inadequate understanding of the archaeological discipline and archaeologists are all too often perceived as treasure hunters. It can be a serious problem when locals believe that archaeologists are indeed treasure hunters and try to compete with them in searching/digging for 'treasure.' Archaeological sites are thus destroyed without the benefit of scientific study. Looting of archaeological sites has always been and still is a continuing problem.

   There is thus a need to educate or increase awareness of various publics on Archaeological Heritage. Local archaeologists address this problem partly by conducting lectures in local government offices attended by local officials and residents and inviting them to visit the archaeological dig. This helps to gradually educate the public about the archaeological discipline and hopefully erase notions of archaeologists as treasure hunters. Further ways of addressing this problem is the creation of local site museums. Local people discover about their cultural and archaeological heritage and hopefully learn to appreciate and protect this heritage.

   A recent example of the National Museum towards this objective is the site development of the Tabon Cave Site in Palawan Island. This is the cave complex where the oldest evidence of human occupation in the Philippines is found. Human fossil remains, stone tools, pottery and other artifacts were recovered here. The Site Development of Tabon is a collaborative effort between the National Museum, the Department of Tourism, the Provincial and Local Government of Palawan and several other institutions. The team developed the site based on a comprehensive three-year development plan which considered transportation, accommodations, displays and exhibits, signages, etc. This site is now part of the standard tourist routes in Palawan Province.

   Another way archaeologists have addressed this concern is through education and information activities by the local society of archaeologists known as the Katipunan Arkeologist ng Pilipinas, Inc. (KAPI). Relatively regular archaeology lectures for kids and annual archaeological field schools are offered to the public. Several participants of varied backgrounds join the activities. Apart from learning the rudiments of archaeological excavation, the participants learn about their Philippine archaeological heritage. Some participants have gone on to take formal courses in archaeology. These public education and information activities are crucial to increase knowledge and appreciation for archaeological heritage.

Conclusion

Considering the above problems and corresponding efforts to address them, the conduct of scientific archaeological research in the Philippines has progressed positively. Nevertheless, more effort is still needed to address the concerns particularly in the training of more archaeologists in scientific analysis and acquiring the necessary equipment to undertake such analysis. The ACCU training course is particularly important for addressing the need for further scientific training.

REFERENCES

Aga-Oglu, K., (1948) Ming export blue and white jars in the University of Michigan collection. Art Quarterly 11:201-217

－. (1955) The so-called Swatow wares: Types and problems of provenance. Far Eastern Ceramic Bulletin 7:1-34.

－. (1961) Ming porcelain from sites in the Philippines, Asian Perspectives 5:243-252

Ang G. R., (1968) Dr. H. Otley Beyer: Dean of Philippine anthropology, a commemorative issue, San Carlos Publications, University of San Carlos, Cebu City

Bautista, A. P., (1990) Magallanes archaeological project: A progress report, Manuscript, National Museum, Manila

－. (1995) Preliminary report on the archaeological excavations at Calatagan-Lian Site, Batangas, Unpublished report, National Museum

Bellwood, P., J. Stevenson, A. Anderson and E. Dizon, (2003) Archaeological and palaeoenvironmental research in Batanes and Ilocos Norte Provinces, northern Philippines. Bulletin of the Indo-Pacific Prehistory Association 23:141-162

Beyer, H. O., (1947) Outline review of Philippine archaeology by islands and provinces. Philippine Journal of Science 77:205-374

－. (1948) Philippine and East Asian archaeology and its relationships to the origin of the pacific island population. Bulletin 29, National Research Council of the Philippines, Quezon City:

Beyer, H. O. and J. C. d. Veyra, (1947) Philippine saga, A pictorial history of the archipelago since time began, 3rd ed edition, Capitol Publishing House Inc, Manila

Binford, L. R., (1968) New perspectives in archaeology, Aldene Publishing Co., Chicago

Bondoc, N., (1979) A re-investigation of the Espinosa archaeological sites: Cagayan and Kalinga-Apayao. Anthropological Papers No. 6, National Museum, Manila

Clarke, D., (1968) Analytical archaeology, Methuen, London

Coutts, P., and J. Wesson, (1981) "Models of Philippine prehistory: A review of the flaked stone industries," in Archaeological Studies of Pacific Stone Resources. Edited by F. Leach and J. Davidson, pp. 55-105, Bar International Series 104, Oxford

Daniel, G., (1975) A hundred and fifty years of archaeology, 2nd edition, Harvard University Press

de la Torre, A. A., (1996a) Preliminary report: 1995-1996 Calatagan, Batangas archaeology project. Unpublished manuscript, National Museum

−. (1996b) The Surigao del Norte archaeological project, Bulletin of the Indo-Pacific Prehistory Association 14:177-85

Detroit, F., E. Dizon, F. Semah, C. Falgueres, S. Hameau, W. Ronquillo, and E. Cabanis, (2002) Notes on the morphology and age of the Tabon Cave fossil Homo sapiens. Current Anthropology 43:660-666.

Dizon, E. Z., (1988). An Iron Age in the Philippines? A critical examination, Ph.D. dissertation, University of Pennsylvania

Dizon, E. Z., and R. A. Santiago, (1996) Faces from Maitum: The archaeological excavation of Ayub Cave, National Museum, Manila

Evangelista, A. E., (1967) "H.O. Beyer's Philippine Neolithic in the context of postwar discoveries in local archaeology," in Studies in Philippine Anthropology. Edited by M. D. Zamora, pp. 128-150. Quezon City: Alemars-Phoenix.

−. (1969) The Philippines: Archaeology in the Philippines to 1950. Asian Perspectives 12:97-104.

Fox, R. B., (1970) "The Tabon Caves: Archaeological explorations and excavations on Palawan Islands, Philippines," in Monograph of the National Museum No. 1, National Museum, Manila

−. (1978) "The Philippine Palaeolithic," in Early Palaeolithic in South and Southeast Asia. Edited by F. Ikawa-Smith, pp. 59-85. The Hague: Mouton Publishers.

Fox, R. B. and A. E. Evangelista (1957) The Bato Caves, Sorsogon Province, Philippines: A preliminary report of a jar burial stone tool assemblage. University of Manila Journal of East Asiatic Studies 6

Fox, R. B. and J. Peralta, (1974) "Preliminary report on the Palaeolithic archaeology of Cagayan Valley, Philippines and the Cabalwanian Industry." First Regional Seminar on Southeast Asian prehistory and archaeology, pp. 100-147, Manila

Guthe, C. E., (1927) The University of Michigan Philippine Expedition. American Anthropologist 24:69-76

−. (1928) Distribution of sites visited by the University of Michigan Expedition 1922-25. Papers of the Michigan Academy of Science, Arts and Letters 10:76-89.

−. (1934) Gold decorated teeth from the Philippine Islands, Papers of the Michigan Academy of Science, Arts and Letters 20:7-22

−. (1937) A burial site on the Island of Samar, Philippine Islands, Papers of the Michigan Academy of Science, Arts and Letters 23:29-35

Henson, F. G., (1983) A locational study of prehistoric settlements in Central Philippines, Ph. D. dissertation, University of New York at Buffalo

Hutterer, K. L. (1976) An evolutionary approach to the Southeast Asian cultural sequence. Current Anthropology 17:221-242

−. (1987) Philippine archaeology: Status and prospects. Journal of Southeast Asian Studies 18:235-249

Hutterer, K. L. and W. K. Macdonald, (1982) Houses built on scattered poles: Prehistory and ecology in Negros Oriental, Philippines, University of San Carlos, Cebu City

Jagor, F., (1875) Travels in the Philippines, Chapman and Hall, London

Jocano, F. L., (1967) "Beyer's theory on Filipino prehistory and culture: An alternative approach to the problem," in Studies in Philippine Anthropology. Edited by M. D. Zamora, pp. 128-50. Alemars-Phoenix, Quezon City

−. (1998) Philippine prehistory: Rediscovering pre-colonial heritage, 2nd edition. Manila: Punlad Research House.

Longacre, W., (1981) "Kalinga pottery, an ethnoarchaeological study," in Pattern of the past: Studies in honour of David C. Clarke. Edited by I. Hodder, G. Isaac and H. Hammond, pp. 49-66. Cambridge University Press, London

Lynch, F., (1967) Henry Otley Beyer 1883-1966, Philippine Studies: A quarterly Beyer memorial issue on the prehistory of the Philippines 15:3-8.

Marche, A. A., (1970) Luzon and Palawan (Translated from French by Carmen Ojeda and Jovita Castro), Filipiniana Book Guild, Manila

Mijares, A. S. B., (1998) Philippine archaeology in retrospect. Hukay: Bulletin of the University of the Philippines Archaeological Studies Program 1:5-16.

−. (2004) "Lowland-Upland interaction: The ceramic evidence from the Peñablanca Cave Sites." Paper presented for a workshop on the Asian Fore-Arc Project:Results and prospects from the Philippines and Taiwan, Held in Seminar Room A, Coombs Building, Australian National University, 5-6

Neri, L. A., (2003) Obsidian sourcing at Huluga Open Site: An evidence of exchange. MS Thesis, University of the Philippines.

Ogawa, H., (2000) Excavation of the Lal-lo shell middens. Tokyo University of Foreign Studies, Tokyo

Paz, V. J., (2001) Archaeobotany and cultural transformation: Patterns of early plant utilization in northern Wallacea. Ph.D dissertation, University of Cambridge

Peralta, J., (1978) Field manual in archaeology, Anthropology Papers No. 1, National Museum, Manila

Ronquillo, W., (1985) "Archaeological research in the Philippines, 1951-1983." Bulletin of the Indo-Pacific Prehistory Association No.6, Canberra

Ronquillo, W. P., (1981) The technological and functional analysis of the lithic flake tools from Rabel Cave, Northern Luzon, Philippines, Anthropological Paper No.13, National Museum, Manila

Santiago, A. L., (2001) Theoretical development in Philippine archaeology, Bulletin of the University of the Philippines Archaeological Studies Program 3:1-25, Hukay

Schadenberg, A., (1885) Die Bewohner von Sued-Mindanao und der Insel Samal. Zeitschrift fuer Ehnologie 17:8-37, 45-57

Solheim, W. G., (1957) "The Sa-Huynh Kalanay pottery tradition: Past and future research," in Studies in Philippine Anthropology. Edited by M. D. Zamora, pp. 151-174 Alemars-Phoenix, Quezon City

—. (1959a) Introduction to Sa-Huynh, Asian Perspectives 3:97-108

—. (1959b) Sa-Huynh related pottery in Southeast Asia, Asian Perspectives 3:177-188

—. (1964) Archaeology of central Philippines: A study chiefly of the Iron Age and its relationships, Bureau of Printing, Manila

—. (1968) "The Batungan cave sites, Masbate, Philippines," in Anthropology at the Eighth Pacific Science Congress. Edited by W. G. Solheim, Social Science Research Institute, Honolulu

—. (1981) "Philippine prehistory," in People and Art in the Philippines. Edited by G. Casal, pp. 17-83, Museum of Cultural History, University of California. Los Angeles

—. (2002) Archaeology of central Philippines: A study chiefly of the Iron Age and its relationships, Revised edition, Archaeological Studies Program, University of the Philippines, Quezon City

Solheim, W. G., and N. Gaynor., (1978) "The Marche Cache," in Filipino Heritage: The Making of a Nation, vol. 7. Edited by A. Roces, pp. 1752-1754, Hamlyn House, Sydney

Tsang, C. H. and R. A. Santiago, (2001) "Recent archaeological studies in northern Luzon and their implications for the prehistoric relationship between Taiwan and the Philippines." Paper presented at the International Symposium on Austronesian Cultures: Issues Relating to Taiwan, Taipei, Taiwan

Vondra, C. F. and M. E. Mathisen, (1978) Pleistocene studies in the Cagayan Valley, northern Luzon, Philippines: A preliminary report based on geologic fieldwork from February through May 1978, Manuscript, National Museum, Manila

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THE APPLICATION OF SCIENTIFIC METHODS IN KOREAN ARCHAEOLOGY AND THEIR POTENTIAL

CONTENTS

1. Introduction

Over the past 60 years Korean archaeology has developed in quality as well as in quantity. In the early 1960s, the number of excavations was less than ten per year, but in the last 3 years, that number has increased to over 400 excavations. In addition, we only had a few research institutions including the National Museum, but we now have about 120 institutions reflecting a quantitative growth in research, funding, and the importance of archaeology to the government and the Korean people.

Table 1. The Frequency of Excavation in South Korea Since 1946

Year	1946	1963	1973	1982	1991	1997	2001	2002	2003
Excavations	2	14	27	55	107	239	469	598	404

At the same time as the volume of excavations has increased, analytical methods in Korean archaeology have also made consistent and qualitative developments. Before the 1990s, archaeological research was focused on typology and diffusionism. This entailed a simple classification, recording system, and chronological and systematization of remains. However, since the implementation of C14 dating, several scientific methods were aggressively applied in many archaeological research projects. We have discovered various manufacturing techniques, place of origin of certain artifact types such as pottery, bronze ware, obsidian and glass. Moreover a statistical classification of artifacts and paleoenvironmental reconstructions based on remains and pollen analysis have been conducted.

This paper reviews how scientific methodology has been applied to archaeology in Korea. It also looks into the problems that may arise during the application process of analytical techniques and suggests how this scientific methodology can be efficiently utilized.

2. Scientific Methods of Investigation

Site investigation includes research on buried artifacts conducted through survey and analysis of the physical and chemical properties of the earth. This process is comparable to that of a doctor examining and diagnosing a patient with mechanical devices before an operation. In the investigation of sites, we do not dig or cut out parts of the earth to reveal what kind of features or artifacts are buried underground. Instead, we use a nondestructive investigation method. The two archaeological site investigation methods used in Korea are Ground Penetrating Radar (GPR), Electrical Resistivity, and geomagnetic survey.

(1) Ground Penetrating Radar (GPR)

Ground penetrating radar, or 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. First introduced in Korea in the early 1990s, this method is actively used to acquire subsurface information before starting an excavation. It has especially shown great accuracy with the survey and excavation results from the Baekje Dynasty burial site at Bubcheonri, Wonju, Gangwondo Province, and in the Gaya Dynasty burial site at Songhak-dong, Gosung, Gyeongsangnamdo Province. This method is now widely used in archaeological excavation in Korea.

**Case 1.2.	The Application of GPR in Prospecting for Archaeological Remains**

<u>Study areas:</u>

1. Bubcheonri burial mound group in Wonju in Gangwondo province.

   A stone tomb was found with flagstones and piled stones from spoiled tombs of the Baekje Dynasty. These are some of the archaeological features at Bubcheonri , Wonju.

2. Songhakdong no. 1 tomb, Gosung in Gyeongsangnamdo Province

   Songhakdong no. 1 tomb in Gosung is a unique keyhole-shaped tomb in Gyeongsangnamdo Province. The site consists of 3 tombs with many stone tombs according to GPR and excavation. Results of GPR explorations and excavations revealed that it was not a keyhole-shaped tomb.

<u>Result:</u>

GPR was very helpful in detecting archaeological features and patterns before excavation was carried out.

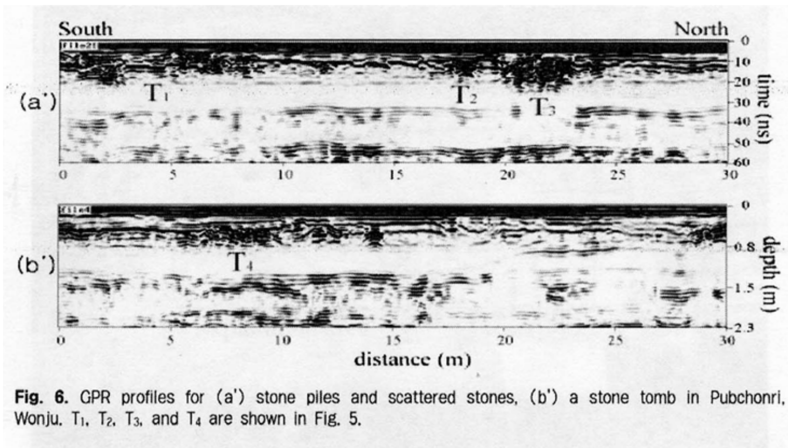


Fig. 1: GPR profiles for (a') stone piles and scattered stones. (b') a stone tomb in Bubcheonri, Wonju.

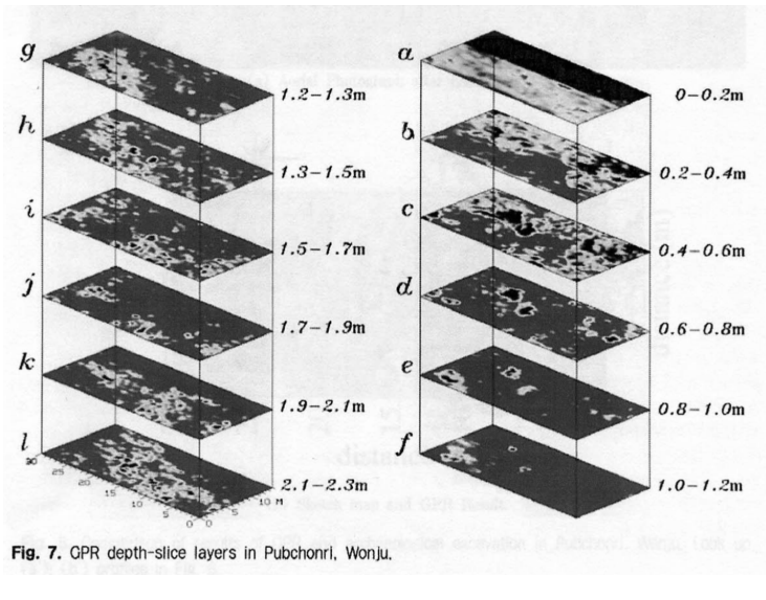
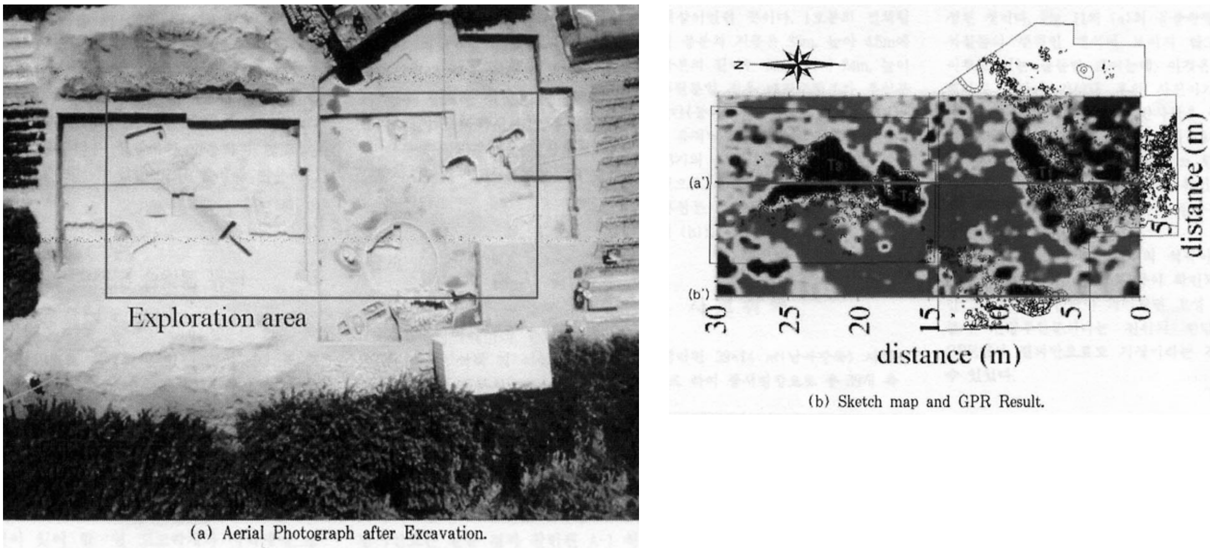


Fig. 2: GPR depth-slice layers at Bubcheonri, Wonju.



(a) Aerial Photograph after Excavation.
(b) Sketch map and GPR Result.

Fig. 3: Comparison of results of GPR and archaeological excavation at Bubcheonri, Wonju.

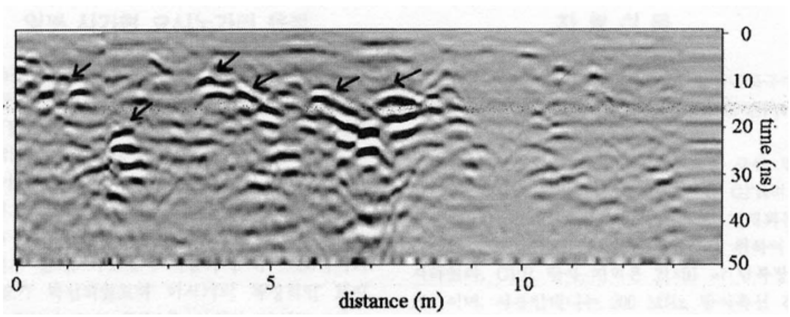
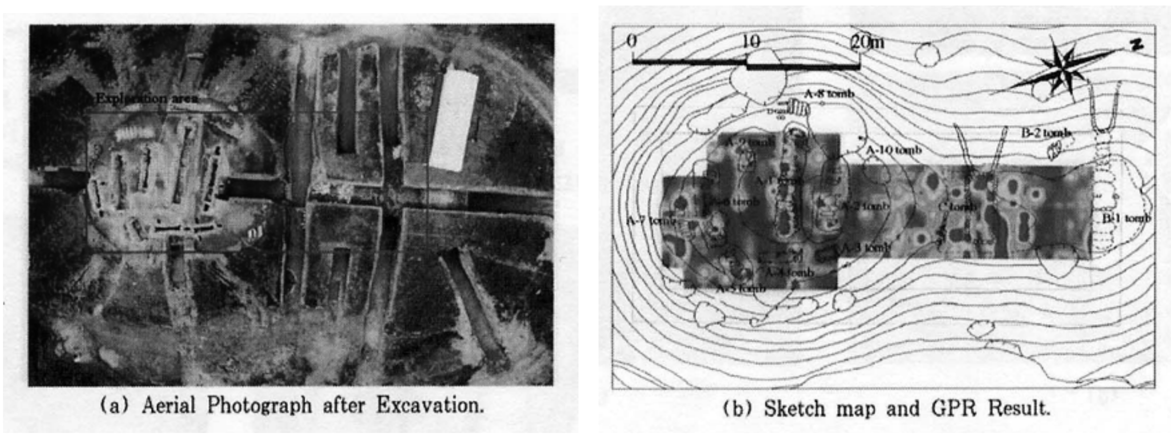


Fig. 4: GPR profile of Songhakdong no. 1 tomb in GOSUNG Gyeongsangnamdo Province. The maked arrows are the strong reflections from the A-1 tomb.



(a) Aerial Photograph after Excavation.
(b) Sketch map and GPR Result.

Fig. 5: Comparison of results of GPR and archaeological excavation at Songhakdong no.1 tomb.

Despite its success, some problems have surfaced in using this method in Korea. First, of all, the people using this device do not have the skills to read the results and need to be careful in interpreting them. It was easy to identify the stone chamber features at Bubpcheonri and Songhakdong, but there are many data assessment errors made with the settlement analysis. This problem will be solved in the future when the users become more experienced in using this method.

Another problem is that this device requires an antenna to operate so it cannot be used on mountain slopes. In a country where about 70% of the land is mountainous, this device can only be used on a limited number of sites.

(2) Electrical Resistivity Method

The Electrical Resistivity Method injects electricity into the surface of the earth and measures the resistance of a volume of material to the flow of electrical currents to find features. This method was introduced in Korea in the early 1990s together with GPR and it has been utilized in excavations looking for underground features.

Case 3~6.
Case Studies on the Geophysical Application Regarding Safety Inspections for Cultural Remains

Four cases are presented to show the applicability of the geophysical techniques for the safety inspection of cultural remains.

1. GPR surveys have been carried out to detect the steel bars inside of the arch stones at Sungneymoon.

2. GPR and DC electrical resistivity methods have been performed to extract information about the stability of the rock mass or the area beside the cultural remains of Botasa and Beopcheonsa.

3. Cross-hole seismic tomography has been applied to estimate the depth of the wall at Heunginjimoon.

The results of these explorations have been used as important information for various safety inspection projects.

(3) Geomagnetic Survey

Geomagnetic survey as a nondestructive experimental feasibility study was conducted using a magnetomer to find buried cultural objects such as pottery and steel in low-relief mountaineous area of Doojeongdong, Cheonan, Cungcheongnamdo, Province. 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. Steel waste such as cans and wires hidden in the soil and bushes also influenced the magnetic anomalies.

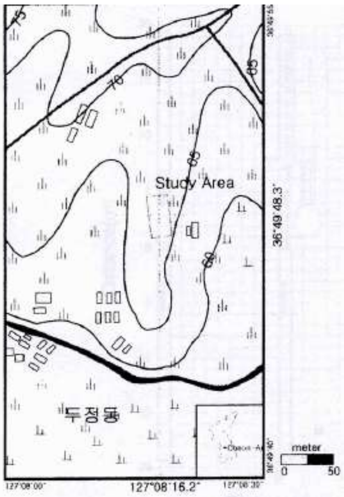


Fig. 6: Location map of the study area.

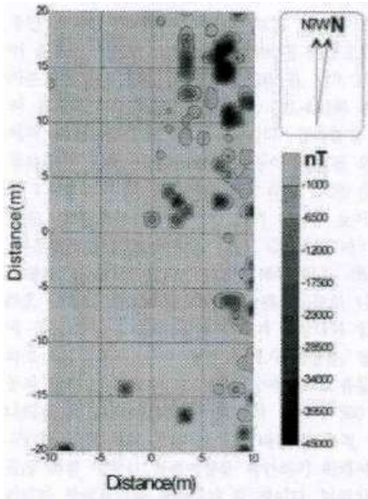


Fig. 7: Magnetic anomaly contour map of the study area.

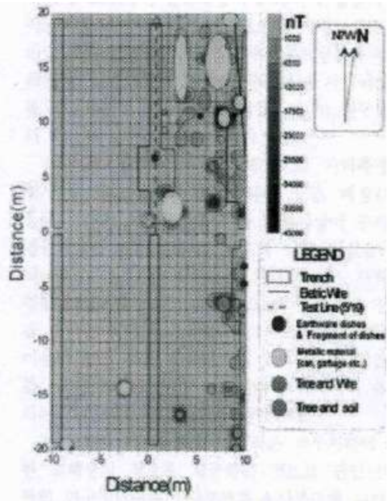


Fig. 8. Excavation result overlapped on the magnetic anomaly contour map.

Therefore, it is better to remove such steel waste prior to magnetic surveys, if possible. Some magnetically anomalous points produced no archaeological objects during excavation. This may be explained by shallower excavation deposits.

3. Absolute Dating Methods

Chronology is very important in archaeological research. The purpose of archeological research is ‘to understand the human behavior of the past’, thus one has to find out above all the position of archaeological material in time and space. The two representative dating methods in archaeology are relative dating, which identifies the temporal relationship among the archaeological materials, and absolute dating, which gives the specific date of the material being studied.

Since the introduction of Radiocarbon Dating (C14 Dating) in Korea in the early 1960s, Potassium-Argon Dating (K-Ar Dating) and Thermoluminescene Dating (TL Dating) have also been used. Recently, Geomagnetic Dating, a technique measuring changes in the intensity and orientation of the Earth’s magnetic field, has been used in some research.

Radiocarbon dating, which measures the changes in C14 content, was the very first of the Absolute dating methods to be developed. It was improved many times since its development in the late 1940s, and recently together with the introduction of the Accelerator Mass Spectrometer (AMS), a more accurate date is possible with only a 0.001g sample. This method was first introduced in Korea in 1961 and it was used in the absolute dating of various sites, thus contributing greatly in establishing the prehistoric Korean chronology. The C14 Dating results of the Osan-ri site at Yangyang, Gangwondo Province, have revealed that it is the oldest Neolithic Age site in Korea. C14 Dating was conducted by foreign research institutes upon request until the mid 1990s. Then Seoul National University introduced AMS in the late 1990s, and now most of the C14 Dating is conducted by the university.

Geomagnetic Dating is based on the principle that the intensity and orientation of the Earth's magnetic field changes over time. In other words, when you study a sample related to a certain archaeological event, you check the position of the magnetic pole when that event took place and estimate the time indirectly. This method was introduced to Korea in the 1980s, but it was not until after the mid 1990s when it was actually applied to date sites. Paleomagnetic measurements taken at a charcoal kiln site in Yongwon-ri, Cheonan, Chungcheongnam-do Province, were estimated to date between late 3rd century A.D. and early 4th century A.D. compared with the paleomagnetism movement map of Japan. However, the application of the dating method based on the paleomagnet has shown many limitations in Korea. The database on the paleomagnetic movement route, above all, is not substantial. Thus, in order to use this dating method, the absolute age should also be measured at the point of measurement and recorded in the database. It would then be a far more useful dating method.

Table 2. Application of Geomagnetic Dating

Site	Location	Agency
Tile kiln	Shingyeri, Chunan	Korea University
Tile kiln	Yeochori, Changnyeong	Jinju National Museum
Settlement	Pungnapdong, Seoul	Hanshin University
Charcoal kiln	Songdaeri, Chungwon	Cultural Properties Protection Foundation

Table 3. Archeomagnetic results of the study area Daejungdong, by Korea University

Site	n	D(°)	I(°)	k	α_{95}	Age(year)
KY001(JJ1)	16	348.2	54.6	233.1	2.4	A.D. 765±30
KY002(JJ2)	9	342.6	62.5	103.1	5.1	A.D. 625±40
KC002(JJ3)	0	-	-	-	-	-
2-KY001(JJ4)	13	4.9	52.3	118.5	3.8	A.D. 390.0±20
2-KY801(JJ5)	26	10.0	54.3	259.1	1.8	A.D. 355.0±1

n : number of samples used in average/measurement
D and I : declination and inclination
K : Fisherian precision parameter
α 95 : radius of cone of 95 percent confidence interval

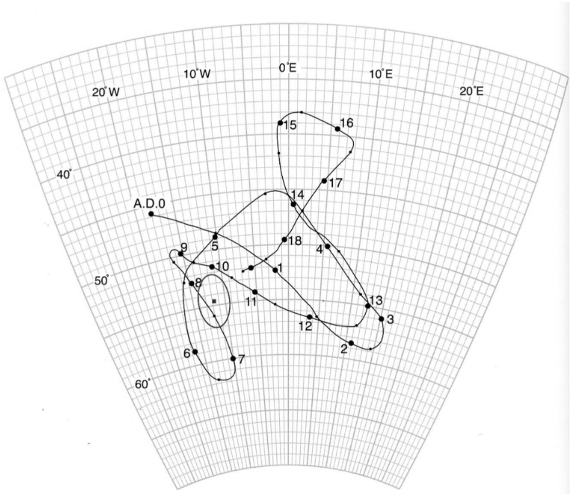


Fig. 10a: Korean secular variation diagram from A.D. 0 to 1950. The numbers in the diagram indicate the year divided by 100 (for example, 16 means A.D. 1600). The closed square and ellipsoid are the archeomagnetic direction from site JJ1 and its 95 percent confidence limit, respectively.

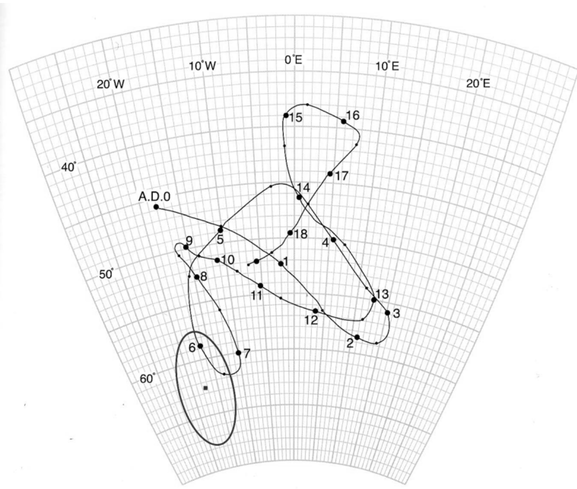


Fig. 10b: Korean secular variation diagram from A.D. 0 to 1950. The numbers in the diagram indicate the year divided by 100 (for example, 16 means A.D. 1600). The closed square and ellipsoid are the archeomagnetic direction from site JJ2 and its 95 percent confidence limit, respectively.

Another method of measuring the absolute age of archaeological sites is K-Ar Dating, which measures the time it takes for K-40 to decay to Ar-40. This method was applied as a supporting method when dating the Jeongok-ri site, Yeoncheon, Gyeonggi-do Province. The TL Dating, a method of measuring the amount of energy called TL released from quartz in the soil under an intense heat, was applied at the Paleolithic site in Jeongok-ri, Yeoncheon, Gyeonggi-do Province, and at the Koryo Dynasty ceramic kiln site in Seo-ri, Yongin, Gyonggi-do Province.

4. Scientific Analysis

The analysis of archaeological material requires a lot of help from science. Since the early 1980s, the analysis of the relics' materials was started and a large amount of information was collected. Recently, there have been attempts to study the paeleoenvironment with natural materials and analyses using the computer.

(1) Material Analysis of Remains

In archaeology, Type classification is mainly the identification of the material's properties by the archaeologist's observation, whereas material analysis is the scientific analysis of the material's properties and structure. Material analysis can be divided into property analysis and tissue examination. Scientific analyses are composed of microscopic analysis, chemical analysis, heat analysis and radiography.

Microscopic analysis is conducted with a microscope, polarizing microscopy and Scanning electron microscopy (SEM).

The chemical analysis is divided into Optical Emission Spectroscopy, X-ray Diffraction Analysis (XRD), Electron Probe Micro Analysis, Mossbauer Spectroscopy, Neutron Activation Analysis and X-ray Florescence (XRF). One type of heat analysis is Differential Thermal Analysis.

Case 7. Chemical Compositions of Glass Beads Excavated from the Sudong Site,

Eighteen glass bead samples excavated from the Sudong site, Youngkwang, Cheollanamdo Province were analyzed by WDS with SEM. The colors of glass samples were greenish blue, light purplish blue, purplish blue and colorless. Ten oxides (SiO2, Na2O, CaO, K2O, MgO, Al2O3, Fe2O3, TiO2, CuO and MnO) of each sample were analyzed, and it was found that all glass beads except for the two colorless glasses were K2O- SiO2 system with 17.2~19.6% of K2O. Coloreless samples showed that the concentrations of SiO2 and K2O were 93~94% and 2~4%, as well as amorphous materials, using the X-ray diffraction method. One greenish blue glass bead suggested that Copper oxide reacted as a coloring material and cobalt oxide with trace elements as a colorant for fifteen samples of light purplish blue and purplish blue. The differentiation between light purplish blue and purplish blue for fifteen samples was that the concentration of MnO was below 1% for former and range of 1.4~1.8% for latter. However, two glasses (No. 11 and 13) have shown light purplish blue with a high concentration of 1.5% and 2.0% of MnO respectively and it was difficult to explain with only chemical compositions. These results of glass analysis showed that the technology of glass making at the Sudong is dated to the Iron age and has an important role for the understanding the raw materials and techniques for making glass, and characterizing the site.

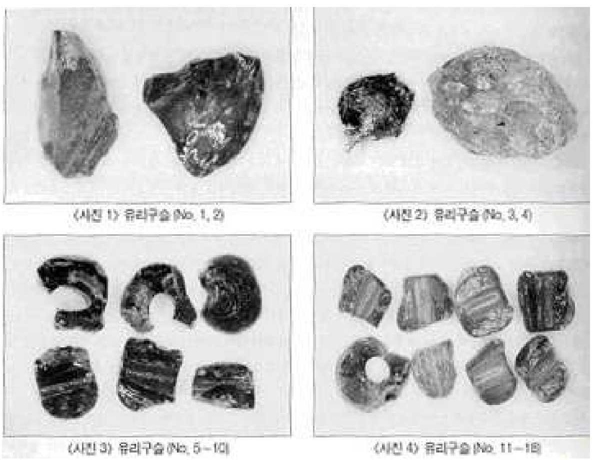


Fig. 11: Glass beads

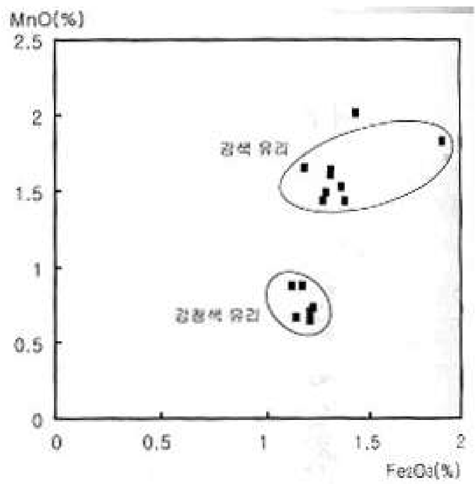


Fig. 12. Analysis of Glass Beads

These methodologies were applied to analyze many types of artifacts, such as stone implements, metallic goods as well as pottery. In terms of pottery, we analyzed the clay properties, chemical properties, firing temperature and condition to find out the origin of clay, pottery techniques and trade relationships in the old days. There are relatively large amounts of analyses carried out on pottery. Analyses on the stone implements can be divided into two, using trace analysis and material analysis. In using trace analysis, we find out about the use of stone implement and infer the behavior of the users through microscopic observation. In case of the obsidian, we analyze its properties to find out its origin through materials analysis. The obsidian unearthed on the southern coast of Korea was revealed to be from Koshitake, Kyushu, Japan and that found in Osan-ri, Yangyang, Gangwon-do Province, is from Mt. Baekdu on the north of the Korean Peninsula. Material analysis was also conducted on "comma"-shaped jade artifacts to solve some issues regarding its origin, production techniques and trade. For example, jadeite is believed to have come into Korea from Japan, but analysis showed that jadeite from Korea and Japan are different. It was suggested that the jadeite in Korea might have been local.

Case 8. A Classification of Ancient Korean Coins by Neutron Activation Analysis

Fifty ancient Korean coins originating in the Chosen period have been determined for 11 elements such as Sn, Fe, As, Au, Ag, Co, Sb, Ir, Os, Ru, and Ni by destructive and non-destructive neutron activation analysis as well as for 3 elements such as Cu, Pb and Zn by atomic absorption spectroscopy. Multivariate data have been analyzed by the principal components mapping method. The spread of sample points in the eigenvector plot has been attributed to the common origin of some elements.

Case 9. Lead Isotope Ratios of Bronze Artifacts from the Sudong site

Five lead isotope ratios (206/204, 208/204, 207/206, 208/206) of two bronze artifacts excavated from the Sudong site, Youngkwanggun were analyzed by TIMS (thermal ionization mass spectrometer). The lead isotope ratio data obtained were compared with those of galena from Korea, Japan and China. They were being used as raw material reference data. Multivariate mapping methods such as statistical linear discriminant analysis (SLDA) was applied to classify the sources of raw materials. The lead isotope data of a bronze artifact decorated with a bird design was included from the galena area of northern China, and this result was in accordance with SLDA result. An imitation bronze mirror from southern China was very difficult to differentiate from one found in South Korea. Consequently, the result of the lead isotope ratios of two bronze artifacts suggested that the sources of raw materials had a different origin from each other.

Agency: Chosun University

Laboratory: Dept. of Conservation Science, National Museum of Korea

(2) Analysis of Organic Materials

The scientific analysis of organic remains is conducted through scientific investigation but can also be based on the results of scientific experiments. By analyzing the animal bones, fish, shells and birds found on the site, the livelihood of people living in those times can be reconstructed. In addition, by examining fossilized plant materials and detecting ancient pollen, evidence of past environments can be also be reconstructed. Various studies of the classes of rice plants and their genealogies can be undertaken. Studies that can help to establish the beginning of rice farming in Korea and studies on whether carbonized rice is wild or cultivated can also be undertaken. Recently, analyses on plant opal phytoliths, a microfossil from plants are being conducted. Furthermore, information on the dietary life of those times is being investigated by analyzing the fatty acids that remain in features or on artifacts. This paper will investigate plant opal phytoliths and the analysis of residual fatty acids in further detail.

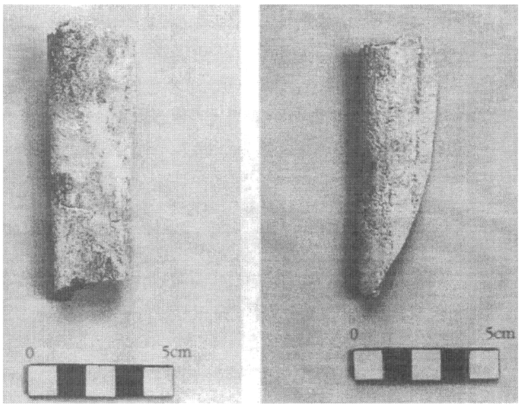


Fig. 13: Prehistoric bone sample
Left: Human femur Right: Deer tibia

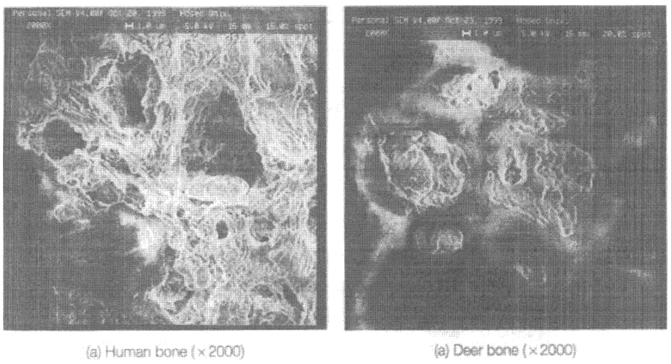


Fig. 14: SEM photographs of prehistoric bones
Left: Human bone (x2000) Right: Deer bone (x2000)

Table 4. XRD data for prehistoric human and deer bone samples					
Human	Deer	dA	I/Io	Hkl	Minerals
3.4470(25.85)	3.4601(25.75)	3.45		002	Hydroxyapatite
2.8023(31.94)	2.8066(31.89)	2.83			Hydroxyapatite
2.2597(39.90)	2.2668(39.77)				
1.9472(46.65)	1.9587(46.63)			310	
1.8493(49.28)	1.8475(49.33)	1.84			Hydroxyapatite

Table 4. XRD data for prehistoric human and deer bone samples.

1) Pollen Analysis

The first attempt to elucidate the palaeoenvironment of various periods in Korea using pollen analysis was on the palaeolithic dwelling site of Sokjangri, Gongju, Chungchungnamdo Province in 1973. Since this result was reported, other palaeoenvironmental studies have gradually been initiated at cave sites and open air sites located in the central part of Korea.

Even though the quantities of pollen grains preserved in sediments of each paleolithic site were quite small amounts, at least there has been an attempt to understand the past vegetation or paleoclimate at each cave and open air site. The dominant pollen grains of cultural layer VII in Kum cave located at Tanyang were non-arboreal pollens and spores, indicating wet climatic conditions.

The frequency of arboreal pollen was 92.9% at Jummal cave. Pollen belonging to deciduous broad-leaved trees was present in even higher percentages. At the Turubong caves located at Cheongwon, many pollen remains belonging to 13 Families and 12 Genuses were counted and a large amount of pollen was observed at this cave compared with other paleolithic sites in Korea.

The results obtained from the dwelling place of Sokjangri was the first report related to paleolithic environments in Korea. The past vegetation around the dwelling area was composed of mixed forest such as deciduous broad-leaved trees and confererous needle-leaved trees. It is estimated that the climate was warm and moist during that era.

As mentioned above, the results obtained from several paleolithic sites had relatively insufficient data to interpret past vegetation or paleoenvironments in Korea. A general landscape sketch corresponded to the palaeoenvironment in Korea needs to be conducted.

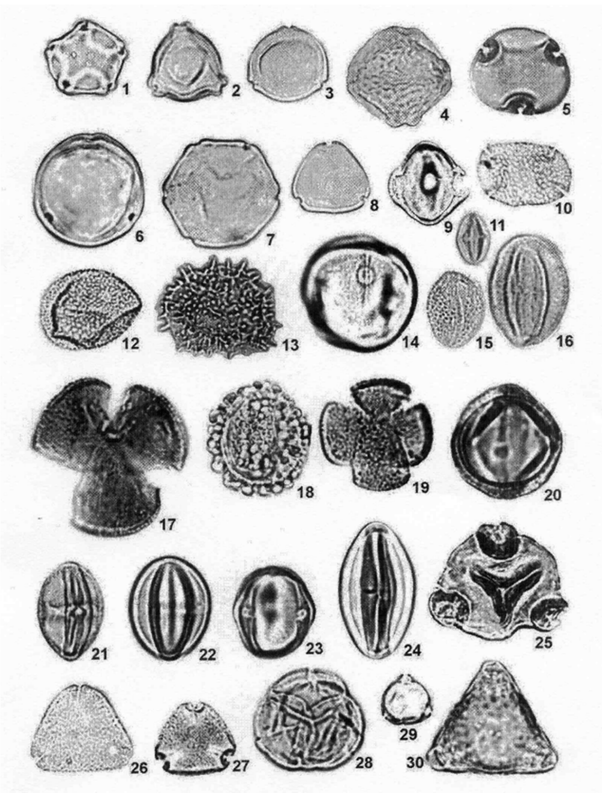


Fig.15: Pollen grains recovered from sediment samples.

2) Plant Opal Phytolith Analysis

Plant opals differ in size, shape and quantity depending on the type. Plant opal analysis is conducted based on detecting the plant opals remaining in ancient soil. Information on the kinds of plants that grew during the past can be assessed. In particular, the fact that plant opals can be extracted from soil or pottery when there are nearly no other data preserved makes plant opal analysis, together with pollen analysis, an extremely useful way to restore the past environment.

In Korea, Plant Opal analyses are mainly focused on farming issues. This method is especially useful for determining the origin of rice farming and whether rice farming was prevalent. Based on carbonized rice seeds excavated at the Namkyeong site in Pyeongyang and Heunam-ri site in Yeoju, Gyeonggi-do Province, rice farming in Korea is estimated to have begun around the 8th century B.C. during the Bronze Age. However, carbonized rice seeds were also excavated from the sedimentary soil of the late Neolithic Age in Gimpo and Ilsan, the lower part of the Han River, and rice pollen was also found in sedimentary Neolithic sediments in the lower part of the Yeongsan River. From such findings, arguments that rice farming probably began during the Neolithic period were put forward. Moreover, plant opals were detected in ceramic bowls with comb-patterns that were excavated from the Nongso-ri shell midden in Gimhae, Gyeonsangnam-do Province. This site is dated to the late Neolithic, supporting the possibility that Korean rice farming had already begun at this time.

In addition, plant opal phytolith analyses are being conducted with rice found in sedimentary soils in order to determine whether or not the soil was in fact a rice paddy field.

3) Analysis of Residual Fatty Acid

The major components that compose the body of animals and plants are protein, carbohydrates and fat. Among these, only a small amount of fat remains unchanged in the soil over long periods of time. By analyzing the fatty acid that comprise the fat, information on the dietary lifestyles of ancient people and ancient environments can be reconstructed. This method was introduced to Korea in 1988. Initially it was used to build a database on samples of clear entities including oil remnants from a lamp-oil container and fish bones excavated from old tombs. After the completion of this database, analysis on archaeological data was conducted.

Up until now, the method for the analysis of residual fatty acid was used to determine the use of open-air stoves during the Neolithic period. These common stone-paved features that can be found on Korean sites of the Neolithic are suggested to have been used as open-air stoves where food was cooked, and also as kilns for firing pottery. However, according to the results of the residual fatty acid analysis the argument regarding the open-air stove proved to be more likely.

The fatty acids of acorns shells detected from the stone-paved features of the Galmeori site in Jinan, Jeollabuk-do Province, and the animal fatty acids detected from the stone-paved features of the Yongyu island site in Incheon proved that these stone-paved features were indeed open-air stoves for cooking. In addition, carbon was found on the bottom of the inside of bowls with double mouth rims from the Galmeori site in Jinan, demonstrating that animals were being cooked in these vessels.

The analysis of residual fatty acids in Korea is still in its infancy. The database on animals and plants has not been completed which leads to difficulties in identifying the names of animals or plants even if the remaining fatty acids are identified. For now, fatty acid components are only used to distinguish between animals and plants.

(3) Computer Analysis

Computers are being used not only in organizing archaeological data but also in various analyses. For example, in the case of complicated statistical data, the use of computers is essential and it is also being used in restoring cultural assets.

Geographical Information Systems (GIS) is a type of analysis based on a computer database program, and is used in settlement archaeology. It has been used in the study of the distribution of Prehistoric remains in Seoul.

Case 10. 3D Modeling Method for Cultural Properties and Web GIS Database Construction

This method recognizes the necessity of transmitting data and constructing three-dimensional databases by using photogrammetry and VRML (Virtual Reality Modeling Language). In addition, utilizing basic data for improving exhibition techniques for use with the World Wide Web is an important avenue of future research. Three dimensional modeling methods that acquire three-dimensional coordinates using VRML is also being conducted.

5. Problems and Prospects

I have examined various research efforts currently being conducted in Korean archaeology. In Korea, scientific methods are used throughout the entire process of collecting archaeological data and data analysis. However, it is also true that such scientific methods are only adopted by a few researchers. In order to utilize scientific methods, an endless analysis of various cases, and the construction of a database, are necessary. Only when the database is large enough can explanations be narrowed down. Unfortunately, Korea does not yet possess a sufficient database which makes it difficult to explain the results of many analyses. This is the reason why many researchers fail to find it necessary to utilize scientific methods in their studies.

However, the world is moving towards the increasing use of scientific methods in archaeological studies. Researchers should not be disappointed in the results they obtain due to insufficient data, but should have confidence in the scientific methods they use and the data they collect. Although the results may not be satisfactory, the continuing accumulation of data will bring us closer to the truths of the past.

BIBLIOGRAPHY

Jang, Ho-sik·Kim, Jin-Soo·Lee, Jong-Chool, (2003) Positioning Analysis of Archaeological Sites Using GPR

Mancheol, and Namseok Lee, (2000) A Comparative study of nondestructive geomagnetic survey with archaeological survey for detection of buried cultural properties in Doojeong-dong site, Cheonan, Chungnam Province, Journal of the Korean Geophysical Society, v. 3, n. 3, p. 175-184

Jung, sunghyuk·Lee, Jae Kee, (2004) 3D Modeling Method for Cultural Properties Web GIS Database Construction

Churl Hyun Jo, Hyun Dok Oh, Ki Mun Bang, Hyo Jin Lee, Jai Hoa Choi, and Young Ho Cha, (2004) Casw Studies on the Geophysical Application to the Safety Inspection for the Cultural Relics, The Korean Society for Geosystem Engineering. Vol. 41, No. 1

So Gu Kim, Hyun Dok Oh, (2003) Application of GPR to Prospect Archaeological Remains, The Journal of Engineering Geology, Vol. 13, No. 4.

Do Sung Jae, Kim Won Nyeon, Park Young Hee, Koo Eng Mo, (2004) A Study on the Archeomagnetic chronology, Shingyeri, Chunan, Archaeological report of Shingyeri Site, Korea University

Park Chang Go, Archaeomagnetic study for Klin of Gungpyungri site, Cheongwon, Chungchungnamdo Province, Chungbook University,

Sang Joon Kang, Current research on pollen analysis of paleolithic sites in Korea,

Sang Heon Yi, Bong Won Kang, Hye Su Yun, (1999) The Palynological Evidence for the Environment of the Three Kingdoms Period at the Bangmigi-gol Site, Haguh-ri, Yeoju-gun, Gyeonggi-do, J. Paeont. Soc. Korea, Vol.15, No. 2

Deog Im An, (1999) Special Issue New Approaches on the Neolithic Cultures: A Study on the Faunal Remains from the Konam - ri Shell Midden (8 th Excavation) at Anmyon Island, Taean , Prehistoric and Anicient Vol. 13.

Deog Im An, (1993) Fish remain in Archaeology, Prehistoric and Ancient Vol. 4

Hyung Tae Kang, Kwang Yong Chung, Ki Gil Lee, (2003) Chemical Compositions of Glass Beads Excavated from Sudong Site, Youngkwang, Journal of the Honam Archaeological Society Vol. 18

Hyung Tae Kang, Kwang Yong Chung, Ki Gil Lee, (2002) Lead Isotope Ratios of Bronze Artifacts from Sudong Site, YoungKwang – gun, Journal of the Honam Archaeological Society Vol. 15

Hyung Tae Kang, Kwang Yong Chung, Ki Jeong Ryu, Chemical Composition and Lead Isotope Ratio of Bronze Sword Excavated from Hwasan - ni Site, Seochon, Journal of the Hoseo Archaeological Society Vol.6, 7

Kwang Yong Chung, Hyung Tae Kang, Jong Yoon Woo, (2002) Scientific Analysis of Bronze Dagger from Chongwon Site, Journal of the Hoseo Archaeological Society Vol.6, 7

Chul Lee, Jong Du Lee, Hyung Tae Kang, Myung Zoon Czae, Seungwon Kim, (1992) Classification of Korean Ancient Glass Pieces by Pattern Recognition Method

Sang Heon Yi, Pil Yoon Bong, Myung Suk Yi, (2004) Pollen and spores of South Korea, Vol.7.

Sri Lanka

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ARCHAEOLOGICAL RESEARCH AND RECORD OF ACTIVITIES IN SRI LANKA: PROBLEMS AND NEEDS

Introduction

Sri Lanka's archaeological heritage is divisible into its prehistoric (Stone Age), proto-historic (Iron Age) and historical periods. This time span covers an estimated one million years and perhaps longer. The Iron Age appears at about 1000 B.C. and the historical period at 500 B.C. The built heritage of Sri Lanka includes such impressive features as proto-historic megalithic burial tombs and towering stupas (the largest brick edifices in the world enshrining the relics of the Buddha or of his principal disciples), pre-historic rock shelters to citadels and royal palaces, humble cave shrines to planned monasteries, cultural landscapes to planned royal parks, and from vernacular settlements to urban centers. The following sections describe Sri Lanka's heritage sites that have been inscribed on UNESCO's World Heritage List.

Anuradhapura: The First Capital of the Island

Founded in the 4th century B.C., or perhaps even earlier, Anuradhapura became the capital of a united – all-island kingdom in the 2nd century B.C. and continued as the principal political and religious center of the country for more or less the end of the 10th century A.D. It has been described as 'one of the most durable centers of political power and urban life in South Asia' and 'one of the most stable long term urban sites in world history'. Ancient Anuradhapura (both city and suburbs) covers an area of about 40 sq. kilometers, with a fortified citadel, surrounded by successive concentric rings of great Buddhist monasteries, of man-made reservoirs with rice fields and agricultural settlements, with suburban and forest monasteries at the periphery.

The life and the characteristics of the urban center of Anuradhapura and the great monasteries are described in great detail in the early 5th century A.D. by the Chinese pilgrim and scholar monk Fa-Xian. Today the city center contains a heavy accumulation of occupational debris and a complex stratigraphy to a depth of nearly 15 meters in places, indicating a long and continuous occupation dating back to pre and proto-historic times. Each of the five great monasteries of the inner ring consists of a colossal stupa, surrounded by monastic residences and other ritual and ancillary structures. The stupa, which forms the principal ritual focus of the monastery, is a massive structure of solid brickwork containing at its inaccessible center, small chambers enshrining the sacred relics of Lord Buddha or his disciples. The striking element of the stupa is its hemispherical dome, which stands on an elevated square terrace. The dome is surmounted by a cube and a cone in succession. All these elements are arranged in a single vertical axis with each volume gradually decreasing in size as the eye travels upwards along the axis. The contrasting combination of square and circular plan forms and of hemispherical, cubical and conical three-dimensional shapes provide a dramatic form to this edifice. The stupas belonging to Mahavihara (Ruwanveli stupa: 2nd century B.C., original height – 96 meters approx.), Abhayagiri Vihara (Abhayagiri stupa: 1st century B.C., original height – 106 meters approx.) and Jetavana Vihara (Jetavana stupa: 3rd-4th centuries A.D., original height – 120 meters approx.) of this ring of great monasteries are not only the largest monuments of their kind in the entire Buddhist realm, but they are still the tallest brick constructions ever made, being surpassed in height only by two of the stone built Great Pyramids of Gizeh, of the pre-modern world. Only the complex layout of the monastic colleges that surround them, match the colossal stupas in scale. These colleges form elaborate semi-autonomous units, each having their own principal monastic residences, libraries, entrance pavilions, refectories, toilets, bath houses, pond and pools. The sacred Bo-tree, brought from India and planted at Mahavihara is considered as the world's longest documented living tree.

The UNESCO World Heritage City of Anuradhapura indeed has a universal value to all mankind and is undoubtedly the prime heritage site of the Island for the analysis and understanding of various aspects of Sri Lanka's past, its social, religious and economic systems, its political organization and its rich art, and its architecture and technology.

Polonnaruva: The Medieval Capital

Polonnaruva was the successor capital to Anuradhapura from 11th to 13th centuries. It was, however, a provincial capital during the Anuradhapura period. Here, the scale of city planning is much less extensive than at Anuradhapura, but very much complex in grouping and massing of various building forms, using of technology, which is a result of the complex interaction of Buddhism and Hinduism on the one hand and of indigenous, South Indian and Southeast Asian traditions. The city is planned on a north-south axis with the waters of the great man-made sea-of-Parakrama and the green paddy fields forming the western and southern most features. The royal city is divided into the inner city and outer city, each fortified by a moat and a rampart. The inner and outer cities have gateways oriented at the four cardinal directions. The streets are laid out on a rectangular grid, oriented north south and east west. The city is dominated with storied palaces, stupas, Buddha images, image houses and chapter houses, all of colossal proportions. The monumental stupas at Polonnaruva, however, do not compete in height with their Anuradhapura counterparts. But their design indicates a far more complex cultural milieu. The circular stupa shrine, called Vatadage in Sri Lanka, with its ornate design and decorations, represents the ultimate development of its kind of the entire Buddhist tradition. Out of the Buddha images of colossal proportion, 'Gal-vihara' is the most celebrated site, where three outstanding works of art have been carved out of the living rock. The design of the massive brick-built shrines to house these colossal Buddha images is a rare mixture of indigenous, South Indian and South East Asian architectural traditions of the period.

Polonnaruva also has large Buddhist monasteries, some of them even surpassing their counterparts at Anuradhapura in planning and layout. Here, not only the colossal stupa, but the image house and chapter house of similar or even greater proportions are grouped in the highest central terrace, while the monastic residences and other buildings, pond and pools are arranged on a series of concentric descending terraces.

Polonnaruva has the largest number of Hindu temples spread out amidst the Buddhist shrines, and located within the outer city as well as the city limits. The location of these Hindu shrines are interesting, and a useful index to the observance of Hindu rituals by Buddhists in a strictly Buddhists atmosphere. It also suggests the zoning of residential and immigrant Hindu population, probably the traders and or government employees, as well as the relations of the Hindu Queens during their frequent visits to the Island. The excavations at Polonnaruva have yielded valuable Hindu bronze sculptures of excellent workmanship leading to an understanding of the Hindu religious practices during the period.

Sigiriya: The 5th Century City, Palace and Garden Complex

Sigiriya is one of the best preserved and most dramatic examples of urban planning, palace architecture and ancient landscape gardening in south Asia dating from the 5th century A.D. The archaeology of the site and the region goes back to pre- and proto-historic times, and the boulder strewn area around the base of the central rock was the location of a Buddhist rock-shelter monastic complex from the 3rd or 2nd century B.C. The present layout, however, essentially dates from one major period of construction during the eighteen-year rule of its creator, Kasyapa I (477 – 495 A.D.). The entire complex is centered on a massive rock, rising to about 185 meters above the surrounding plain, with the royal palace located on the 1.5 hectare plateau on its summit. The present plan of Sigiriya consists of three distinct precincts fortified by moats and ramparts that are surrounding the rock and extending to the east and west. The famous gardens of Sigiriya, the symmetrically laid-out water gardens, the asymmetrical boulder garden and a series of concentric terraced gardens are located in the inner western precinct. The most sensational feature of Sigiriya is the 5th century paintings, found in a depression on the rock face. They are but the fragmentary survivors of an immense backdrop of paintings which once extended in a wide band across the western rock face.

An equally dramatic element is the ascent to the aerial palace on the rock summit along an elevated walk or gallery, referred to as the 'Mirror Wall' on account of its highly polished plaster surface, leading to the 'Lion Staircase-House' from which Sigiriya derives its name. Built against the rock face, this seems to have consisted of the head, chest and paws of a colossal sphinx-like lion of timber, brick and plaster, with an internal staircase. Only the great paws and the marble staircase of this structure still survive. The Mirror Wall contains poems and other graffiti inscribed by the ancient visitors to the site from the 6th to 13th centuries, who recorded their emotional expressions of the site. They are among the earliest surviving literary compositions in the Sinhala language. The aerial palace of the rock summit provides a 360-degree panoramic view of the natural and man-made landscape.

Dambulla: The Golden Rock Temple

Dambulla was one of the largest and most important monastic settlements from the 3rd century B.C., containing about 80 rock-shelter monastic residences, along the southern and western slopes of the Dambulla rock. Subsequently, during the Anuradhapura and Polonnaruva periods, the rock-shelters at the upper most level were turned into elaborately painted image shrines. Several centuries later, during the period of the Kandyan Kingdom in the 18th century, it was restored and repainted by the Kandyan kings. This is perhaps the only living site in the country that has an unbroken history from the 3rd century B.C. to this day. It contains today the most extensive sequence of historic paintings and sculptures surviving in Sri Lanka, including some of the finest and best preserved murals of the Kandyan School. The painted surface at Dambulla covers an area of more than 2,300 square meters. Lying to the southwest to the Dambulla rock is a proto-historic settlement with megalithic burial grounds.

Kandy: The Last Independent Kingdom

Although founded as early as the 14th century, and containing monuments of that date in its periphery, Kandy in fact displays a living tangible and intangible heritage of the 18th and 19th centuries – a distinctive survival of an unbroken tradition going back in principle to Anuradhapura and Polonnaruva times. The central lake of Kandy constitutes the geographical focus and its sloping hills on either side form a natural setting for this impressive capital City of the Kandyan kingdom. The Temple of the Tooth Relic, one of the most magnificent and well preserved examples of the Kandyan architectural style on the royal palace square is the principle focus of the city. Alongside the Temple of the Tooth Relic is the Audience Hall – a timber structure with ornately carved pillars – which is called the 'gem of Kandyan architecture'. The main Buddhist monasteries of Malwatte and Asgiriya, located just outside the royal and temple squares shows the final stage of the evolution of the urban monastic plan that has its roots in Anuradhapura. Opposite the royal palace square, is the temple (devale) square, where Buddhist and Hindu shrines are located side by side.

The annual pageant and procession of the Temple of the Tooth Relic still keep alive a tradition dating back to the 4th century A.D., when the sacred relic of the Tooth was brought to Sri Lanka from India. Even today, as in the past, this sacred temple is the largest and the most influential patron of traditional dancers, artists and craftsmen, who are nurtured by this institution through a significantly unique land tenure system, which demand perpetual dedication to the development of the requisite skills.

Kandy also contains important evidence of the nature of premodern urban planning. Its street layout still displays the original rectangular grid of the 17th and 18th centuries. The present buildings, specially the street facades, have a unique character with a mixture of local and colonial British architecture. Today, Kandy is regarded as the religious and cultural capital of Sri Lanka.

Galle: The Colonial Port City

Founded by the Portuguese in the early 16th century, the Galle Fort was enlarged and developed by the Dutch in the 17th century to set up their administrative hub for the southern maritime province. The fortified port city of Galle has been planned according to the iron grid pattern and it is comprised of attractive street patterns with buildings nourished with distinctive architectural character, which is a mixture of local and colonial Dutch traditions. The original usage of the buildings varied from dwellings to administrative buildings, namely, the commander's residence, secretariat, the town hall, court houses, the trade offices, the pay offices, general warehouse, the church, ammunition store, slave hospital, naval guard house, barracks, powder sellers etc. The wide and high ramparts on all sides defining the city had a single gateway. The British who assumed power after the Dutch, made some modifications to the fort by adding new buildings to suit their administrative setup, but they preserved the town plan, most of the built structures and the street facades that were established by the Dutch.

The old port and the environs is a site for many shipwrecks during the Dutch occupation, and therefore, a prime site from a maritime archaeological point of view.

The preservation and conservation of this heritage is in the hands of two state institutions, the Department of Archaeology, and the Central Cultural Fund. The objectives of the Department of Archaeology, which was established by the British Colonial rule in 1890, are to explore, record, inventorize, excavate, conserve and maintain the archaeological heritage that is scattered throughout the country comprising approximately one thousand sites.

The Central Cultural Fund was established in 1980 under an Act of Parliament as a semi-government institution with the objectives of carrying out archaeological research, conservation and layout work, and interpretation, presentation and management of principal heritage sites (specially the World Heritage Sites). The Central Cultural Fund was responsible in implementing successfully the UNESCO - Sri Lanka Project of the Cultural Triangle from 1980-1997, which was the largest of thirty two UNESCO campaigns and regarded by UNESCO and a model for the developing countries. This project involved the preservation of the Abhayagiri and Jetavana monasteries at Anuradhapura, Alahana Parivena (monastic university) at Polonnaruva, water gardens at Sigiriya and the royal palace and temples squares and the two great monasteries at Kandy. Presently the Central Cultural Fund is engaged in carrying out the spillover work at the above sites, in addition to the management of all these World Cultural Heritage sites including that of Galle.

The principal activities that are being carried out by the Department of Archaeology and the Central Cultural Fund with special reference to research and recording are listed below:

Exploration

Exploration of monuments and sites is considered as a major task of the Department of Archaeology. In fact, the true name of this institution is the Archaeological Survey Department, which shows the great emphasis paid to the subject.

Measured Drawings, Survey Maps and Photographic Documentation

Initially the sites and monuments belonging to the historical period were explored and the surface remains were recorded using measured drawings and photographic documentation. Survey maps were also prepared to provide a macro picture of the sites that were explored. Despite this work, the practice of preparing measured drawings, survey maps and photographic documentation is being carried out as key recording systems in exploration.

The "one inch" survey maps prepared by the Department of Survey for more than 175 years, still act as the base documents in identifying the monuments and sites in any exploration work. A large number of sites with monuments have been marked by the Department of Survey as archaeological reserves in these maps. Some of the monuments that have disappeared can still be identified with the help of these maps.

From the 1960's the Archaeological Department adopted a major scientific approach in which attention was paid not only to the monuments, but also other human activities and environmental factors. Some of these explorations are as follows:

- Survey of pre-historic crematory grounds.
- Surface survey of a certain implementiferous coastal alluvia consisting of basal alluvial gravel capped by fossil dunes and locating with reference to the maps prepared by the soil surveys of the Irrigation Department.
- Surface survey of undisturbed cave deposits.
- Exploration at proposed Samanala Vewa hydropower area that has brought to light several interesting iron production sites.
- Exploration of the Sigiriya - Dambulla region which has recorded a large number of settlement sites including irrigation tanks and also valuable iron production sites (with the Central Cultural Fund and the Postgraduate Institute of Archaeology)

Aerial surveys

Aerial surveys conducted by the Department of Surveys have made possible the identification of some of the heritage sites, for example, the so-called 'Vijithapura' a fortified site at Polonnaruva, and changes in the course of the Mahaweli Ganga (the principal river in Sri Lanka during historical times). Although these discoveries illustrate the exciting potential of applying such techniques, aerial or satellite photography is still not widely used in exploration.

Non-invasive Techniques

Only a few non-invasive techniques such as resistivity surveys have been carried out on an experimental basis at selected sites. However they have not had much success. At Jetavana Monastery, Anuradhapura for example, the results of a resistivity survey were quite temperamental and the moisture and salt of the earth altered the deductions adversely. Infra-red photography and proton magnetometer surveys have not been attempted.

In order to identify all possible shipwreck sites in the bay of Galle, the sea bed was explored using side-scan sonar and Satellite-based Differential System (DGPS) in collaboration with the western Australian Maritime Museum.

Since the Buddhist stupas are still the objects of veneration, excavations designed to reveal scientific knowledge such as the construction technique of the inner core, the positioning of the relic chambers and their sacred enshrinements are considered unethical. As such there is a greater need to develop a system of non-invasive techniques to investigate such information.

Detailed Recording

Descriptions and Traditional Survey Maps and Plans

Colonial travelers from the 1830's onward were the pioneers of recording their impressions of monuments and sites. However these records hardly contribute to heritage preservation activities of such monuments and sites. Detailed descriptions by writers such as Parker, Forbes and Tennent, reflect a move away from the 'impressionist' attitude towards precise and reality-based descriptive documentation during the latter part of the 19th century. 'Ancient Irrigation Works' by R.L. Brohier represents a wonderful documentation of ancient irrigation systems and even some of the archaeological sites. His two volumes on 'Land Maps and Surveys' are also equally important works of documentation on ancient topography.

The 'one-inch' survey maps prepared by the Department of Survey are still a base document in locating monuments and sites.

Measured Drawings

In 1867, J. G. Smither, the Government Architect undertook a major documentation program to prepare measured drawings of important monuments and sites in Anuradhapura. His publication titled "Architectural Remains of Anuradhapura" provide measured drawings of high standard with precise detailing of these monuments and sites. This monumental work is still referred to by heritage professionals.

With the establishment of the Department of Archaeology in 1890, H.C.P. Bell, the first Commissioner of the Department continued the documentation of monuments and sites using measured drawings in a methodical manner using highly skilled draughts men. These measured drawings formed a classic collection of documents of ancient monuments and these are preserved at the Department of Archaeology. Most of these have also been published in the Department's annual reports. The tradition of documentation of monuments and sites using measured drawings initiated by Smither and Bell set the standard of measured drawings and it continues to very this day. Measured drawings are still widely used for detail recording of monuments and sites.

Some of the large-scale recent undertakings are as follows

- measured drawings of the street facades of the UNESCO World Heritage City of Galle by the Department of Archaeology in 1988.
- measured drawings of the plans and street facades of UNESCO World Heritage City of Kandy by the Central Cultural Fund from 1997-2002.
- measured drawings of plans at various levels and numerous elevations of stone-built Siva Devale at Polonnaruva by the Central Cultural Fund in 2001 in collaboration with the Department of Archaeology and University of Moratuwa

Photography

Lotan prepared the first major photographic recording program of the monuments in Anuradhapura and Polonnaruva during the latter part of the 19th century, and it is still preserved at Department of Archaeology. The publications by H.W. Caves at the turn of the 19th century also provide a valuable collection of photographic records of monuments and sites. The photographic records of the monuments and sites done on glass negatives by the Department of Archaeology are a unique collection for posterity. Some of these photographs have already been published in the Department's annual reports.

The photographic records of UNESCO World Heritage Sites from 1980 by the Central Cultural Fund is also catalogued and preserved in photo-archives. Still photographic recording is a major method in the documentation of monuments and sites.

Aerial Surveys

Aerial photographs at a flight height of about 1500 meters and enlarged mosaic maps were prepared in early 1980's for the UNESCO World Heritage Sites of Anuradhapura, Polonnaruva, Sigiriya, Dambulla and Kandy to record the existing conditions before the commencement of the excavation and conservation work program under the UNESCO - Sri Lanka Project of the Cultural Triangle. This is the lowest attitude of flying ever carried out for aerial surveys in Sri Lanka.

The Kite technique of taking aerial photographs was also introduced in 1983 at Polonnaruva by the Central Cultural Fund for the first time in Sri Lankan archaeology. The GREEN'S KITE (1.5m. x 1.35m.) with an Olympus camera (35mm., 120 film, motor drive type) with appropriate exposure was flown in mid air (about 20m.). The photographs were taken by means of a remote control machine. Although this experiment proved to a great success, and

UNESCO was subsidizing the enormous expenditure involved in conducting aerial photography from an aircraft, it had not, unfortunately, been carried out further.

Mapping and Contour Surveys

Traditional survey techniques are still being used to map sites. For instance, contour maps at half-meter intervals were also produced for the above UNESCO World Heritage Sites with 30-meter north south and east west girded squares in early 1980's. The elevation in relation to mean sea level was also marked at each gridded crossing. All historic and modern built structures including trees giving their approximate height, foliage and variety were all plotted in these contour maps.

Photogrammetry

Photogrammetry was also used to document some of the large rock sculptures.

Modern Survey Techniques

In the case of special structures such as large stupas, modern survey techniques with theodolites, electronic total stations and associated computer software are used in collaboration with the Geodetic Unit of the Survey Department to ascertain existing and conjectural heights and profile of the dome and other elements. The GPS and EDM (Electro Magnetic Distance Measuring Technology) are used to establish control points. As per this survey, the shape of the dome of the stupa has a parabolic shape, represented by the equation $Z = 50.77112 – 0.001548 R – 0.019566 R2$, where Z and R are in meters, and Z is measured vertically upwards from the stone platform on which the dome rests, and R is the radius of the circular section of the dome cut by a plane of constant Z. This is closest to the traditional 'heap–of–paddy' shape, which is the best shape for the dome of a colossal stupa, from a structural point of view.

Digital Maps

Preparation of detailed digital maps of some of the sites (ex: Polonnaruva) has begun by the Central Cultural Fund.

However the use of computer software such as AutoCAD, and photogrammetry are not generally used in the documentation of monuments and sites.

Excavation

Two different approaches are being employed by the Department of Archaeology regarding excavation. First is the 'monument - oriented' excavations from the perspective of the 'direct historical' approach based on the ancient chronicles of Sri Lanka, with epigraphy playing a significant role. This was coupled with an emphasis on the history of Sri Lankan art and architecture. As such, the exposure of monuments for documentation, conservation, study and interpretation is carried out from its inception in the Department of Archaeology and still functions to this day. Second, is 'problem-oriented' research excavation that is primarily focused on prehistory by employing standard excavation techniques.

The approach of the Central Cultural Fund regarding excavation at World Heritage Sites was a mixture of the above two, with much emphasis on the former approach. Therefore, the specific objectives of the excavation program of the UNESCO - Sri Lanka Cultural Triangle Project were,

a) to expose and clarify the layout of the heritage sites, i.e., reveal as many of the elements of its ancient architectural character and spatial organization as possible, and,

b) to excavate the 'vertical' history of these heritage sites. i.e., to study by stratigraphic excavations the sequential history of these sites, from its earliest period of occupation in possible prehistoric times up to the modern era.

Recognizing the danger of over excavating these unique sites, a policy was adopted to leave more than one third of each site untouched, for the archaeologists of the future, who will have more advanced techniques of retrieval and analysis, to study and interpret their history.

A grid system using 81 pits to a 30-meter square was followed in the excavation. One of the 81 pits down to the virgin soil was to be excavated to examine the vertical history of the site while rest of the pits in each 30-meter square to be excavated only to the level of the last important cultural phase.

Drawings and Photographs

In both these approaches to excavation followed by the Department of Archaeology and the Central Cultural Fund various techniques are performed. For example photographic records (both vertical and horizontal) are taken of the excavation pits and of the artifacts that are unearthed in the process, in addition to the written observations and remarks entered into the field books of the excavators, measured drawings of the plans, cross sections, wall elevations, and contour surveys with the levels and horizontal measurements.

'Vertical Photogrammetry'

In addition to the above, the Central Cultural Fund experimented with the recording technique of 'vertical photogrammetry' during the excavations in order to develop an information base, using three-dimensional photography that could be made not only to record the excavation but to photographically reconstruct and to re-examine the measurements even over a hundred year period with strong magnification of the strata. Thus, the archaeologists working at these sites will give themselves a second opportunity to question their own theories at a later date or even provide their critics a sporting chance to formulate parallel alternatives.

In this system, two identical cameras (WILD P32), specially manufactured in Switzerland are fixed approximately 3 meters above ground on a specially made quadruped. At this distance, the cameras focus automatically. This quadruped (3m x 3m) that fits into each excavation pit could be raised or lowered to a required height and be moved to any uniform excavation grid. In the first instance, the center points of the four sides of the pit are marked with cement plaster. The north direction indicator, the scale and the pit number are placed on the baulks. Both cameras that have the same shutter speed and aperture will be exposed by a twin-shutter release cable at various stages of excavation. The contact prints of connected excavation pits, when placed together supply three-dimensional views of the exposed remains (if any) below ground level. The plotting will then be done on all excavation pits. (Unfortunately this experiment had not carried further enough to test its applicability in excavation recording).

However the use of digital camera together with total station, and other advance recording techniques and use of GPS and GIS have also not been tried out or employed in excavation recordings.

Research and Analysis

Dating

The traditional techniques of inscriptional data, stylistic trends of art objects and coins are still used for dating archaeological materials.

TL dating and 14C are also used for dating selected samples of archaeological material. Some of the dating work carried out so far is as follows:

- The dune sands from Pathirajawela and Wellegangoda excavations were dated with TL to c. 74,000 and 28,000 BP respectively, and the charcoal samples from Kitulgala and Batadomba cave excavations were tested for 14C to 29,000 - 13,000 BP. and analysis conducted by the Department of Archaeology have made possible to understand the pre-historic period of the country.

- The TL dating of brick samples collected from different phases of construction of the Mirisaveti Stupa at Anuradhapura agree reasonably well with the ages anticipated with historical chronologies (according to the Mahawansa, or the Great Chronicle, this stupa built by King Dutugemunu in the 2nd Century B.C. has been enlarged later by King Gajabahu in the 2nd Century A.D.).
- The TL dating of the pottery found during the excavations at Anuradhapura containing inscribed Brahmi script gave dates of 6th Century B.C, which coincides the period of Aryan emigrations to the Island.
- The TL dating of potsherds and bricks at Sigiriya confirms the archaeological excavations results at the site that Sigiriya has continued to be occupied for a longer period (at least up to 12th Century A.D.) after the demise of King Kasyapa, the chief builder of the 5th Century A.D.
- The charcoal samples associated with the earlier construction phase found below the Jetavana Stupa (4th Century A.D.) was tested for 14C. It confirmed that this earlier phase dates back to six centuries earlier than the Stupa and agrees well with the literal evidence of its association with Ararat Mahinda (son of Emperor Asoka of India), who introduced Buddhism to Sri Lanka in the 3rd Century B.C.

Identification of Different Construction Phases

The detail study of cracking patterns and different plaster textures, bonding patterns of brick work etc. are used to identify different construction phases and evolution of buildings/ structures, that are helpful in the preparation of detail conservation proposals of such buildings/ structures.

Subsurface Investigations

Subsurface investigations are carried out on monuments that have undergone substantial differential settlements to decide the subsurface improvements required for such monuments (ex: Siva Devale No. 1 at Polonnaruva). Soil samples from trial pits from auguring are tested and dynamic cone penetrometer is used to find the cone resistance for this purpose.

Other Analyses

The soluble salt measurements and XRD analysis are being carried out on selected brick monuments to identify the deterioration process.

Special Research

Some of the special research work that were conducted by the research laboratory of the Central Cultural Fund are as follows:

- Mineralogical and Textural studies of Brick and Plaster samples from some archaeological excavation sites in Sri Lanka.
- Study of Ancient Animal Bone fragments found at Kandy.
- Faunal Diversity and their impact on the Jetavana Stupa in Anuradhapura.
- Infestation of Timbers of Historical Buildings by Xylocopa tenviscapa Westwood and their control by Biological and Chemical Agents.

Inventory

Traditional Methods

Although the compilation of an inventory of archaeological sites and monuments is a primary objective of the Department of Archaeology, this had not been considered as a priority item up to 1940, perhaps due to lack of staff and funds and also the pre-occupation with exploration, documentation and conservation of such sites and monuments. The first significant attempt in this regard was taken in 1940 with the help of village headmen and divisional revenue officers. However, the results of this exercise were not found encouraging. In 1969, a card system similar to that of the European Council with slight modifications to inventorize monuments was introduced. Several monuments were inventorized under this system, but never continued. In 1978 an ICCROM expert (Dr. Jukka Jokilehto) helped the Department of Archaeology to prepare a format for the listing of monuments and computerization of data, but it was too complicated to implement at that early stage. A major effort was again made in early 1980's to prepare a comprehensive inventory. The difference between a monument and a site was distinguished and on that basis, listing was commenced. By this time, the Department's register comprised only 454 monuments and sites, although some of these cover sites with a large number of monuments. In this system, traditional method of data sheets with descriptions, measurements, drawings and maps, photographs of monuments and sites are used. A unique number to each monument and site was also allocated for easy reference. By the end of the 1989 the list of monuments and sites increased up to 12,700. These monuments and sites were all included in the Government gazette as the ‘Monuments Register’ of the country on 28.12.1990. This process continues to this very day.

Computerized Data Base

Presently the Department of Archaeology is preparing a National Archaeological Sites and Monuments Record on a computerized data base which provide a means of recording the location of a monument and its physical characteristics, significance and also to provide recommendations for further action that shall be taken to investigation or preserve it. The objective of this effort is to plan and budget effectively for proper preservation, conservation and management of several thousand monuments and sites that are scattered all over the country. The data base is currently located in the Department’s Headquarters in Colombo. The project is still in its early stages with work currently focusing on the inputting of information on sites from existing paper records and data gathered from fieldwork. Whenever a new archaeological survey is carried out, the information discovered is recorded on specially designed recording forms (which is annexed as Annexure ‘A’) and entered in to the Sites and Monuments Register in Colombo. These record forms have been carefully designed to ensure that the persons doing the recording in the field, notes down particular information that is essential for creating a record of the sites on the database. Such information includes a brief description of the site together with environmental conditions around the sites that may affect it, management information such as whether it is protected within an archaeological reserve and accurate data on the location of the site using a small GPS unit. Up to now about 500 sites and monuments in Colombo and Gampaha districts have been entered on to this database.

It is proposed in the future to link this Sites and Monuments Record to a GIS to create a powerful and highly flexible management tool. The digital maps and photographs will also be down loaded into the System. Since this database will be linked to GIS, the GPS units can then be used to locate the site/ monument and the information can then easily be down loaded to a computer containing a digital map on which the location is displayed.

The ultimate aim of this project is to have information on every archaeological site in Sri Lanka. This will take many years and will involve the training of Sri Lankan heritage professionals in the full use of the system, but the end result will be one of the most efficient and advanced programs of its type in South Asia.

Artifact Inventory

Presently the Central Cultural Fund is using the software program ‘Object ID’ to inventorize the artifacts within the museum and in the field at World Heritage Site of

Polonnaruva. 'Object ID' is an international documentation standard for describing the cultural objects using text and digital photography. It has been developed through collaboration of the museum community, police and custom agencies, the art trade, insurance authorities, the valuers of art and antiques. The 'Object ID' program helps to combat art theft by encouraging the use of standard. Up to now about 1200 artifacts have been recorded under this system. With the test of the applicability of this system, the Central Cultural Fund will extend this program to other World Heritage Sites in Sri Lanka.

Conservation

Measured Drawings and Photography

Traditional methods of measured drawings and photography are widely used to record the condition before, during and after conservation of artifacts, mural paintings, monuments, sites etc.

Digital Recording

Recording with digital camera and total station with associated computer software is being presently used to record the condition before, during and after conservation of the Abhayagiriya Stupa which is the second tallest brick building in the World. This will make possible to prepare a digital 3D model of the stupa before conservation. Since the conservation policy adopted is minimum intervention without restoring the dome to its original profile, this model will help to identify and study the gulleys that are created due to erosion of the surface brick work and the extent of brick infill that is required to prevent rainwater percolation into the dome through these gulleys and to have a smooth flow. As such this 3D model will help to create profiles at different areas of the dome and eventually a 3D model of the dome after its conservation. This has also made possible to quantify the extent of brick infill, which is useful in the preparation of estimates on labour, material, funds, time etc. These before and after conservation 3D models will also helpful in future monitoring of this structure.

Actual Copies of Paintings

With regard to painting conservation, the existing condition is copied on to canvass sheets to the actual scale and colour.

However, the use of photogrammetry, which is the most accurate means of painting documentation, is not used so far.

Photogrammetry

Photogrammety was used by the Department of Archaeology for the restoration of 9th century Dambegoda Bodhisattva Image in Southern Sri Lanka in 1989. More than 10 meters high freestanding image had been blasted by the treasure hunters after its collapse to the ground. When it was found in the 19th century, this crystalline limestone image had been broken into more than one hundred pieces. The restoration plan was to erect this image to its pristine glory by putting together all pieces in their original positions with stainless steel reinforcements. Initially a sand bed, that was 11 meters long and 4 meters wide was prepared and near hundred pieces of stone were temporarily assembled with the statue in horizontal position with the face directed to the sky. With the specially designed camera, that the Central Cultural Fund has developed to record the excavation pits, a complete photogrammetric documentation of the image was than carried out to ascertain the profiles of the missing portions of the image to complete the lacunae of the statue.

The Central Cultural Fund also utilized the above technique in preparing a photographic mosaic of the stone paved terrace of the Rankot Vehera at Polonnaruva. This mosaic, which is a three-dimensional view of stone paving before conservation, was used to prepare the conservation proposal of the stone paving. Apart from this, photogrammetry has not been used for conservation work.

Engineering Studies

In order to decide the structural interventions required during the conservation of the Abhayagiriya Stupa, the dome and the cube were analyzed using the finite element method, in collaboration with University of Peradeniya. The full stupa was analyzed as an axisymmetric solid to determine the stresses in the dome. The cube was analyzed with a 3D model. The analysis showed that the stresses in the stupa are well below the strength of the bricks used. The dome is wholly under compression, with the maximum stress value well below the compressive strength of the ancient brick. Some of the regions of the cube are in tension. As such it was decided to introduce a reinforced concrete ring beam embedded at the top of the cube.

Laboratory Research (Material Sciences)

In order to prepare specification for new bricks for conservation of brick monuments, the samples of ancient bricks of the monument under conservation are tested for compressive strength and water absorption. Since the principal followed in conservation is to retain the old fabric and materials as much as possible, the new bricks should be little less in strength and little high in water absorption. Once the new bricks are supplied to the site, the samples of the bricks are tested in the laboratory for its compressive strength and water absorption to check weather the supplied bricks comply with the specifications. If the samples do not comply to the specifications, the related brick lots will be rejected. This is a strict practice the Central Cultural Fund is following form its inception.

Since the use of cement causes negative effects on the conserved monuments, many research have been carried out by the Central Cultural Fund in collaboration with the National Building Research Organization to evolve a mixture that is compatible in every sense with the ancient mixture specially the mud mortar, which is the common binding medium of colossal structures like stupas during Anuradhapura period. The laboratory research have made possible to evolve a special mixture (1 lime: 1 paddy husk ash: 2 tile powder: 2 ant hill clay) for conservation of Abhayagiriya stupa as an alternative to 1 cement: 2 lime: 10 sand mixture which is traditionally used for conservation of brick monuments. This new mixture is successfully being used for the conservation of Abhayagiri stupa.

Monitoring and Recording of Unintentional Changes

Traditional methods of comparing past records (descriptions. photographs, technical drawings etc.) and visual observation are used to monitor and to record the unintentional changes to monuments and sites.

Since the above method is not accurate enough, the Central Cultural Fund is presently exploring the possibility of establishing a program on the monitoring and recording of unintentional changes at UNESCO World Heritage Sites with the objective of developing these sites in a direction in which the values and the integrity can remain as intact as possible. Presently the Central Cultural Fund is carrying out feasibility studies on the possibility of using the following equipment, tools and methodologies to monitor and record unintentional changes to monuments and sites:

Photogrammetry

- the rate of micro-flora and bacterial growth on fine sculptural surfaces and finely decorated plaster surfaces.
- the rates of peeling off of plaster and of fine sculptured surfaces.
- the rate of deterioration of exposed brick surfaces and mortar.

3D Laser Scanning

- the rate of exfoliation of fine sculptural surfaces.
- the rate of loss of decorative motives and fine edges of plaster work.
- the rate of wear and tear on the steps and other sculptural work (ex: moonstones) due to human walking.

Chromameter

- the rate of colour fading on paintings.

Infra-red Beams, Hygrometers and other Electronic Equipment

- to take continuous climatic measurements (temperature, relative humidity etc.) within buildings that has decorative plaster, paintings etc.

Remote Sensing

- the rate of exfoliation and cracking on sculptural surfaces
- development of cracks, average surface and interior temperature of the solid bricks structures.

Aerial and Satellite Photos

- to inspect encroachments, unauthorized constructions, and incompatible structures de-forestation etc. within heritage sites and their buffer zones.

GPS and GIS

- for large scale monitoring of sites and their buffer zones.
- The operational strategy suggested in monitoring such aspects is to enter all data and records on computers at each site and to establish a database and link each project with the Head Office in Colombo, so that monitoring can be done at both the site and at the head office.

Conclusion

The above account provides a basic overview of the heritage research and recording activities that have, and are presently being carried out by the Department of Archaeology and the Central Cultural Fund, the two premier institutions in Sri Lanka, whose primary objective is the preservation of tangible cultural heritage in the country. Although some of the latest research methodologies and analytical methods have been tried and tested here and there, the above account shows that the age-old systems are still practiced in most cases. While recognizing the value and the dependability of tested age-old systems in heritage research and recording activities, we must also use the latest systems for improved and efficient management of heritage. This involves training, technical, and sometimes financial assistance, and above all, a change of attitudes of heritage professionals and of the profession itself.

Thailand

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PROBLEMS AND NEEDS FOR ARCHAEOLOGICAL RESEARCH AND RECORD OF ACTIVITIES IN THAILAND

Introduction

Archaeological work in Thailand began in the early 19th century with the discovery, in 1831, of one monument that was believed to be the oldest Buddhist sanctuary in the region. During the reign of King Rama III, Prince Mongkut, who later became King Rama IV, spent his priesthood period traveling and surveying through the country. He collected many ancient objects from abandoned towns and ancient cities and brought them back to Bangkok. The most well known object was the discovery of the first stone inscription of the Thai language. It was found in 1833 and was associated with one well-cut stone slab (later known as the throne of king Sukhothai) on the center mound of old Sukhothai, the earliest capital of Thailand. At the time his collections were kept in the royal palace and then studied. In 1859 he ordered a building constructed in the compound of the Grand Palace. It was used to exhibits antique and art objects and was the beginning of a royal private museum

During his reign, King Rama IV ordered the biggest Buddhist sanctuary in Nakhon Pathom province to be uncovered to prove his assumption that it was the centre of the oldest city ever found in the region. Later on, the first conservation of this monument was conducted in order to renovate the old building.

In 1874 King Rama V (King Chulalongkorn) opened a new museum hall in the palace to the public and then later in 1887 moved to the Frontal Palace and established that as a public museum; it still stands as a public museum to this day.

The second period of archaeological work began in 1907 instituted by the Crown Prince, later King Rama VI. He formed the archaeological club with the aim being, to study the history of the country. This was a period of historical recording. He also announced to protect the cultural heritage of the old capital at Ayutthaya. In 1911 he formed the fine arts department, and archaeology and antiquities was one of its main sections. In 1933 the Fine Arts Department was established by the government. The “Royal Decree Organizing the Service of the Fine Arts

Department" was subsequently promulgated. This Royal Decree was stated that the Division of Museums and Archaeology was a component part of the new department. Later on it was changed to two divisions under the Ministry of Education.

Presently it is developed as the Office of Archaeology under the Ministry of Culture and its duties are to conduct archaeological surveys, excavation and research and conserve ancient monuments throughout the kingdom.

Modern systematic archaeological investigation was begun in Thailand quite late. The first systematic excavation was undertaken by a joint project between Thailand and Denmark at the archaeological site of Ban Kao, Kanchanaburi province in west-central Thailand in 1960. Since then the general concept of employing the methods and techniques of "European style" archaeological field research have been recognized and adopted by Thai archaeologists. However, with the later excavations at the famous site of Ban Chiang in Northeastern Thailand, prt of the joint project by the Thai Fine Arts Department and the University Museum of the University of Pennsylvania, USA, theories, concepts and methodologies from American archaeology have been introduced and adopted by a few Thai archaeologists representing the new generation. Thus, this blend of the Euro-American concept, methodology and techniques characterizes the present archaeological field investigations in Thailand.

For three decades archaeological research in Thailand has increased in intensity. Archaeological research projects were developed specifically for 4 major regions of the country which were the Northeastern, Northern, Central and Southern. The main activities of these research projects include the preliminary surveys to locate archaeological sites in every region of the country and to conduct test excavation at certain key sites. As a result of the development of these research projects, more than 1000 archaeological sites have already been found and listed.

The archaeological sites so far known in Thailand can be classified in various ways. For instance, sites are primarily and usually classified according to time-period into prehistoric, protohistoric and historic. After this initial designation, the sites are then subdivided according to function, for example, cemetery, habitation, industrial, quarry site, etc. The historic period of Thailand can be divided into two parts, before and after Thai political domination of the country. The first part can again be subdivided into three periods: the Dvaravati (6th -12th centuries), Srivijaya (7th -12th centuries), and Lopburi (11th -13th centuries) periods. The second is subdivided into five periods namely, the Chiengsaen, Sukhothai (12th-14th centuries), U-Thong, Ayutthaya, (13th-18th centuries) and Bangkok or Rattanakosin periods.

Problems in Archaeological Research in Thailand

For the past decade, under government policy to develop cultural heritage for tourism, many historic sites have been selected and managed to be historical parks. The most well-known sites are Sukhothai and Ayutthaya historical parks where the monumental structures and extensive cultural landscapes can be identified after excavation. However, many other ancient towns and archaeological sites are left uncovered especially prehistoric and historic Dvaravati burial sites. The first reason that these sites are not selected to be cultural heritages for tourism is because of the difficulty in maintaining and conserving in situ excavations. Damage to this kind of archaeological heritage is almost certain to occur when excavated cultural features are left exposed without any management plan. Sub-surface structures and artifacts generally deteriorate very rapidly when exposed to new environmental conditions above ground. The impacts range from physical deterioration such as weathering and crumbling of Dvaravati brick features to the erosion and slumping of unexcavated cultural layers, as well as vandalism and looting. The consequences include the destruction of the features that have been excavated together with damage to unexcavated features.

The second reason is that certain types of archaeological heritage are considered to be of lower value compared with other heritage. Likely threats range from an indifference to deliberate damage resulting in the entire loss of certain archaeological heritage places and their value. A perfect example of these problems can be seen even in the high-profile, well protected Ayutthaya Historical Park where a large number of monuments have been well excavated and restored but many sites are neglected because they are less visible and less imposing archaeological features. From historical records and ground surveys, more than 300 temples have been discovered, most of which have been excavated and restored, while only a few invisible places like markets, villages or industrial areas are left buried.

For the studied cases I would like to mention kiln sites or tile and pottery industrial production areas of Ayutthaya that have very limited resources for management, but from a research point of view they have provided considerable data and information for Thai people and other visitors and researchers.

Archaeological Research at the Ayutthaya Kiln Sites

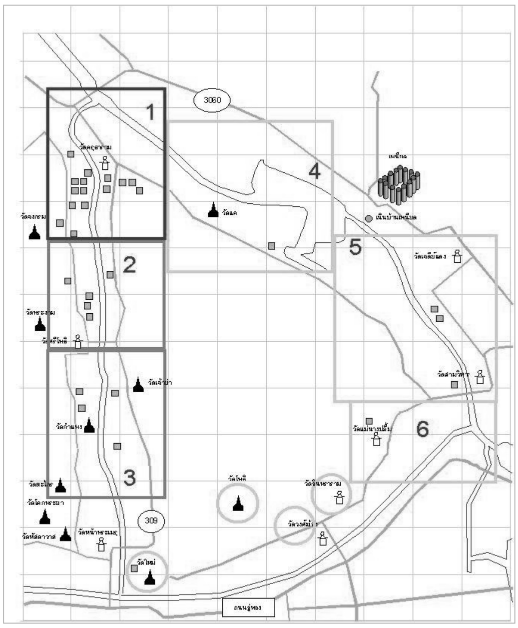
Ayutthaya is known as one of the most famous UNESCO World Heritage sites in Thailand, having been nominated by UNESCO in 1991. Ayutthaya was one of the capitals of Thailand from A.D. 1350 – 1767. It is situated on the central alluvial plain of Thailand, about 80 kilometers north of Bangkok, the present capital.

Ayutthaya which was established by King U- Thong lasted 417 years and was ruled by 33 kings from 5 dynasties. Each king in his turn built his town, and fostered Buddhism and culture. According to western sources, Ayutthaya was a glorious city with beautiful landscapes, crowded inhabitants and served as an international port with a continuous flow of sea-faring ships.

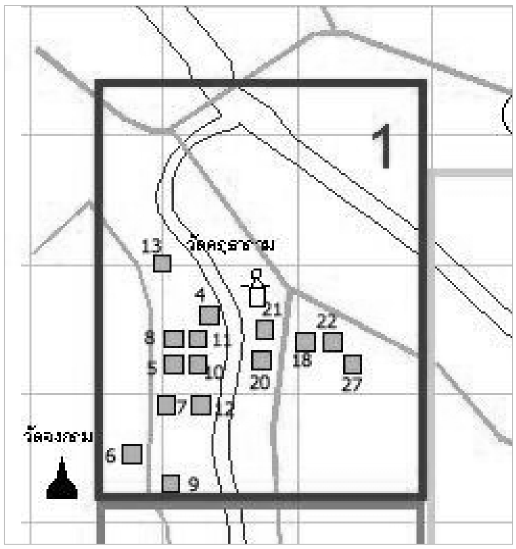
All aspects of architecture, religion, medicine, government, external relations, traditional court ceremonies, agriculture and economics reached their peak during the Ayutthayan period, resulting in more prosperity and wealth. Its riches also brought in foes to rob and take away manpower. The kings had to fight at least 70 battles. The two big defeats left the city empty, temples and palaces burned to the ground, together with the nations written testimony of the past.

From such ruins, King Rama V began to restore the monuments and preservation of Ayutthaya remains. The successive governments began to follow suite by delegating the responsibility to The Department of Fine Arts. The restoration work, which was well carried-out, continue to the present day in the name of the Ayutthaya Historic City.

Besides the restoration of monuments both inside and outside the city of Ayutthaya, the Department of Fine Arts is also in charge of archaeological research to fulfill the knowledge of Ayutthaya in every aspect. One of them is to answer from where the architectural materials of Ayutthaya were brought and how they were produced.



Map of Klong Sra Boa and Klong Bang Kuod



Detail of Klong Sra Boa where Kut (Garuda) Temple is located

Historical Record Review

The "Record of Ancient Architecture in Ancient Phra Nakhon Si Ayutthaya", which was written a bit after the declination of Ayutthaya, was said that …above the city island there were 5 villages, one of which was making pottery, various kinds of tiles, limes and liqueur. This area was called Thung (field) Kuarn and the opposite area called Thung Kaew. These were explained by senior scholars as being the area along the man-made canal namely Klong Sra Boa. The primary assumption is that there might have been a factory producing architectural materials that supply materials for building construction needs throughout Ayutthaya's long history.

Archaeological Survey

In 1999 the FAD had approved the budget for the excavation project and preservation of the Ayutthaya kiln sites at Klong Sra Boa and the surrounding area. The project continued for 3 years and was successfully completed in 2002.

Geographically, there are three main rivers flowing through the northern part of Ayutthaya namely Chao Phraya, Lopburi and Pasak. The Lopburi, in the middle of all of them is also called Klong Bang Koad, and joins the Pasak at the north-eastern corner of the city. Then it turns westwards which became the protection waterways of the northern part of the city, called Klong Muang. Klong Sra Boa. As mentioned earlier, it is dug strongly in a north-south direction for about 2 kilometers joining Klong Bang Koad together with Klong Muang. These three adjoining rivers compose a triangular area, and about 100 meters around lie the archaeological region that is the subject of the proposed work.

The first task consisted of ground survey. The purpose of the survey was to locate every feature and artifact that could lead to the identification of kilns or other objects associated with ceramic technology and firing. Many surface finds associated with kilns were found, especially wasted fragments of vase products of earthen pottery and tiles. These artifacts are found along both sides of Klong Sra Boa to the northern area of Klong Bang Kuod associated with human settlements and their ancient monasteries. Some features of kiln construction are scattered in the area called Pa-niead or elephant trail of Ayutthaya. Therefore, it might be possible to find the kilns belonging to Ayutthaya pottery and tile production in this area.

Ethnological survey

An ethnological study was designed to work in this specific area. Presently, there are many kilns that are still used by local people. Their products are earthen pottery, tiles and also bricks. Many kilns have been left or unused and abandoned, but only one earthen pottery kiln is still in use. It is located in the middle of the Klong Sra Boa area. From the survey results it is shown that the production of earthen pottery is not currently in fashion or needed. At the same time many baked-brick kilns are found in the northern area of Klong Bang Kuod and further north. It means that brick making is more economically viable instead. These pottery and brick makers state that their ancestors settled down in this northern part of Ayutthaya hundreds of years ago and were terracotta producers for a long period. It was in doubt whether these people were a new generation of old Ayutthayan people who came back to their home town and continued their expert workmanship.

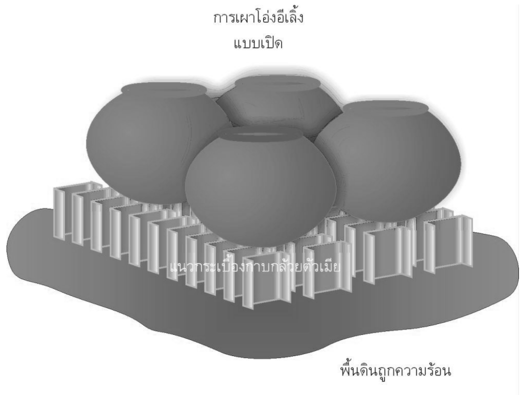
The kiln in use is an updraft kiln. It consists of two parts, 2-3 meter square firing chambers that have one or two clay grates underneath and connected to a fire box at one side. This type of kiln can be produce either earthen tiles or pottery.

Excavation

Generally in local Thai Buddhist societies, either present or past, a monastery or temple is usually located in the middle of the village and surrounded by houses. After the survey we decided to divide the area along 3 waterways into 7 areas according to the appearances of the Ayutthaya ancient temples and the associated evidence found. Thirty pits were excavated was for the purpose of uncovering the selected area in order to provide answers to historic questions. Data collection and analysis have been done carefully, with some interpretation.

Results and Interpretation of the Evidence

1. Most artifacts consist of a large amount of tile fragments, potsherds and a few foreign ceramics from China, Japan and Vietnam. Artifacts and stratigraphy prove that the historical record is somewhat correct. There were two industrial areas located on the uppermost part both eastern and western banks of Klong Sra Boa. The eastern area near the Krut (Garuda) Temple was the production area of large earthen pots, jars or massive storage vessels. The western area opposite to Krut Temple was the production area for various kinds of earthen tiles, such as flat roof tiles, haft cylindrical tiles, various kinds of antefix tiles, thick square floor tiles or other decorative parts. Stratigraphy shows layers of a dwelling which meant that the people lived and worked in the same area, as their houses where were not so far from



Reconstruction of open bonfire

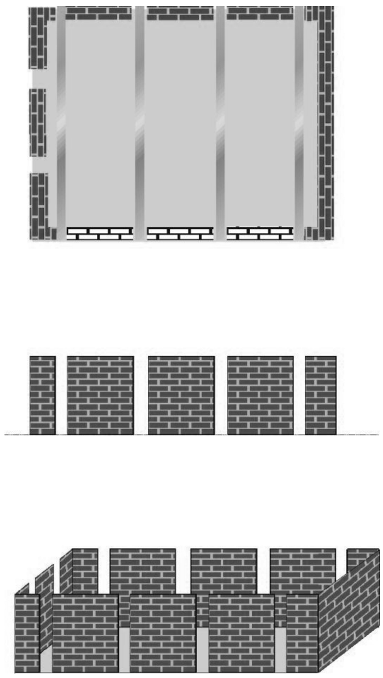
the factory. House remains exist throughout the stratified deposit right up to the present day level associated with the present-day productive kiln.

2. Kiln types and firing technique: 3 types of kiln were used. In the eastern area, an open bonfire was selected by preparing flat ground then laying the pots covered by brushwood or bamboo before firing. This technique was specifically used for producing only massive earthen vessels.

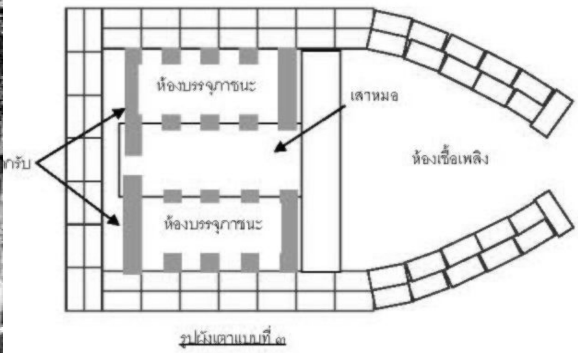
   According to the stratigraphy in the excavation pits on the western area, evidence has been found of 3.5 x 4 meter square kilns on the lowest layer. Their purpose was only for tile producing, based on recovered artifacts. By ethnological study, this technique of firing is still practiced in the Pattani kiln site in the southern region of Thailand. Pattani was one of the big cities that grew in trade and merchants and was famous especially during the Ayutthaya period. The city population was Muslim, and preserved their traditions and culture in many aspects. Tile making and techniques of firing are also done in the traditional way, unchanged for more than two hundreds years and dating back at least to late Ayutthaya period. The kiln is square in shape, 2 or 3 meter wide with 2.5 – 3 meter in height. Dried tiles interspersed with fuel (brushwood) are placed in the kiln where the fire travels. Thus low firing continues uninterrupted for 3 or 4 days until completed. In comparing the features found in the pits, this technique is presumably similar.

   The third kiln type is an updraft kiln that appears on the upper layer of a square kiln. Its plan appeared as oval in shape with a straight cut at one end. The features show that it consists of two parts, a firing chamber and a fire box. It appears to be similar

Existing square kiln in Pattani



Three dimensional reconstruction of square kiln



Plan of reconstructed updraft kiln

Existing updraft kiln in Ayutthaya

to kilns still used in today. The firing chamber is square and built by bricks. On the ground lie one or two clay grates depending upon how big the kiln was. A small tunnel fire box was built adjoining the side of the firing chamber.

This is an unusual updraft kiln and unlike other primitive round updraft kiln that appeared in many parts of Thailand. This Ayutthaya kiln is seem to be more developed for adapting the firing chamber from a square low firing kiln. The square firing chamber is quite big and large enough to contain a considerable number of tiles for firing equal to the previous kiln type but takes about 2 days for firing.

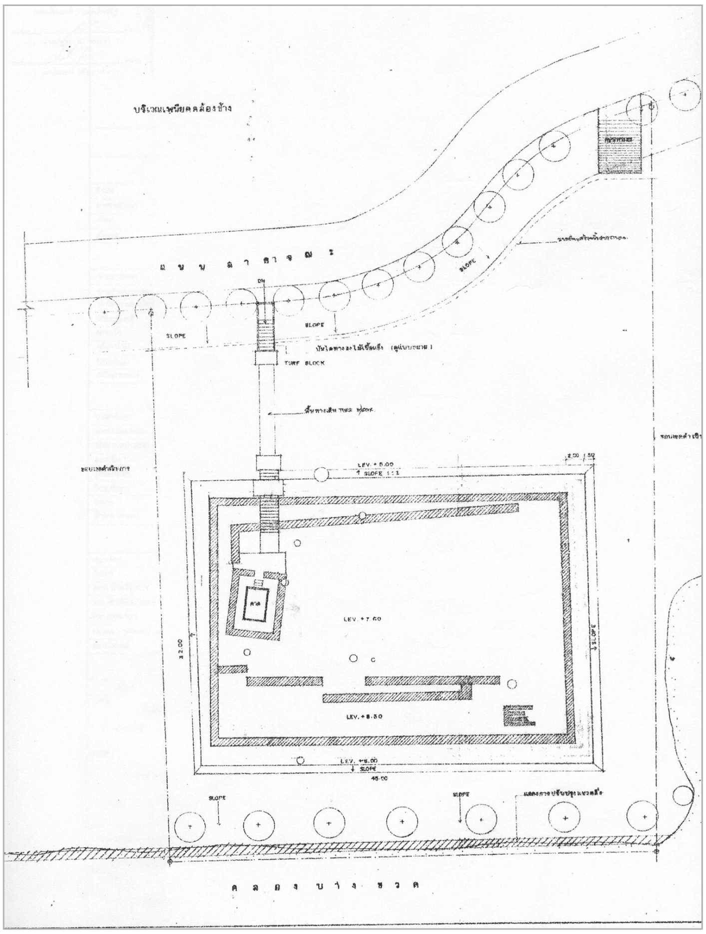
One question of concern is when this firing technique first appeared and how it suddenly changed. Comparing the firing technique in square kilns to updraft kilns, we come to the issue of time in the firing process; the updraft kiln takes less time. Many vested, slump and melt tile fragments were found in the beginning state of the changing kiln type and firing technique. This evidence reveals that they were not able to control firing temperature higher than the old technique. After some time these expert fire controllers were able to produce any kind of earthen products, various types of tiles or pottery. These updraft kiln type were used continuously for a long period of time until the present day.

Preservation of the Sites

Unfortunately, the Fine Arts Department was unable to recover the whole ancient factory area because of their private land ownership, thus it was decided to close most of the sites.

To preserve the sites, recording and documentary evidence are the most necessary. The reports of the site excavation have been completed and published. Some decisions have been made to open an unearthed site for the public, so that it can be shown as an example of the Ayutthaya kiln area. The site should have enough features for study and also easily reached. One possibility is the mound near the bank of the Klong Bang Kuod, where an elephant trail is located. This is a very attractive place for tourists.

Preservation work was started by preparing a previously excavated mound to check for archaeological remains. After checking the damage of the remaining kilns, some deterioration was found where the kilns were exposed in the open atmosphere for a long time. Bricks, and kiln making materials, were removed, and left to only a few layers but other artifacts, mostly tile fragments, are in situ. The method for conserving the kilns is to keep the kilns undisturbed and to leave tile fragments in situ, and to protect kilns unharmed by fencing them in. Observations have been made for one year. The conclusion of this study is that the kilns are able to stand in an open area if they are not touched by. In terms of tile fragments, it is difficult to leave them because they are small and lie separately on the ground, and are, thus, easily removed. The application of chemicals for adhering them to the ground will preserve the site for a longer time



Preservation plan of the excavation site

Filling soil in excavated pits

Improvement in the site landscape

Restored brick construction of kilns

and the operation can be carried out sooner. Though this kiln site might not last long, the evidence would be well recorded. This will be helpful for imagining past activities and increasing knowledge for future generations.

The Need for Archaeological Research

The excavation of the Ayutthaya kiln site is a very good example of the weakness of archaeological research in Thailand. Although the excavation took 3 years to finish, it did not mean that the research was completed. There are many questions that cannot be answered and many problems yet to solve. One reason for the large amount of research yet to be done is due to a lack of staff and experts to analyze the evidence from these kinds of sites. Most of the archaeologists in Thailand learn general archaeological methods and techniques so that they can classify archaeological artifacts and produce reports for public, but they cannot conduct intensive, specialized analyses of various materials in detail. Therefore, we need more time for research, more research for comparing data, more training in related subjects and also more facilities for analysis.

REFERENCES

1. Babetti, M. and Hein, (June 1989) D. Palaeomegnetism and High–Resolution Dating of Ceramic Kilns in Thailand. Vol. XXI
2. Chuimei, Ho, (1988) Minnan Blue and White Wares; An Archaeological survey of kiln sites of the 16th – 19th centuries in southern Fujian, BAR International Series 428, China
3. Lamb, P.Y.K. and others, (1985) A Ceramic Legacy of Asia’s Maritime Trade, S.E.A. Ceramic Society, Oxford University Press, Kuala Lumpur

Vietnam

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PROBLEMS AND NEEDS FOR ARCHAEOLOGICAL RESEARCH: THE THANG LONG ROYAL CITADEL SITE

Introduction:

From the ancient to the Medieval Age, Vietnam had 4 famous capitals. They are: (1) Co Loa Capital at Dong Anh from the An Duong Vuong period (1st-3rd centuries AD), (2) Hoa Lu Capital in Ninh Binh from the Dinh-Pre Le period (10th century A.D.), (3) Thang Long Capital in Hanoi from the Ly-Tran-Le period (A.D. 1010-1789), and (4) Hue Capital from the Nguyen period (A.D. 1802-1945) in the central Hue area. Presently, only the Hue Capital has been conserved. The other capitals have disappeared from the ground surface and they have been little known throughout history. Among these capitals, Thang Long is the greatest and the most famous Capital with the longest historical existence.

Vietnamese ancient history includes accurate records of the appearance of Thang Long Capital from Dai Viet State (the present Hanoi Capital) in A.D. 1010 under the Ly dynasty. This Capital existed throughout the Ly-Tran-Le period, at approximately 1000 B.P. Written sources are very important, enabling researchers to clearly identify the construction and development of the Thang Long Capital through every period, especially the history of the Kings' dynasties and associated unsettled historical events such as wars, natural disasters, fires … and even the palaces constructed in each stage with the names of those who ruled during each time. However, the Vietnamese ancient literature was used to record only significant events, and not detailed descriptions, so it is difficult for researchers to clearly envisage the physiognomy, locations, and scale of the Capital as well as the shapes of the palaces built in the Capital.

On the other hand, due to many reasons, the ancient Thang Long Imperial citadel has been destroyed and deeply buried. Part of the ancient Hanoi citadel area built in the Nguyen period (19th century) still survives on the present ground surface. This area is located between Hoang Dieu, Nguyen Tri Phuong, Dien Bien Phu, and Phan Dinh Phung streets.

The disappearance of the Thang Long Imperial Citadel from the Ly-Tran-Le period and the shortage of various historical sources as mentioned above, make it impossible for researchers to have a sufficient base to envisage and restore the history, physiognomy and scale of this well-known Citadel. Many young generations have no idea where the ancient Thang Long Imperial Citadel is, nor how large it is. They are only aware of the present ancient Hanoi Citadel area.

That fact forces the archaeologist to have a step-by-step plan to excavate and conduct research on the Thang Long Imperial Citadel because archaeology can enable historians to study details of past events and supply evidence for historical data.

In addition, archaeological sites also reveal tangible evidence that can vividly reflect historical events and yield valuable scientific data. Therefore, archaeological research and excavation at the Thang Long Citadel area have become a very significant matter, promising significant scientific results.

Prior to the excavations at the Thang Long Citadel, all historical sources (i.e. old maps) and other data were carefully studied. At the same time, exploration and investigation on the ground surface has been carried out with a view towards searching for the remaining traces such as stelea, and pagodas/communal houses, and then identifying the borders between the areas of the Citadel, the Imperial Citadel, and Forbidden citadel of the ancient capital.

From the above historical data sources, The Hanoi Citadel was identified and is located in the area that includes the central axis of the Forbidden Citadel and the Thang Long Imperial Citadel from the Ly-Tran-Le periods. In the present ancient citadel area the Kinh Thien

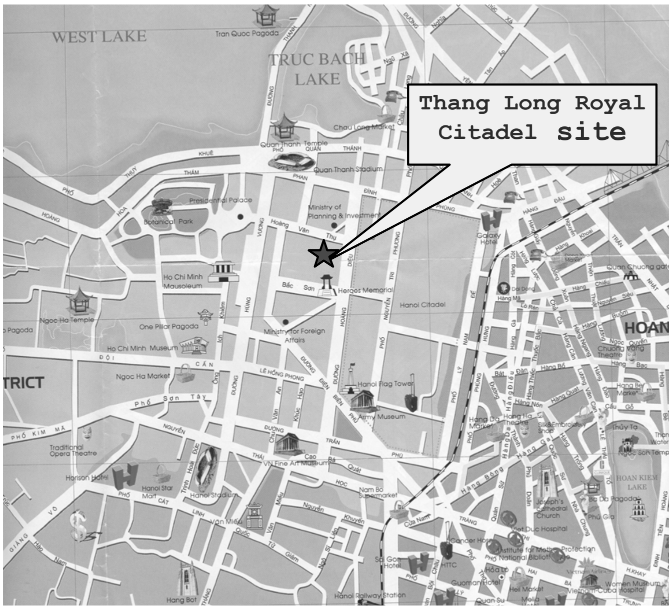

Fig. 1: Map of the Thang Long Loyal Citadel Site 1

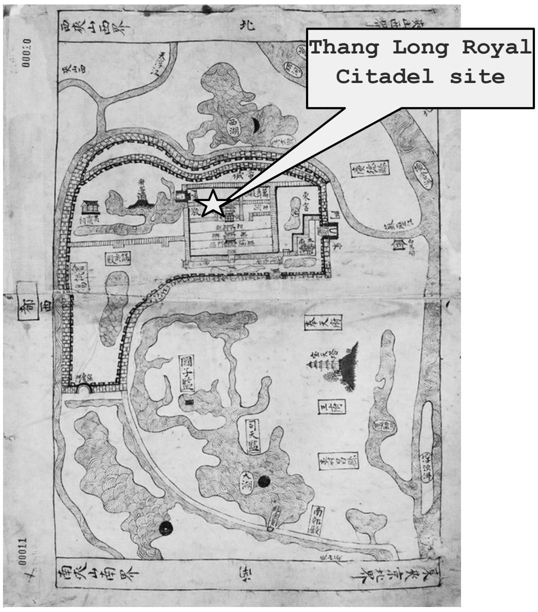

Fig. 2: Map of the Thang Long Loyal Citadel Site 2

palace Audience Hall is located. This dates from the Early Le period (15th century A.D.) with terraces and stone banisters carved in a dragon shape. According to the old history, Kinh Thien palace was built on the old foundation of Can Nguyen palace which was later called Thien An palace in the Ly-Tran period. It used to be the Audience Hall for various dynasties which makes this location very important for the study of the Imperial Citadel area or the central area of the Thang Long Capital.

Between 1998 - 2000, some exploratory excavations were made at the Hau Lau, Doan Mon and Bac Mon sites within the ancient Hanoi Citadel. These resulted in architectural finds of sites from the Ly-Tran-Le periods along with numerous artifacts, including architectural materials, ceramics, and metal and wooden objects. These data usher in the prospect for new research into the Thang Long Imperial Citadel.

However, excavation of the Thang Long Citadel is quite complicated due to the large number of modern constructions on the site. In order to excavate, it is necessary to clear the surface and remove the modern buildings. This task is beyond the archaeologists' ability and they have to look for the Government support.

Fortunately, in the middle of 2002, the Vietnam Government planned to construct the National Assembly House and the new Ba Dinh Conference Hall at 18 Hoang Dieu (see Fig. 1). This area is located on the West side of Kinh Thien palace, 87m away from its east side. From the old map, the area around 18 Hoang Dieu is assumed to be located in a very important position in the central area of the Thang Long Imperial Citadel (Fig 2). In accordance with the Vietnamese Law of Cultural Heritage, archaeological excavation and study must be made before any modern construction. Thanks to this law, the Thang Long Imperial Citadel project including excavation in the 18 Hoang Dieu area was set up and began in the middle of December 2002.

This excavation was carried out by the Institute of the Archaeology of Vietnamese Academy of Social Sciences and under the direct control of the Vietnamese Government.

I. Methods of Excavation and Study at Thang Long Imperial Citadel Site:

The excavation area is located at 21002'256'' North latitude, and 105050'321'' East longitude, with an area of 22, 4000 m^2.

At first, the excavation was aimed at clearing the ground surface for the construction of the National Assembly House and the new Ba Dinh Conference Hall. The deadline for completion of the excavations was at the end of August 2003. Due to such a very short time, the Project Management had to select and decide the appropriate method for archaeological excavation.

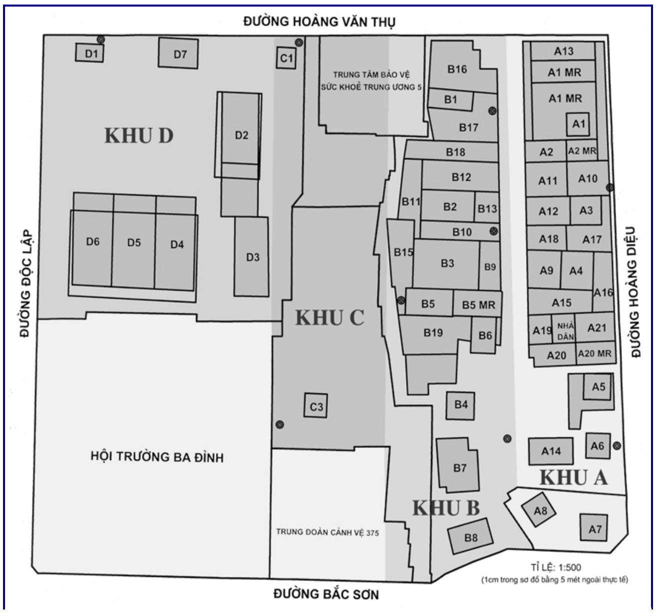

Fig. 3: Plan of the excavated area

After a thorough survey of the site and the current situation, we divided the excavation plan into 4 small sections namely A, B, C, D. Each small section was sub-divided into many trenches, each trench being from 200m^2 to 300m^2. These small trenches are coded in accordance with the section, for example, trenches A1, A2 means trench 1 and 2 in section A, the same coding method is applied to section B, C, D (Fig.3).

This area contained many modern houses, so it was necessary to first use tractors to level off the ground surface and unearth the foundation of the houses. After that, we located the excavation trenches and then carried out the excavation with standard excavation methods by hand. With this method, each layer is removed and treated in accordance with the soil colour and the situation of relics and artifacts when exposed. When the relics and artifacts have been found, they are kept *in situ*, the layer surface is cleaned and drawn, descriptive notes are taken, photographs are taken, video of the excavations are also taken and coordinates are located. After careful study and if considered necessary, those artifacts will be removed from the layer, the architectural remains will be maintained *in situ* to continue study and clearly identify the layer and its characteristics and dates. The removed artifacts will be kept on trays or in plastic bags. Small artifacts will be kept in small plastic bags or boxes. Before removal, they will be registered on registration forms with statistics of their scale and location, depth, cultural layers and date of discovery. This work will be done very carefully and accurately because it is very important for the study of the relationship between the dates of various types of artifacts and architectural vestiges, at the same time it is a base for systemization and classification for future correcting and report writing.

These are fundamental and compulsory principles of archaeological excavation.

All the removed artifacts will be dipped in water, cleaned and dried and then they will be numbered according to their trench and layer for classification, and correction after the excavation finishes. After being technically treated, these artifacts will be kept in temporary storage and arranged in the system of excavation trenches. During this process, it is necessary to appoint a particular supervisor who is responsible for observing and guiding the workers during the process of cleaning, drying, numbering and arranging the storage. For the important and rare artifacts, they are immediately sorted out and kept in a special storage area to avoid damage and loss. For the broken but attachable and restorable artifacts, they will be sorted out and kept separately. Professional technicians will restore them during the excavation process.

The scientific treatment at the excavation trenches in sections A, B, C, D is very important. The excavation of the huge area with 52 trenches excavated at the same time make it difficult to manage. To overcome this difficulty, there are 2 appointed scientists responsible for each trench, who are accompanied with a group of technicians specializing in graphics, photography and camcorder work.

Another problem at the Thang Long site is that the architectural urban remains are very complicated due to their multilayers overlapping each other.

- The upper layer is from the Le and Nguyen period (15^{th} - 19^{th} centuries).
- The middle layer is from the Ly and Tran period (11^{th} - 14^{th} centuries).
- The lower layer is from the pre-Thang Long period (7^{the} - 10^{the} centuries).

Therefore, the treatment of the strata and architectural vestiges raises a lot of problems. Moreover, this is a very new field for Vietnamese archaeology. Due to the lack of experience, the selection and decision of the appropriate excavation method is very essential for the project management. We can't choose a normal excavation approach as for prehistoric sites, because these sites will be unearthed layer by layer and when artifacts and vestiges are found, they will be removed from the ground.

The site has a lot of architectural layers, including various types of foundations of palaces and yards, pebble pillar bases, stone bases (for supporting wooden pillars) paths covered with gravel stones, system of drainage, and water wells. Apart form that, there are vestiges of rivers, lake and burials. The 1999 ICOMOS Australia *Burra Charter* uses the term *Fabric* to refer to the upper part of the building and the remaining vestiges on the top layer, as well as the excavated architectural materials. The Imperial Citadel site has revealed a lot of this *fabric*. This complexity makes it hard for the archaeologists to make a choice:

- It is impossible to study the vestiges in the lower layer if the upper is not removed. It also means that it is impossible to conserve the upper layer if it is necessary to excavate to clarify the scale, fabric and values of the vestiges in the lower layers.
- Which architecture to be removed from what particular location must be considered very carefully.
- Before any decision is made, it is important to know that the removal of architecture means the destruction of its origin. Therefore, it is necessary to urgently set up scientific profiles to restore such architecture in the subsequent study process.

The most important factor is to thoroughly study such architecture in association with the entire excavation area, in order to clearly and identify or at least realize their characteristic values. At the same time, it is necessary to set up the scientific profiles: drawing, photography, description with the relocation of that site before removal.

On the basic of the above-mentioned methods, we have carried out the excavation at Thang Long and gained significant results that I have mentioned at the beginning.

II. The Results of the Excavation and Research at Thang Long Imperial Citadel:

In the excavation sections, many architectural remains and millions of artifacts have been found. They all lie in the cultural layers with an average depth of about 1.0m - 3.50m.

This is the first time a complex of relics and sites from the west part of Thang Long and the ancient Hanoi Citadel has been exposed with the continual material evolution of over 1300 years, thus, providing a lot of important information for the identification of the location, scale and physiognomy of the architectural complex of palaces in the west central area of Thang Long citadel from the Ly-Tran-Le period and Hanoi citadel from the Nguyen period.

In the following section the main excavation results are discussed.

1. Architectural Vestiges:

1.1. Architectural Vestiges at Section A:

Section A is located next to Hoang Dieu road, encompassing a total area of 6000m^2. This is the location of a lot of important, and typical architectural vestiges have been found, such as:

The north side that includes vestiges of multi-compartment architecture, which is 62m long, 12m wide, which are clearly shown by a system of more than 40 pillars gravel stone bases. This system is distributed in rows; each row includes 4 bases with 9 compartments, there are drainage lines for falling water from thatch roofs. This architecture is dated to the Ly and Tran period.

Fig.4: Picture of Section A

The west side includes a system of "six-sided" bases lying along riverside in North-South direction with the length of 82m. Besides, there are 3 ancient wells: one from the Ly period, which was built with brick arrangement and the bottom was covered with square bricks with decorative designs and the two water wells from the Le - Nguyen period, which were arranged with stones. Inside these wells, a lot of valuable objects have been found.

In the middle of section A there is a brick foundation and drainage system from the Ly - Tran period and a brick wall from the Le period; some wooden pillars still stand on the bases from the pre-Thang Long period. Especially, there was the find of a well arranged with bricks from the Tran period.

On the south side, there were vestiges two architectural foundations running in East - west direction toward the bank of an ancient river. These architectures are identified by the brick terraces around the verandah with 2 yards covered with square bricks and a system of stone pillar bases on the gravel stone bases on the architectural foundation. Beyond the front yard (north) of the architecture, there is a drainage sewer and a gravel stone path running parallel with the architecture.

1.2. Architectural Vestiges at Section B:

Section B is adjacent to section A, with an area of over 6000m^2. Between them, there are traces of an ancient river with a width of 18m. On both banks are found a lot of ceramics, including those used only by the Kind.

This location also yielded a lot of architectural remains. They overlapped each other and it is possible to realize 4 following periods:

- The lowest layer is the architectural system from the Pre-Thang Long period or the so-called Dai La period, which is clearly shown through the rows of wooden pillar standing on the stone bases in the depth of 3m-4,20m. In this cultural layer also found a lot of such objects as bricks "*Giang Tay quan*" (Giangxi soldiers), pipe shaped brick ends with sacred-animal images, masks and a lot of ceramics dated from the 7th - 9th centuries.
- The upper layer over the architecture from Dai La period includes architectural vestiges the Ly - Tran period, which are clearly shown through the systems of gravel stone bases and the lotus-shaped bases. Based on the composition of those gravel stone bases, it is possible to see that there

Fig. 5: Picture of Section B

are 2 large architectural units built with 2 parallel rows of houses along North - South axis next to the ancient river. Between the 2 architectural rows is a system of brick foundation and drainage sewer from the Ly - Tran period pouring to the ancient river.

- The top layer is the Le period architecture built with large bricks.

At the section B, ancient wells have also been found. In which, there are 2 Dai La period wells, two from the Ly period, one from the Late-Le period. The Dai La wells even reveal the usage and reconstruction from the Ly period. Next to them, there is a gravel stone path from the Ly-Tran periods and a system of drainage sewer pouring to the river.

1.3 Architectural Vestiges at Section C:

Section C is next the section B. The excavation of this are is approximately 1.300m^2. In particular, the C1 trench has been fully excavated, including architectural vestiges from the Ly period, with a system of square pillar bases built with gravel stones and bricks.

1.4. Architectural Vestiges at Section D:

Section D is located in Ba Dinh sport centre, next to Doc Lap road. Four thousand metres squared has been excavated at this site. At this location, the excavation trenches include extensive architectural vestiges dating from Dai La, Ly-Tran to late Le periods.

Therefore, all over the excavated area are found vestiges of architecture from the Ly period. Those architectural vestiges are densely distributed and overlapped each other. Apart from these, there is a system of ponds/ lakes, ancient river and water wells as well as numerous artifacts.

2. Artifacts:

The quantity of artifacts is estimated to be in the millions, including the majority of bricks, tiles and architectural decorative materials. Among which, there are hundreds of artifacts found for the first time. Remarkably, among the many bricks found are some with the printed Chinese Characters "*Dai Viet quoc quan thanh chuyen*" (Bricks for building Dai Viet Citadel), showing that they were used for the architectural construction of Dai Viet state from the Dinh-Le period, the bricks with "*Ly gia de tam de Long Thuy Thai Binh tu nien tao*" showing that they were used for architecture is the Ly period in 1057, the bricks "*Vinh Ninh Truong*" show that they were used for Tran period's architecture and other bricks titled "*Vo Ky quan*", "*Trang Phong quan*"…show the construction in Le Thanh Tong's period.

Apart from building tiles and bricks, there is a large number of phoenix, dragon heads and various types of *la de* (Buddhist leaf) bricks attached on pipe tile ends, various types of tiles *bo noc* (tiles for covering the top line of the roof) decorated with dragon, phoenix images… reflecting that the architecture from Ly, Tran period was of a higher quality and more sophisticated than at other locations.

Fig. 6: Artifacts; dragon heads *la de* bricks attached on pipe tile ends (upper) and ceramic with 5-claw dragon painting (below).

Besides, a large number of ceramics used in the royal dynasty through many periods has also been found. Among which, especially remarkable is the system of high - quality ceramics, which might be for the King and his family's use only. This is also clearly reflected through high-quality ceramics from early-Le period, decoratd in the 5 claw dragon shape, and in the lap of the ceramics, there is a raised "*Quan*" character (Royal Officers' use) or "*Kinh*" character (Respectful offering) made in Vietnam with high-level technique.

Apart from that, at the excavated area are also found canons, swords, spears, arrow heads, various bronze coins, household items and metal ornaments, reflecting various aspects of the economy and society at the Thang Long Citadel in the Ly, Tran, Le periods.

III. The Value of the Thang Long Imperial Citadel Site:

1. The Thang Long Imperial Citadel area at 18 Hoang Dieu is considered to be the most important location in the system of ancient and medieval Vietnam Capitals as it is the point of convergence of Thang Long-Hanoi history and culture, and Vietnamese culture through more than 13 centuries (from Dai La period in 7^{th} - 9^{th} centuries, to the Nguyen period (19^{th} century). There are few capitals in the world that include this kind of complex of remains with a long standing history and culture. In addition, there are various cultural layers that overlap with each other within a fairly continual sequence. Thang Long Citadel is an outstanding example of the historical development of a large city-state and society, thus making an important contribution to the history of Vietnam.

2. The site area is located in the Forbidden citadel, which is the central circle surrounding the residential area of the King and his family and also the workplaces of the royal offices, where solemn ceremonies of the reign were held. This is the area with a concentration of the most typical royal architecture and artifacts reflecting royal life. In otherwords, these are the highest-quality products of the national culture in every historical period.

The recent archaeological excavations have revealed vestiges of the royal palaces, including fairly large-scale architecture, a lot of high-quality building materials, numerous ceramics for the King's use as well as many valuable royal items. These items are tangible evidence that reflects the standard of techniques and special arts of the nation regarding the developmental horizontal plan of the contemporary region and the world.

The moulds for casting designs on ceramics and waste ceramics used for piling up the foundation also show the existence of office kilns in Thang Long Imperial Citadel, specializing in production of high-quality ceramics to serve dynasty life.

The vestiges of rivers, rivulets, ponds, and lakes show the characteristics of the town/city-river/ lake of Dai Viet capital.

3. The site area include Chinese ceramics through many dynasties, Islam ceramics from West Asia, Hizen ceramics from Japan, Chinese coins with titles of various dynasties … They are evidence of the economic-cultural relationship and interaction between Dai Viet and the world outside.

The results of the research and the national scientific workshop show the *agreement in high appreciation of historical cultural values of Thang Long Imperial Citadel site, considering it as the "invaluable", "extremely valuable" cultural heritage of the capital and the nation*. The international consultants have considered this area as *the rare and valuable cultural heritage in the world, converging sufficient criteria to be recognized as World Cultural Heritage, therefore, it is necessary to conserve this entire important site area.*

IV. The Conservation of Thang Long Imperial Citadel Site:

As we know, an archaeological site creates a significant form of cultural heritage because it is the door leading to the past, increasing our awareness of the society and the development from the past to modern time.

The excavation at the site has become a valuable and crucial tool for exploration and great appreciation of the history of the Thang Long-Hanoi capital and Vietnamese history. Therefore, the conservation and introduction of these valuable heritage remains to the public in order to increase the respect for the site, to educate and enjoy the site values are considered to be important. The conservation of these heritage resources will usher in a new exciting prospect for national cultural tourist projects and make Hanoi a favourite tourist city. However, the conservation of the heritage rights in the capital centre will make it hard for the urban development, although there is also potential for the development of new investment trends.

In the First Chapter, General Principles, Item 2 of the Chinese charter ICOMOS in 2002 obviously states that: "The conservation objective is to keep all factors of the entire heritage area intact and to protect it for the future to have historical information of their value. In fact, conservation includes the treatment of the damage caused by the natural process or human behavior and prevention of further value reduction, applying both technical and management approaches. All the conservation methods must obey the principles that any changes to the historical situation are not allowed".

For the Thang Long Imperial Citadel area, the selection of a conservation method which is efficient, feasible and able to bring into full play all of the values is extremely important, because it is a type of archaeological site with multi-cultural layers, numerous vestiges from many historical periods overlapping each other.

When the conservation of this important site is raised, we have to deal with very adverse challenges as followed:

- First, due to the typical feature of an archaeological site, the architectural vestiges of Thang Long Citadel all lie from the depth of 1m to 4m, on a very large area, in the vigorous environmental conditions, which easily deform and destroy the vestiges, artifacts such as heat, high humidity, excessive rain, moss and mould, water horizontal penetration, and underground water …
- Second, at present Vietnam has no experience in the conservation of archaeological sites, which causes a lot of difficulties and embarrassment when discussing conservation of the site area.

However, we also conceive that, if there is good coordination with various scientific disciplines and functional institutions and the advantages of international consultation and support is used, we will be able to overcome those difficulties and challenges and at the same time it will be a good chance to improve the conservation branch of the archaeological institute in Vietnam in the future.

On the basics of the awareness of the site values and consideration of all such difficulties, we have proposed the following conservation methods to the Government.

1. Long-term conservation of Thang Long Imperial Citadel for both conservation of the original site situation and the combination of the restoration of parts of the site.

1.1. For a cultural historical project such as at the Thang Long Imperial Citadel site, there are often 3 general solutions to the conservation that are closely connected with the establishment of historical, cultural and tourist parks for all generations to enjoy, they are:

- Reconstruction of the entire site.

- Reconstruction of parts of the site.
- Conservation of the original status of the site.

From the study of overseas experiences, especially from Japan, we have chosen the project: conservation of the original status in combination of reconstruction of parts of the site. The orientations to implement the project as follows:

On the basis of the exposed vestiges, we will study and select the locations with important typical vestiges for each historical period to conserve the original status in combination with a display house for the artifacts and study how to visualize them with the samples, models, and modern illustration facilities.

The locations with the vestiges chosen to in order to conserve the original will be constructed in an on-site museum. During the conservation process, these locations will continue to be excavated, studied and evaluated with a view towards clarifying functions and scientific bases to reconstruct later when possible.

The conservation is mainly carried out with the Anastylosis method-meaning reassembly of the remains but separately broken items and implemented with 4 following principles of archaeological restoration:

- Absolute appreciation of the historical values of the site.
- Safely maintain the original factors of the site.
- Focus on consolidation to relocate the site.
- Not to overlook late factors, and to not reconstruct the complete form.

The present architectural vestiges at the Thang Long Citadel at 18 Hoang Dieu are all remains, and do not have enough data to envisage the original form as well as to accurately reconstruct the architectural work. In such conditions, some typical remains will be selected to set up an assumed model based on the archaeological and historical evidence of Vietnamese architecture-construction. This model, on the one hand, will help visitors to envisage the scale, fabric and decorative style of the architecture of the Thang Long Imperial palaces through various periods; on the other hand, it will be an experimental image to exploit the opinions from the public and scientists to set up a base for the restoration, reconstruction of those remains in the future when there is enough necessary data.

1.2. The rest that are not selected will be covered with sand according to conservation principles to preserve them until it is possible to study, conserve and bring int play. Before being covered with sand, this area will continued to be excavated, studied thoroughly, the data will be systematized and the scientific profile will be completed. On the top of this area, grass and plants will be grown, models will be erected to illustrate the original status of the remains for visitors to envisage the architectures lying underneath.

The above-mentioned conservation methods are long- term and need a lot of time to study and to be put into practice step by step on the detailed plan.

2. Our first and foremost task is to apply an urgent conservation method to the exposed vestiges and artifacts to prevent damage from nature and further degradation of the site, by erecting roofing and building a water drainage system to protect the site. This work will satisfy two basic demands:

- The first is to protect the entire exposed vestiges away from the natural environment:
- The second is to protect the original status of the site for further excavation and study and at the same time select the best conservation methods for each individual vestige.

Together with the above proposals, we also propose to the Government:

- To establish a Centre for Research and Conservation of the Thang Long Imperial Citadel. This centre will be responsible for both organizing studies and carrying out conservation of the site area, at the same time it will be a head office for international relations, primarily for UNESCO.
- Set up a plan to turn the Thang Long Imperial Citadel and ancient Hanoi Citadel into a Park of History-Culture of Thang Long and Hanoi.
- Push forward the study and evaluation of the site values with a step by step preparation of the scientific profile to propose to UNESCO to recognize the Park of the History and Culture of the Thang Long-Hanoi as part of the World Cultural Heritage.

Apart from Government investment, we wish to establish Funds for conservation and to bring into fully play the cultural heritage of the Thang Long Imperial Citadel to welcome grants from various international sources and from domestic donators.

First and foremost, preparations will be made for the Thang Long-Hanoi millemium from now until 2010. The basis of these preparations will take the form of the conservation project for the exposed site. We will set up a plan to both conserve, display on site, and to set up a space to introduce and display artifacts and archaeological data with a view towards highlighting the historical, cultural and architectural values in the Forbidden Thang Long Imperial Citadel from the various historical periods. We will also reconstruct samples and models with relevant data to illustrate the original status of the site. Simultaneously, during the study and conservation process, we will organize visits for the public and tourists without any disturbance to the conservation work or causing further harm to the site.

V. Conclusion:

Thang Long Imperial Citadel plays an especially important role in the research into the history and culture of the Thang Long-Hanoi capital and the Vietnamese nation. Therefore, this site is extremely necessary for development as an on-site museum, that can display some of the artifacts and various exposed remains to be conserved for the future. This important place vividly reflects the history of the Thang Long-Hanoi capital, a deserving symbol for the development of an understanding of the history of the Vietnamese nation.

However, the conservation work at the Thang Long Imperial Citadel site is facing many challenges and difficulties, especially in the current situation in Vietnam when there is a lack of experience in the conservation of archaeological sites. Therefore, we are looking forward to future coordination and support from international experts in this field.

Lecture Papers

1. Report on the lectures

   Dr. Valerie MAGAR
   Dr. Gamini WIJESURIYA

2. An Introduction to the Conservation Science of Inorganic Archaeological Objects

   Dr. KOEZUKA Takayasu

   Dr. FURIHATA Junko

3. The History, Maintenance, and Restoration of Heijo Palace from Past to Present

   Mr. TAKASE Yoichi

Training course on preservation and restoration of cultural heritage in the Asia-Pacific region 2004.
Archaeological research methodology and analytical methods for ancient remains

27 October – 26 November, 2004 Nara, Japan

Report on the lectures presented by:

Valerie MAGAR and Gamini WIJESURIYA
ICCROM

Introduction

During the *Training course on preservation and restoration of cultural heritage in the Asia-Pacific region 2004. Archaeological research methodology and analytical methods for ancient remains* held in Nara from 27 October to 26 November 2004, ICCROM staff members gave two series of presentations, at the beginning and the end of the course.

The lectures at the beginning of the course, presented by Valerie Magar, had the aim of focusing the attention on the conservation and management of archaeological heritage at an international level, and to encourage discussion from the participants. Two lectures were prepared for this purpose, one dealing with the international guidelines existing for conservation, and with a special emphasis on those related to archaeological heritage, and the other one dealing with some of the management and conservation methodologies currently applied for archaeological heritage.

In this initial part of the course, presentations made by each of the course participants were also planned, to illustrate the situation of the archaeological conservation and research in their home countries.

At the end of the course, Gamini Wijesuriya prepared two more lectures, with the aim of drawing the attention of the participants to the current status of heritage conservation, and the need for continuous improvements to the preservation systems in individual countries.

1. Lecture: Archaeological heritage conservation – International guidelines

For the first lecture, it seemed important to start with a brief explanation of the different organisations dealing with the conservation of cultural heritage at an international level. Their roles and activities are often confusing, and this aimed at clarifying their possibilities of action in different parts of the world.

In this sense, mainly the following organisations were mentioned and described:

- IGO (Intergovernmental organisations = State Members)
    - UNESCO
    - ICCROM (112 Members States in November 2004)

- NGO (Non governmental organisations – Individual Members)
    - ICOM = ca. 17,000 members
    - ICOMOS = ca. 7,000 members
- Private organisations, among others…
    - GCI
    - WMF

It also seemed important to go through a quick review of the definitions of heritage, and particularly emphasising the importance of considering cultural heritage – both with its tangible and intangible dimensions- with a larger view, encompassing also the environment in which heritage is located, whether we are speaking of objects, archaeological heritage, monuments, vernacular heritage, historical centres, cultural landscapes, natural sites, or intangible heritage, to name only a few of the existing categories.

The next part of the lecture used questions directed to the participants, for them to define the different reasons why heritage should be preserved in the present and for the future. The aim of this discussion was to define the different possible values that can be attached to heritage, and the different possible approaches to its conservation according to the perception and valuation of the concerned group. It was also important to understand that the same motivations that back conservation measures can also lead to the destruction of cultural heritage, in particular circumstances:

- Political interests
- Economic interests
- Religious beliefs
- Strong interest for the past
- Educative purposes

Some time was therefore given within the talk to speak about the different possible values that may be defined for heritage, and some of the different existing documents proposing categories. Some of these include:

- Social and spiritual value
- Historic value
- Aesthetic value
- Scientific value
- Economic value
- Other associated values

What we save from the past depends largely on how we define this heritage, and what is considered a valuable and authentic heritage resource. We convey selected archaeological objects or sites because they convey specific values for us. These values however may be different for a variety of groups, including archaeologists, conservation professionals, national and local communities, and other groups, and there will most probably be an equal number of different approaches to the past. It is also fundamental to keep in mind that values may change over time, hence their relative character.

It was important to emphasize the changes that have occurred in dealing with cultural heritage, and the shift that has existed from focusing only in the material aspects of the remains of the past, to focusing on the perception and values attributed to this heritage, and hence the dynamic process that now characterises conservation the discipline, involving an active participation of the public, and the need for a clear understanding of the associated traditions and meanings involved in the creation and current use of the heritage.

The final part of this presentation dealt with a review of the international documents that provide guidelines for the conservation of heritage, with a special emphasis on those dealing with archaeological heritage. The main idea was to explain which documents exist, as well as providing a brief explanation of the wider context in which these documents were created, and also showing the evolution of the discipline.

Before presenting the documents, it seemed important to clarify the different types of documents available, i.e. charters, declarations, recommendations, conventions, and their meanings.

In this sense, the following definitions were retained:

- **Declaration**
  The declarations imply a moral or political commitment, linking the States on the basis of good faith.
- **Recommendation**
  The recommendations are invitations to one or more States to follow certain actions of conduct.
- **Convention**
  The conventions are international treaties, that need to be ratified by the government of each country; there is therefore a legal commitment involved.

The presentation started with a brief account of the global situation in the 1930s and the context of the appearance of the Athens Charter. Some of its contents were highlighted and briefly discussed. The same method was used to present the next documents, always trying to show changing situations that encouraged or promoted their appearance. The following is a synthesis of what was presented:

- 1931 – Athens Charter
    - Conserving the original and authentic artefact or monument, rather than rebuilding.
    - Accurate documentation
    - Backfilling for materials impossible to preserve
    - International collaboration between professionals.
    - Mostly European participants at the meeting.

- After World War II – There was an attempt to provide more efficient international organisations by means of which possible misunderstanding between nations could be settled without armed conflict.
- Period of promotion of educational, scientific and cultural cooperation.
- 1945 – Changes from
    - League of Nations to United Nations Organisation (ONU)
    - International Committee of Intellectual Cooperation to UNESCO
    - International Museums Office to ICOM (1946)
- 1954 – UNESCO **Convention** on the Protection of Cultural Property in the Event of Armed Conflict with Regulations for the Execution of the Convention (Hague Convention).
    - Second Protocol (2003).
    - Use of the Emblem of the Blue Shield.
- 1956 – UNESCO Recommendation on International Principles applicable to archaeological excavations.
- 1959 – Creation of ICCROM, based in Rome.
- 1964 – Venice Charter (then adopted by ICOMOS)
    - Avoiding reconstruction, except for anastylosis.
    - Modern techniques, distinguishable from the original materials.
    - Previous separation between 'dead' and 'living' monuments no longer considered relevant.
    - Need to respect historical integrity.
- 1964 – UNESCO Recommendation on the Means of Prohibiting and Preventing the Illicit Export, Import and Transfer of Ownership of Cultural Property.
- 1965 – Creation of ICOMOS
- 1970 – UNESCO **Convention** on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property
- 1972 – UNESCO Recommendation concerning the Protection, at National Level, of the Cultural and Natural Heritage.
- 1972 - UNESCO **Convention** concerning the Protection of World Cultural and Natural Heritage
    - World Heritage Centre
    - World Heritage Committee
    - Outstanding Universal Value

- 1979 – Australia ICOMOS – Burra Charter
    - o Australian adaptation to the Venice Charter
    - o Methodology and sequence for the management and conservation of places of cultural significance.
    - o Logical step-by-step process, but no magical recipe.
    - o Traditional use of places – stakeholders
- 1984 – ICOM Code of Ethics
- 1988 – New Zealand Professional Conservators – Group Code of Ethics
- 1990 – ICOMOS Charter for the protection and management of archaeological heritage
    - o Legislation, planning, research, conservation and site management and conservation.
    - o Critical role of the archaeologist in the conservation process.
- 1992 – European Convention on the protection of archaeological heritage
- 1994 – Nara Document on Authenticity.
    - o Recognition of cultural diversity and plurality of values.
    - o Sense of authenticity resting on values and meanings attributed to places by society through time.
- 2000 – China Principles (2002 translated into English)
- 2001 – Proposal of a UNESCO **Convention** on the protection of the Underwater Cultural Heritage.
- 2003 - Proposal of a UNESCO **Convention** for the Safeguarding of the Intangible Cultural Heritage.

The explanation of the different international documents in a commented manner and shown in this chronological sequence seemed interesting to the participants, who also found it clearer to understand some of the treatments carried out in specific moments in the past in their home countries. An interesting discussion followed on how to use some of these documents; most of the participants were archaeologists, with little training in conservation. Some were looking for clear answers for specific problems in these international documents, but the discussion that followed helped to show that conservation's theoretical and methodological approaches basically compose a critical approach, which needs to be transdisciplinary based on the humanities and on the social and physical sciences, and for which there is no simple recipe.

A short end discussion also dealt with the need to adapt the international guidelines to national levels.

2. Lecture: Conservation and management of archaeological heritage

The second lecture initially focused on describing and discussing the aims of conservation, with particular emphasis on the maintenance of the values of a site, without freezing it, and allowing changes and current uses. The discussion was centred on the importance of finding a balance for each site.

Based on the lecture from the previous day, and the evolution of theoretical aspects of conservation, we discussed how in many places, the attention has shifted preferably to a values-based approach to heritage, first asking why and for whom we are preserving it, and at last how to preserve it. Emphasis was placed on showing how this is a dynamic and complex process, requiring a critical judgment for each case.

This critical judgment implies weighting all the available knowledge that lead to a decision, including:

- ethical issues
- all the aims of conservation
- the extent of treatments
- the time and funding available
- the positions of stakeholders

One of the common problems found when dealing with the management of archaeological sites is the tendency to leap in search of solutions before understanding the site as a complex, before having a clear diagnosis which permits to plan accordingly. The management policy cannot be obtained by applying a recipe; it requires the complete attention of a skilled manager and the commitment of the authorities responsible for the site, as well as the cooperation and understanding of local communities.

Another common problem is found when the values and problems of a site are assumed to be well known and understood. Several examples have shown the importance of actually having a clear discussion of these subjects at the beginning of a management process, and precisely understanding the many positions that are likely to appear.

The lecture then proceeded to analyse one of the management models (based on the Burra Charter), and provided an explanation step-by-step of all the method it proposes: documentation, involvement of stakeholders, assessing the significance, assessing the condition, assessing the management environment, defining management policy, choosing the management strategies and how to put them into practice, monitoring, review of plan. For each of these steps, examples were used to illustrate the possible difficulties that can be encountered in the way of the management process, and some possible means to avoid those problems.

The last part of the lecture focused on the conservation methodology, as a part of the management process. Again, it focused on the main steps it involves, including planning and documentation, prospection, excavation, and the conservation measures to be considered when maintaining finds in situ, or when retrieving movable objects. For the latter, emphasis was placed on issues such as environmental control, retrieval methods of movable finds, lifting, packing and transport. For the stabilisation in situ, different protective measures were discussed, including the protection between campaigns, long-time conservation measures, including the use of shelters or the decision to rebury finds, maintenance, monitoring, and the presentation to the public. Finally an interesting discussion closed the session on the theme of publication and dissemination of the information for the benefit of other professionals, and a wider public as well.

3. Presentations by the participants

The presentations made by the participants on the situation of archaeological conservation and research in their home countries is extremely important, as it allows the course organisers as well as the participants to have a better understanding of the possibilities and needs in each of the countries involved. This also provides an excellent opportunity for the course coordinators to link some of the issues and concerns expressed by the participants with the contents of the course sessions.

The course coordinators distributed the written version of the participants' presentations at the beginning of the course, and this format should allow for a very short presentation, and more time for discussion.

However, it might be interesting to consider sending the participants a template of the type of information that should be emphasized in the presentations. While a more free choice of the presentation gives a better insight into the ways of thinking and proceeding of the different participants, a more structured framework would enable both the participants and the coordinators and lecturers to make easier comparisons on the issues and concerns expressed for each country.

Overall, the presentations were extremely informative, and gave way to good comments and interactions between the participants.

The main issues and concerns expressed during the presentations include the following themes:

- The importance of establishing priorities (zoning within the sites according to the needs)
- The need to define different levels of protection, in accordance with the priorities.
- The need for more training in their countries, both for professionals and craftsmen.
- The importance of publications, for different publics.
- The need for good survey and documentation.
    - Systematic survey files
    - Inventory
    - Access to inventories
- The importance of testing conservation materials before applying them.
- When establishing collaborations with foreign countries for archaeological research:
    - Deciding together which sites require more research
    - Deciding together the scope of the research
    - Defining the conservation of the site

    - Ensuring the publication of the results in the host country
- The importance of increasing the awareness on the importance of archaeology.
- The sometimes limited advantage of using modern scientific methods due to:
    - The lack of trained professionals to interpret the data.
    - The cost of maintaining the equipment.
- Presentation and interpretation of the sites to the public
    - At the sites.
    - Including information in brochures, schoolbooks…

4. Lecture: Preserving our heritage- Changing views and our tasks and Responses

Materials remains of the past for the retrieval and study of which we learnt many advanced techniques and invest considerable effort falls into the category of heritage as illustrated by Valerie Magar in her presentation. It is no more a myth that heritage influences people's lives in many ways. This makes caring (preservation, conservation etc) for our heritage important and in the process, the archaeological community too has a major role to play. The preservation of materials remains (and their associated values and communities) however, is far more complex and extends beyond the scientific vigour that we learnt throughout the current course. While, science should continue to play its role in better understanding the heritage and its relevance to the society, countries should evolve their own processes for preservation to suit their own historical, socio-cultural and political conditions. This is already happening and indeed at an unprecedented rate.

For the archaeologists, those material remains recovered with grate efforts helped to reconstruct past societies and the cultural processes until recently and to many even now. Their efforts went into retrieving the remains, studying and interpreting them with great scientific vigour. At the same time conservation professionals started to record, study and interpret more visible remains of the past, monuments and sites. Those interpretations though were in the form of more readable monuments or sites compared to the written texts by the archaeologists. These groups had their own views on the definition of heritage and the approaches to their interpretation and preservation.

These definitions and approaches to heritage are being challenged and changed drastically over the last three decades. At the same time, threats to heritage are being increased, while potentials of heritage are also being discussed. As a consequence, approaches to their preservation are also being changed. The intention of this presentation was to discuss some of the changes occurring in the field of heritage preservation and to propose a process to absorb (where necessary) such changes into the existing heritage protection systems of different countries. This is seen as a continuous improvement process for which archaeologists as a professional group can play a role.

4.1. Changing Views

We can discuss the current changes under the following headings:

- *The Meaning of cultural heritage has expanded*
- *The views and approaches to heritage preservation have changed*
- *The threats to heritage are being increased*
- *The potentials are being expanded*
- *The approaches to management of heritage are being changed*

4.1.1 An expanded meaning of the cultural heritage

The remains of the past always had meanings to the traditional societies. The majority of what we currently designate as heritage survives due to the interests of these societies who created them for different purposes and endeavour to care for them, and prevent them from being, destroyed by man-made or natural causes. They were manifestations of spiritual social conditions and technological advancements of given periods. However, with the advent of the industrialization and the spread of the western civilization all over the world, those traditional attitudes and perceptions towards the past were either ignored or not acknowledged sufficiently. Instead, modern notions of archaeology and conservation began to dominate and determined the fate of the heritage. However, those views have served the purpose of the time and as can be expected, changes are occurring.

The following are some of the existing changes:

- Historical and social role - The political context of archaeology is being recognized and as a result archaeological studies are being oriented to be more relevant to wider community.
- Indigenous heritage/ sacred sites are being paid attention.
- Archaeological Heritage Management.
- Monuments and sites vs. landscapes.
- Meaning of the cultural heritage to the humanity-World Heritage.
- Cultural diversity is being acknowledged.
- Heritage as social ensemble of many different complex interdependent manifestations reflecting the culture of human community.
- Living heritage.
- Interdependence of Culture-Nature being recognised.
- Priest’s Prince’s and Politician’s heritage (PPP) Vs people’s heritage.
- Intangible values are attached to heritage.

4.2 Views and approaches to heritage preservation have changed

With the changing views and meanings towards heritage, the approaches to their preservation are also changing. Like the meaning of heritage to the society, traditional societies had their own principles and process for caring their own heritage. They were also overshadowed by the modern western concepts of conservation.

The traditions in the East, for instance, were very strong in conservation ideologies. The following is a quotation from an early treatise on architecture:

> Those temples whose characteristics are still (are to be restored) with their own materials. …..the sage wishing to restore them, (must proceed in such a way) they regain their integrity and that they are pleasantly arranged (a new); this (is to be done) with the dimensions - height and width - which were theirs and with decoration consisting of corner, elongated and other areas, without anything being added (to what was originally existed) and always in conformity with the initial appearance (of the building) and with the advice of the knowledgeable. (*Mayamatha of the 6th century AD*)

Conservation, preservation restoration and so on are being used in different contexts by different regions but with the goals being the protection of heritage. The time has come to localise the views and definitions of heritage as well as the approaches to conservation, while also recognising the interests of the international community.

The following are some of the changes occurring:

- Value/significance based conservation
- Diversity of cultures, and heritage
- Cultural context of Authenticity
- Care for heritage values and the cultural meaning/identity
- Balancing user needs and conservation
- Interpretation and presentation
- Conserving culture, promoting diversity
- Cultural diversity within biodiversity
- Enjoyment and use of the people
- Maintenance-Monitoring
- Outstanding Universal Values

4.3 Threats to heritage are being increased

In the context of heritage preservation, it is necessary for us to be aware of the threats to heritage. Threats comes form two fundamental sources namely by nature and human beings. Vulnerability to sudden changes due to natural causes such as earthquakes and the deliberate destruction by man for reasons such as economic pressures, ethnic, religious, and political conflicts have become common realities.

<u>Threats to heritage:</u>

- **Natural**
    - Earthquakes
    - Fire
    - Etc.
- **By man**
    - Economic pressure (through new developments / illegal destruction of heritage for trading).
    - Destruction due to ethnic, religious and political conflicts.

4.4. Potentials are being expanded

On the other hand, it is also clear that the potentials of heritage (in addition to issues such as identities and religious and customary uses) are being discussed. Some of these may yet to prove their validity but there are already in domains of heritage preservation.

<u>Potentials:</u>

- Benefits to the society through tourism activities
- Heritage conservation as a means of poverty alleviation
- Development of areas linking heritage places
- Self generated funding form heritage sites

4.5. The potentials are being expanded

Heritage is being considered as resources and the management of them is now being discussed in much broader perspectives.

<u>Heritage management:</u>

- Traditional systems
- Public sector only approaches to heritage management
- Conventional to more systematic management planning
- Public involvement in heritage conservation
- Public and Private partnerships for conservation
- Team work (professionals as well as others)

5. Our Tasks and responses

Under these changing circumstances, it is important that the professionals engaged in preservation consider continuous improvements to systems in their own countries. Improvements does not mean that every changes that are taking place in the world be incorporated or absorbed into to national systems. It does mean however, careful examination of the changes, engaged in a wider debate within the social, cultural and institutional fretworks of individual countries and where necessary to make changes. We may think of four stages in the process of continuous improvements.

Continuous improvements:

- Revisit
- Research
- React (Resources, Realistic)
- Results

- **Revisit**
    - *Principles*
    - *Processes/Procedures*
    - *Practices*

Principles guiding the meaning of heritage and their conservation are the most important to begin with. We need to examine whether the current or changing principles capture all the aspirations and socio-cultural patterns of the individual countries. Followed by these are the processes/procedures governing the conservation work. A plethora of literature is being produced in the world in the form of charters, declarations, recommendation and other forms. One needs to re-examine whether they are relevant and practical within the social, legislative and institutional frameworks and also whether they are acceptable to the community. Wider consultations and debates need to take place at this stage.

- *Principles*
    - Capture new definitions: reflect all aspects of history and culture
    - Conservation principles:
        - International/Local Charters/Sops/guidelines
        - Interpretation

The other areas that need continuous revisits are the processes to be followed in identification, conservation and overall management of heritage resources.

- *Processes/Procedures*
    - Value/significance driven conservation management processes
    - Integrated approach (Planning/visitor/tourism/infrastructure…)
    - Participatory approach (public as customers)
    - Top down vs. bottom up
    - Peer review

The third areas to revisit are the Practices, which includes legislative and institutional frameworks. These are areas difficult to changed easily and require lengthy processes. Nevertheless, it is important to engage in revisiting them

- *Practices*
    - Legislations
    - Institutions (need changes?)/Staff
    - Updating inventory
    - Professional ethics, standards and education
    - Site management
      – Traditional systems (can be used?)
      – New institutions/staff
      – Risk preparedness
      – Monitoring and reporting
    - *Funding*
    - *Working with international community*

- **Research**
    - *Identify knowledge gaps*
      - Learn more
      - Further research if necessary

At the completion of the above mentioned revisits, you may find gaps, which require further studies before making attempts to do changes. You may need to learn more through formal channels and at the same time may need to engage in further research.

- **React (Resources, Realistic)**
    - *Personal*
    - *Professional*
    - *Public (Local, National)*

Once you are convinced that changes / improvements to any of the above mentioned points are required and justified through further research and studies, it is time to react. At this stage, it is important to recognise that such changes are realistic within your own context and have sufficient resources to implement changes. Reaction can be effective through three mediums.

- *Personal*
    - Use your office (government/university)

At personal level, one can use one's position in the public institutions, university of other institutions to make the required changes. Individuals <u>can</u> make a difference.

- *Professional*
    - Use the organisations
    - Use international professional organisations
      – ICOMOS, WAC, WMF

The second level of reaction should be through the professional levels and through the professional organisations, which are working at national levels as well as their counterparts or mother bodies at international levels.

- *Public (Local, National)*
    - Organise local groups
    - News papers/articles by academics

Other levels of activities are through public.

- **Results**
    - Improved principles, processes and practices
      – Programme
      – Propagate
      – Promote

Through these three means, one should be able to make the necessary changes. The most important part is the implementation or the use of results at all levels.

This should be a continuous process.

An Introduction to the Conservation Science of Inorganic Archaeological Objects

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1. Introduction

Conservation science is inherently linked with the study of all cultural material as well as the social sciences, such as archaeology, art history, the history of handicrafts, architectural history, and ethnology. From the viewpoint of material science, conservation science makes it possible to provide important information about both art and architectural materials and the social sciences. In addition, conservation science is intrinsically associated with almost all fields of natural science, and is growing as an independent discipline with a strong research focus.

Generally, we can classify cultural properties into three categories. The first is organic objects such as animal and/or plant tissues. The second is inorganic objects made of metals, silicecous, and related materials. The last includes compound objects that form a single unit, such as items constructed of both metal and wood. Indeed, most cultural properties are made from a number of materials, rather than a single material.

Archaeological objects are often unearthed in relatively good condition despite being buried in various sediments for long periods. This is sometimes due to stable subsurface conditions. However even when some objects are recovered exhibiting good preservation, some deterioration can rapidly occur. Removal from its original buried location after excavation alters the environment of buried remains and triggers deterioration of excavated objects. This sometimes results in total destruction or metamorphosis from its originally excavated state; this problem occurs particularly with wooden and iron artifacts.

Material culture reveals considerable information about the past. All materials, including archaeological materials, have a certain life span, and are faced with the process of deterioration. Further, many are of great artistic value. Therefore, it is important to extend the life of these materials and preserve them as long as possible without compromising the information and the value they possess.

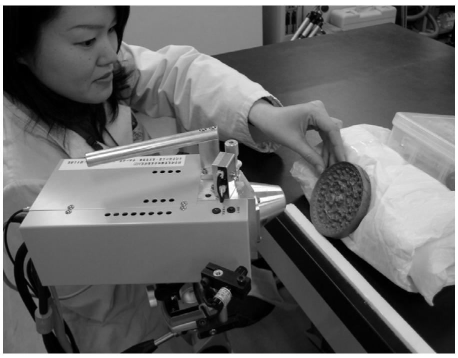


Fig. 1: X-ray fluorescent spectrometer.

This report outlines the nature of excavated materials and the application of conservation science that is described here as: the system of techniques intended to preserve cultural properties and materials for future generations.

2. Research Methods for Inorganic Objects

In conservation science, research into the methods of conservation are preferable to examining artifacts directly without sample collection as these procedures may cause damage or destruction.

2-1: Research Methods for Cultural Materials

Non-destructive methods used for research materials are generally performed by using techniques and equipment such as X-ray fluorescence analysis, PIXE analysis, and radioactive analysis. X-ray fluorescence analysis is the most widely used for conservation investigation (Fig.1). The elements in the specimen are identified from their place in the X-ray spectrum or energy and a quantitative analysis is made by measuring the intensity of the X-rays. The equipment used for this research usually includes modifications to the standard system to compensate for size and shape. However, radio-activation analysis and X-ray microanalysis are also often used. These are necessary to carry out qualitative and quantitative analyses on small samples.

In the event that sample collecting is permitted, atomic absorption spectroscopic analysis and plasma luminescent spectroscopic analysis are widely used in cultural properties research. The X-ray diffraction method is also used to identify crystal structures that identify mineral composition, deposits on stone statues, corrosion and pigments (Fig.2). It is difficult to carry out non-destructive measurements using any of the above methods, however only a small sample is required for this technique, thus, minimizing extensive damage to the item.

2-2: Investigation into the Inner Structure

In order to study and preserve archaeological objects, it is necessary to understand the exact internal composition (what is “inside” the object) as well as to examine their exterior. This process is indispensable for investigating ancient or historic manufacturing techniques for various objects (i.e. tools). However, it also helps to obtain information required to clean and restore the object. In the field of conservation science, X-ray radiography has become a popular method for investigating the internal composition of objects. Recently, computer image processing has also begun to be employed. In addition, X-ray computerized

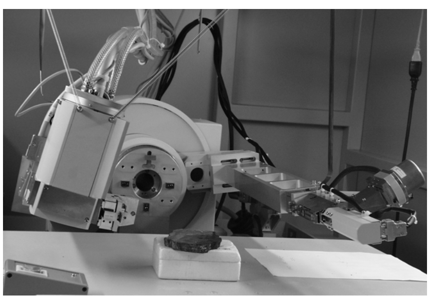


Fig. 2: Non-destructive X-ray diffraction system.

tomography (CT) allows a comprehensive three-dimensional examination of the interior of cultural objects. Therefore, it has now become possible to extract highly detailed information from historic and modern artifacts, and other items. Neutron radiography has also been put to practical use in the development of a method for obtaining alternate types of information from that of X-ray radiography.

Fig.3: X-ray radiography

2-3: The Influence of Environment

It is necessary to maintain the taphonomic integrity of buried objects as examining the excavation environment and its associated sediments will be instructive regarding the causes of deterioration and weathering. The results of these examinations will provide important information during the investigation of the materials. In addition, it will also be used to determine optimal conditions (temperature, humidity, and lighting) for exhibiting cultural property and for designing appropriate curation and storage facilities.

In the present era of global atmospheric pollution, metallic and stone cultural properties displayed outdoors are often damaged by acid rain or automobile exhaust fumes. Furthermore, techniques for preventing mould and insect damage are also important for creating a stable environment for storage and display.

2-4: Restoration

Traditional techniques for preserving and restoring cultural properties have always been recognized as important. However, selection of the correct materials, and application of the most advanced technology are also imperative for proper conservation. We have emphasized that traditional materials and techniques are important for preserving or restoring works of art, handicrafts, and buildings. For example, when one repairs *Urushi* (lacquer ware) objects, one should use the same type of *Urushi* that was used on the original piece. An additional example can be seen in the restoration of historic Japanese buildings which are usually repaired and preserved by *miyadaiku* (carpenters who specialize in building shrines and temples), who have learned traditional techniques for generations.

However it is not clear how most historic buildings and artifacts were manufactured, thus, it follows that there are no known traditional restoration techniques for unknown technological processes. Since the objects have already been altered due to physical and chemical processes related to their antiquity, it is necessary to use available restoration techniques that take advantage of scientific principles.

3. Conservation Science of Inorganic Objects (Metals)

The general category of inorganic objects embraces several types of raw material: earthenware, pottery, roof tiles, stone artifacts, glass, and metallic artifacts to list a few. Ancient metallic artifacts can be made of many materials. Some are made of a single metal, such as iron, gold, copper, silver, tin or lead. Some are made of bronze (copper alloy). There are also composite objects made of several metals, like plated copper onto an iron base. Metallic artifacts create a significant problem due to corrosion, especially if they have been buried. They are also difficult to protect against oxidation while in storage.

Corrosion is caused by the interaction of oxygen, water and various ions. Chloride ions play a major role in the advance of corrosion (Fig.4, 5). Excavated metallic objects are usually scientifically examined in order to determine their inner structure, and to aid in the application of preservation treatment before display or store. Since the shape and surface of objects are very important, any modification, for the sake of research, should be prohibited. In general the conservation of historic objects is performed by using various methods such as non-destructive analysis and/or microanalysis. The study of metallic objects usually sheds light on traditional manufacturing techniques used for producing them, in addition to assessing the extent to which they have corroded. X-ray radiography has long been used for these purposes. The first use of this method in Japan was in 1935, to investigate a pillow made of glass beads that was excavated from the *Inariyama*-tumulus in *Osaka* prefecture. In 1978, X-ray radiography was used with great success on an excavated sword from the *Inariyama*-tumulus in *Saitama* prefecture. Results allowed the decipherment of a 115-character inscription written in gold inlay on the sword. Since that time, the use of X-ray radiography has spread rapidly in the conservation of excavated objects, and presently X-ray CT used as a viable analytical technique. This has made it possible to observe objects in more detail by obtaining sectional images of an arbitrary part or by constructing 3-D images.

In addition, the development of new analytical equipment and advances in computer technology have allowed greater rigour regarding investigatory methods that have been applied to inorganic objects. At present, the most popular method is X-ray fluorescence analysis, which is a non-destructive technique. In this method, primary radiation from the X-ray tube strikes the object which emits a characteristic X-ray spectra of the elements contained within a specimen. According to these characteristics the

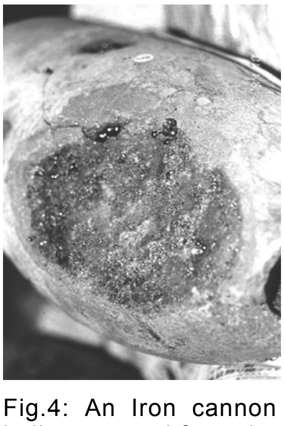


Fig.4: An Iron cannon ball excavated from the sea and dried naturally showing a rapid increase in iron rust.

Fig.5: Bronze disease is formed with the chemical reaction of copper and chloride ion.

X-ray spectra is measured, the elements in the specimen are identified, and the intensity of the X-ray beam then provides a quantitative analysis. The use of the PIXE method for examining objects has also been attempted.

On the other hand, most metallic objects corrode while they are in the ground and their surfaces change greatly, thus it is difficult to measure their original composition. This makes it difficult to interpret the results of non-destructive analyses correctly. Recently new X-ray fluorescence analysis equipment has been developed that can be used to examine micro-areas ($10\mu m\ \phi$). After an extremely small area is polished, the freshly exposed surface can be analyzed to show the original composition allowing study of the objects' material history and the site where the material was produced.

Generally speaking, an excavated metallic object is covered with various types of oxides. In some cases, the oxides will insulate the object from further corrosion, while in other cases some kinds of oxide make the original material more corroded. To inhibit the growth of corrosion after excavation identifying the causes of the corrosion and removing them are required. Commonly there are two causes of metal corrosion, one is both oxygen and water in the environment, the other is due to soluble salts contained in secondary products (such as oxidized materials) adhering to the objects. Analyzing these secondary substances could lead to a better understanding of the object.

A: Iron Objects

Iron objects are usually covered with oxi-iron hydroxide and they have three types: α-, β-, and γ-FeOOH. The β-FeOOH is produced in the presence of chloride ions and causes a particular problem for preservation. This corrosion product was first discovered by Matsuo Nambu, inside an iron meteorite, approximately 30 years ago. After that, it was reported that β-FeOOH is present in excavated iron objects (Fig.6) and invades them through chloride ions (Makoto Shima and Hideo Yabuki, 1979). Prior to preserving objects, we now examine them using X-ray diffraction analysis to assess the extent of oxidation on iron objects. To determine the method of treatment, the presence of chloride ions and anions such as sulfide ions, fluorine ions, and nitrate ions are analyzed quantitatively. Chloride ions are a major cause of corrosion action on objects (especially in Japan, where the relative humidity is so high), and so they should be removed (i.e., the object should be desalinated) to the best extent possible. There are two methods for desalinating iron objects: the dry method and the solution (or washing) method. The alkaline solution method is widely used in Japan and is performed as follows: iron objects soaked in deoxidized water are put

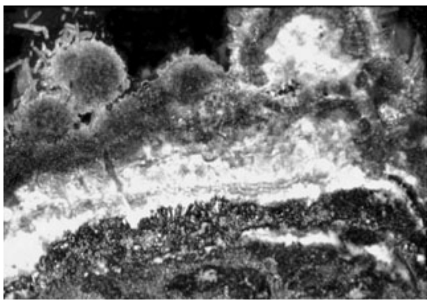


Fig.6: β-FeOOH, "AKAGANEIT" This corrosion product was found inside an historic sword.

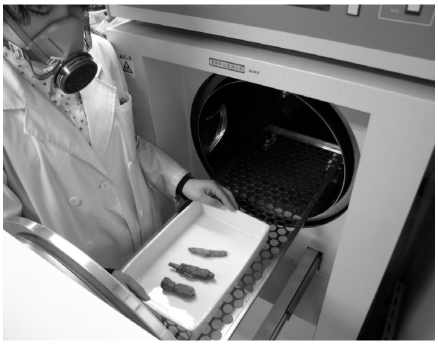
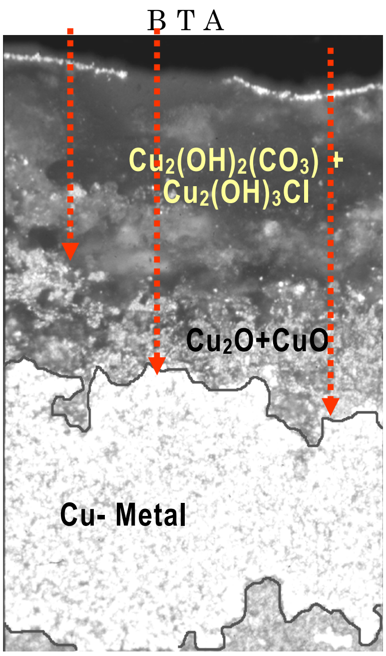


Fig.7: High temperature and high pressure device used to remove chloride from iron objects.

in an autoclave that is a modified medical sterilizer. The temperature is regulated inside the autoclave at 120 degrees centigrade with high pressure as mean of extracting chloride ions and sulfide ions. Iron objects are then impregnated with acrylic resin in order to consolidate and insulate the objects from the air.

B: Copper objects

Copper and bronze objects, as well as irons, corrode and degrade in the presence of chloride ions. For example, bronze mirrors that seemed stable when excavated often corrode within a few years, and end with the degradation of the entire object. This phenomenon is called "bronze disease". Copper chloride is detected in the corrosion that develops on bronze objects. The non-destructive X-ray diffraction analysis employs parallel beams that can be used to obtain diffraction data regarding corrosion without damaging cultural property, and contribute to the early detection of bronze disease. Bronze disease can be interrupted by removing the causative substance, the chloride ions. However, the removal of chloride ions from bronze objects is difficult in most cases, because the color of the object often changes or the object is damaged in other ways. Therefore, bronze objects are usually protected from chloride ion attack by applying a protective film over the fresh metal to prevent corrosive action. This is called the benzotriazole method (Fig.8), a type of chemical protection. It is generally used for treating excavated copper and bronze objects.



$$CuO + BTA \rightarrow Cu^{II}BTA$$

$$Cu_2O + BTA \rightarrow Cu^{I}BTA \rightarrow Cu^{I}BTA + Cu^{II}BTA$$

Fig.8: BTA treatment. BTA makes a stable thin protective film around the inside of the copper-metal as the chemical reacts with copper-metal and copper-oxide. This film protects the metal from chloride. First developed in 1968, this method is now a standard used around the world.

The History, Maintenance, and Restoration of Heijo Palace from Past to Present

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1. The Heijo Palace Site

Heijo, established at the beginning of the 8^{th} century, was the new political and economic capital of Japan modeled after the great historic Chinese capital of Changan. The construction of the new Heijo capital began in A.D. 708, and upon completion in A.D. 710, Japan's new capital was immediately transferred from the previous capital of Fujiwara. Heijo Palace is located at the north-central edge of the Heijo Capital grounds, stretching 1.3km east to west and 1km south to north, and comprising a total area of 120 hectares. Inside the palace, there were several large institutional buildings such as the *Daigokuden* (Imperial Audience Hall) and *Chodoin* (State Hall Compound), that served as locations for political and ritual activities, the *Dairi* (the Emperor's Domicile), as well as other various government institutions. Although the capital centre prospered for almost three quarters of a century, following its abandonment it was rapidly transformed back into rice paddy fields after the next transfer of the capital to Nagaoka in A.D. 784.

Research on Heijo Palace began from a single study based on location surveying by Sadamasa KITAURA at the end of the Edo period in the middle of the 18^{th} century. Following this work, during the Meiji period, Tadasu SEKINO implemented a project employing the exact restoration of various features. The foundation of his work was based on the identification of topographic features, material remains and building foundations, and consultion of available literature (i.e. historic texts). Full-scale investigation of Heijo Palace, which began in 1955, was based on these early studies, with continuous excavation and research since 1959, and continuing up to the present. Excavation and research has been completed for approximately 1/3 of the total area of Heijo Palace, a total of 40 hectares over a period in excess of 40 years. Indeed, the Heijo capital is one of the largest full-scale systematic research sites in the world. A plethora of facts on Heijo Palace have been clarified through excavation and research, for example, the allocation of facilities including buildings and its organizational transition to the *Ritsuryo* legal code and associated designations. However, elucidating the function of the early Japanese government and the investigation of lifestyles, subsistence, trade, and daily activities in this early historic period of Japanese history was, and still is, a primary focus of research.

The following is a discussion of the physical organization and structure of the Capital. Heijo Palace is enclosed with an earthen wall about five meters in height, which was built by tamping down earth. There were twelve gates along the earthen wall. Among them, the main gate at the center in the south is termed *Suzaku* Gate. Passing through *Suzaku* Gate, the *Daigokuden* and the *Chodoin* were built at the centre, while the Eastern *Chodoin* was built in the same manner in the eastern district. *Choshudenin* (the Imperial Assembly Hall) was located south of the Eastern *Chodoin*, and the *Dairi* in the north. Around these primary facilities, there were various kinds of government institutions encompassing many buildings. Government institutes that have been clarified so far include *Dajokan* (the State Council), *Hyobusho*, *Shikibusho*, *Meryo* (the Stable Compound), *Daizenshiki*, and *Mikinotsukasa*.

The *Daigokuden* and *Chodoin* were located in the center of Heijo Palace, and were the primary official facilities used for political and ritual activities as well as banquets. These Halls were built along the same architectural plan as Chinese-style structures with a symmetrical design along the axis line extending south to north, stone foundations, tiled roofs, and vermilion-painted pillars. In contrast, the *Dairi* (the emperor's domicile) and the general government offices consisted of traditional Japanese structures with plain wooden pillars sunk into the ground and covered with a roof of *hinoki* (Japanese cypress) bark.

There were also gardens within the Heijo Palace grounds. Among them, the entire area of the *Toin* (East Palace) Garden located in the southeastern corner of the Palace site was uncovered and demarcated. Centering on a shallow pond with small stones, other buildings were located that served as viewing and reception areas to appreciate the garden. Due to the antiquity of the garden, the state of conservation, its artistic quality and its scale, are highly valued. During its restoration and maintenance, an area of piled stones was found by the pond and subsequently exhibited outside. In addition, small stones were also laid out and surrounding buildings were restored above the ruins.

2. History of Maintenance

(1) Maintenance before World War II

The Foundation for the Conservation of the Heijo Palace Site was established mainly by Kajuro TANADA at the end of the Meiji Era to the beginning of the Taisho Era specifically for public involvement in its maintenance. Tanada and his group organized “the Organization for the Preservation of the *Daigokuden* Hall Site” in 1913, and acquired about 10 hectares of land with monetary donations from landowners from 1915 to 1919. As a result, structural bases at Heijo Palace, such as the Second *Daigokuden* Hall and the *Chodoin*, were allowed to remain as ridges in a paddy field.

Based on the maintenance plan established by this organization, volunteers in Osaka constructed a stone-lined moat around the conserved land and peripheral road of these buildings. This is the first maintenance work carried out at the Heijo Palace Site (1919-1920). The location of the moat was along the circumference of the *Daigokuden*, *Chodoin*, and *Choushudenin*, estimated by Tadasu SEKINO. However, as a result, buried remains of the Heijo Palace Site were destroyed with the construction of this moat. At that time, nobody knew that the ruins of Heijo Palace were buried. It is believed that the moat was constructed with the intent to mark off the site boundaries, the inside and outside of the site clearly, conserve the inside, and find the sanctuary.

In 1922, Heijo Palace was declared an historical site under the law for the conservation of historic sites, scenic beauty, and protected species, enacted in 1919. Accordingly, the Organization for the Preservation of the *Daigokuden* Hall considered that their mission was accomplished and subsequently disbanded after donating about 10 hectares that they owned to the nation. This land was then entrusted for the conservation of Heijo Palace to the nation. At that time, the Interior Ministry had jurisdiction over historic sites. In addition to the land taken over, the Interior Ministry purchased about 2 hectares including the *Dairi* district north of the Second *Daigokuden* and the land at the south of the *Choshudenin*. At that time, the range of designated historical sites covered approximately 47 hectares centering on the area that is presently called the First *Chodoin* and the Second *Chodoin.*

After designation as a historic site, Nara Prefecture implemented the maintenance of Heijo Palace with subsidies from the Interior Ministry. Contents of that maintenance project are as follows:

1. Large stone monuments with the inscriptions “Historic Heijo Palace Site” and “*Daigokuden* Site”, were built in front of the *Choshudenin* and *Daigokuden* respectively. The former is 63 cm square and 4.6 m high on the stone base, and the latter is 51 cm square and 3.6 m high on the stone base. Both are made of granite.

2. The boundary stones were laid on the ground at the four corners and some points along the four sides of the palace boundaries. In addition, ginkgo trees were planted in groups every 200 m along the boundary of the site. Fourteen areas on which to plant the ginkgo trees were were purchased for this purpose.

3. The road, which is 2.7 - 5.4 m in width, leading to the site of the *Daigokuden* and the *Chodoin* from North Ichijo Street was newly constructed. Rice fields inside this road were removed, flattened, and a lawn was planted. Gutters were laid on the both sides of the road to drain water out to the peripheral stone moat. At the point where the road and the moat cross, a concrete bridge was built. In addition, at the entrance to the eastside of the *Dairi* and the southern gate of the *Choshudenin*, stone pillars were laid down as a barrier for cars to restrict traffic into the site.

4. In order to conserve the shape of the bases of each existing Hall site, stone pillars, curved “marker of land forms”, were laid down at the bottom of the bases, and the plain surface of each base was measured.

5. A board providing explanations about conservation and illustrations of the designated area was placed at the south entrance of the *Chodoin*.
6. Another location with preserved bases was purchased by the government to include as part of the palace site.

The maintenance project mentioned above was carried out for two years from 1923 to 1924, with new methods of conservation and maintenance. Planting ginkgo trees along the boundary of the designated area was a unique method taking the plain land form of Heijo Place, that consisting of paddy fields, into account. However, the maintenance at this phase basically centered on remaining bases that could be seen as slightly elevated ground surfaces prior to exposure. A great effort was made to conserve and restore them. Restoration cannot be comparable to the present conservation and maintenance that is now based on an understanding of the excavated structures. Planning and implemention of previous restoration projects were made without any understanding of buried structural details.

(2) Maintenance after World War II

Heijo Place attracted attention again in 1953. Underground remains of Heijo Palace were found during construction to expand the width of *Ichijo* Street. Consequently, with the increasing social awareness of large-scale excavation and research as well as conservation of the privately-owned palace site, sustainable excavation and research since 1959 by the Nara National Cultural Properties Research Institute gained full support and acknowledgement by the community.

Meanwhile, in spite of the rising momentum of development in the high-growth period after the war, the development of the designated area was restrained. Therefore, the requests to cancel the designation of private-owned land as an historic site were submitted due to increasing complaints against such restraints. In addition, since the plan to construct the inspection garage of the Kinki Nippon Railway in the southwestern part of the Site, outside the designated historic site, was accepted by the Cultural Properties Protection Committee in 1961, nationwide public activities to conserve Heijo Palace was against that plan. As a result of this series of activities, the construction plan of the inspection garage was cancelled and the additional designation of non-designated areas as well as the purchasing of the whole privately-owned designated land by the nation was in motion. The first land was bought in 1963, and the national land consisting of 93 hectares was secured in 1973. It has since expanded to 108 hectares with gradual and continuous nationalization.

At Heijo Palace restoration based on excavation and research results was carried out after 1964. At that time, the excavation and research at Heijo Palace was in progress every year. This work proved quite profitable with the discovery of substantial architectural remains, other features, and artifacts. Simultaneously, while the purchasing project of peripheral land was advancing in addition to national land since the Taisho era, the nationalization of the whole area of the Palace except for the dense private residential areas had been delimited. However, most remains found during excavation were building foundations with pillars sunk into the ground. When stone was used, in most cases it was volcanic tuff. Since buried remains were subjected to weathering and are vulnerable, they cannot be exposed to air. Consequently, even valuable remains that may potentially by exhibited must be reburied after the excavation and research has finished. The realities of conservation decisions such as this were difficult for the public to understand. Moreover, as both the traditional national land and the land purchased in recent years had become a weed-ridden wasteland, it was necessary to carry out the maintenance of such national land for the time being, prior to the conservation and maintenance project for the whole Palace.

The maintenance method, created by the Nara National Cultural Properties Research Institute, are as follows:

1. Covering the whole area including bases 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.

In the case of number 1 above, it was possible to confirm the location of the remains in the area similar to the bases discovered at the Second *Daigokuden* and *Chodoin*, but impossible in areas where there are no bases left or never existed. For number 2 above, a shed was necessary to protect excavated remains from wind and rain. However, a large roof causes problems regarding aesthetics for example obstructing scenery, not to mention only partial protection for the elements. In number 3 above, there are some methods regarding the use full-sized building replicas. Some of these are listed below.

(A) Making models using the same materials as the real buildings.

(B) To recognize the scale of buildings and earthen walls, constructing bases, planting lawn, and separately considering the location of pillars.

Briefly, in No.3 (A), remains are restored or their replicas are exhibited, and in (B), the location, scale, and structure of remains seems to be expressed by landscaping. As a result of the discussion with the Cultural Properties Protection Committee, it was agreed that methods of No.1 and No.3 (B) were to be adopted in most of the areas, and No.2 in only part of some areas. Consequently, the maintenance of the *Dairi*, the Second *Daigokuden*, and the *Chodoin* area began in 1964. Maintenance at that time was basically as effective as now even with reparations after this time.

In other words, in number 1, the method of bases covered with grass, was adopted for the Second *Daigokuden* and *Chodoin* area, and No.3 (B), the method in which the location of pillars are marked with boxwood on mounds covered with grass was used in the *Dairi* area. As for number 2, three buildings exhibiting various remains were constructed in the eastern part of the *Dairi* area from 1965 to 1967.

3. Conservation and Maintenance Methods for Remains at Heijo Palace

Japanese architecture consists of many wooden structures. This applies to ancient and modern times. Architecture at Heijo Palace was also built of wood and structurally sorted into two types, 1) buildings with cornerstones on which pillars are laid, and 2) buildings with pillars sunk into the ground. (See figure 3.) In the case of the former, after the parts above the ground disappear, cornerstones and holes in which cornerstones were laid remain. If these buildings have their bases remaining, then earthen bases, decorated stone bases, and trenches for draining rainwater also remain. In case of the latter, holes for pillars on the ground, and – if conditions are good in rare cases– prop roots remain. In addition to these, wells, trenches, and garbage halls tend to preserve. These remains consist mainly of soil with a small amount of stone and wood. Therefore, any remains are vulnerable and cannot be exhibited without a protective shed. Since the buried remains of Heijo Palace are also in the same situation, any possible measure must be taken to ensure their conservation. This is the best way to conserve these remains for their survival after 1,200 years.

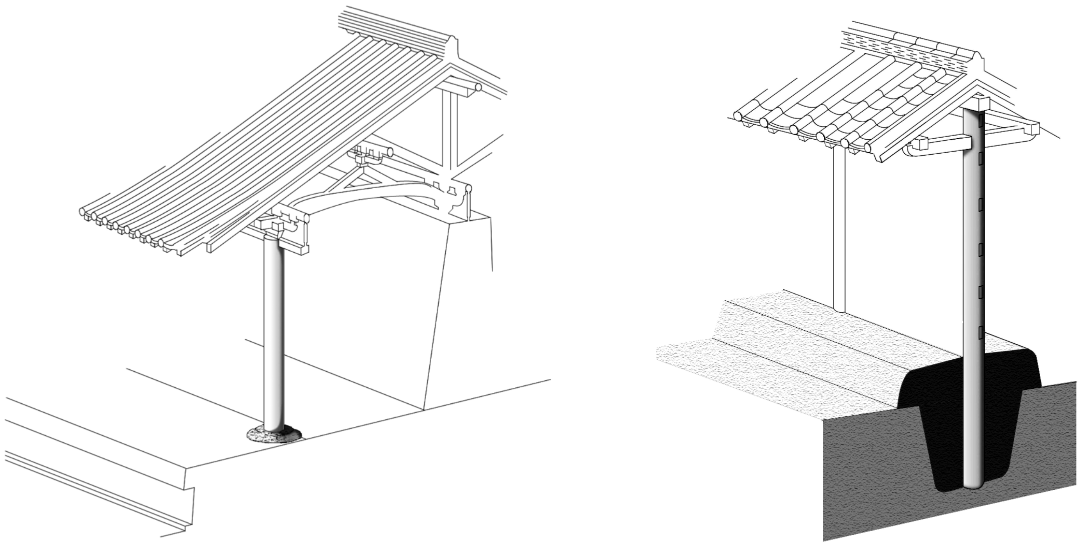

Fig.1: Buildings with cornerstones on which pillars are laid (left), and buildings with pillars sunk into the ground (right).

Consequently, important remains found during excavation and research are expected to be reburied.

In these situations, the public will not have a chance to observe the remains of Heijo Palace, nor understand or feel the past or derive some comprehension of the sense of place and history at the ancient capital of Japan. Smaller features or buildings such as kilns can still be exhibited if fully covered by a roof or shed. However, it is impossible to adopt the same method for huge ruins like Heijo Palace that stretches 1.3 km east to west, and 1 km south to north. Accordingly, the critical subject then became, how is it possible to restore images of buried remains after reburial for their protection.

Among some potential methods to recreate the image of various features, there is reproduction of the remains themselves. Replicas for exhibition can be placed on the site of reburied features. At Heijo Palace, this method was used for wells located at the *Dairi* and the *Mikinotsukasa*.

The second method is to exhibit replicas on the same location as the buried remains. Various phases of restoration can be considered. For example, restoration of a base and a cornerstone, standing a pillar of a certain height, reproducing walls and doors to a certain height as well as pillars, construction of the entire building, and reproducing interior furniture and furnishing goods. In this way, various stages of exhibition from a low degree of restoration to a more advanced degree, are possible. At Heijo Palace, each phase of restoration has been attempted.

The third method is that the ground plan of the original structure can be expressed using different materials from that of the original buildings. The plan of a building with sunken pillars can be presented with boxwood in the shape of a pillar, and an earthen wall can be expressed with hedges of *Camellia sasanqua*. These are all typical methods developed at the Heijo Palace Site.

4. The Museum Concept for Historic Sites and Problems of Application

Heijo Palace was designated as a special historical site in 1952, and has presently been maintained and managed by the Agency for Cultural Affairs. Among the 131 hectares of designated special historical sites, 108 hectares of national land is a target for restoration with the exception of dense residential areas. The first restoration project of Heijo Palace was implemented at the beginning of the 20th century while the “Basic Concept for Conservation and Maintenance of Special Historical Heijo Palace Site” was established in 1978. The fundamental conservation and presentation concept lying at the heart of Heijo Palace is that it should be regarded as a museum and a base for research on Japan’s ancient imperial palace, aiming to be the place where the public can understand the lifestyle and culture of the ancient capital of Japan.

The restoration of Heijo Palace has been advancing to some extent. However, there are limited systems in place to properly manage and operate it. In addition, there is currently an insufficient supporting infrastructure. A manual for the maintenance of trees and mowing of undeveloped areas is needed. The management of restored buildings and the *Toin* Garden must also be improved. In addition, the following are future areas for improvement of the Heijo Palace site:

1. The implementation of guided tours around the site, and on-site training.
2. The management of shops dealing with rental bicycles, electric automobiles, restaurants, coffee shop, and kiosks.
3. The establishment of learning programs in cooperation with school education.
4. The planning and implementation of various kinds of events and symposiums, etc

The institution of these programs is urgently required and all are important for the proper functioning of Heijo Palace as it stands as one of the most representative symbols of Japanese archaeological and World Heritage Sites.

V

Final Reports by Participants

Cambodia

AN Sopheap

Presently, there are many sites (both natural and cultural) that are registered on the UNESCO World Heritage list. Embedded within the idea of cultural heritage are certain values including social, spiritual, historic, aesthetic, scientific, economic and others. Because of their significance, each country in the world has started to apply careful management for the conservation and protection of their properties. Japan is a typical country that has paid strong attention to cultural property. An experienced team of specialists involved in archaeological research, restoration and conservation has developed quickly in Japan.

In order to contribute to the promotion of cultural heritage protection, the Asia/Pacific Cultural Center for UNESCO (ACCU), the Agency for Cultural Affair, Japan, and the International Center for the Study of the Preservation and Restoration of Cultural Property (ICCROM), jointly organized the Training Course on the Preservation and Restoration of Cultural Heritage in the Asia Pacific Region 2004 – from 27 October to 26 September 2004.

There are 13 participants from different countries in the Asia Pacific region that were selected for this training course, they are: Cambodia, Kazakhstan, Lao P.D.R., Mongolia, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippine, Korea, Sri Lanka, Thailand and Vietnam.

This training course provided us an opportunity to exchange views with every participant from each country and to understand the diverse policies for preserving their own cultural properties. According to the country report presentations given by all participants we can summarize the general cultural heritage management and protection system for each country as follows:

- Divide protected zones of heritage sites into separate categories
- Organize training for the next generation:
    - i.e. Specifically for various professionals and craftsman
- Collaborate with international teams of researchers and institutes:
    - Share and distribute of reports (i.e. research results and management schemes)
    - Create long-term budget programmes
- Survey and documentation methods:
    - Choosing appropriate methods depending on the situation and requirements
    - A Combination of techniques should be used for field and laboratory work
- Recognition of archaeology - promotion to the public:
    - Presentation of site (interpretation plans)

- Publication and exhibition (public and government funding)

- Using scientific methods:
  - Traditional and modern techniques
- Conservation materials - interactive approach:
  - Knowledge of the situation, then conduct testing, and, only then applying the treatment required for measuring and monitoring

The objective of this training course is to provide participants with general knowledge concerning archaeological laboratory and some field methods regarding the preservation and restoration of cultural heritage. The purpose of this is to apply these methods and knowledge, for immediate and future use, to their own heritage work, as well as to pass these methods on to other specialists within their country.

During the one month training course we have learned many things. We have been exposed to theoretical and conceptual explanations regarding overall global heritage management from ICCROM experts and Japanese lecturers from different institutes and organizations, been given workshops on archaeological methods, engaged in extensive discussions, and participated on a three day site visit about the preservation and restoration of cultural property in Japan.

The most interesting points in the training course for me include the following:

- Archaeological excavation methods
- Scientific dating in archaeology and analytical methods of ancient remains
- Conservation of artifacts from excavations
- Preservation and restoration of cultural sites
- Public presentation of sites

Archaeological Excavation Methods

Through lectures, I saw that in Japan there are underwater archaeological excavations and buried excavations (both prehistoric and historic sites). I am particularly interested in the research on toilet archaeology in Japan as this can provide us with a lot of information about past diet, disease, and the technology of general daily life.

In Japan, a combination of modern and multidisciplinary technology is used in archaeological excavation, for example: 3D laser scanners survey methods, GIS, aerial photo use, and conservation methods for removing fragile artifacts from the excavations. These are all very useful methods for archaeological research.

Scientific Dating in Archaeology and Analytical Method for Ancient Remains

Dating methods are divided into 3 types:

- Relative age: based on stratigraphy and typology
- Absolute chronology: based on historical data
- Age determination by nature, numerical age or chronometric age: based on scientific methods.

A variety of Japanese scientists from different backgrounds work closely with archaeologists and in the field of archaeology; this collaborative relationship is strongly developed. There are many kind of scientific technology applied to analyze ancient remains.

Artifact Conservation from Archaeological Excavations

Ancient artifacts from excavations are very important for archaeologists. These artifacts are removed to a safe place for analysis. Excavation means that upon removal from a buried context, the archaeologist changes the atmosphere of an artifact (that is made of rapidly decomposing materials like wood or bronze), making it extremely susceptible to damage.

During the lectures I learned that the conservation method of ancient artifacts in Japan is comprehensive. The metal, ceramic, bone and wooden artifacts that have been found from excavations are always conserved by using modern scientific technology.

Preservation and Restoration of Archaeological and Historical Sites

For every country in the world, the concept of the preservation and restoration of cultural heritage sites is different depending on the technology, economy and the natural situation of the site.

Through the lectures during the training course, I learned that the history of the preservation and restoration of cultural heritage in Japan developed in 3 phases:

- From the beginning of the 20th century, Japan started to think about the protection and management of the cultural heritage sites. However, because of the limited knowledge of past lifeways during that time, some preservation activities caused damage to sites.
- After the 2nd World War: Japan started increasing research regarding cultural properties. The large scale and sustainable archaeological excavations were conducted at many sites. After finishing the excavation, they started to think about the conservation of those ancient remains. During that time most archaeological sites were recovered but some parts were restored in order to protect them and show them to the public.

- 1980 to the present day: in order to provide interpretation of heritage sites to the public, the new concept of reconstruction was applied to many sites in Japan. According to the lectures and explanations provided for various sites, I believe that the reconstruction of sites is very difficult work. Most historical sites in Japan are made out of wood, and until now, remain underground. However, it is very different in Cambodia to preserve many historical sites as they are built from stone and brick and have remained on the surface for hundreds of years.

Over time, with improvements as well as the employment of a combination of techniques, the reconstruction of historical sites in Japan has become very successful.

In my opinion, I think that the reconstruction of heritage sites is important for helping people to understand about ancient structures. It also means that reconstruction is part of destruction of historical sites. The reconstruction of the Nara palace site is a very good example, because most parts of the ancient remains are conserved, and only some parts were chosen for reconstruction.

Presentation of Sites

As a result of visiting many sites during the training course, in addition to the 3 day site excursion program, I noticed that the presentation of historical sites in Japan is well done. Every important site in Japan always has an exhibition museum, and there are a lot of programs to provide people with direct experience from their past. It is a very good way to promote understanding about cultural property and history.

One other interesting aspect is the preparation of explanation panels on sites. I think that the information panel is very useful for visitors.

In conclusion, my impression is that this one month training course was very important for improving my general comprehension of archaeology, preservation and restoration of cultural heritage. Many theoretical lectures and explanations about sites were provided during the training course that have upgraded my knowledge and my experience. I hope they will be of benefit to my work in Cambodia at Angkor Wat.

In addition, as I studied and lived with other participants from different countries, I learned and shared different methods and different problems from their experiences. I believe that this feature was one of the most valuable for every participant. The ACCU Nara training course was a good opportunity for me to gain these experiences in order to deepen my knowledge base and to help improve heritage preservation and management in Cambodia.

Finally, I would like to express my sincere gratitude to the ACCU Nara office and ICCROM who organized this training course. Thank you very much.

Kazakhstan

Gulnara Esmukhanovna MOLDAKHMETOVA

I express my gratitude to everyone concerned with The Cultural Heritage Protection Cooperation Office, Asia/Pacific Culture Centre for UNESCO in Nara, Japan (ACCU Nara Office), who organized the training course on the Preservation and Restoration of Cultural Heritage in the Asia/Pacific Region 2004, entitled "Archaeological Research Methodology and Analytical Methods of Ancient Remains".

I am a professional civil engineer in Kazakhstan, and I work in the State Institute for Scientific and Planning on Monuments of Materials Culture. Our Institute represents the only institution in Kazakhstan responsible for all kinds of scientific research, surveys and planning for protection, conservation, restoration, rehabilitation, adaptive reuse, interpretation and presentation of immovable cultural heritage. The Institute has contributed to the elaboration of all ongoing national programmes related to cultural heritage, and also participates in their implementation, conducting scientific, planning and experimental work on a broad range of heritage conservation and management problems. The main part of my work in the Institute is concerned with documentation and conservation of archaeological and other monuments and sites, but also with the preparation of management plans for cultural heritage sites. Since 2003 I have been working in the Division for Management Planning on Cultural Heritage Sites and participating in the UNESCO/Japanese Trust Fund Project for the Preservation and Restoration of Otrar Tobe, the Silk Road archaeological city-site in South Kazakhstan.

The preservation of the mud-brick and earth-structure archaeological sites of Otrar Oasis pose two very special technical problems. The first is the severity of the climate, reaching a high of 50^{o} C in summer and a low of -20^{o} C in winter; it is also quite humid, with considerable snow, rain and wind at some periods in the year. This means that erosion occurs very quickly, and that standard techniques or mud-structure preservation, which is successful elsewhere in the region, cannot be applied here. The second major problem is the enormous size of the Otrar oasis, over 200 km^2 in area, and the scale of its cultural remains. Five major activities are being undertaken for the preservation and restoration of Otrar Tobe:

- Documentation and Research: state-of-the-art recording and the setting up of a computer-based scientific documentation system;

- Conservation: preservation of the Otrar Tobe archaeological site and its protection for present and future generations, and emergency safeguarding actions at Kyuruk Tobe, Altyn Tobe and Kok Mardan;
- Master Plan: Plan for the conservation and maintenance of the archaeological site of Otrar Tobe and for its surroundings;
- Training: building of national and regional capacity in the management, preservation and conservation of cultural heritage through the provision of in-service training to national experts and craftsmen in conservation matching international standards;
- Promotional Activities: a Web site, publications, visitor leaflets and information boards and a video on Otrar will all help make the site better known.

Kazakhstan, as a newly independent country since its separation from the Soviet Union in 1991, requires a new interpretation of its monuments and cultural history in order to act as a focus for the development of a national identity. Kazakh history is based on oral traditions, which can be illustrated through information obtained from outside sources, such as those from China, Iran and Russia, however, material obtained from these sources is necessarily incomplete. Archaeological and other monuments are themselves therefore the principal witnesses of Kazakh history, much more so than in countries with long traditions of written history.

My main interest for participation in this course was the possibility to learn what is common and what are is different in archaeological site research, conservation and management concepts and approaches between the different countries of Asia. In addition, I also wished to learn various techniques of conservation, and to use them then in my practical work. Further development of new networks with colleagues in other countries would be particularly useful in this regard, in the transfer of modern technology and the accumulation of knowledge with respect to recent research.

During my stay in Japan, through lectures, practical exercises and study visits (all aspects of the training course agenda), I had the opportunity to see Japan's complicated structure regarding multidisciplinary work concerned with scientific research and the preservation of archaeological heritage. The study of archaeological science builds on the foundations of such fields as archaeology, historical science, gardening history, and architectural history, in collaborating with natural science disciplines for deepening the study of archaeology and history, and enabling the development and multidisciplinary expansion of new fields of study. Conservation science is inherently linked with the study of all cultural material as well as the social sciences, such as archaeology, art history of handicrafts, architectural history, and ethnology. From the viewpoint of material science, conservation science makes it possible to provide important information about both art and architectural materials and social sciences. The documentation from studies within several fields of science gives the premise for all on-site measures directed towards conservation and safeguarding of the natural and cultural values of archaeological sites.

The ACCU Nara training course demonstrated to me the important role of natural sciences in archaeological research and conservation. Some methods of scientific dating in archaeology like dendrochronology (the science of dating timber through the measurement of tree rings) have not been hitherto used in Kazakhstan. The interpretation of Kazakh cultural heritage will be considerably enhanced if monuments and artifacts containing wood can be precisely dated. These range from samples dating from the Bronze Age to the present time. These include spectacular early finds where the timbers have been preserved in areas of dry climate, by waterlogged conditions or by the permafrost, but also standing buildings. Many of these archaeological finds and monuments are of international importance, including timber burial chambers in *kurgans*, such as that at the site of Berel. Weather forms a unique pattern from year to year, that governs the rate at which trees grow. In wet years, trees will grow faster and acquire extra girth; while in dry years their growth will be much less. Dendrochronology can provide a date for timbers (providing that the outer ring of sapwood survives) as precise as a few months within the cutting of the tree, although this requires a 'curve' showing the general pattern of growth for trees in a particular climatic region to be established. The growth of trees not only provides information on dating, but also on palaeoclimate – of particular interest at the present time, when fears of global warming make a heightened understanding of climatic change in the past of ever increasing urgency.

The training course has provided me with a clear picture of the complicated system of historic preservation. From the lectures by Dr. Valerie MAGAR (ICCROM) I have learned a lot of useful information related to cultural heritage management and archaeological conservation methodology. In Kazakhstan we have only started to work in this direction. The general approach to the conservation and management of heritage sites will also be good examples for specialists in my country. From the lecture by Mr. TSUKAMOTO Toshio, I have learned about the development of a 3D digital archive system for archaeological remains and an associated method for data utilization and the real-time 3D digital measurement of archaeological remains using an outdoor laser rangefinder. A new combined field has developed as a hybrid of archaeology and information science. Digital archiving, also a new field, is playing an important role in conservation science. Meanwhile, any restoration or conservation works cannot be considered as finished without such proper documentation.

There were also many other impressive points for me in Japan. First of all, it was the Japanese historic architecture itself, representing a perfect example of refined simplicity and aesthetic quality, with a high level of workmanship and special relationships with the natural environment. Due to the opportunity to see restored sites, restored monuments, and museum exhibitions, all supported by explanations from professionals, I have also learned a lot of practical things related to Environmental Archaeology in Japan. It was quite interesting to discuss with Japanese experts and with course participants, and archaeological experts from the other countries, our common and particular problems and concerns; I felt that this was also one of the most important components of the course. After returning to Kazakhstan, I will share this information with my colleagues.

As a result of the knowledge received through this training program, I will:

a) use what I have learned in my practical work,

b) share this knowledge with other professionals working in the fields of management and conservation (of archaeological sites), and

c) disseminate, through publications in the local and national newspapers, information about the Japanese system of protection and conservation of cultural heritage, and also my impressions of the one-month stay in Japan.

In general, the training programme struck an excellent balance between lectures and practical exercises, and all of the teachers were highly professional. The study excursion was very informative. It represented an important and interesting part of the training programme. The excursion helped me to realize the actual state of the protection and conservation of archaeological heritage in Japan, and to appreciate it to its real value. The training course itself demonstrated a high level of organization regarding the training process. I feel that the programme was designed very thoughtfully, embracing a wide range of problems related to the protection and preservation of cultural heritage in Japan with reference to international concepts and experiences. The training course itself should be a model for the organization of other such training projects. I highly appreciate the work of the ACCU Nara staff during this training course, and I will apply, teach, and improve what I learned when I return to Kazakhstan; furthermore, I am sure that it will have a significant impact on the activities of all of the participants.

Laos

Viengkeo SOUKSAVATDY

It is my great privilege to attend this Training Course, that was held in Japan’s wonderful 8th century capital city of Nara. In previous years the ACCU Nara Cultural Heritage Protection Cooperation Office has hosted a series of International Meetings and training courses on different topics concerning cultural heritage protection in the Asia/Pacific Region, so that the trainees in charge of this domain from many countries may share and exchange their knowledge among themselves and with Japanese specialists.

It is not merely by chance that the Cultural Heritage Protection Cooperation Office ACCU and the National Research Institute for Cultural Properties (Nabunken) have been established in Nara. This city succeeded in creating a rich complex of intact built heritage that reflects the power and glorious history of the country. This tradition is seen through the perfect management and maintenance of its monuments and sites. Most Japanese traditional monuments are made of wood. The care regarding the conservation of wooden structures and perishable materials is rather difficult than for stone and brick, therefore, I am impressed by how many of them have been preserved and restored in such good condition even today. The oldest wooden construction in the world, the Buddhist Temple of Horyu-ji, still stands in excellent condition and is located in Nara Prefecture. It was designated, UNESCO, as part of the World Cultural Heritage in 1993. Many monuments in Ancient Nara, including the Heijo Palace site, are inscribed on the UNESCO World Heritage list. These are predominantly multi-story temples and castles that reflect superb carpentry skill and also preserve the authenticity of traditional craftsmanship.

The city of Nara has developed economically in parallel with preservation its past. Its charmed landscapes and richness of cultural heritage has indeed come from the strong root that flourished in modern Japan. The harmonization between development and preservation would be the best support for sustainable development in the future. Nara became, and continues to be, a true Capital for study and cooperation among heritage keepers in the Asia/Pacific region and beyond.

As an archaeologist, the current Training Course, focusing on Archaeological Methodology and Analytical Methods of Ancient Remains, comes at a good time regarding my interests. I found that the content of the courses including lectures, laboratory sessions, and a 3 day field trip fully matched my expectations. The lecturers provided good teaching methods with comprehensive visual devices e.g. slides, transparency, and PowerPoint presentations. Every subject taught was accompanied by handouts in English. Moreover, some of rare references were also given, even though published in different languages; however, their pictures and illustrations were useful and informative so that the participants can take them home and use them as references for their future research and for others readers as well. Simultaneous translation from Japanese to English and specific terminology was perfectly adapted for all the given lectures.

At the beginning of the training course we have learned about legislation concerning Cultural Heritage Preservation and Protection in Japan that was traced back to as early as 1897. Following this Dr. Valerie MAGAR from ICCROM in Rome presented an overview on the International Inter-Governmental, Non-Governmental and some private organizations working in connection with the Preservation of Cultural and Natural Heritage. A review of the series of international conventions, charters and documents was provided, and following that the present condition of Archaeology and Cultural Heritage Preservation in Asia and the Pacific was discussed. These lectures were helpful and profitable for me in terms of broadening my knowledge about the legal protection of cultural properties. Right now in Laos we do not yet have laws concerning the protection of cultural heritage. We are in the process of drafting a Law for Preservation of Cultural and Natural Heritage. In the meantime we have applied for the Presidential Decree for Preservation of Historic, Cultural and Natural Heritage, issued in 1997.

The Training Course emphasized the inclusion of multidisciplinary methods, thus, its curriculum covered a broad number of advanced sciences and technology in order to present scientific methods of research. In addition, it provided interpretation and experimentation in a deeper sense as opposed to mere information.

Archaeological research in Laos is still in (relative) infancy, many activities such as site investigations, surveys, and inventories are yet to be undertaken throughout the country. The major problem facing Archaeology in Laos, is a lack of trained professional staff. Beside this difficulty, we have started from scratch regarding basic research facilities such as, storerooms, a conservation laboratory, equipment and so on. Our situation is quite different from that of our colleagues from other nations. However, the ACCU training course gave me a broader vision regarding the scientific methods use in archaeological research, and the subsequent conservation of the materials studied. The practical laboratory sessions, in particular, were very valuable for me.

Many of the modern equipment used today, and demonstrated in the course, helps the archaeologist save time and conduct more accurate and efficient work. The lecture given by Mr. Tsukamoto about survey measuring methods by using laser technology was a very impressive demonstration to all participants. It would be interesting to conduct reconnaissance with the newly invented equipment (hardware and software) such as digital images and 3D laser scanning for small and large scale areas. Little by little this new technology will come to replace the traditional photogrammetric equipment which is always manually controlled.

We attended 7 days of lectures at the National Research Institute for Cultural Properties in

Nara ("Nabunken") where most of the conservation laboratories and sophisticated equipment is kept. All 13 participants and 2 trainees from Afghanistan and 5 other Vietnamese students and researchers from museums in Vietnam (and studying at Waseda University) have joined the course as short-term observers. The professors from Nabunken kindly demonstrated and answered various questions raised during visits to the laboratories. We had long discussions and close observation of the ultramodern machines. In Laos, and in many of the participant's countries, w do not have any such equipment, but the exposure gives us valuable information and a wider concept of how the technology can contribute to the preservation of cultural heritage. In the past we did not believe that computers would be useful for archaeological work, but, in fact computers now play a very important role in every kind of work. The access to this kind of basic equipment has become much more widespread for every one. With the help of some basic equipment like computers, digital cameras, GPS devices, printers and so on, we can conduct good work; essentially, machines and instruments with a greater capacity can provide improved possibilities for research.

Among these scientific disciplines, I found that dendrochronology, palynology, and paleoparasitology play a new role in the field of environmental archaeology and identification of wooden artifacts. In my Laos, and also in many Southeast Asian countries, traditional architecture is mainly made of wood. Thus, these disciplines have a lot to offer for the future of archaeological science in protecting and understanding the heritage of Laos and other nations in Asia.

The most helpful lecture relating to my current work was the identification of the faunal (bone) remains. As I have presented in my country report, during the previous salvage excavation August of 2004 we discovered a Neolithic human skeleton and some animal bones that await identification. The usefulness of the course for all participants was the practical sessions that accompanied the theoretical lectures. We learned not only about the morphological characteristics of mammal species, but also about birds and fish. We had the opportunity to touch, identify, compare and reconstruct, both animal and human bones (replicas and real bones).

We also engaged in practical work on how to extract pollen from archaeological sediment samples and from fresh flowers. We learned not only how to prepare a sample, but also every one of us enjoyed sharing our own knowledge and observed prepared samples through the microscope.

During the 3 day field trip to Ishikawa and Fukui Prefectures participants had the opportunity to visit various excavated sites. A trip to the Noto Kokubun-ji site, belonging to the Nara period (8^{th} century) was included in the program. Inside the modest site museum, a reconstruction of the temple complex and associated archaeological finds were displayed. On the actual temple complex site, that was fully excavated in the past, are the reconstructed remains of the stone bases and the partly reconstructed south gate. The site is a good example of post excavation preservation.

Another site that we visited was Ichijo-dani which was a small village during the medieval period within its natural habitat, a small river valley. The reconstruction, based on a stone base is well done. The site is a successful tourist destination with a small souvenir shop and museum that provide good information to the visitors; it can also generate money for site maintenance. In term of its use, the site illustrates an interesting case of community involvement for protection of their own heritage.

The Ishikawa *Maibun* Archaeological Foundation demonstrates an enormous capacity for Archaeological Research with the support from Ishikawa Prefecture and other financial resources. Its research facilities demonstrate to us how important the local government is to preserving cultural properties. We learned that every year there are more than 10.000 rescue excavations in operation all around the country.

The Torihama Shell Midden Museum is an interesting building designed as a mound that inspires harmony wedded with the surrounding landscape. The display and presentation of the artifacts is perfectly done and very educational. Japanese communities are very conscious and active about presenting their past, even a small village far from a major centre is willing to support an excavated site and its subsequent preservation.

The conservation of wooden architecture in Japan reflects the devotion to heritage conservation and management in many regions of the country. In Laos, there are also many wooden buildings, particularly at the Luang Prabang UNESCO World Heritage City. However, there are a large number of registered wooden structures that need to be treated and conserved. This training course gave broadend my perspective regarding this issue. Using traditional methods, traditional materials and traditional skills to conserve and restore historic monuments is highly recommended.

I feel that the ACCU Nara Training Course successfully achieved its goals. During the 30 day period in Nara I gained many new experiences and learned many lessons - not only in terms of academic fulfillment, but also regarding important contact with participants, colleagues, specialists, and many friends. This experience created better mutual understanding among our countries and the potential for regional cooperation in the future. Nara is an ideal place to stay and learn about cultural heritage. It is quite a safe environment, and all of the participants were able to enjoy a diverse atmosphere, comprised of both cultural and natural places, in this ancient capital. Furthermore, Nara is located close to Osaka and Kyoto which made it possible to visit and evaluate the heritage conservation and management situation at many castles and beautiful settings. I will have many fond memories of Japanese culture and Japan for years to come.

Mongolia

Byambaa GUNCHINSUREN

APPROACHES TO SOLVING PROBLEMS IN MONGOLIAN CULTURAL HERITAGE AND ARCHAEOLOGY

I would like to express my gratitude to Dr. USHIKAWA Yoshiyuki, Director of ACCU in Nara for having invited me to the "Training course on the Preservation and Restoration of Cultural Heritage in the Asia/Pacific region 2004, entitled "Archaeological research Methodology and Analytical Methods of Ancient Remains", organized by the Cultural Heritage Protection Office Asia/Pacific Cultural Centre for UNESCO (ACCU) in Nara, from 27 October to 27 November, 2004. Also I must thank Dr. NISHIMURA Yasushi, Ms. ISHII Kayoko and Mr. Mark DIAB for having coordinated the training course, teaching, and generally supporting our theoretical and practical training.

Japan is one country rich in ancient historical monuments and we all know that many of them are registered on the UNESCO World Cultural Heritage List. Even countries that participated in this year's ACCU Nara training course have some of their own monuments registered on the UNESCO World Heritage list to some extent. Mongolia is a country located at the centre of Asia with rich archaeological remains dating back several hundred thousand years. It established the first state among the Central Asian nomads and conquered half of the world during the historic period. We have our first registered monument on the list of World Cultural Heritage. This site is the Orkhon Valley, a place rich in archaeological remains where settlement is known from the Paleolithic period onward, and also later where many Turkic and Mongolian tribes established their first cities. The fact that Mongolia has only just now registered its first monument is related to the relatively turbulent social situation that existed in Mongolia up until the 1990s because of the so-called socialist countries that could decide, internally, any research problem they wished within their own framework, and did not want to make research available to countries with other political systems.

Now, Mongolian researchers can decide the next monuments that should be registered on the list and to prepare their own scientific definitions. The Mongolian government and researchers, together with the UNESCO committee, must labor to initiate this task. I see it as one of the main goals we have encountered. To register sites, such as the Tsakhiurt Valley which is an open air site dating back to the Stone Age, and the ancient petroglyphs in the basin of the two rivers (Tsagaan Salaa and Baga Oigor) on the list of World Cultural Heritage is a very important step for the protection of the spiritual and material culture of the native nomads in Central Asia.

Another primary initiative for Mongolian archaeology is to list all archaeological and historical sites in an official site registry system, and to locate and map them accurately. Even though studies of many sites in Mongolia began at the end of the 19th century, such work was done randomly until the middle of the past century. After organization of the joint Mongolian-Soviet historic-cultural expedition in 1967, a systematic study of prehistoric artifacts and sites began in Mongolia. In addition, the preparation of Mongolian archaeological maps was completed in 1989-90, but this project was interrupted because of financial problems. Over 1500 localities or workshops dating back to the Stone Age were revealed at this point; new Stone age sites are being discovered annually. Thus, unlike the site registry systems in some countries participating in the ACCU training course, there is currently no possibility to order all of the sites in Mongolai systematically. However, it is possible to number them in terms of each *Aimag* (the territory of Mongolia is divided into 21 administrative units or *Aimags*) and to map them by chronological sequence: in particular, monuments of the Paleolithic, Neolithic, Bronze, Iron Age and so on). In order to accomplish this task, the environmental and social influences for each site, where artifacts are located, need to be defined in advance. The job of understanding the context of prehistoric sites is even more pressing in regions with severe continental climates, like Mongolia. Harsh climates can lead to site destruction more easily due to environmental factors. After the definition of archaeological features, we have to decide whether to attribute them to state protection or to local protection. Although we have legally defined archaeological remains which should be in the state and the *Aimag*, attained protection at the local level about 30 years ago, and changed the list several times, the laws can no longer satisfy the modern requirements.

Moreover, we can apply methods used by Japanese archaeologists. Dr. Nishimura (ACCU Nara) has informed me to produce an archaeological map of Mongolia. In other words, it seems to me that we should initiate special training for archaeological remains among native people, and to collect or analyze positive information. As a result, we could register especially interesting sites. In this case, it is more economical to do this, although it is certain that some information will be redundant.

The next significant task for Mongolian archaeology is to salvage archaeological remains. Here I would like to concentrate on two things:

First, the Law on Cultural Heritage: our country first ratified the Law on the Protection of Historical and Cultural Objects in 1971, but has since amended it several times. According to the last amendment on 16 April 2004, the Department of Culture and Art, Ministry of Science, Technology, Education and Culture of Mongolia must grant scientific organizations such as institutes, universities and museums the permission to conduct archaeological excavation. To conduct any archaeological excavation is the first stage for preservation and destruction of the given monument. To grant all organizations at the same time the permission to undertake such activity is same as destroying the abundant historical-cultural remains. Thus, we should amend proper provision of the law so that professional scientific organizations must conduct an archaeological survey/excavation in the territory of Mongolia, and this single organization must then grant the permission to conduct archaeological research.

It should be noted, in accordance with the above-mentioned problem, that the fact that we invited Dr. Valerie Magar from the International Centre for the Study of the Preservation and Restoration of Cultural Property was of immense benefit for the course. Although all of us had known that there are international declarations on the protection of cultural heritage, we heard, probably for the first time, that there are so many that exist, and that many countries have united to support them. As for Mongolia, we must translate and analyze all of the declarations Dr. Magar discussed, and as a result, work out a new construction of the Law on the Protection of Cultural Heritages. We may seek special advice on these issues from Dr. Valerie Magar.

The second law regarding cultural heritage protection is termed: The Law on the Utilization of Entrails of the Earth of Mongolia. Large companies that undertake geological surveys and utilizations in many countries were invited to Mongolia. A convention was organized for potential investors for the first time in 1996. After it had broken up for some time after 1996, two large meetings then took place for potential mining investors under the framework of the "Visit Mongolia" campaign in 2003 and 2004. As a result, the whole territory of Mongolia was been divided into areas with survey/utilization licenses given to investing companies. At this time, over 200 mining companies are involved in activities in Mongolia. It is obvious that this number will increase sharply if organizations that are building roads, hydroelectric power plants and other extensive objects are added to the mining companies.

There is a provision in the Law on the Protection of Cultural Heritage that before any company initiates its production activity, the area where the company is going to undertake its activity must be studied in advance. But this provision is not reflected to any extent in other laws including the Law on the Utilization of Entrails of the Earth. Therefore, foreign or domestic companies, that want to undertake their activities, must first acquire permission for survey and utilization from two state organizations: the Office of Registration for Cadastre and Mineral Resources Authority. However, I would like to note that some companies, such as Ivanhoe Mines, follow all of the Mongolian laws, and others, such as CAMECO Group do not! It is evident that dozens of ancient and medieval remains have been, and are still being, completely destroyed without any restoration.

We have to put a provision into the Law on the Protection of Cultural Heritages and Law on the Utilization of Entrails of the Earth that if it is required to undertake any activity related to the land, then archaeological survey and/or excavation must be carried out in advance. Moreover, archaeologists should be included in a strategy planning group or organization to be set up in the purpose of executing those laws. UNESCO's declarations and documents, that Mongolia has joined, should be translated into Mongolian and then conveyed to the group in order to work out such laws. It seems to me that it is possible that in order to work out those laws we submit a proposal to the Ministry of Science, Technology, Education and Culture of Mongolia, through the Mongolian Academy of Sciences, that an expert will be invited from the International Centre for the Study of the Preservation and Restoration of Cultural Property. The results should also be conveyed to the Parliament of Mongolia.

Because of the phenomena that gold value is increasing sharply in the world market the robbing of ancient graves is occurring more and more in Mongolia in recent years. One measure against this robbing is to make the cultural value of archaeological remains known among native people. We can apply Japanese archaeologists' methods of which Dr. Nishimura Yasushi told us about. I think that it is very possible to protect ancient graves from robbers by way of initiating training to inform them and simple herdsmen of the cultural value of a given artifact.

The next task for Mongolian archaeologists is to preserve and restore the artifacts which have already been brought to the Institute after being unearthed. Upon being deposited in the Institute, it is incumbent upon the archaeologist to accurately analyze their structure. After that, we will have the benefit of keeping them and conserving and restoring them.

Out of the variety of scientific projects that have been implemented in Mongolia since 1990, some archaeological artifacts have being restored, but this number is very small. The main reason that the number is very small lies in the fact that only archaeological artifacts found through projects have been restored.

The Ministry of Science, Technology, Education and Culture of Mongolia, in cooperation with the Turkish International Cooperation Agency, the Republic of Turkey, is implementing a joint scientific project called "Excavation, Restoration and Reservation of Some Monuments and Facts of Turkish Period in Mongolia." One of the goals of this project is the restoration of the Turkic Bilge Khan and Kol Tegin memorial complexes located at Arkhangai *Aimag*. This restoration was started in 2004. Therefore, our goal to restore the steles with ancient runic inscription to their original position and to open exhibitions will be fulfilled.

In connection with the registration of the Orkhon Valley archaeological remains, that is on the World Heritage list, we are going to set up a laboratory for the restoration of archaeological which will be financed by the Japanese Government beginning in 2005. What I would like to note here is that I am very grateful that we visited the National Research Institute for Cultural Property in Nara. I am pleased to see all of the equipment that we can use in our Institute. As a result of the investigations carried out in Mongolia in past years, many painted wooden or iron objects have been found. The equipment in the National Research Institute for Cultural Property will be useful for understanding the material and structure of those artifacts.

I would like to emphasize one important note regarding the lecture "Introduction to

Dendrochronology" by Dr. Mitsutani. This attracted my attention very much because wooden objects reveal their structure and extensive information on environment and climate, as well as the artists' spiritual-world views. It is important to acquire such comprehensive information on the date of the objects. It seems to me that we should analyze wooden objects found in grave excavations in Mongolia by using dendrochronology.

Another problem for Mongolian archaeologists is to exhibit archaeological finds for the public. We visited some Japanese museums during this training course. It is very praiseworthy that all objects are exhibited. However, many exhibits are smaller in number than the objects that our researchers revealed in only three months of Summer fieldwork. Their properties are not different, but the structures and dates of the artifacts are different in each region in Mongolia. Thus, we have to mount a permanent exhibition by using abundant artifacts already accumulated from archaeological excavations. Thereby we can solve the following problems as a whole:

1. To make archaeological findings of our country known to other countries
2. To organize a training course for allowing a general grasp of archaeology and archaeological remains for Mongolians and the Mongolian public
3. To produce a general map of archaeological sites and remains in Mongolia

Another problem for Mongolian archaeologists is to publish samples of artifacts and to make them available for the public. What I am going to state here involves not scientific monographs, but publications to be written in non-professional or understandable terminology for the public. The jargon of archaeology is not understandable to the public, and therefore, any archaeologist confronted with communication problems with the public should be capable of explaining their work to anyone.

I did not attempt to discuss the planning and management of archaeology in this report, because all of the questions regarding these issues were covered in the course of the ACCU training program, and have already been fulfilled in Mongolian archaeology.

Although archaeology is one of the younger disciplines in Mongolia, archaeologists have used most of the dating methods available because they have implemented joint scientific projects in cooperation with countries where these sciences have been developed.

Finally, I hope that UNESCO, the Cultural Heritage Protection Office, Asia/Pacific Cultural Centre for UNESCO (ACCU-Nara), the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), and the National Research Institute for Cultural Properties in Nara (Nabunken) give assistance to solve the problems faced by Mongolian archaeology that I have mentioned in this report.

Nepal

Ram Bahadur KUNWAR

Introduction

Nepal is rich in archaeological assets. Many archaeological sites are scattered from the plains to the high Himalayan mountain range. Archaeological sites in Nepal can be divided into three regions: the Himalayas in the north bordering China, the central hilly region, and the Terai region (the flat Ganges river floodplain) in the south. All these regions are equally important for archaeological research. Several archaeological explorations and excavations have been conducted by the Department of Archaeology (DOA) in Nepal with the support of various institutions around the world. Many exciting remains and ruins have been discovered around the area through this research. The Himalayan region holds a lot of potential for archaeological research but few surveys and excavations have been undertaken so far. Previous excavations have yielded many structural ruins and artifacts representing various periods. Cave shelters are major attractions. Many archaeological sites are expected to be found, however, we have not done much research due to the remote and arduous geography of this mountainous region.

The central hilly region is also significant for archaeological work. This region is important for prehistoric and historic work. Many medieval sites exist in this region as well. Owing to its difficult landscape and the predicament of transportation and communication, only selected sites have been excavated. Much work has still yet to be done in the region in order to disclose the many potential prehistoric and historic sites.

Similarly, the Terai region is also vital for archaeological research activities and work. As a matter of fact, this region is famous for Buddhist archaeology. Some famous Buddhist sites situated in the region include: Lumbini, Kapilvastu and Ramagrama. Lumbini is the place where the Buddha was born in 563 B.C., Kapilvastu was the hometown of Buddha where he spent twenty-nine years with his family, and the Ramagrama is believed to be the ancient stupa of the Buddha. Many research projects have been undertaken there since 1896, and research is still continuing in the region. Several sites have been excavated and well preserved, and maintained by Department of Archaeology. Major research has been concentrated in this region more than any other part of the country. The excavation of Ramagrama and Gotihawa stupas has recently been completed. The conservation plan is currently being formulated.

Since 1956, the Department of Archaeology has been involved in different research regarding the preservation and restoration of archaeological sites. Many sites have been explored and excavated around the country. The excavated sites have been well preserved and they are the main source for the development of cultural tourism in Nepal at the moment.

I have been working in the Department of Archaeology since 1998 as an excavation officer and have had many opportunities to participate in various excavations around Nepal. I have been confronted with many questions regarding archaeological exploration and excavation in Nepalese prehistory and history as a result of my involvement in this research. Therefore, I sincerely express my gratitude to the organizers of the ACCU Nara Training Course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region 2004, entitled, *Archaeological Research Methodology and Analytical Methods of Ancient Remains* for providing me with such a great opportunity to participate in this training, that has furnished me with a considerable amount of knowledge that I can utilize in my future work.

A Glimpse of the Training and My Impressions

The training course began on the 27th of October 2004 at the ACCU office in Nara. I was unable to attend the opening ceremony of the training course due to a delay with my flight arrangements. I arrived in time to attend a lecture being given by Mr. Mark Diab about the protocols of living in Japan. After introductions by all the participants, we attended a lecture about the training course objectives and the daily routine during the programme. We were also given a brief synopsis of the history of Japan and its prehistoric and historic cultural chronology. The training ended on the 26th of November 2004.

I enjoyed all of the lectures and acquired lot of knowledge about various techniques and technology used by Japanese archaeologists for scientific research in the field of archaeological exploration, excavation and restoration. All of the classes during the training course were knowledgeable and meaningful. During the training course, I learned about the cultural heritage preservation and protection laws of Japan, and could make comparisons with the Ancient Monument Conservation act of Nepal. This act is the main guideline for the conduct of archaeological research in the Department of Archaeology in Nepal. I also became acquainted with some of the protected monuments and sites in Japan. In addition, I was impressed by the lecture about international cultural heritage preservation and protection laws by Dr. Valerie Magar of ICCROM (Rome).

The lecture by Dr. Magar was quite interesting and furnished me with a lot of information about ICCROM. I learned about the main activities being carried out at ICCROM and the various international organizations that have been involved in cultural heritage preservation and protection. At the same time, I gained insight on the diverse meanings of “heritage”. Questions that arise and addressed included: why do we conserve heritage? What should we save? The social, spiritual, historic, aesthetic, scientific and economic values of cultural heritage in the different part of the world also need to be addressed as they are sometimes very different; every country has its own concerns based on its past, culture, and focus. Likewise, I am also acquainted with the different international charters recommendations and conventions regarding the guidelines for heritage conservation in the various part of the world. The lectures about management and archaeological conservation methods in Japan were also awe-inspiring for me and supplied a lot of facts relating to their significance for the restoration of tangible and intangible archaeological assets; this is important for the sake of future generations. In Nepal, we also follow certain procedures before starting any conservation and restoration work for gaining better results. Although we have not applied management methods yet, as Japan has, we usually follow restoration and conservation procedures to some extent.

The dendrochronological dating method lecture also impressed me and provided a lot of knowledge concerning absolute dating methods in archaeological research. Japan has apparently developed a strong emphasis in the field of dendrochronological analysis. However, it is quite possible to undertake that type of work here owing to the abundance of waterlogged sites where big fragments of wood can still be found during excavations. Various apparatus' have also been developed by the Japanese archaeologists for scientific research that enables them to conduct research properly. Dendrochrological research has not yet taken hold in Nepal and there is a little chance of development because most of the archaeological sites belong to the tropical and sub-tropical regions where it is not possible to get samples for research, however, we have discovered some samples from the Mustang district, which is situated in the trans Himalayan region, that made it possible to construct a dendrochronological calendar of the master sequence for dating some sites.

The country paper presentation session, by all of the course participants, was also interesting and enabled me to understand archaeological activities, research, and specific research methods applied in different countries. It was also a good introduction to major archaeological sites, and major research problems and issues for restoration and conservation in the Asia/Pacific region. The comments by Dr. Magar (ICCROM) on the country papers was also awe-inspiring and knowledgeable. She centered her comments on the need for training, collaboration with foreign teams or institutions, survey and documentation methods, the recognition of archaeology by the public, the presentation of sites, the use of scientific methods, and the authenticity of conservation materials for the betterment of archaeological conservation and research. Furthermore, the lectures about dating methods were also interesting and supplied me with additional knowledge on C14 dating and the dendrochronological dating method.

The lecture on the natural sciences and archaeology provided a great depth of information about the relationship of archaeology to other sciences in terms of getting genuine facts from the past. Moreover, the lecture on conservation science and artifact analysis were also informative as they provided comprehensive knowledge in the area of wood conservation, the handling of artifacts during excavation, the best way of lifting fragile objects from the ground, the immediate care of artifacts, proper packing for safe storage, the best methods for pollen collection from bogs, and the immediate care of iron, bronze, silver, lead and copper objects. I also had the opportunity to observe various equipment developed for special analyses of objects and materials. This type of apparatus is not available in my country. Instead we must apply traditional techniques for research. Conservation science in Japan has been developed more extensively than in Nepal and researchers are applying scientific methods for the restoration of archaeological and historical sites. As a matter of fact, Japan has developed various method and techniques for waterlogged wood conservation. These methods would be a good guideline for the participants if they applied them in the field of waterlogged wood conservation in their own countries.

The survey measuring method using the 3D scanner was a new method for me. The digital archive system is also a new technology in the field of archaeological research and conservation. It is based on producing high precision 3D digital archives specifically designed for archaeological remains. This is a highly practical system that allows for the following information to be collected: 1. the measurement of all types of archaeological remains; 2. the extraction of high precision data for research purpose; and 3. easy operation by non-specialists. Japanese scholars have been studying the feasibility of its application to conservation treatment and restoration work. It can be also used in the apparel and medical industries.

Furthermore, I also enjoyed the environmental archaeology lecture where I was able to assimilate a lot of information concerning climate, geology, soil, past vegetation and their importance for the environmental reconstruction, food habits, and zooarchaeology. The pollen analysis lecture was also interesting. All of the participants conducted practical work for collecting pollen grains from the soil and used a microscope to see small seeds. Bone analysis classes were also outstanding and informative. We observed different kinds of bones from various animal species and got some insight regarding the importance of these materials for the study of human evolution. The palaeoparasitology was also a new area of research for me, especially regarding toilet archaeology and its application to research. Many ancient toilet sites have been excavated in Japan and have uncovered many remains of various crops that have provided archaeologists with knowledge about the food habits of the ancient people. Similarly, the GIS and GPS lectures provided lot of information concerning these systems and their applications to archaeological research. In Japan, this new technology is widely used by archaeologists, however, these systems have not yet been applied in Nepal for archaeological research. Moreover, the lecture on landscaping and management of archaeological sites has provided wide knowledge concerning the management of various archaeological sites in Japan. The management of archaeological sites in Japan is greatly appreciated.

The field trip to the various archaeological sites, research center and museum was also exciting and interesting. We visited the Noto Kokobun-ji temple site which is situated in Ishikawa Prefecture in Nanao city. The excavation work at this site started in 1922. After the completion of the excavation, the reconstruction and restoration project was carried out with the cooperation of the local people. The preservation, restoration and management plan of the site greatly impressed me. The site museum also supplied me with a lot of information about the material culture of the Japanese people from this time period. The display system in the museum also excited me as well.

Likewise, the visit to the Ishikawa Archaeological Foundation excited me because I had not seen such a big research center before. The Ishikawa foundation basically engages in rescue excavation, storage and analysis, publication of excavation reports, conservation and treatment of the objects, the documentation of excavation records such as mapping and photography, and compiling and preparing archaeological information for educational purposes regarding the protection of cultural heritage. The storage system for excavated material, labs for the conservation of artifacts, special rooms for the preservation of wooden objects, pottery drawing, washing the pottery and photography, the museum display and the audio visual system, the big storage room for the protection of the old drawings, the reference library, the model house of the Jomon period and the kiln for creating the replica of the various terracotta figurine, all greatly impressed me. Such a foundation is very necessary for each country in order to conduct scientific research in archaeology.

Furthermore, the visit to the Ichijodani Asakura clan ruins situated in Fukui city in Fukui Prefecture also provided me with some insight relating to the medieval history of Japan. This grand castle town was founded in 1471 and existed for 103 years as a fortification and residence for the Asakura clan, vessels and commoners. Many excavations have been conducted around the site. This work uncovered a town complex with a temple, a house for the lord and his samurai retainers, dwellings for craft workers and merchants, and gardens and street with drainage gutters. After the completion of the excavation, the medieval traditional town was restored and rebuilt over the ruins of the Asakura clan using traditional building materials. It was also a new experience for me because I have never seen a reconstructed conjectural architectural town built over ruins.

The visit to the Torihama Shell Midden and Romantic Park was also knowledgeable and noteworthy. The Torihama site is a prehistoric shell midden located on a sand bank at the junction of the Hasu and Takase rivers, but the actual site where the excavation was conducted is now submerged under the re-structured and realigned river. The research demonstrated that the shell midden was created during the early to middle *Jomon* period, around 4,000 B.C. to 3,000 B.C. The museum devoted solely to the site greatly excited me and supplied me with a lot of information about the material culture of the *Jomon* period. I was also surprised when I saw a wooden boat at the display that was brought from Nepal. The exhibition of the museum was magnificent and awe-inspiring. The visit to the Matsugase *Daiba* Battery Platform provided insight about the 19th century in Japan. The two day discussion related to the future task in the preservation of cultural heritage also provided many new insights for heritage conservation. Overall, I learned a lot during the lectures, the practical work and the field trips. Every lecture was interesting and awe-inspiring and provided me with theoretical depth and practical knowledge as well.

Archaeological Research Problems in Nepal

Archaeologists always seek a scientific analysis for the reconstruction of the history of human beings on the basis of the material remains of the past. Thus, archaeological research has played a pivotal role for acquiring facts related to people and their societies of by-gone days. Archaeological research in Nepal started much later than in other part of the Asia Pacific region, however many research projects have been conducted by the DOA all over the country within a short span of time, and has acquired satisfactory results from this research. All of the research has been published through the journal of the DOA and various institutions around the world. However, a detailed archaeological survey throughout Nepal has yet to be carried out. Therefore, the accurate number of archaeological sites is not known. The surveys done so far including a few accidental events, brought some archaeological sites to our notice. Among these, very few are excavated and others remain unexcavated. All of the explored sites, both excavated and unexcavated, are the subject of conservation work and are being studied thoroughly. We have an obligation not only to explore, explain, conserve and excavate, but also to publicize the significance to the people of the present generation in a scientific way. A lot of research has been conducted following scientific methods whereas some used traditional methods for research activities. A few years ago, archaeological research was conducted using scientific methods with the support of different institutions around the world. The results helped to advance the study of Nepalese history and culture.

Although we have been conducting a lot of research in the field of archaeology in Nepal, the research has not yet developed as it has in Japan. Japan has already developed a high quality research system along with the use of scientific machines and skilled manpower. This is the reason why the research is quit accurate and scientific. However, in Nepal, there are still many problems with the ability to conduct proper archaeological research. The following list discusses the main problems that must be solved in order to get better result from the archaeological research being done in Nepal:

1. A lack of training institutes is the main problem. Due to this, we are unable to acquire skilled manpower for the research. We still depend on our neighboring countries for training courses. However, in Japan, many training institutes already exist in every Prefecture, and many skilled workers are produced every year by these institutions for executing scientific research. This is the reason why the research is of such high quality. Through the lectures, I found out that ten thousand professionals per year have been doing archaeological research in Japan.
2. The lack of scientific instruments and skilled manpower to use modern equipment is also a major problem in Nepal. Archaeological exploration, excavation and conservation seek different kinds of instruments and skilled manpower for operating

these instrument properly. Japan has developed various kinds of apparatus and these are using for research everywhere for getting accurate results. The modern instruments that are developed in Japan for various analyses surprised me, and I came to know the the importance of these instruments for getting results from research. I will request to my Department to buy some instruments for conducting scientific exploration, excavation and analysis. However, these instruments are very expensive. This is why the DOA is unable to buy these instruments in the near future.

3. In Nepal there are a lack labs for the analysis of excavated objects. Conservation is other big problem. This has always created various predicaments for research and the conservation of artifacts. We usually send samples abroad for lab analysis which is why it takes a long time for the publication of final reports. Likewise, the cost of the lab analysis is quiet high and it is not possible for us to bear the expenses of the test with a limited budget. Due to these facts, we are force to depend on traditional methods for analyzing artifacts and for dating. However, in Japan, the situation is quit different from Nepal because there is no problem regarding lab analysis. Gigantic laboratories exist in different Prefectures along with modern apparatus that allow researchers to work properly. In addition, it is very easy to get accurate results within a short span of time. It will take a long time for Nepal to develop this type of research system.

4. A lack of investment for archaeological research is also a big problem in my country. The Government of Nepal has allotted a limited budget for the protection of cultural assets and research, and with this limited budget we have to protect all of the cultural properties in the entire country. There is no private sector to invest in for cultural properties research. The situation in Japan is quit different as the Government of Japan invests a lot of money in the protection of cultural properties and research management every year. Additionally, every Prefectural government also has their own funding. Similarly, there are also a lot of funding agencies that provided huge amounts of money for the protection of cultural properties. Through the course lectures I learned about the various funding agencies in the world that provide money for archaeological research. Therefore, I will request that my Department ask for donations from these agencies for the betterment of archaeological research in Nepal.

5. There is a lack of awareness concerning the importance of cultural properties for the public; this is a grave problem in Nepal. Even educated people do not know about the significance of archaeological assets. The Japanese people are very conscious of their cultural properties, and there is direct participation of the people in the protection of the cultural wealth of their respective Prefectures. The direct participation by the public has made it possible for the Japanese conservator and professional to conduct such a high level of conservation and restoration.

6. Conventional approaches are still used in archaeological research in Nepal, owing to the lack of skilled manpower and equipment. Traditional methods have already disappeared from various parts of the world, and archaeologists prefer to apply scientific methods to their archaeological research. Archaeologists in Japan have also applied scientific methods and instruments for their archaeological research. Likewise, they also use scientific methods for the analysis of artifacts.

   In summary, many problems still exist in Nepal in the field of archaeological research. The Department of Archaeology in Nepal is trying to overcome these problems with the support of different institutions around the world. On the other hand, Japan has already developed many scientific methods for research on archaeological sites. Thus, at present the approaches to archaeological research in Japan are different than in my country. The basic difference existing between the two countries are the following: Japanese archaeologists apply scientific methods for archaeological research, whereas in Nepal we still follow traditional methods along with some scientific methods for archaeological research.

Relevance of the Training Course to My Research

The training programme was very important and relevant to me because it supplied me with a lot of information relating to management methods for archaeological conservation, dendrochronological dating methods, C14 dating methods, and other new scientific dating methods. I also learned about the conservation of artifacts, the analysis of artifacts, survey measuring methods, and the importance of environment archaeology such as analytical methods for pollen, seed and faunal remains, and animal bone analysis. Other areas that I was exposed to include data integration methods, landscape and management of archaeological sites, the architectural design of various periods in Japan, the status of conservation of archaeological sites, and archaeological remains from various periods. Moreover, it provided me with a lot of information about the history of the Angkor UNESCO World Heritage site in Cambodia, the Tamgaly archaeological landscape and rock art site in Kazakhstan, salvage excavations at Pha Phen limestone outcrop in Laos, various archaeological expedition projects in Mongolia, the Maori site types of New Zealand, salvage excavations in the Taxila valley of Pakistan, the result of the 2000 and 2001 fieldwork seasons in Papua New Guinea, and the development of archaeological research in the Philippines. Other sites I learned about included the status of dating methods in Korea, Anuradhapura, Polonnaruva, Nigeria, Dambula, and the Candy and Galley sites in Sri Lanka, the Ayutthaya Kiln sites in Thailand, and the methods of excavation at the Thang Long Imperial Citadel site in Vietnam. I also had opportunities to understand the history of archaeological research, the status of archaeology, methods of archaeological exploration, excavation and conservation, preservation and conservation laws and techniques, the status of publications, recording systems, artifact analyses, problems with conservation, and important archaeological sites in various Asia Pacific countries. I was also able to share different ideas with the participants relating to existing problems with archaeological research in the Asia- Pacific region. Discussions among the participants also gave me a lot of new research ideas. During the field trip I collected a lot of information concerning the archaeological research centres of Japan, the conservation status, museum displays, and archaeological artifacts from various periods. I got a lot of information relating to the operation of various equipment used for research purposes, as well as their limitations.

This training provided me with a lot of insight concerning to archaeological excavation, exploration, conservation, heritage management and analysis of various excavated objects. From this training, I came to know that lot of things are still to be improved in my country. I will share all of these experiences and expertise with the experts in the Department of Archaeology in Nepal, and try to convince them to follow some techniques to achieve better research results. I will also apply the research methods that I learned during the training period in my own work.

Conclusion

Overall, the training was quiet 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 thank and express my gratitude to the Cultural Heritage Protection Cooperation Office Asia/Pacific Cultural Center for UNESCO (ACCU Nara), The International Center for the study of the Preservation and Restoration of Cultural Properties ICCROM, The National Research Institutes for Cultural Properties, the Ministry of Foreign Affairs of Japan, the Japanese National Commission for UNESCO, the Nara Prefectural Government and the Municipal Government of Nara on behalf of Nepal, for providing me with such a great opportunity to participate in the training course. I would also like to thank Dr. Ushikawa, Director of the ACCU Nara office, Mr. Yoshioka, Deputy director of ACCU Nara, and the other member of ACCU Nara for their help, especially Dr. Yasushi Nishimura, Ms. Kayoko Ishii, and Mr. Mark Diab for their outstanding coordination and lecturing during the training course. Thanks also go to Ms. Hata, and Mr. Suemori. I would also like to thank the Government of Nepal and Mr. Kosh Prasad Acharya, Director General of the Department of Archaeology of Nepal for nominating me to participate in this beneficial training course.

New Zealand

Rachel DARMODY

1. Introduction

The training course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region (26 October-26 November 2004) presented information on archaeological research and analytical methods of ancient remains. Attended by representatives of 13 different countries, it provided an opportunity for the study of archaeological methods employed in Japan and for comparisons to be made by the participating Asia-Pacific countries. Organized by the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU), the course enabled participants to learn from Japanese heritage professionals and to share their own experiences.

This report, completed as a requirement of the course, evaluates the relevance of this training programme to my work and how it can be applied to New Zealand archaeology.

2. Role at New Zealand Historic Places Trust

I am employed by the New Zealand Historic Places Trust as a Regional Archaeologist, based in the Tauranga Office of the Lower Northern Region. The Historic Places Trust employs five full-time regional archaeologists distributed throughout the country and two archaeologists based at head office, one of whom is the Senior Archaeologist.

The Historic Places Trust is New Zealand's lead heritage agency and is responsible for administering the Historic Places Act 1993 ("HPA"). This is the country's most important piece of legislation for the protection of archaeological sites. The HPA makes it illegal to "modify, damage or destroy" an archaeological site without an authority from the Historic Places Trust. The Trust has the ability to decline an application to modify an archaeological site and provides substantial penalties for site destruction, including criminal convictions through New Zealand's court system.

As a Regional Archaeologist, I am responsible for assessing authority applications in the Lower Northern Region and for making recommendations to the Senior Archaeologist. At times this means defending the decisions the Trust has made through the Environment Court, when an authority is appealed. To avoid this situation, regional archaeologists attempt to work with developers in the early planning stages of projects, to encourage the preservation of important archaeological sites. This is often done through another important piece of legislation for archaeological sites- the Resource Management Act 2003 ("RMA"). The RMA requires local governments to recognize and provide for archaeological sites as part of the integrated management of resources in both plans and policy statements. Under the RMA the recognition and protection of historic heritage is a matter of national importance and historic heritage is to be protected from inappropriate subdivision, use or development. Local governments have approached this responsibility in many different ways throughout the country, with differing degrees of success. Local government therefore plays a vital role in the protection of heritage resources and the Trust has placed an emphasis on working with councils to achieve positive heritage outcomes.

Regional archaeologists are responsible for monitoring the conditions on archaeological authorities and for investigating reports of site damage. In some regions of New Zealand site damage has been very high and increasing at such a rate that the Trust's resources have been stretched. While prosecution is seen as a measure of last resort, the Trust has taken a number of prosecutions in recent years demonstrating that the law in fact does have "teeth".

The Trust manages a number of New Zealand's iconic properties and in the Lower Northern Region this includes six archaeological sites, which are mostly redoubts relating to the New Zealand Wars. Regional archaeologists provide specialist advice to the property managers in relation to site conservation and interpretation, as well as monitoring visitor impact.

A vital part of the Trust's role is advocacy and heritage promotion. At the most basic level this involves providing free advice to the public about archaeological sites and how to look after them, as most sites are in private ownership. Regional archaeologists are also involved in promoting heritage through the presentation of lectures and workshops to special interest groups and the general public.

3. How the training course relates to New Zealand archaeology

New Zealand's history, dating back 1000 years, is very short compared to Japan and the other countries represented on the training course. Nevertheless New Zealand has a rich record of archaeological sites and shares many heritage issues in common with the other countries, which were highlighted throughout the course. These included:

- Site protection

The purpose of the Historic Places Act is to "promote the identification, protection, preservation and conservation" of New Zealand's historical and cultural heritage. One of the Historic Places Trust's main functions is to compile and maintain the statutory register of historic places, historic areas, wahi tapu and wahi tapu areas and it currently has more than 6,000 entries. The Register identifies significant heritage but it does not provide any protection from modification or destruction under the HPA. Local governments (or councils) are responsible for protecting heritage they deem important under the RMA through their district plans. Most councils schedule significant heritage items and these lists are often, but not always, based on the Trust's Register. Some councils provide incentives to private owners of heritage properties and the Trust has a small fund available to contribute to conservation projects involving private registered properties. A number of other pieces of legislation also relate to cultural heritage, including the Antiquities Act 1975 for artifacts/moveable cultural property and this is administered by the Ministry for Culture and Heritage.

While New Zealand's history of site protection dates back to the 1970s, in comparison Japan has over 100 years experience of cultural heritage conservation through law. Japan's current legal framework is based on the Law for the Protection of Cultural Properties 1950 and provides a unified system encompassing the tangible and intangible, as well as natural monuments and places of scenic beauty. In comparison New Zealand has a number of laws for cultural heritage protection that are administered by different organizations, causing a fragmented approach. Japan's heritage protection mechanisms also provide for a much broader variety of cultural properties than New Zealand law. One of the other interesting points about heritage protection in Japan is that it places greater consideration on both the mechanisms of protection and how sites are exhibited and utilized. The nurturing of public awareness and appreciation for heritage sites is therefore given much greater emphasis in Japan.

- Presentation of sites and public recognition

The need to educate individuals and communities to recognize, value, and conserve their heritage resources were an issue identified by many of the participants on the training course. This is a serious problem for New Zealand as the general public has a limited understanding and little appreciation for their heritage. The community needs to receive benefits from archaeological research so there is a need to consider how we present our heritage sites and information about the past.

Japan has provided many examples of how to interpret and display archaeological sites in dynamic and interesting ways. The cultural properties visited on the field trip illustrated how different types of archaeological sites can be presented to the public, from the Noto-Kokubun-ji Temple, to the Ichijodani Asakura Clan Ruin, Torihama shell midden, and the Matsugase *Daiba* Battery Platform. Each site offered visitors the opportunity to conceptualize the original, in some cases through full-scale or partial reconstruction, or by viewing replicas. The display of artifacts associated with the cultural properties and information at on-site interpretation centres created a deeper appreciation of the historical remains. Japan′ s emphasis on establishing specifically designed facilities for a particular archaeological site, to serve both as a museum and research centre, is an important component in raising public awareness.

The field trip also illustrated that it was not just the large cities showing a commitment to preserving archaeological sites. The Matsugase *Daiba* Battery Platform, Matsugase, Fukui Prefecture, is located within a town which has a population of 6,000. After being designated as a National District Site, the community wanted to improve the condition of the site and established a committee with advice from the Agency for Cultural Affairs. Using information from archaeological excavation and historical sources the fortifications were reconstructed and are now open for public display.

In Japan there are a significant number of cultural properties open to the public making heritage more accessible than in New Zealand. The provision of good quality and interesting interpretation at New Zealand heritage sites will be a vital component in encouraging greater public participation in their own history.

- Scientific methods

An important focus of the training course has been the introduction to a range of scientific methods from dendrochronology and other dating methods, to 3D laser scanning of archaeological remains, palaeoparasitology, and bone and pollen analysis. This highlighted the importance of applying a multi-disciplinary approach in archaeological research to obtain as much information as possible from site investigations. The exposure to different scientific methods of analysis illustrated the techniques available and where to go to get this information.

- International cooperation, training and exchange

Japan has recognized the importance of promoting international cooperation for the protection of cultural properties throughout the world. A number of course participants gave examples of joint-projects operating in their countries, bringing both funding and expertise. In Japan a range of cooperative research projects related to conservation and restoration of cultural properties are being undertaken with other countries, as well as training programmes such as this course. The need for mid-career training and on-going networking was identified as a vital issue by the participants on this course.

4. Conclusion

The opportunity to learn from Japanese experts and discuss archaeological and conservation issues with heritage professionals from a range of Asia-Pacific countries has been very rewarding. I wish to thank ACCU and ICCROM for this wonderful opportunity and in particular the staff at the ACCU Office in Nara. I also wish to thank the other participants on the course for making the time in Nara so enjoyable.

Pakistan

Muhammad HASSAN

Introduction

On behalf of the Ministry of Minority, Culture, Sports and Tourism, Department of Archaeology and Museums, of the Government of Pakistan, I would like to express my thoughtful thanks to the Government of Japan and ACCU Nara for giving me the chance to attend the ACCU Nara training course.

Cultural Heritage is an issue of great national and historical pride for every nation, and for its future generations. Each nation of world has a cultural heritage that consists of historic buildings, ancient monuments and ruins. It is a source of reference and research for historians, researchers and archaeologists to study the progress of certain periods of history, culture and the stages of evolution of different societies and nations. Understanding the history of national heritage also contributes to the national economy since it can help to develop cultural tourism. Elements of nationalism, projected by multiple cultural backgrounds that existed in certain periods, can be seen in archaeological ruins, architecture, designs and motifs. National heritage forms a distinctive identity and personality of a nation, and give a sense of pride to its people.

Before starting the course, an opening ceremony was inaugurated at the Kasugano-so Hotel near the ACCU office, with a welcome address by the Director of the ACCU Nara office. The Director also explained the history and the importance of the city of Nara. Following the address, all of the participants introduced themselves and also described their area of work.

I was very happy and grateful to have had the opportunity to participate in the Training course on the Preservation and Restoration of Cultural Heritage in the Asia/Pacific Region 2004, entitled “Archaeological Research Methodology and Analytical Methods of Ancient Remains” which was organized by the Cultural Heritage Protection Cooperation Office Asia/Pacific Cultural Centre for UNESCO (ACCU} Nara on 27th October 2004 to 26th November 2004.

Although I have worked in the Department of Archaeology and Museums since1990, with my primary duties in exploration and excavation, I have not had a chance to train abroad or even within Pakistan. However, I now feel that I am the most fortunate among all of the officers who have had the chance train abroad. My main interest for participating in this course was to learn what is common and what is different in the field of archaeology (i.e. survey, excavation, conservation and documentation of artifacts). I am interested in learning the diverse concepts and approaches in different countries, and also to learn various techniques for preserving cultural heritage?

Thirteen participants from various countries participated in the ACCU Nara training course. They came from: Cambodia, Kazakhstan, Laos, Mongolia, Nepal, New Zealand, Papua New Guinea, the Philippines, Korea, Sri Lanka, Thailand and Vietnam. The contents of this training course were very thorough and rich, and covered many aspects of cultural heritage from archaeological exploration, excavation, research, conservation, restoration of archaeological sites and monuments, proper documentation and photography, to laws and regulations of cultural properties, importance of intangible and tangible cultural heritage, protection of natural heritage, and the proper treatment of archaeological artifacts. The instructors came not only from Japan but also from ICCROM. All of them were experts in their fields, and they introduced new technology and research methods in the field of archaeology, conservation, restoration and preservation.

About the Training Course

The following pages present a summary and my impressions after completing the one-month training course organized by ACCU Nara. The training course was very interesting and informative, and threw light on many aspects of archaeology. If I make a comparison with Pakistan, that has one of the richest cultures and oldest civilizations in the world, but unfortunately there is no modern equipment, and not as much technical knowledge and resources like Japan. In Pakistan, the ancient monuments and sites have suffered from a variety of problems. The natural causes are numerous and varied, for instance, thick vegetation, heavy rainfall, floods, the problems with saltpeter. In addition, vandalism, smuggling of antiquities, and removal of stones and bricks for building purposes, has always been a great cause of destruction of ancient sites and monuments. In this connection, the Department of Archaeology and Museums, Government of Pakistan has taken serious steps towards the protection, preservation and study of ancient monuments and sites. Since then the department has done many surveys, excavations and conservation projects at different sites and monuments for the protection of cultural properties. I am happy to see the modern techniques of Japanese archaeologists in the field of conservation, restoration, exploration and excavation. We cannot yet develop the type of scientific methods that Japan has currently developed

The course began with the first of a series of lectures in the ACCU office and the National Research Institute for Cultural Properties, Nara (NRICPN). All lectures were very beneficial and interesting. The lecture on Cultural Heritage Preservation and Protection Laws by Dr. Magar from ICCROM and Mr. Isomura from Japan were very useful and informative for me. Dr. Magar’s lecture on international conventions and laws regarding cultural heritage protection was very informative. This lecture consisted of an outline of a variety of laws and guidelines that govern the funding, management, conservation and protection of cultural heritage from an international and national perspective. This lecture not only provided a global perspective, but also examples of cultural heritage protection practices from various countries around the world.

Similarly, the lecture by Mr. Isomura about Japanese heritage preservation laws was also informative. Japan has over one hundred years of history regarding cultural heritage conservation laws. This law divides cultural properties into five groups", Tangible Cultural Properties, Intangible Cultural Properties, Folk Cultural Properties, Monuments, and Groups of Historic Buildings. Based on these facts the National government is able to designate items, buildings, or places as Important Cultural Heritage Properties, Historic Sites, and Places of Scenic Beauty or Natural Monuments. The law sets out to protect not only these Cultural properties but also traditional conservation techniques that are essential for their preservation, as well as archaeological finds that remain buried in the earth, i.e. Buried Cultural Properties. The Japanese law briefly dealt with the devolution to local governments and the responsibility to protect cultural heritage. This is a good example of how to protect cultural heritage.

On the other hand, the legal and regulatory situation for cultural preservation and protection in Pakistan is very different. The history of legislation with regard to the protection and preservation of cultural heritage is very old in Pakistan which covers one and half centuries, and after several amendments it reached the final stage, called the 'Antiquities Act 1975' (Act, VII of 1976}. This was an act to repeal and re-enact the Law relating to the preservation and protection of antiquities. The Department of Archaeology and Museums is the only organization that deals with this Act for the protection and preservation of archaeological sites and monuments all over the country. With this in mind, it is hope that in the future local government will take a greater role for the management and protection of cultural properties in their areas.

The lectures on the introduction to dating methods i.e. dendrochronology, C14, survey measuring methods (3D laser scanning}, analytical methods of organic material (pollen, seed, and faunal remains}, data integration by GIS and GPS and the workshop on the analysis of animal bones were all very informative, comprehensive and impressive. Before this, I did not know about the detail of above mentioned topics. It was very useful for me because these methods are not being implemented in my country. These lectures provided a solid basic grounding on the planning and organization of archaeological excavations and explorations.

The Department of Archaeology and Museums of the Government of Pakistan has a full-fledged branch for exploration and excavation. The branch always remains busy conducting excavations and explorations throughout the country, especially relating to prehistoric, proto historic, the Gandhara Grave Culture, and Buddhist and historic periods sites. However, the methods of excavation and exploration are all different since we are using still traditional methodology in the field of archaeology, but Japanese archaeologists conduct the same work with modern techniques. I have learned a number of things from the Japanese approach to conservation and how the retention of traditional knowledge and skills is an integral part of their cultural heritage conservation. It was also an excellent opportunity to see the dendrochronology laboratory and faunal osteoarchaeology laboratory at the National Research Institute for Cultural Properties in Nara. Unfortunately, in my Department in Pakistan, there are no such laboratories available for the analysis of bones and dendrochronology.

The reconstruction of ancient building and ruins in Japan is a very good method. Ancient buildings have been buried in the soil for a very long time before being unearthed through excavation. They have been exposed to the present day environment which causes damage. Although conservation and restoration has been undertaken they are still at risk. The conservation and restoration methods are only to consolidate and to extend the age of those building and ruins. The restoration methods and design themselves sometimes destroy the authenticity of buildings. If any mistake occurs during the conservation and restoration they cannot be corrected. Thus, the technique of covering up the original remains and reconstructing buildings on the top is based on evidence and interpretations. The reconstructed buildings will provide more essential data for visitors. They can be changed and corrected if any new evidence or information appears in the future, without making any damages to the original buildings or ruins.

In Pakistan the conservation and restoration of sites and monuments is different from Japan. The structure of sites and monuments in Pakistan consists of mostly bricks and stone masonry. However, there is no concept regarding the reconstruction of sites and monuments like there is in Japan. The aim of the conservation of monuments or sites in Pakistan is to protect it from further decay, thus giving it a new lease on life. Its primary objectives are to preserve the original features as far as possible so that the authenticity of the monuments or sites are not impaired

The Department of Archaeology and Museums Government of Pakistan has however been aware of the problems throughout the years, for example, a shortage of technical manpower, financial issues of important, scientific instruments, and creating new policies, however, the department has always made to efforts to carry out their conservation work using similar type of material and identical binding matters. However further improvements are made from time to time for better and efficient preservation, protection, conservation and presentation of cultural properties.

Study Trip

Besides, the lectures in the class room, we visited many temples and shrines in the vicinity of Nara. The maintenance of the sites and monuments was excellent. The credit should go to the government of Japan and its people who care for their cultural heritage with great respect. The ACCU office also arranged a three day field study trip out of Nara to Ishikawa and Fukui Prefectures. The study trip was very informative and knowledgeable. I assimilated a considerable amount of knowledge and information from this trip. The trip was began on the morning of 17th November and ended in the evening of 19th November. During the visit to archaeological sites in Ishikawa and Fukui Prefectures I was really happy to see modern techniques used to handle artifacts. The storage system, treatment of artifacts, photography of artifacts, and the restoration and preservation were ideal. The reconstruction and restoration of Archaeological remains at the Noto Kokubun-ji site and museum presented a real scene of the past. On the other hand, I appreciate the work of the Ishikawa Archaeological Foundation (Research Centre), especially their keen interest in artifact storage, analysis, publication of excavations reports, conservation science and treatment, proper documentation and recording of artifacts, and mapping and photography. The same high level of work was seen at other archaeological sites we visited, such as, the Ichijodani Asakura Clan Ruins, the Torihama Shell Midden and Romantic Park, and the Matsugase *Daiba* Battery Platform located in Fukui Prefecture. All of these locales are good examples of the protection of cultural properties in Japan. The Mikata Jomon Torihama Archaeological Site and Museum was excellent and the museum displays were also well organized. Finally, the historic site of the Matsugase Daiba Battery Platform, was very interesting because of the reconstruction and installation of the cannons on the Platform.

Discussion

During the last days of the training course, a discussion began on the topic of "Future Tasks in the Preservation of Cultural Heritage" organized and presented by Dr. Wijesuriya from ICCROM (Rome), an expert in international conservation. The discussion was very interesting and meaningful. First, the participants introduced themselves and presented their comments, impressions and suggestions about the training course. This discussion consisted of different approaches among nations towards the protection and preservation of cultural heritage through laws. Almost all the participants demonstrated their interest in cultural properties. All the participants shared their country problems with the expert. The discussion was a good experience for me. During the discussion I gained a lot of knowledge about cultural heritage regarding different countries and their problems. At the end of the training, all the participants confirmed that they would continue communication through email amongst themselves and ACCU for the future benefit of cultural heritage (i.e. conservation, restoration and excavation from their countries).

Conclusion

As a whole, the training programme was extremely effective and impressive. It was clear that all of the participants felt this way because we acquired a considerable amount of knowledge and experience from the training course, especially regarding the process of conservation, protection, heritage planning and management, and various archaeological techniques.

The training course consisted of theory and practical work. Sites visit to different prefectures in Japan gave me a great chance to enhance my knowledge in many ways. The coordination of the whole programme was very systematic and efficient regarding the arrangement of lectures, transportation and hotels. The organization of the lectures and discussions was especially noteworthy. The attitude of all the staff and organizers, especially Dr. Yasushi Nishimura, Kayoko Ishii and Mark Diab were excellent. The duration and timing of the lectures was very suitable. Finally, I would like to summarize the training course in a few words, if that is possible: the conservation, preservation, restoration, protection and reconstruction of cultural heritage is extremely important for future generations.

Acknowledgements

I feel that the one month training course at the ACCU office in Nara Japan reached a successful conclusion. I would like to thanks to Dr. Ushikawa Yoshiyuki, the Director of ACCU and all of the staff of ACCU who helped us in every way in Nara. I would also like to thank the ICCORM representatives for providing the funding that enabled me to attend this training course. I am also pleased to give thoughtful regards to my Director-General in the Department of Archaeology and Museums of Pakistan who nominated me for this training course. I would like to sincerely thank my colleagues and the staff of Lahore Fort and the Taxila Museum who helped me to prepare the country paper. My thanks also go to my staff at Gilgit for encouragement.

Papua New Guinea

Nick ARAHO

METHODS, TECHNIQUES AND PERCEPTIONS ON THE HUON PENINSULA OF PAPUA NEW GUINEA: FINAL REPORT ON THE ACCU TRAINING WORKSHOP, 27th OCTOBER-26TH NOVEMBER 2004. NARA JAPAN.

"Currently, there is a schism between the art historians
and the dendrochronologists about the right techniques
to use in dating cultural heritage, but while we are arguing, each year
A new tree ring is being added.
Perhaps the tree ring knows better."

Dr. Mitsutani (NRICPN. November, 2004, Nara, Japan)

Acknowledgements

My sincere thanks goes to Dr Ushikawa and the staff and the secretariat of ACCU Nara for availing me of this opportunity to travel to Nara, Japan, to attend the training course on The Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region 2004: Archaeological Research Methodology and Analytical Methods of Ancient Remains, and to experience a bit of Japanese culture. I also wish to thank Ms Regina Kati, the Secretary General of the UNESCO National Commission in Port Moresby and her staff for co-coordinating travel arrangements, and also to apologise for being a pain at times when I urgently needed to contact ACCU-Nara to confirm my participation. Thanks are also extended to the Director of the Papua New Guinea National Museum Mr. Soroi Marepo Eoe for approving my attendance at this course and to the Japanese Embassy in Port Moresby for granting me the required visa to travel to Japan. To my fellow course participants in Nara, I say thank you for the intellectual stimulus, and making my stay there more bearable with your warm and friendly company. I was humbled by the common problems we all share in struggling to address issues of heritage management with limited funding and resources, and I hope, just as Dr Wijesuriya said, that the Nara 2004 group can contribute in a little way to making a difference in the business of promoting the relevance of each countries cultural patrimony to world issues and affairs, and to show that it is possible to live in DIVERSITY and yet to be ONE. Lastly, I would like to thank Dr. Nishimura, Ms. Ishii, Mark Diab, Kaoru, and Ms. Hata and the lecturers too numerous for me to name here-you all know who you are-for successfully running the training course. If I have missed out anyone, it is not intentional.

Introduction

In this report I can only afford to select specific items from the menu of techniques and methods presented at the training session for application to my case study: the Huon Peninsula on Papua New Guinea, where I have been struggling to carry out archaeological research. To be fair, it is not possible to give an accurate evaluation of the course in such a short time after returning home to Papua New Guinea (PNG) because it would be an injustice to all our Japanese colleagues and hosts who spent all the time, effort, and resources preparing for the course, giving lectures, and doing their best to ensure that everything ran smoothly. Besides, the full benefit of the course can only be accurately judged given more time, as a considerable amount of information was crammed into my head, and I am still trying to make sense of it all. However, since our hosts at ACCU-Nara have invited us to evaluate their performance I have gone ahead and done that in my normal insensitive way and in the process have neglected a lot of important methodological and analytical techniques worth considering. In so doing I hope that I have not hurt anyone's feelings as this is not my intention, and if I have, I apologise. I have to deal with reality every day at the PNG National Museum so this approach of selecting specific technologies, analytical skills and methodologies is indicative of that struggle-a limitation imposed by limited funding and resources. Ideally, a long term plan matched by a steady budget to attain specific objectives for archaeological research would be preferable. However the PNG National Museum is confronted with a dwindling budget each year, a lack of expertise in relevant scientific fields, and as such cannot hope to adequately cover all of its research priorities, let alone keep up with the adoption and use of modern scientific methods for archaeological analysis, such as all the skills learned at the ACCU training course in Nara. Given the above scenario, the selective approach adopted for the purposes of singling out specific skills and methods is reflective of the constraints which underpin a drive towards selectivity and prioritizing. What I mean by this is that my approach in this report will be to focus the discussion on specific site(s) such as the Wandokai Cave sites (Caves KIB, KIC and KID) on the Huon Peninsula because of: (1) my familiarity with the archaeological research objectives there (Araho, 1997; Groube *et. al*., 1986; Muke, 1984; Digim 'Rina', 1985); (2) long standing international research interests in the area concerning geological studies aimed at understanding past global climatic patterns over the last 500,000 years, focusing on the uplifted coral terraces in the area, and palaeobiology of the ancient coral reefs. This work characterizes much of the on-going research in the area, and indirectly fuels the impetus for international recognition and promotion of the area on the world stage (Bloom *et. al*., 1974; Chappell, 2002; Chappell, 1974; Chappell *et. al*., 1996a,b; Chappell and Polach, 1991; Esat *et. al*., 1999; Ota and Chappell, 1996; Ota *et. al*., 1996; Pandolfi *et. al*., 1994; Yokoyama *et. al*., 2000; Yokoyama *et. al*., 2001); (3) following from points 1 and 2, the potential that already exists for future collaboration based on previous collaborative research, within which the newly acquired techniques at the ACCU workshop, described below, can be applied.

Part A: Training Evaluation

The following is an evaluation of the ACCU training course with a discussion regarding problems associated with heritage management, and the applicability of methodologies on the Huon Peninsula. The methodological and analytical issues selected for possible application on the Wandokai Caves and Huon Peninsula area includes: (1) identification and conservation of historical objects, mostly from World War II; (2) faunal analysis of skeletal material- fish, human and animal; (3) surveying methods, (4) dating technology, and (5) site presentation methods for public education, appreciation, and management. I will now present an evaluation of the particular analytical skills chosen for application to the Huon Peninsula research.

1. Faunal Analysis and Physical Anthropology: Bone Identification

Human

The manual on the identification of human skeletal material by Pales and Garcia (1981) distributed during the training course was a useful document, and gave a detailed and comprehensive coverage of the human skeletal structure. It had excellent illustrations on the different parts of the human skeletal structure and provided a perfect accompaniment to other books and materials such as Brothwell's (1981) publication entitled "Digging Up Bones", that can be used to identify skeletal material from archaeological sites. Together with the experience of handling and re-assembling bones during the practical session, I was able to gain some basic ideas about skeletal parts, their orientation, and the correct positioning of bones, thus allowing an understanding of the issues and problems associated with bone identification. There is no shortage of unidentified skeletal material in the PNG National Museum which can provide the basis for gaining practical skills, improving accuracy in bone identification, and in the analysis of bones recovered from sites on the Huon Peninsula of Papua New Guinea.

Fish.

In terms of the analysis of fish skeletal remains the practical sessions were useful as the use of real skeletal material was combined with the manual by Cannon (1987) on fish osteology.. This is a simple and very effective analytical technique, as the pictorial material provided clear instructions of fish skeletal remains. The technique is applicable to the Huon Peninsula coastal sites where it is likely that fish bones will continue to be an important element of the archaeological record there.

2. Metal Conservation and Analysis

Metal conservation was introduced as a component of the course. Course handouts complimented the formal lectures and visits to the analytical laboratories at the National Research Institute for Cultural Properties (NRICP), where explanations about various equipment and their uses was explained. The volume by Koezuka (2004) provides a handy guide to the range of techniques and practices available for use. A publication by NRICP entitled, "Introduction to the Conservation Science Laboratory" lists all of the equipment and techniques available for use.

Relevance of the Metal Conservation Course to the Department of Modern History, PNG National Museum.

Although I am not well versed in the application of some skills and technology observed in the analytical laboratories, the limited experience that I had through the observations and attendance at the lectures suggests to me that this is an area that needs to be further investigated with particular reference to the treatment and conservation of metal heritage in Papua New Guinea. The issues are underpinned by the fact that Papua New Guinea was one of the epi-centres of various battles during WWII, and the attendant material culture such as old ships, planes, guns, and bullets are still evident on the landscape, and are part of the historical heritage of the country. Furthermore an important component of the PNG National Museum is the Department of Modern History which carries out investigations into and curates the National Collection of WWII material.

3. Surveying Methods

The training consisted of a lecture and outdoor practical session on the demonstration of a 3D Laser Scanner. This technique can be used for measuring objects and features from a range of between 10-20 metres. This range can encompass most heritage buildings, sites or properties, and in fact, it is also the same size of the cave sites on the Huon Peninsula. The demonstration employed a technique called Real-Time 3D Digital Measurement, that constructs 3-dimensional images of archaeological remains using an outdoor laser rangefinder. Surveying methods such as these are useful in the formation of maps and images at different scales, upon which GIS (sometimes used for the management of cultural properties) relies on. This is a technique that could possibly be used on the Huon Peninsula, except that it is expensive in which case theodolites and EDM equipment are more suitable

4. Dating Methods

This part of the training course was important for me, as it also outlined several different methods of scientific dating (Nagatomo, 2004), and secondly for the fact that some, if not the whole battery of, dating methods introduced during the lectures has been used at one point or another on the Huon Peninsula for the dating of the coral terraces (Bloom *et. al*., 1974; Chappell, 1974; Chappell *et. al*., 1996a,b; Ota and Chappell, 1996; Ota *et. al*. 1996; Chappell and Polach, 1991). However this was a highly technical field, and one in which I can hardly claim to be an expert, and therefore would require close collaboration with dating experts who carry out research on the Huon Peninsula relict terraces, in the selection of material and sites for dating.

5. Presentations and Site Management

In terms of site presentation and management, the sites visited during the training workshop provided settings for learning about the practical applications of methodologies and analysis through models and exhibitions on site development and management designed to incorporate results of excavations, sorting and analysis, displays and exhibitions, publications, conservation science, archiving, and education and diffusion. The volume by Yano (n.d) is a good introduction to site presentation and management. Two notable sites visited included the Nara Palace site, with its outdoor excavations in progress, exposed layout of the entire site, and complemented by its indoor exhibitions and models, all with a minimum of text. Conceptually, like other similar monumental features that dot entire Japanese social space recording stages of Japanese history this is a design on a grand scale and fortunate enough to have the National Research Institute for Cultural Properties (NRICP) located on the same grounds. The latest in archaeological research and analytical technology, ongoing at the NRICP, is brought to bear on the results of the excavation through the planning, design, recording, storage, selection, conservation, and training of national and inter-national archaeologists and conservationists in the latest archaeological methodologies and analytical skills. The visit to the Kanazawa Research Foundation was no different, and further emphasized the degree of careful planning and management of archaeological heritage, incorporating various educational and public educational experiences, including lectures, observation of storage space, artefact processing facilities, cleaning, sorting, and drying laboratories, and an adjoining room/museum for exhibits.

One question that struck me was that in all the sites that were visited, each had their particular histories, reasons, and motivations for their construction. However, by their very creation they impose new meanings that compete with other uses, histories, and perceptions, now defined largely by their archaeological and scientific value as an overarching framework, to which we were introduced as part of the training. This is not a problem unique to only Japanese archaeologist in dealing with the many silent voices that seem to speak from the mute sites, as each course participant will be aware about the problems that confront us with choices on interpretation of archaeological data, or what to preserve and what not to. However, is there a particularly homegrown Japanese perception about the way the various levels of histories articulate over the Japanese landscape and how landscape history should be viewed and interpreted from their own ideological standpoint? Therefore, it seems to me that lurking somewhere in the background of Japanese cultural history are questions about various interpretative frameworks and perceptions. How the distribution of sites articulate within the mental, ideological, and perceptual framework of all stakeholders in the business of managing heritage in Japan was not clear to me. Also it is not clear me to me how these homegrown views find expression in a country that made serious impacts during WWII and continue to do so through its cultural and developmental programmes. I raise this with some degree of hesitancy, because I am well aware of the sensitivities involved in expressing what may seem emotional sentiments, but I raise the issues at an intellectual level as an offer to all in a drive to satisfy our collective curiosity about different perceptions of the same landscape we are interested in. In addition, I would like to know why we choose to view it differently and to invite all of us to decide if these perceptions are justified or useful in dealing with each other as partners who have work with the material remains of histories and memories, and learn from past experiences to build a better world for future generations.

Part B: Application of Methodology and Analytical Skills on the Huon Peninsula

In order to properly situate the discussion of the techniques and the applicability of relevant methodologies to the Huon Peninsula, I briefly describe the setting of the Huon Peninsula landscape and its relevance to scientific and archaeological research.

1. Background

Geologically, the island of New Guinea was formed as a result of intense folding and faulting resulting from the collision between the westward moving Pacific Plate and the northward moving Australian Plate. One consequence of this is that the entire coastline of the Huon Peninsula is being tectonically uplifted, a phenomenon which is attributed to the large scale tectonic processes mentioned above. Superimposed upon this actively rising coastline are a set of 12 major relict coral terraces rising up to 600 metres a.s.l., described and radiometrically dated initially by Chappell (1974). Each terrace is the crest of a reef which grew during an interval of glacio-eustatic sea level rise (Chappell 1996:8), which simply means that each time post glacial sea levels rose following the melting of the polar icecaps, and the release of millions of tons of water, the sea level rise was accompanied by reef growth radiometrically dated at 30ka, 40-50ka, 60ka, 80ka, 105ka, 120ka, 140ka, 185ka, and 220ka. The main feature of the uplifted terraces are broad surfaces interpreted to be former lagoons enclosed by barrier reefs on the outer margins, especially on the northwest where the uplift rate is lower and in the order of about 0.5 metres/1000 years as compared to higher uplift rates of 2.7/1000 years, (on the southeast side near the 40,000 year old site of Bobongara. Consistent with this differential in uplift rates the heights, and forms of the terrace differ. On the northwest side these are broad surfaces interpreted to be former lagoons enclosed by barrier reefs on the outer margins, whereas on the southeastern side these are narrow benches of staircase-like flights, with mainly flat surfaces tens of metres wide and usually backed by cliffs. The actual mechanism for reef growth in times of rapid sea level rise is rapid upward growth, in keeping with the rapidly rising sea level and forward. The reef superimposed on continually uplifting coast continues its upward mobility even after sea level stabilizes, then dies and become relict terraces. Interpretation of the reef terraces has allowed separation of the history of land uplift relative to fluctuating sea level changes through the application of radiometric dating techniques on the reefs and comparison with glacio-eustatic events identified and dated elsewhere in the world (Chappell.1974). The 6000 year old Holocene terrace in which the Wandokai Caves are set is the last and youngest of the major reef building event associated with the last interglacial period of 20-30ka. An additional process which has acted upon this Holocene reef and other major reef structures is the occurrence of co-seismic events and the attendant regressive features. Co-seismic events are episodic and sudden uplifts events often on centimetre or metre scale, of sections of the coast, against the general uplift patterns for the Huon Peninsula, and associated with large earthquakes which occur episodically over a 1000-2000 year interval on the Huon Peninsula, then set upon by regressive process such as wave action to create caves, notices, caverns and ledges and mini terraces, and sometimes incipient and younger terraces on top of older ones. Wandokai caves KIC, KIB, and KID are examples of such regressive features which cut into the large Holocene reef structure (Chappell and Ota, 1996; Ota *et. al*., 1993).

Physical Description of the Caves

The caves on the Huon Peninsula are the youngest set of terraces on the relict reef complex. A summary of two caves excavated in 1985 are included in this report from which issues or problems will be identified for possible application of analytical techniques and methodology learned during the training at ACCU-Nara. Cave KIC is the upper of the two caves that was excavated and looks more weathered than Cave KID. It was once larger but has had its size reduced through constant collapse of the roof. Four squares were excavated. The stratigraphy was of undifferentiated soil save for the hearth and ash lenses associated with a number of artefacts including stone axes, pottery, bone tools, cut and burned bone, fish hook shanks made of shell, stone axes, a stone grinder, shell tools, and a dog tooth ornament. There was a burial at a depth of 1.2 metres below the surface. Cave KID artefacts consist of a few sherds of pottery, a stone axe which was found buried in old hearth dated to 800 years B.P. In contrast to the paucity of archaeological material, the abundance of WWII material is much higher.

2.Identification and Conservation of Material from the Huon Peninsula WWII Sites

Objectives: What are the Objectives of Material ldentification and Conservation from the Huon Peninsula WWII sites?

Proper identification of material is important for a number of reasons such as, the selection of correct methods for the treatment and conservation of material, and determining the use or reason why the material or object was produced in the first place. Furthermore proper identification is important in determining components or parts of machinery or larger objects. Ultimately the proper identification of material is important in determining the place of the object(s) in the social, political, economic, and ideological history of the nation that produced it-in this case Japan- and the impact it had on the lives and history of the people on the Huon Peninsula of Papua New Guinea. In this case it is important to understand how the material correlates of human behaviour in the form of guns, bullets, bombs parts, soles of rubber boots etc from Caves KIB, Cave KIC, Cave KID affect the way the people on the Huon Peninsula now perceive their cultural and physical landscape and if the new meaning about Huon landscape use and interpretation as a battlefield did not usher in a new perception of landscape use which they are still trying to come to terms with 62 years after WWII ended. Proper conservation of Huon Peninsula WWII material goes together with correct identification and contributes to the above objective of the re-construction of social and political history and the social memory of war, as perceived through the material remains of large scale armed conflicts as it was played out on the Huon Peninsula landscape. A critical component of conservation-not only for posterity and future enjoyment - is that one can, from the material remains of war be reminded about its negative as well as positive sides and therefore promote lessons and opportunities for peace and harmony by learning from its devastating effects. Proper conservation can also promote greater scholarship, develop new techniques and promote collaborative research on war history on the Huon Peninsula.

What factors may prevent or inhibit the proper identification/conservation of WWII objects on the Huon Peninsula?

a. Problem of material identification and conservation.

There is the problem of the identification of the various fragments of metal, rubber, soles of boots and determining the place of manufacture, and the purposes for which the material were produced. Examples of the material recovered at the Wandokai Caves include bottles which are suspected to have contained sake, a kind of Japanese hard drink, ampoules filled with an amber coloured liquid, possibly drugs used for medicinal purposes and so on. The range of metal objects from the Huon Peninsula sites is likely to increase with the further planned excavations of other rock shelter sites and caves on the Huon Peninsula. Other factors include: (a) Insufficient archival or library information in Papua New Guinean libraries pertaining to the material found on the Huon Peninsula sites thus resulting in incomplete research (b) Difficulty in accessing information on material parts produced in Japan. The information on this may only be accessible from Japanese sources, either from archives belonging to companies who produced these material or other public libraries and sources located only in Japan, Australia or the US.

b. Problem of material conservation.

The problem of material conservation is a serious one as both excavated and non-excavated material are in serious danger of being permanently damaged. For example the problem of material corrosion is serious one and affects WWII metallic objects recovered from the Wandokai sites including bullet cases, belt buckles, parts of boots and wires.

Why the lack of material identification and conservation is likely to be a problem?

There are several reasons, but an important one is that it will inhibit the objectives of reconstructing an accurate social history of impact of war as it was experienced in the Huon Peninsula, thus there is a danger of promoting an inaccurate reconstruction based on faulty data.

How can these inhibitive factors be-i.e. problems of material identification/conservation be solved?

Actively promoting the issues rose above in publications, conferences, discussions and other public forums dealing with these issues is good start to get the issues on the agenda. This should go hand in hand with seeking funds and resources to carry out more research to target the specific issues raised above. In particular, to explore possibilities to engage institutions such as the NRICP specialty in metal conservation, identification and analysis in tandem with collaboratively designed projects to address these issues.

3. Bones Analysis

OBJECTIVES: What are the objectives of carrying out an accurate faunal analysis of bone from the Huon Peninsula.

(1) To determine the taphonomic history and conditions of the Wandokai Caves and other similar cave sites under which bones were deposited and modified and what factors might induce post depositional bones alteration. An enquiry into the identification of faunal skeletal material specifically at Cave KID at Wandokai will impinge on the question of breakage patterns of disarticulated bone. A numerical count of classes of bones resulted in 211 bones from the five squares that were excavated in Cave KID. In specific terms splintered bone comprised 14.2% (n=30), unidentifiable bone fragments comprised 61.2% (n=129), unidentified whole bone comprised 17.5 % (n=37), and those bones subject to taphonomic damage comprised 7.1% (n=15). The weakness with this classification is that there was an inherent subjective bias in the definition of the four classes partly because of the lack of experience and training in dealing with post-cranial breakage patterns and therefore the whole assemblage needs to be

reanalysed again with better resources and techniques. Although some of the splintered bones may have been the result of gnawing by dogs which leave characteristic marks as Binford (1981) argues, it is not certain if this were the case. The problem still remains that none of the splintered bones recovered in the Cave KID showed convincing evidence of teeth marks associated with long bones. Although it was possible to suggest that it was the long bones that were gnawed by scavengers this cannot be ascertained one hundred percent. Furthermore the fact that four classes of bones are occurring together raises the question as to why this was occurring within the same stratigraphic context. An additional question would be determined if the well preserved bones were not part of an interred body which later became scattered, and if this is why they were not gnawed?

(2) The other objective would be to determine the range of animals that were taken on the Huon Peninsula which may assist in the understanding of how people used the Huon Peninsula environment and the kinds of animal species that may have been available for use.

(3) Accurate identification is important in separating the animal bones from the human ones judging from the range that were recovered from the Wandokai Caves which are all mixed up. The sorting of human bones is further complicated by the fact that some of the bones historically belong to the indigenous New Guineans because of the popular use of caves in historical times as burial sites, but during WWII the Huon landscape was also the location for the deposition of bones belonging to both the allied and Japanese forces therefore it is quite likely that bones of mixed racial origin still lie scattered in cave deposits such as the Wandokai Caves.

What factors may be responsible for the difficulty in the identification of faunal and human skeletal material.

The lack of training and experience in bone identification and analysis, or teaching aids and manuals will still continue to pose a problem unless further training and experience is gained.

Why the lack of correct bone identification or analysis might be a problem in achieving the objectives.

It may not be possible to separate the various classes of bones including those of indigenous New Guineans and other allied or Japanese bones, human versus animal, gnawing by animals versus alteration by other taphonomic processes or factors-chemical, natural, biological, or physical processes- that are/can be responsible for bone deposition and alteration. These factors need to be established as soon as possible in order to reconstruct a more accurate picture of both the prehistoric and historical use of the Huon Peninsula landscape.

4. Surveying and Plotting of Sites

Objectives: What are the objectives of an accurate location of potential archaeological sites on the Huon Peninsula.

The accurate location of the Wandokai Cave sites and other associated sites will be carried out by using surveying and plotting techniques so that the exact position/location of the dated sites on the terraces can be established because of the following reasons; (1) to determine if these sites fit into the framework for regressive features (caves, rock shelters, ledges, notches, associated with co seismic events of the last 6000 years at a number of localities at the Kwambu-Kalisairo area, Nanda-Kanomi area, and Wandokai-Hubegong area whose radio-metrically dated sequences range from 5400-2500 B.P, 6070-850BP, and 6070 respectively). These are potential human habitation sites that had been earlier dated and studied by Chappell (1974, et al 1996a, b) and Ota et al (1993) established for the Huon Peninsula area and to determine if their formation coincides with human occupation of them, (2) to determine which regressive features had not been geologically dated yet and seek ways and means to date these specific sites either through a PNG National Museum funded research project or at a collaborative level with other interested researchers (3) and to enlist the support and expertise of the dating specialists in the archaeological dating of human habitation sites and their location on the Huon Peninsula area.

What are the factors that may inhibit the accurate location of/plotting of potential archaeological sites on the Huon Peninsula?

Lack of resources and funding to purchase equipment, train, and hire key technicians knowledgeable about Huon Peninsula terrace morphology will be needed to make accurate measurements of known, new, and potential sites. The lack of an electronic GIS database on PNG and on the Huon Peninsula, or the inability to access it due to its location overseas either in Australia, Japan, or the US where the researchers who have recorded the data. This data needs to be accessed in order to review the geological, cultural, and archaeological status of the Huon Peninsula sites in order to determine where the gaps are for prediction and locating of new sites and upgrading the specific plans for investigation 40,000 year old formations associated with the earliest human habitation sites and waisted axes on the Huon Peninsula. To see if the cave art recorded on the higher terraces at Kanome are associated with the 40,000 year old terraces.

Why would the lack of accurate site identification be a problem?

It would not be possible to determine the exact position of specific sites in relation to the major terrace sequences and therefore reduce the chances of determining the age of caves and sites relative to the time (age) of their occupation, use, and abandonment so that one is forced to continually infer their position, and hence their location, height, and age.

5. Radio-Metric Dating

Objectives: What are the objectives of the proposed radio-metric dating programme on the Huon Peninsula?

The major objective of the archaeological programme is to set up a comprehensive data-base of dates independently for archaeological sites based on the (1) history of occupation associated with dates obtained from the age of the cultural material and (2) the geological age of the sites themselves based on actual dating of coral from the specific sites (where possible), rather than inferring their age from the dates of the adjacent terraces established in previous studies (e.g. Chappell 1974). In the past the major objective of dating on the Huon Peninsula has been to reconstruct sea level changes due to the effects of glacio-eustatic influences (e.g. Chappell 1974, Bloom et al 1974). The three archaeological dates-40,000 years BP for the Bobongara site (Groube et al 1986), 800 years BP for Wandokai (Araho, 1997) and 6000 years BP for the Bobongara shell midden (Digim 'Rina.L 1985) are the only radiometrically dated records of human habitation on the Huon Peninsula. Future archaeological research will aim to expand the suite of dates to give a more comprehensive coverage of human settlement patterns on the Huon Peninsula. However these two lines of investigation-one geological and the other archaeological-may or may not necessarily be complementary in terms of site selection for sampling and dating due to differences in objectives, research priorities, and funding restrictions so that the age and archaeological contents of the cave sites on the Huon Peninsula have to be inferred from the dated terrace sequences (Chappell 1974, Chappell et al 1996a, b) while considering ways to date specific cave sites for better accuracy relative to their time of occupation and history of use and abandonment from the prehistoric to historic times.(3) Inclusion of the results in the Preparation of the Technical document for the nomination of the Huon Peninsula area, including the Bobongara area to the World Heritage Commission for inscription on the World Heritage List. This will include as much technical data as possible to justify the request for consideration of the Huon Peninsula area as a potential World Heritage site, and the dates will be an important component just as the 40,000 year old human habitation site at Bobongara broke new ground by first drawing attention to the great antiquity of human settlement on this part of New Guinea and the Southwest Pacific (Groube et al 1986). (4) Dating will also be important in the identification of regressive features associated with major co seismic processes at those sites previously studied by Chappell and Ota (1996) as they can give us some idea about ages of regressive features such as caves which may hold potential for human habitation.

What are the factors that may inhibit the objectives of the dating programme?

The number of factors include (1) lack of sustained and regular archaeological surveys and dating of the sites (2) The lack of training and experience in the technicalities of correct sampling, treatment and cross-checking of the sites which will require the input of scientists such as Professor John Chappell, the world renown expert on the geology of the Huon terraces so that accuracy is and knowledge of the correct dating methods are brought to bear on the dating plans ensured, (3) restrictions on financial and logistical support due to administrative incompetence and interest by the PNG National Museum, (4) severe restrictions on the freedom to use the money-US$30,000.00 - approved by the World Heritage Commission in Paris for Preparatory Assistance of the preparation of the Technical Document for the nomination of the Huon Peninsula area for inclusion on the World Heritage List. (5) Landowner restrictions to carry out dating and research activities on potential sites, (6) Damage to potential sites from a range of alternate use of the Huon Peninsula for gardening (tilling), burning, grazing. The chances of damage to sites are now increasing with the increase in population and greater population mobility in the area.

How and why these factors may inhibit the objectives of the dating and research programme on the Huon Peninsula.

(1) The lack of systematic and regular archaeological research will not provide the body of scientific data needed to complete a balanced and detailed technical document to justify the importance and significance of the site to the World Heritage List. (2) Restrictions on financial and logistical support has been the greatest hindrance so far and this already discouraged local, museum, support for completing the dating programme, (3) Withholding of the Preparatory Assistance Programme Funds approved by UNESCO for Bobongara due to ongoing unresolved issues with spending of UNESCO funds at the Kuk archaeological (if this is true) has set a bad precedent for allowing further attraction of overseas funding, but assistance from other sources is being sought, and together with the tightening up of the administrative mechanism responsible for the disbursement of funds it is likely that this problem can be solved, (4) the landowner and perceptual issues need to be identified and addressed as soon as possible so that enough time will have been devoted to debates on the issues for suggestions and plans to be drawn up to addressing, solving or managing the issues before the they get out of hand as has been the case at the Kuk archaeological site.

How the inhibiting factors can be addressed in order to fulfill the objectives of the dating and research programme.

(1) Adequate funding to carry out research, engagement of experts, and consultation with landowners and other stakeholders on the research and development and management priorities for the next 10 years, and planning for the completion of the Huon Peninsula nomination document for World Heritage Listing needs to be put in place, (2) Seek to have the US$30,000.00 released for the Huon Peninsula Preparatory Assistance work.

(3) Concurrent with point number 2, seek financial assistance from internal and external sources for continued documentation, consultation on the Huon Peninsula. Collaborative engagements should be particularly encouraged to tap into existing sources of funding, facilities and resources.

6. Scientific and Cultural Management Plan: Geological, Archaeological, Cultural/Historical Data Review of the Huon Peninsula

Objectives: What are the objectives of carrying out a geological, archaeological, cultural/historical data review of the Huon Peninsula?

The objectives of this exercise would be to compile and evaluate all the geological, archaeological, historical/cultural data on the Huon Peninsula in order to identify future research needs, plans for site management and technical assistance, as part of the plans for compilation of a technical document for the nomination of the Huon Peninsula to the World Heritage List using as a guide the handouts distributed by Wijesuriya (2004) during the training.

What factors would inhibit these objectives?

Lack of sufficient enough time (about 6 months is required) away from regular administrative duties in a suitable setting to be totally engaged in the write up and production of the review. (1) The failure to compile a dossier of information incorporating all the critical information on scientific results of research that has been carried out over the last 30 years on the Huon Peninsula, results of discussions and a management plan for the Huon Peninsula area, (2) The failure to generate a forum to discuss future priorities and draw up plans for the next 10 years.

Why would the lack of carrying out a review be a problem?

(1) For example there is a dearth of archaeological information, aside from the significance of the Bobongara site, and drawing attention to this deficiency at a suitable enough setting such as a review may result in addressing of this problem as part of future plans for researching into and promotion of archaeological and historical heritage of the Huon Peninsula

area.(2)Linked to this will be strategies to upgrade management plans by way of discussions with all stakeholders including the Morobe Provincial government and the local landowners from the current situation where ideas have been thrown around but not seriously incorporated into a written form, useful for attracting funding and resources. (3) The lack of a review of the current course and past practice of rigid focus on pure research cannot address the more potentially contentious issues that are likely to disrupt any future plans for the Huon Peninsula area and Bobongara site. For example the problems associated with the lack of archaeological site identification, perceptions of the cultural and scientific landscape, and the potentially contentious socio-political issues that may derail the negotiation process to harmonise research interests with academic needs may not be known, unless these issues are raised as part of the processes leading to the preparation of the nomination document so that planners may begin to take stock of the potential issues, if similar concerns faced by the PNG National team with the Kuk archaeological site during the attempts to have it nominated to the World Heritage List are to be avoided or adequately managed in order for the World Heritage imperative to experience any/some degree of success.

7. Presentation and Management

Objectives: What are the objectives of the presentation and site management plan?

In some ways this is the most important section on the issue of heritage management on the Huon Peninsula judging from the experiences of Kuk archaeological site (Ketan and Muke 2001). The objectives of the site management plan include consultations with all stakeholders and specially the landowners of the Huon Peninsula area to gauge their views so that their input can be incorporated into future plans for research, documentation, and eco-tourism proposals for the people of the Huon Peninsula area. This will include ventures and developmental plans associated with infrastructure that may be used in the promotion of the sites and/or generate ongoing interests in research and revenue generation. These objectives will be an adjunct to the foregoing discussions on site management plans, and will reflect the outcome of discussions, views, and ideas from the main stakeholders and will definitely find expression in the form of mounted exhibits and displays, to educate, entertain, the people of Morobe Province, Papua New Guinea, and the rest of the world about the scientific, natural, and cultural heritage of the Huon Peninsula. Gaining the interest and support of the local communities is important in order to enlist their assistance in preserving the unique cultural and natural heritage of the Huon Peninsula and to ensure its sustainability for the future.

The objectives of presentation would be to design proper exhibits tailored to meet the level of understanding and interests of the different levels of audience, including international scientists and visitors, educated and non-technically minded Papua New Guineans, and very importantly the interests of the local landowners who live at the site to educate, promote, conserve, understand and appreciate the natural and cultural heritage of the Huon Peninsula as elucidated through the scientific studies and local indigenous interpretations.

What factors would inhibit the proper presentation and management of sites to the public?

(1) Technical problems include how best to select sites, and information from the range that is available and the criteria to be used given that there are caves, waterfalls, cave art, archaeological sites, inlets, steep sided gorges and so on, and the inability to interpret the complex technical data in a form that is suitable for use, understanding, and enjoyment due to lack of resources and means.

(2) Management issues include perceptual issues where the promotion of one aspect of the natural/cultural imperative may be seen to be negating the importance of other equally important sites and perceptions. For example the alternate perceptions of the landscape as re-defined from its existing metaphysical form-whatever that may have been in the past, may include the geological, archaeological, and historical significance of the Huon Peninsula/Bobongara area, which is already impinging on the existing interpretative traditional framework such as the use, of the same land for gardening and other cultural pursuits which derive from the indigenous perspective of man land relationship on the Huon Peninsula. This is an area that is not well understood despite the promotion of the area on a world scale for World Heritage purposes. So far it has not been possible to determine the indigenous perspective of what is considered to be important as it pertains to local interpretations and perceptions of the cultural landscape as opposed to the introduced meanings generated by the archaeological and scientific interests in the area. The success and failure of the promoting the cultural/natural imperative versus the scientific interests (including archaeology) will depend on the relative importance that each stakeholder chooses to promote or demote. The breakdown in communications at the Kuk archaeological site-site of the purportedly independent evolution of tuber based agriculture at 9000 years BP has exactly to do with the different meanings attached to the use of the same landscape, often leading to the over promotion of one set of ideals over another (Araho 1998, Muke 1998, Moutu 1998). This has frustrated efforts to carry out Preparatory Assistance work, setting back progress on the Huon Peninsula/Bobongara area for another 5 years, to date. Given this situation the objective now is to find alternate sources of funds from sources willing to engage in collaborative archaeological research with Papua New Guinea National Museum archaeologists while waiting to see what happens to the funds approved for the Huon Peninsula/Bobongara area. Sites on the Huon Peninsula including Bobongara fortunately have not encountered a similar fate-yet-but enough promotion of the site and attention has been drawn to it to be able to warrant some attention in future if stakeholders decide to

pursue their own perceptual interests too vigorously rather than seeking a considered and negotiated approach on the issues that interest them.

(3) The administrative issues have to do with a number factors including; (a) lack of funds and resources to develop and sustain the sites. Unless there is a commitment by the PNG National Government to committing funds, facilities, and resources, public presentation and management of the Huon Peninsula/Bobongara area will remain only a useless dream, promoted by name to attract funds from the government only to redirect it to some other use, while ignoring such as the kind of initiative taken by the Smithsonian Institution through the efforts of Dr John Pandolfi to open the Huon Peninsula Archaeological and Palaeobiological Museum at Kanome in June 2002, with no PNG National Museum (b) difficulties associated with the preparation and presentation of exhibits if the access to skilled and trained people in the art of working with appropriate material for presentation, designing, and planning of the exhibition is limited. This limitation can be imposed by such factors as lack of funding, training and knowledge in the skills the particular areas of design, which in turn can affect the conservation, maintenance of suitable exhibit conditions, and the safety and comfort of the exhibits.

Why would the lack of proper presentation and management be a problem in attaining the objectives?

The lack of proper presentation of information and improper management and planning can lead to the less satisfaction and enjoyment of the exhibits at a number of levels including the proper and more seriously raising of false expectations which can lead to division and discord among the stakeholders. Flow on effects from this can include bad/negative publicity, damage to sites and facilities through vandalism and neglect, diminished value, importance, and significance of the Huon Peninsula as a prime world heritage site.

8. Recommendations

A. On the Training and evaluation section.

1. More time should be spent on hands on experience and complement it with lectures and discussions.
2. For future planning purpose ACCU could contact various participating countries in the training programme and incorporate their proposals on what they would like in the training menu.

3. A particular request from the PNG National Museum is to investigate the possibility of further training in bone analysis, by using bone material from the Huon Peninsula or other PNG National Museum collections in the three months course now offered by ACCU, at the end of which a report on the results and a publication in a technical journal can be produced. An alternative to bone analysis could be the analysis of material (metal and other fabric) from WWII sites on the Huon Peninsula, with the assistance of the Nabuken Institute in its identification, conservation and report production.
4. Some discussion on the Japanese conceptual framework on site interpretation, landscape use, and perceptions would be a useful introduction to see how it ties together all the disparate monumental phenomena that now dot the Japanese social and cultural landscape.

B. On the choices of technique and methodologies chosen for application on the Huon Peninsula.

1. PNG National Museum request is for a conservation expert to learn about metal conservation.
2. Need assistance in designing and implementing collaborative projects.
3. Need access to funding, resources, and facilities to carry out and engage experts in research, conservation and heritage management of the Huon Peninsula cultural and natural resources.

9. Conclusions

The ACCU training course offered many methods on its course menu and created more interest to conduct research in Papua New Guinea than can be adequately matched with counterpart funding and resources. I have, therefore, tried to select a few of the methodologies and techniques in order to apply them to my own particular needs on the Huon Peninsula, at the expense of neglecting other equally important PNG sites or issues that perhaps need more attention than the research and documentation programme. However, this is a choice that all archaeologists are faced with: to do or not to do?

References

Araho. N., (1998) Report on some Kawelka Perceptions on the Kuk Archaeological Site, in Strathern. A, and P. J. Stewart (Ed). *Kuk Heritage: Issues and Debates in Papua New Guinea*, PNG National Museum, The Centre for Pacific Studies, James Cook University, Townsville, Australia, and the Okari Research Group, Department of Anthropology, SHO1 Forbes Quad, University of Pittsburgh, Pittsburgh, PA, 1560, USA.

Araho. N, (1995) *Results of the excavation of two sea cut caves in the Holocene Reef Face at Wandokai, Finschaffen District, Morobe Province, Papua New Guinea*. A Sub-Thesis submitted in fulfillment of the requirements for the Bachelor of Arts in Honours, Department of Anthropology and Sociology, University of Papua New Guinea.

Binford L. R. (1981) *Ancient Men and Modern Myths*, Academic Press, New York

Bloom A. L, W. S. Broecker, J.M.A. Chappell, R. K. Mathews, and K. J. Mesolella, (1974), Quaternary Sea Level Fluctuations on a Tectonic Coast: New 230 Th/U Dates from the Huon Peninsula, New Guinea: *Quaternary Research*, Vol. 4, 185-205.

Cannon. D., (1987) *Marine Fish Osteology: A Manual for Archaeologists*, Department of Archaeology, Simon Fraser University, Burnaby, B. C. Publication No.18

Chappell. J, (1974), Geology of Coral Terraces, Huon Peninsula, New Guinea: A Study of Quaternary Tectonic Movements and Sea-Level Changes: *Geological Society of America Bulletin*, Vol. 85; 553-570.

Chappell. J, (1976), Holocene Sea Level Change and coral-reef growth at the Huon Peninsula, Papua New Guinea: *Geological Society of America Bulletin*, Vol. 87, 235-240.

Chappell. J, (1983), A Revised Sea Level Record for the last 300,000 years from Papua New Guinea, *Search*, Vol. 14 No.3-4: 100-101.

Chappell. J, and B.G. Thom, (1970), Determination of last inter-glacial episode and the Wilson Antarctic surge hypothesis, *Nature*, Vol. 272: 809-810.

Chappell. J, and H.A. Polach, (1972), Biome effects of Partial Recystallisation on 14C Dating Late Pleistocene Corals and Molluscs: *Quaternary Research*, Vol. 2, 244-252.

Digim 'Rina.L, (1986), Archaeological investigations on the Lower Terraces of the Bobongara area, Huon Peninsula, A Sub-thesis submitted in fulfillment of the requirements for the Bachelor of Arts in Honours, Department of Anthropology and Sociology, University of Papua New Guinea.

Groube, L., J. Chappell, J.Muke and D.Price (1986), A 40,000 year old human occupation site at Huon Peninsula, Papua New Guinea. *Nature*, Vol.324, pp: 453-55.

Ketan, J, and J.D.Muke., (2001), *National Heritage Management: a site Management Plan for the Kuk World Heritage Project in Papua New Guinea*, PNG National Commission for UNESCO and the Anthropology and Sociology Strand, School of Humanities and Social Sciences, University of Papua New Guinea.

Koezuka T., (2004), *An introduction to the Conservation Science of Archaeological Inorganic Objects*, Training Course on Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region, 2004. Archaeological Research Methodology and Analytical Methods of Ancient Remains, Nara, Japan.

Moutu, A., (1998) The Kuk Archaeological Heritage and the Kawelka Landowners: An Anthropological View of Some Pertinent Issues, in Strathern. A, and P. J. Stewart (Ed). Kuk Heritage: Issues and Debates in Papua New Guinea, PNG National Museum, The Centre for

Pacific Studies, James Cook University, Townsville, Australia, and the Okari Research Group, Department of Anthropology, SHO1 Forbes Quad, University of Pittsburgh, Pittsburgh, PA, 1560, USA.

Muke, J.D., (1998) The Death (and Re-birth) of Kuk: A Progress Report on the Recent Developments at the Kuk Prehistoric Site, in Strathern. A, and P. J. Stewart (Ed). Kuk Heritage: Issues and Debates in Papua New Guinea, PNG National Museum, The Centre for Pacific Studies, James Cook University, Townsville, Australia, and the Okari Research Group, Department of Anthropology, SHO1 Forbes Quad, University of Pittsburgh, Pittsburgh, PA, 1560, USA.

Muke.J.D, (1984), *The Huon Discoveries: A Preliminary Report on the Stone Artefacts, and a comparative analysis of the distribution of Waisted Tools in Greater New Guinea*, Department of Prehistory and Anthropology, The Faculties, Australian National University.

Nagatomo. T., (2004) *Scientific Dating in Archaeology*, Training Course on Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region, 2004. Archaeological Research Methodology and Analytical Methods of Ancient Remains. Nara, Japan.

Ota. Y, and J. Chappell, (1996), Late Quaternary co seismic uplift events on the Huon Peninsula, Papua New Guinea, deduced from coral terrace data. *Journal of Geophysical Research*, Vol. 101, No B3, pp: 6071-6082.

Ota. Y., J. Chappell, R. Kelly, N. Yonekura, E. Matsumoto, T. Nishimura, and J. Head; (1993). Holocene coral reef terraces and co seismic uplift of Huon Peninsula, Papua New Guinea, *Quaternary Research Bulletin*, 40, pp: 177-188.

Pales. L., and M. A. Garcia (1981), Atlas Osteologique, pour server à l'identification dentification des Mammiferes du Quaternaire. II Tete-Rachis Centures scapulaire et pelvienne Membres, Canivores Homme. Edutions du centre National de La Recherche Scientifique, 15 quai Anatole-France-75700, Paris.

Tsukamoto, T., (2004) *Survey Measurement Methods.1.The Development of a 3D Digital Archive System for Archaeological Remains and Associated Method for Data Utilization, 2.Real-time 3D Digital Measurement of Archaeological Remains Using an Outdoor Laser Rangefinder*, Training Course on Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region, 2004. Archaeological Research Methodology and Analytical Methods of Ancient Remains. Nara, Japan.

Wijesuriya. G., (n.d) *Training Course on Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region.27 October-26 November 2004*, Nara, Japan. ICCROM

Wijesuriya. G., (n.d) *Preservation Laws and Guideline*, ICCROM

Yano.K., (n.d) “Hozon” and “Seibi”-Preservation, Restoration, and Utilization, Planning Institute for Conservation of Cultural Properties

Philippines

Alexandra S. DE LEON

The 2004 ACCU Training Course in Nara is particularly important for my work in the Philippines. I work as an Archaeologist/Researcher at the Archaeology Division of the National Museum of the Philippines where I am directly involved in archaeological research on Philippine archaeological sites, from the exploration, excavation, and analysis, to the exhibition of research findings. The National Museum is the primary governmental body that oversees and controls all archaeological research and conservation activities in the Philippines, thus, the Training Course, that focused principally on methodologies for archaeological research and artifact analysis, is especially useful for my Institution's work towards the research and conservation of Philippine archaeological heritage.

The conservation of archaeological heritage is a concept that has yet to firmly take root in Philippine archaeology where the broader philosophies, theories and practices of archaeological heritage conservation have yet to be imbibed by local archaeologists. The mandate for cultural heritage conservation in the Philippines essentially lies with two government agencies namely, the National Museum and the National Historical Institute. The National Museum is tasked with the preservation, conservation and protection of movable and immovable cultural properties (this includes old buildings, monuments, shrines, documents and objects which may be classified as antiques, relics or artifacts, landmarks, anthropological and historical sites, and specimens of natural history which are of cultural, historical, archaeological, anthropological or scientific value and significant to the nation) while the National Historical Institute is responsible for the conservation and preservation of the country's historical legacies (this includes historical sites, monuments, landmarks and shrines, structures, relics and memorabilia of heroes and other eminent Filipinos, documents and other source materials). With obviously overlapping roles between both institutions, the coordination of policy and program implementation is managed by the National Commission for Culture and the Arts (NCCA), the umbrella government agency that handles all agencies involved in culture and the arts.

The conservation and management of archaeological heritage in the Philippines has been limited because Philippine archaeological sites, despite being highly significant, are largely characterized by relatively small prehistoric sites that have a marked lack of 'monumentality' (in comparison for example with the monumental religious sites of Asia such as Angkor Wat in Cambodia or the Nara Period temples of Japan). Philippine prehistoric archaeological sites mostly contain fragmented remains such as stone tools, pottery sherds, human and animal bones and hardly any structural remains. The humid tropical environment does not help with preservation and leaves, if any at all, only minor traces of organic/structural remains. With nothing large or monumental to protect, preservation and restoration activities fail to gather attention and secure financial support. Nevertheless, conservation of such small and “un”-monumental sites is undoubtedly essential and there should be no reason to prevent site conservation. The Japanese example of preserving and exhibiting the Torihama Shell Midden Site in Fukui Prefecture is a fine illustration of the preservation, reconstruction and public presentation of prehistoric sites. Despite having small sites, presentation/exhibits can be undertaken in a very interesting and appealing manner.

Insufficient funding, of course, is another reason why archaeological heritage protection is deficient in the Philippines. National surveys or inventories of archaeological sites have not been undertaken comprehensively and thus archaeological heritage protection takes on a rather reactive nature. Preservation measures are conducted only when sites are discovered during archaeological assessment surveys for infrastructure/development projects. Moreover, with restricted funds, available resources are directed towards archaeological excavation and analysis. Minimal funds or nothing is left over for preservation/site development and management. Nevertheless, local archaeologists should work to raise funds from both government and private sources to prioritize preservation and reconstruction of sites for public presentation/exhibition. Significant reasons to prioritize such activities include economic/tourism benefits and an increase in public awareness and appreciation for archaeological heritage.

Current legislation is also inadequate for the protection of archaeological heritage. While there have been laws enacted for the protection of cultural heritage such as the Republic Act 4846 or the Cultural Properties and Preservation Act, they are not enough to protect archaeological sites from destruction brought about by development and looting. Penal provisions for violating this law include a fine of P10 000.00 or about US$200 and imprisonment for not more than two years, hardly severe enough to thwart potential violators. Archaeological assessment systems have been put in place in recent years primarily regulated by the Philippine Mining Act (DAO 95-23, which is only a Department Administrative Order and not enacted law) whereby major earthmoving projects are required to obtain environmental/archaeological clearance from the Department of Environment and Natural Resources. This system though does not cover realty/property development projects and loopholes have been found in the Order particularly in implementation at the provincial, municipal and local government level.

There is also inadequate recognition of archaeological heritage values among most sectors of Philippine society – government, business and civil. Political leaders at the national, provincial, municipal and local levels of government are largely unaware of the significance of conserving archaeological heritage. Most are also ignorant about heritage protection laws and sometimes allow development and infrastructure projects that destroy archaeological sites. This sense of ignorance about archaeological heritage values is pervasive among business and civil/public sectors as well. The majorities are unaware and unconcerned with cultural and archaeological heritage. At the heart of this limited concept of archaeological heritage conservation is a general lack of information and education on Philippine archaeological heritage and the significance of conserving and protecting it.

Considering the state of archaeological heritage conservation and management in the Philippines described above, there is much to be done toward developing concepts and practices of preservation and restoration. This 2004 Training Course is highly relevant and particularly crucial in exposing me to the broader sense of archaeological heritage conservation and management where, prior to this course, I was mostly concerned with purely archaeological research. Frankly, I was even unaware of the UN conventions, charters and declarations for cultural heritage protection and its relevance to my archaeological work. Now that I possess this broader perspective, I hope I can begin to make small changes towards improving the state of Philippine archaeological heritage conservation.

Impressions and Learning

The Japanese protection and preservation laws for cultural heritage and the national, prefectural, municipal and local government machineries are truly enviable. Moreover, well-funded supporting units such as museums and research institutes for 'cultural properties' are truly outstanding. While some lecturers have mentioned inadequacies in the laws such as the protection/preservation of cultural properties from privately-owned Japanese properties and some have even mentioned inadequate funds for research, these problems seem minute and unimportant for me, coming from an under-funded third-world country. The Philippines has a long way to go in terms of enacting clearly defined laws for cultural heritage protection and in terms of setting up organizational support and systems particularly at the provincial, municipal and local levels of government. Having proper and well-funded museums and research institutes would be the icing on the cake for us.

Some other impressive features of Japanese cultural heritage systems include a long tradition of cultural heritage preservation/protection, the sheer volume of protected archaeological sites, and large-scale reconstructions of cultural heritage sites. The Philippines efforts at cultural heritage preservation/protection is relatively young, protected sites are much smaller, and large-scale reconstructions are practically non-existent. It is, therefore, a treat to see numerous spectacular and well-conserved heritage sites in Japan such as those in Nara, Kyoto and Himeji.

The lectures given during the Training Course mostly proved very interesting and worthwhile. Scientific research methods presented in the Training Course such as dating methods, conservation science, environmental archaeology, etc., are very useful. Conservation treatment for Philippine archaeological remains is usually utilized for underwater archaeological remains and some rare cases of waterlogged sites. Treatment of wooden remains has also used similar materials and techniques as shown during the course. Conservation treatments such as the use of resins to obtain stratigraphic samples and artifacts were really interesting and can be useful for our archaeological sites. However, some methods, for example, dendrochronology is not particularly applicable for the Philippines. While it has been useful for the Japanese case, dendrochronology has not been useful for tropical countries, such as the Philippines, because of dissimilar tree ring growth patterns. It may be possible to use but a lot of work will be needed before it is applicable. High-technology survey equipment introduced during the Course can be very useful for archaeological research in the Philippines. Some techniques would make mapping, artifact analysis and reproductions much easier. Their cost, however, will deter acquisition of technical equipment for reasons of impracticality especially when certain types of Philippine prehistoric archaeological sites are considered. Despite having the desire to apply new learning and new technology, the foremost factor that will prevent its application will be the lack of funds to acquire equipment and supplies. However, if certain archaeological sites will warrant it, collaborative arrangement might be made with institutions with the help of the Asia/Pacific Cultural Centre for UNESCO (ACCU) or the National Research Institute for Cultural Properties (NRICP). Meanwhile, traditional scientific techniques that are scientifically acceptable, but more tedious and time consuming to use, will still be utilized.

The various workshops were a good idea to show archaeologists what specialists do especially for most of us participants who have not practically analysed pollen, bones, and parasites. Unfortunately though, the workshops could not be comprehensive enough for participants to develop expert skills in so short a time. Certainly, the most practical way for Filipino archaeologists is to let specialists undertake the analysis of such remains rather than develop the expert skills ourselves.

The site visits were truly informative and enjoyable. To see how archaeological sites are preserved and presented in various ways for public appreciation was really interesting. I especially liked seeing the variety of indoor and outdoor exhibitions at all the sites visited including the Noto Kokobun-ji Site, Ichijodani, and Ishikawa, and how well thought out and well presented they are to visitors. I hope that someday English translations on exhibit labels and captions can be provided. The Ishikawa Archaeological Foundation which serves as a research and tourist facility was very interesting. The reconstruction of houses from various stages of Japanese prehistory was really enjoyable. The Torihama Shell Mound Site was really interesting for me because we have similar shell midden sites in the Philippines and yet no site museums have been developed yet. Torihama is a good example of a prehistoric site museum that we need to develop in the Philippines. The Matsugase *Daiba* Battery Site was interesting because even in such a small town both government and community can develop conservation and management activities for archaeological heritage.

One of the most important parts of the Training Course was learning about the heritage conservation and management activities of other Asia/Pacific countries. The experiences of each country varied and yet generally similar problems occur. Thus, this Course was especially important for providing a very good opportunity to build networks and share ideas and solutions on archaeological heritage concerns.

It goes without saying that all of the learning and experiences gained from the Course will be shared with my colleagues in the Museum in the Philippines and other associates at the University and the local archaeological society. Through this, I hope that the small community of Filipino archaeologists can work together to gradually improve the state of archaeological heritage conservation in the Philippines.

With an expanded perspective and knowledge gained from the Training Course, I now realize there is so much that needs to be done in order to improve the current state of archaeological heritage conservation in the Philippines. Some particular issues that warrant review and discussion among local archaeologists include legislation, research and conservation principles, public awareness, and human resource development and funding.

Republic of Korea

AN, Kyungsuk

1. Introduction

The Cultural Heritage Protection Cooperation Office, Asia/Pacific Culture Centre for UNESCO in Nara, Japan (ACCU Nara Office) has organized a training course on the Preservation and Restoration of Cultural Heritage in the Asia/Pacific Region 2004 entitled, -Archaeological Research Methodology and Analytical Methods of Ancient Remains.

Individually, if I exclude my previous courses on museum curator education, this training course was the first program for me. This program included lectures and experiments, a reward announcement, and a field trip. Through these experiences, I was taught analytical methods of basic materials, and the maintenance process that I can apply to the remains of archeology and restoration. These processes are all useful.

On the weekend, where no activities were planned, I visited Japanese UNESCO World Heritage sites and visited each local museum. As a result, every weekend was an excellent supplement to the week's activities and fostered encouragement in understanding cultural heritage. It was very important for me to learn and evaluate experts theories in a practical way, and firsthand. The result was very satisfactory; most people feel pride in their cultural heritage and love museums. The most impressive museum in my opinion was the Yayoi museum in Osaka. A lecture was given about achieving prosperity. Many people attended and became absorbed in the lecture, and as a result I was able to feel the force and the appreciation of cultural heritage in Japan.

However, the most impressive point during this training program was the variety of cultures represented by the 13 participants. I have had many previous experiences with China, Korea and Japan, however, this was an excellent opportunity for me to have contact with archaeologists from other nations. I was not completely familiar with Western and Southeast Asian cultures before coming to Nara for the Training Courses. This will be valuable when I need to inquire about neighboring countries for my work. It is clear to me that the direction that we must approach is to expand our international perspectives in the future.

2. The Situation in Korea

In Japan, excavation, report publication, site recording, and analysis are performed systematically. Also, there is multidisciplinary cooperation; archeologists and experts from other fieldwork together. Since I have previous knowledge about Japan I was aware that the cultural heritage and restoration systems are at high levels.

Japanese archaeology is similar to Korean, therefore, the Japanese methods will be easily adaptable and applicable to Korean situations. However, the circumstances of conservation in Korea differ from that of the Japanese situation in many respects. Therefore, we must find a new way to adapt them to Korean issues in some cases.

I noticed many different examples from the Korean situation and was able to understand a lot regarding restoration of artifacts. At times I wondered if the evidence from archaeological sites was expected, and if there was enough for the public to appreciate? However, public visitation is high for many sites and I felt that history had returned. In my opinion, this is an important point that we must consider.

At this point, I would like to discuss current Korean archaeological research methodology and analytical methods of remains in Korea, as well as its cultural heritage protection system.

Archaeological Research and Analysis

In Korea field surveys and excavations before development should be done according to the Law for the protection of Cultural Properties. All excavations need advance permission from the archaeology office. Excavation applications should be submitted to the archaeology office through local governments. The Office will give excavation permissions in consultation with the Cultural Properties Committee.

Basically excavations are to be paid by developers according to the Law. But sometimes there have been serious conflicts among excavators, developers and landowners. Solving such disputes effectively will be one of the challenges for the Korean archaeological management system. If such disputes are not solved properly or in advance, archaeological sites will be exposed and risk destruction. Thus, for small-scale excavation, the construction of private houses, the state or local governments can pay for such excavation expenses within its budget limit according to the Law.

The National Museum of Korea and its branch National Museums are directly attached to the Ministry of Culture and Tourism, and are mainly responsible for taking care of archaeological objects, that belong to the central government under the Law of Protection of Cultural Properties. However, university museums can display the excavated cultural properties for an educational purpose with the permission of the National Museum. The National Museums conduct scientific analyses with collections utilizing foreign funding to carry out research using modern and efficient techniques.

Characteristics of the Korean Cultural Heritage Protection System

- The government's full ownership of cultural properties including underground and underwater resources is an efficient system for preserving heritage from treasure hunting and various destruction.
- Centralization of heritage management including development control, management of nation-designated cultural properties and issues of excavation permission play positive roles in protecting heritage, particularly under the democracy system because local governments are sometimes have no power in responding to local residents demands and wishes.
- The central government can coordinate partnerships with local governments through legal appraratuses, administrative guidelines, technical services, audits and funds as mentioned before. In order to get excavation permissions or other permission, the local governments should submit applications to the central government. There are many legal issues in the heritage management system in Korea.

- A law like the Height Limit Law is needed to preserve both historic cities and heritage by controlling sky lines. In addition, the Law for the Protection of Cultural Properties needs these types of articles on the height limit of construction around historic sites.
- The concept of historic cities as designated cultural properties is to be introduced to preserve towns or cities.

3. Application

Application to the Korean Situation

The harmonization of historic preservation with citizen's property rights would be one of the major future policy aims for Korean cultural heritage. Appropriate compensation through legal procedures is desirable. However, financial reality cannot be ignored in the short-term perspective. Harmonization or compromise is urgently needed in some way. Democracy in Korean local governments and local council members is relatively weak regarding their stakeholders' strong demands which emphasize rapid development over heritage preservation.

Thus, local governors, mayors and local council members want to be re-elected. So, it is important to increase allocation of budgets in purchasing private property restricted for heritage preservation.

Of course, sometimes residents strongly disapprove. Gyongju City and SinMaeRi, Chunchen City is a case in point where residents disapproved. The reason was because there are a lot of legal restrictions regarding designated historical heritage. For example, it is limited by law (height limits) and land transaction are stopped. Also, economic losses are huge as an individual developer must pay excavation cost necessary for the extensions of a building and the reconstruction of a building.

In addition there are residents' complaints over the provocation of their privacy by visiting tourists. The issue over heritage preservation along with privacy protection and tourism may surface soon. Up until now, many residents living in or near heritage buildings think they have suffered in silence.

The heritage budget of local governments vary from central government to local government and they are insufficient. Therefore, a national budget for cultural heritage protection is necessary. Also, the Official budget to purchase heritage preservation areas must be increased considerably. Otherwise it is very hard to sort out the dispute over heritage preservation and the protection of private property ownership since landowners complaints are gradually become louder and stronger as this process continues.

Sharing with the Public

In Seoul, I took part in a public hearing for the appointment of historical remains. The participants were mostly archeologists and an area citizen's group. Of course, area residents were not interested in the protection of historical remains, and did not support the appointment of some sites; archaeologists differed, and actually insisted on it. The residents then stated that only archeologists are aware of their historical value, and were, therefore trying to inflate their importance by creating the illusion of historical validity. Archeologists, including myself, have to reflect deeply about such situations. It is important to speak and share with so-called experts. Our task must be to expand considerably the information to be shared with the general public.

As I mentioned, there were many rewarding lessons that I learned from the training course in Japan.

I was in opposition as an archeologist, and thought that the general public was able to easily understand restored remains. I looked for sites on the weekend, and a lot of people were confronting me as an enemy. I regard discussions with the public as worthwhile work. Like area residents that speak in public hearings, historical remains are not the exclusive property of archeologists. Therefore, since many sites have visible remains, proof of their importance as cultural properties, they must be restored in order to be shared with the public.

Also, there is a necessity to share our situation with the world. This kind of interaction can be rewarded with cooperation and help from other institutions.

The Monitoring System

Many important principles were mentioned in the lecture on the Preservation and Restoration of Cultural Heritage sites.

However, what I thought about most during this training course were monitoring systems. The Korean heritage management system mainly aims at preserving heritage, but there is a necessity to take a more aggressive course of action. In order to encourage the voluntary support of citizens, the Archaeology Office is operating a people's heritage monitoring system.

Fortunately, there are some NGO's that have organized campaigns for preserving heritage sites. The support of voluntary local resident groups and NGO participation for the protection of heritage is essential. They can regularly check whether sites have been disturbed or not. More encouragement of such voluntary participation is to urgently needed. It is impossible to take full and intensive care of archaeological resources without such voluntary groups and NGO support, even if the government authority has very strong power with every other resource.

Academic societies have acted in a similar role with NGO's. In Korea the TGV express train course detour to avoid the historic city of Gyongju, and the issue on preserving the Pungnap Mound Castle in Seoul are examples of this proactive role.

We also register cultural heritage and monitored sites are restored as is necessary. Restoration is also important, but is it useful for the public? And, more importantly, what are the subsequent effects? Continuous monitoring allows a more efficient process, and must certainly be followed by detailed guidance for the public.

4. Conclusions

The following list presents my viewpoints regarding the training course.

1. <u>Budget</u>

A national budget for cultural heritage protection is necessary. Also, the official budget to purchase heritage preservation areas must be increased considerably.

2. <u>Share with the public</u>

Our task is to expand our interests in cooperation with the public. I regard this as a worthwhile endeavour. As a local resident speaking in a public hearing once stated, historical remains are not the exclusive property of the archeologist. Thus, since many remains are very visible and have large structures, they must be restored in order to share the experience with the public.

3. Monitoring system

We register cultural heritage in databases and cataloguing systems at the national level, and monitoring of this heritage is continuous. Therefore, restoration is a necessary part of this monitoring and for public presentation. However, is this useful for the public? And, what are the subsequent effects of restoration and conservation, and interpretation for public consumption? This is perhaps the most important consideration.

Continuous monitoring allows a more efficient system. Detailed guidance and public presentation must follow this monitoring system. This process can work if the public appreciates the result.

Finally, this training program has been a challenge and an adventure. I would like to thank the ACCU Nara staff and all of the participants for helping me through the training program without any problems.

Sri Lanka

Jude Nilan COORAY

Introduction

The objective of this report is to comment on how the ACCU Nara training course can be applied to my work, and to evaluate its relevance to the heritage protection and preservation activities in Sri Lanka.

I work for the Central Cultural Fund in Sri Lanka whose mandate is to manage the UNESCO World Heritage Sites throughout the country. Presently, I am the Director Conservation of Abhayagiriya Monastery at the UNESCO World Heritage Site of Anuradhapura and of the UNESCO World Heritage Site of Polonnaruva. In addition, I am also the Assistant Director, presently responsible for the execution of a project to establish a unified system of presentation and information, and monitoring and recording of unintentional changes to the UNESCO World Heritage Sites in Sri Lanka.

The ACCU training course was mainly conducted through lectures at the Asia – Pacific Cultural Center for UNESCO (ACCU) and at the Nara National Research Institute for Cultural Properties (NABUNKEN) in Nara. The practical classes, workshops and discussions were also held in the above venues and field visits were arranged to heritage sites (at the Heijo Palace Site in Nara, Noto Kokobun-ji Temple at Nanao City, Ishikawa Prefectural Archaeological Research Center in Ishikawa Prefecture, the Medieval Castle Town of Ichijodani, the Torihama Shell Midden Site and the Matsugase *Daiba* Battery Platform in Fukui Prefecture, with on-site lectures that provided a clearer understanding and practical application of the methodologies presented during the Nara-based lectures. All subjects and topics arranged were highly relevant and within the scope of the training course, and they were conducted by specialist in each discipline.

Based on the topic contents, they can be broadly categorized under following sub-headings:

- Philosophical and legal framework for the protection and preservation of cultural heritage
- Archaeological and conservation science and analysis
- Heritage recording and data integration
- Restoration, reconstruction and presentation of cultural heritage and site management.

The discussion in the pages that follow is structured under each of the above sub-headings:

Philosophical and legal framework for the protection and preservation of cultural heritage

The philosophical framework provided by various international heritage protection charters and conventions presented during the training course is known and followed by professionals engaged in the protection and preservation of cultural heritage in Sri Lanka. The curricula for the Postgraduate Diplomas on Management and Conservation of Archaeological Heritage conducted by the Postgraduate Institute at the Archaeology at the University of Kelaniya and on Architectural Conservation of Monuments and Sites conducted by the Faculty of Architecture at the University of Moratuwa to train heritage professionals in Sri Lanka specifically cover this aspect of heritage management. As Dr.Valerie Magar of ICCROM has emphasized during her lectures, the present conservation shift from material-based to value-based approaches is known and practiced by Sri Lankan professionals. However as indicated by Dr. Kazuhiro Yano of the Planning Institute for Conservation of Cultural Properties, I understand that more emphasis is paid in Japan to Paragraph 3 of Article 7 of the 1990 Lausanne Charter, that 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. This aspect is discussed below under the sub-heading “Restoration, reconstruction and presentation of cultural heritage and site management”.

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 institution, i.e., the Cultural Properties Protection Department of the Agency for Cultural Affairs. This law covers not only the tangible, but the intangible cultural heritage and places of scenic beauty and natural heritage as well. 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 is commendable. As Dr. Gamini Wijesuriya 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 such, culture and nature are being considered part and parcel with each other.

In Sri Lanka different aspects of heritage are administered by various institutions. For instance, the buried cultural properties, state owned and protected monuments and sites, registered artifacts etc. are directly covered by the Antiquities Ordinance, which is administered by the Department of Archaeology. The administration of the laws related to groups of buildings (especially the historic towns, villages, cultural landscapes etc.) is divided among the Urban Development Authority, National Physical Planning Department and the Archaeological Department. In mixed sites, where cultural and natural values are integrated with each other, it is again divided among the Department of Archaeology, Department of Coast Conservation, Environmental Authority and Department of Wildlife Conservation. The management and development of the historic irrigation tanks and canals, some of which date back to the 3rd century B.C. are under the jurisdiction of the Department of Irrigation, and the Department of Archaeology has no preview of this aspect of heritage. Several contradictory clauses of these laws, lack of coordination between these institutions and different priorities under various ministries create many obstacles in the protection and preservation of cultural heritage. Although the aspects related to intangible cultural heritage and folk cultural properties are mainly under control of the Department of Cultural Affairs, it has the mandate only to promote such activities and lacks proper legal framework for their protection.

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. No emphasis has been given in the Sri Lankan legal framework towards this important precondition for the preservation of heritage. Another interesting aspect of the Japanese law is that it can designate significant cultural (both tangible and intangible) and natural properties as ‘Special Cultural Properties’ and declare those have high value as ‘National Treasures’ and provide technical and financial support for their protection. Apart from the recognition given by inscribing seven sites to the UNESCO’s World Heritage List, there is no system in Sri Lanka for designating properties based on their national and regional values. Such a system will no doubt provide the individuals or communities that are involved with such cultural properties moral support for their protection. Therefore this kind of comprehensive legal framework has largely contributed to facilitating the protection and preservation of cultural heritage in Japan.

For this reason it is important to reconsider revising the present legal framework in Sri Lanka by giving emphasis to the above aspects discussed in 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 age (stratigraphy and typology) and absolute chronology are still widely used for age determination in Sri Lankan archaeology. 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 typologies may occur in totally different ages throughout history. As such, the use of modern (scientific) methods for age determination are vital. This will also enable a cross check or sometimes complement the dates provided by traditional methods.

In Sri Lanka, Radiocarbon and TL dating have been carried out to date 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 Sri

Lanka only equipment related to TL dating is available. In order to acquire accurate dates we need to use several dating methods that are currently used in archaeological dating. There are two options available in this regard.

- To send the samples to the laboratories in other countries (The disadvantage in this option is that due to the high cost involved in dating, there is little encouragement to send samples from many archaeological contexts)
- To establish dating facilities in Sri Lanka based on the most common archaeological materials that may be considered for dating. (Although this is the most appropriate option available to develop accurate age determination in Sri Lankan archaeology, it involves a high cost for purchasing equipment and for training that is not practical for a developing country like Sri Lanka. However, an effort at least needs to be taken to establish two additional appropriate systems of dating with foreign technical and financial support)

I am particularly impressed by the dendrochronological dating technique developed in Japan by Dr. Mitsutani of NABUNKEN. Since Sri Lanka possesses 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 restoration, repair work or even additions carried out, which helps to understand the evolution 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.

Few studies on material properties using chemical analysis have been conducted in Sri Lanka, especially with regard to glazed ceramic tiles from the Anuradhapura period (3rd century B.C. to 10th century A.D.) and now it has been established that these glazed tiles were not imported from China but manufactured in Sri Lanka using imported clay. However no serious study has been carried out so far to analyze the composition of Manganous / Cobolt which will be a good indicator to decide whether the raw materials were brought from China or from a country in the Middle East such as Persia. At the same time there is no firm conclusion with regard to the importation of a rare blue pigment lapis lazuli (natural ultramarine). This mineral is not found in Sri Lanka. Hardly any studies have been carried out in Sri Lanka with regard to the production technique of earthenware ceramics and casting techniques for numerous bronze artifacts. During the training course in Nara we observed rapid techniques (some of them non-destructive) used to carry out similar studies, specifically using Fluorescent X-ray analysis. Although a country like Sri Lanka cannot afford to purchase such expensive equipment, this training provides the encouragement to initiate an action plan in carrying out such studies using available equipment with other institutions such as universities. It is also worthwhile to explore the possibility of carrying out joint research programs with countries like Japan, USA, and the UK where advance facilities and expertise are available.

It is also interesting to learn during the training how the living environment, eating habits of ancient people and the paleoenvironment of ancient Japan is reconstructed through environmental archaeological research. Since Sri Lanka is a tropical country, with the exception of pollen, remains such as parasite eggs and other micro-organic remains do not survive to conduct such types of studies. With regard to pollen, few studies have been initiated to understand the vegetation pattern at Sigiriya gardens (5th century A.D.). Apart from identifying the class of animals and the age and sex of the human skeletons found during the excavations, hardly any studies have been carried out in reconstructing the fauna at heritage sites or understanding the selection of animals as food items. The workshop on the analysis of animal bones during the training provided solid potential for carrying out such research in Sri Lanka.

In Japan, methods of archaeological prospecting using radar survey, electrical and magnetic prospecting etc., are used to explore the sites 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 the specialized equipment, but the skill to interpret the prospecting results which are not available in Sri Lanka. But again it is worthwhile to explore the possibilities to have joint projects with countries like Japan to initiate such a program so that Sri Lankan professionals will have the opportunity to learn and understand the importance of such methods.

This training also gave me the opportunity to become familiar with the technique of the transcription of soil layers or cross section of an archaeological site which can be kept as a scientific record or be exhibited in a museum. The technique of packing in rigid polyurethane form and the liquid nitrogen treatment when handling artifacts that have become too brittle to pick up with bare hands was also interesting. All these techniques are useful in carrying out field activities and can be directly applied without specialist training or high costs.

With regard to the subject of conservation science and analysis, the main emphasis during the training was on archaeological material and artifacts. Although some studies have been carried out in Sri Lanka to identify the presence of salt in materials (such as bricks) using X-ray diffraction (XRD), the training provided the opportunity to expose us to the multiple uses of XRD in analyzing mineral composition, deposits on stone statues, detection of corrosion and pigments, etc. that are essential for deciding their appropriate conservation treatment. It was also important to understand the use of X-ray computerized tomography (CT) with regard to the comprehensive 3D examination of interior objects for their preservation. With regard to the conservation of water logged wood, the training course provided the opportunity to learn about the treatment methods such as Polyethylene Glycol Impregnation, Sugar Alcohol Impregnation, Higher Alcohol Treatment, Freeze Drying etc. Although water logged wood is not often found in excavations, the recent commencement of underwater archaeological activities in Sri Lanka has provided many challenges with regard to the conservation of water logged wooden materials especially those associated with shipwreck sites. Since equipment and proper training in relation to the above treatments are not immediately available in Sri Lanka it is important to explore the possibility of obtaining financial and technical support from 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 the 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; the easy operation by non-specialists. A demonstration was also done using Minolta's VIVID 900 with a non contact measuring range finder used to generate 3D data for objects by composite measurements from multiple view points. Another demonstration was also done to obtain measurements of a building using an outdoor laser range finder. Such a system also provides contour maps and even sectional elevations of measured properties for various types of analysis. However the cost of the equipment is simply out of reach for a country like Sri Lanka. However the ability for speedy recording of the property (both indoor and outdoor) is very high. Presently we are documenting the conservation process of Abhayagiriya stupa (which is a brick built domical structure of colossal proportions) using total station, digital camera and associated software. On the other hand a site like Sigiriya which has complex topography needs to be properly documented for various academic analyses and for conservation and site monitoring. As such it is worthwhile to explore the possibility of inviting the Japanese experts to document such structures and landscape features. With regard to the application of GIS, viewshed analysis is very important especially with regard to the heritage protection activities at Sigiriya. From the top of the rock there is a 360 degree panoramic view of the undulating cultural and natural landscape that needs to be preserved as it is an integral part of Sigiriya's original design. But at the same time some infrastructure facilities, new settlements and even tourist hotels also have to be built within this area. Therefore, viewshed analysis can be useful for planning the zoning of such facilities without disturbing the view from the summit of the central rock.

Site Management and the Restoration, Reconstruction, and Preservation of Cultural Heritage

During the training course the emphasis with regard to heritage management and cultural heritage preservation was on excavated ruins. The formal lectures, and almost all on-site lectures and site visits, were aimed at illustrating the Japanese philosophy and approach behind this subject (Unfortunately, no visits were arranged to any ongoing excavations). In Japanese archaeological contexts, almost all the monuments are constructed out of 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 water logged condition, it is practically impossible to consolidate the ruins and expose them for public presentation. Therefore the Japanese authorities are adopting various methods to present such findings. Some of these methods are presented below:

- Consolidation and exposure of excavated remains under a shelter
- The re-burial of exposed remains and reconstruct only the base of the structure at the present ground level, which is about 60 to 100 centimeters above the actual remains
- The re-burial 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, which is about 60 to 100 centimeters above the actual remains
- The re-burial of exposed remains and reconstruct the building with the superstructure at the present ground level, which is about 60 to 100 centimeters above the actual remains

The philosophy behind this approach is an interpretation of Paragraph 3 of Article 7 of 1990 Lausanne Charter, where the reconstruction of archaeological remains is favored rather than limiting its conservation to a level that ensures reinstatement of its form only. However, in Sri Lankan contexts where most of the exposed monuments have either brick or stone basements, such reconstructions are not essential.

With regard to site information, the Japanese have developed a sound system of signage and printed information (brochures) that provide valuable information for visitors to understand heritage sites. Since the Central Cultural Fund is presently developing a system of signage for its UNESCO World Heritage Sites, the system of signage graphics used in Japan will provide a useful guide in this regard.

The museums visited during the field visits, especially the prehistoric 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 are very much lacking in Sri Lankan sites. The museums in Japan not only display the artifacts and other information found from archaeological activities, but also how archaeologists carry out scientific work from excavation to site presentation. It also helps to build up significant images and the role of the archaeologist among the public. In many of the country papers presented during the training it was pointed out that the work of archaeologist are not properly recognized by the public in many countries. 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 was fortunate to study the high level of archaeological research activities and the public awareness programs that are being carried out by the Ishikawa Prefectural Archaeological Research Center. These programs are especially designed for children, and will contribute greatly to an awareness of their heritage. This system is very similar to the activities of the Archaeological Resource Center in York, U.K. where hands-on archaeology programs are being conducted for kids. Such systems of awareness programs are totally lacking in Sri Lanka. These systems can be introduced at the museum and information centres of the associated heritage sites.

With regard to site management, the training course provided a basic overview of the format that is used for the management plans of Japanese sites. Since UNESCO World Heritage Sites in Sri Lanka do not have proper management plans, it is important to study the formats of the management plans that are used in Japan and other countries to formulate management plans to suit the Sri Lankan situation.

The discussions led by Dr. Gamini Wijesuriya of ICCROM with regard to the subject of ‘future tasks in the preservation of cultural heritage’ is highly relevant to face 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. Wijesuriya: revisit, research, react and result.

Conclusions

The foregoing discussion clearly shows that this training course was highly relevant to the heritage protection and preservation activities in Sri Lanka, and its application can be viewed with 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 countries like Japan, USA, and the UK. In other cases, feasibility studies need to be done in order to asses their sustainable applicability.

Due to the limited 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 pollen analysis and workshops on the analysis of bones), without focusing too much on the theoretical issues, and on introducing researchers’ case studies.

Informal discussions 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 office to consider holding separate training courses in the future on specific subjects such as archaeological dating, archaeological science and analysis, conservation science and analysis, heritage recording and data integration, and museum display techniques. 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 region such as archaeological excavation, field documentation systems, condition assessment, and detail documentation during and after conservation. If ACCU can also offer such courses, then training will be highly relevant and can be directly applied in many of the countries in the region.

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 by ACCU Nara. The library at ICCROM can be used a model and, UNESCO, ICCROM, ICOMOS, ICOM, IUCN 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 place on record my sincere thanks to ACCU Nara for inviting me as one of the training course participants. 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 meet other heritage professional in the Asia – Pacific region, to discuss the issues and to share the experience with regard to heritage. I earnestly hope that the contacts we have developed during this one month training as course participants 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 obtain insight into the rich Japanese cultural heritage.

Acknowledgements

I would like to express my gratitude to the Government of Japan and other institutions in Japan for the financial support provided for my stay in Japan. Finally I would like to express my heartfelt thanks to the Director of the ACCU Nara office and the staff for the excellent and wonderful organization during the whole period of the training course. Special thanks are due to Dr. Yasushi Nishimura, Ms. Kayoko Ishii, Mr. Mark Diab, Ms. Hata, and Mr. Kaoru Suemori for their excellent coordination of the activities related to the training. I am deeply grateful to all of them for their untiring efforts.

Thailand

Pakpadee YUKONGDI

Introduction

The training course on the preservation and restoration of cultural heritage in the Asia – Pacific Region 2004 was organized by the Cultural Heritage Protection Cooperation Office; Asia/Pacific Cultural Centre for UNESCO (ACCU). The objectives of this training course were to help 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/restoration of historic buildings. The course was based on characteristics of Japanese archaeological sites and historic buildings.

The course focused on archaeological research methodology and analytical methods of ancient remains, consisting of 6 main topics, as follows

1. Cultural heritage preservation and protection laws
2. Archaeological sciences
3. Environmental Archaeology
4. Scientific analytical methods in archaeology
5. Conservation sciences
6. Preservation and management of archaeological sites

The course also included analytical workshops at the Nara National Research Institute for Cultural Properties and a three-day excursion to help improve our understanding of archaeological methods by observing archaeological research, preservation/reconstruction, and the management of archaeological sites in Ishikawa and Fukui prefectures.

Comparison and Application to Archaeological Work in Thailand

Archaeological work in Thailand is comprised of historical studies, surveying and mapping, excavation, classification and analysis of objects, and site reports and publishing. Apart from excavation, there are 2 kinds of archaeological work in Thailand, research and rescue archaeology. For more than 10 years, archaeological work in Thailand has been involved mainly with monument excavations and the conservation of historical buildings. Other archaeological sites especially prehistoric sites or historic habitation areas are rarely considered for excavation. This is due to the difficulty of analysing human cultures as a whole by using materials from a few excavated pits. Also it takes a lot of time and a large budget to complete archaeological research. Rescue archaeology is carried out on very important and specific cases, such as the construction of irrigation canals, dams or roads, which have a limited time frame, meaning small-scale excavations, less interpretation, and incomplete results.

Generally, various scientific dating methods, either numerical or relative methods, were introduced to Thai archaeologists over 3 decades ago. The most common method is radiocarbon dating. Excavated artifacts and ecofacts such as charcoal and bones are sent to the Office of Atom for Peace or other institutes, especially universities, in order to determine the dating of samples. Potassium-argon dating in potsherds is also applied using many artifacts. However, without properly deciding the method to be used at the beginning of the excavation, the result of age determinations is still not satisfactory. This factor depends on archaeologists who are knowledgeable or well enough trained to handle excavations through to the final archaeological processes. Many archaeologists still prefer historical data or typology, thus, archaeological science has improved at a slow pace.

Although dendrochronology has recently been established, it will take a long time to collect and create a master chronology. However, relative tree ring dating might be more difficult to obtain because numerous varieties of woods have been used for sculptures and building purposes. Another difficulty is that most of the trees were cut from the northern parts of Thailand which has seen considerable deforestation. Although tree ring samples can be observed from the neighboring countries of both Burma and Laos, where wood is exported for construction elsewhere in Thailand, it is impossible to collect exact information about when a tree was cut without government permission from these countries due to various political problems.

Problems also abound regarding pollen analysis, the sampling methods of ancient and modern pollen were introduced and currently employed by scientists. However, sample collection between the ancient and modern periods, that is the time represented by the entire range of human history, began only a few years ago. One of the difficulties is that it is hard to search for perfect samples from stratified soil deposits; these types of sites from the important periods are unavailable. Scientists and archaeologists must cooperate and work together so that comparative pollen sampling can be developed further.

In Thailand, artifacts consist mostly of inorganic materials used for construction purposes such as stones, bricks, or tiles and pottery from the historic period. Organic materials, especially woods deteriorated easily and do not usually preserve in tropical areas like Thailand. However, human skeletons, animal bones and shells are usually found in prehistoric sites. The analysis of human bones, animal bones and shells is a main component of research in Thailand as there are experienced archaeologists conducting this work. Collecting samples for comparison is necessary for proper animal bone analysis. However, this is rather difficult especially with fish bones due to their great number and diversity of species.

Archaeological research in Japan is currently at a higher standard, especially with regard to the analysis and interpretation of archaeological data because of the use of modern technology and well trained staff. This has made Japan a leader in archaeological research in the Asia region.

Many advanced research facilities are introduced in this training course, such as survey measuring methods, either 3D digital archive system for archaeological remains or real-time 3D digital measurement. Real-time 3D digital measurement can be applied usefully in survey work and for exploring the actual size of monuments and archaeological sites within a short period of time. Similarly, the conservation of archaeological objects and artifact analysis is also very useful. Even though the scientific conservation laboratory is in a separate office and laboratory in the Office of Archaeology (in Thailand), conservation work can be done with the help of many scientific institutes or university experts.

Data Integration by GIS and GPS has already been applied in archaeological projects in Thailand. The introduction of modern equipment and software needs to be updated frequently so that archaeologists have further opportunities to learn and use these techniques.

Not only workshops in the analysis of human and animal remains but pollen or faunal remains are also practiced including the analysis of palaeoparasites from toilet soil. Through this training course, I have improved my knowledge, particularly regarding scientific techniques applied to archaeological research. I have also learned the procedures used in zooarchaeology and palaeobotanical analysis to obtain successive results in environmental archaeology. The study of plant populations and vegetation around a site should be applied to in the search for human habits and moreover human conditions as a whole. Thus, the study of environmental archaeology can be applied for the reconstruction of past environments bit by bit, and expanded to every part of the world in an effort to understand human history and ancient environments.

I felt that the most important topic in this training course is the conservation of archaeological sites. In Japan the restoration of historic architecture has been carried out actively in conjunction with the maintenance of historic sites. Restoration projects involving historic architecture have been carried out with the aim of regenerating local symbols, including the teaching of history that, consequently, encourages tourism considerably. This can be seen at every historic site throughout Japan where some restoration methods were selected for study during the on-site lectures. It seems that architectural, cultural, and artistic quality can be understood easily through three-dimensional experience. This selective method was chosen at the Heijo Palace Site to build an understanding for the public. This method is still unacceptable in Thailand especially with sites that do not contain certain evidence for reconstruction, however, such ideas allow archaeologists and conservators to think more about them for the future.

Conclusion

This course provided an overview of the field of cultural heritage preservation and restoration. In particular, the comprehensive nature of the training course highlighted the need for better integration among archaeologists and related cultural heritage professionals. This modern knowledge is useful and worthwhile to apply in every developing country in the Asian-Pacific region. All of the participants probably cannot apply absolutely all of the knowledge learned to the practical situations in their country, however, recommendations, suggestions and monitoring can be successfully provided to future archaeologists.

Acknowledgement

I would like to express my sincere gratitude to the Director, the staff from the ACCU office in Nara, the respected lecturers and translators. The opportunity afforded to me from this course has extended my knowledge in scientific methodology and the conservation of archaeological sites, and also provided valuable experience both in working and living in Japan. Heartfelt thanks go to Dr. Yasushi NISHIMURA, Ms. Kayoko ISHII, Mr. Mark DIAB, Mr. Kaoru SUEMORI and Ms Kyung Suk AN for their compassion in encouraging me through the saddest situation with the sudden loss of my beloved father. I also would like to thank all of my unforgettable friends, all of the participants. We helped and accompanied each other and had a wonderful experience during the training course, and lived very happily together.

Vietnam

BUI Duy Tri

ARCHAEOLOGICAL SITES AND PROBLEMS OF PRESERVATION AND RESTORATION

1. Preservation of archaeological sites:

An archaeological site is considered to be a treasure, where the national cultural properties from ancient time are kept. The shortage of historical resources or past images makes archaeological research especially important. In this field, archaeology plays a profound role in order to partially restore history by means of tangible data. Normally, the artifacts found from major sites are kept at museums, whereas the remaining monuments underground are often reburied or destroyed after the excavation and study have been finished. Very few buried archaeological sites are preserved on-site as open-air museums that show past cultural periods in an engaging way. Cultural preservation often deals with visible architectural features on the ground. Although these are all archaeological objects, the monuments on the ground seem to be cared for more than those that are underground. This might be due to the fact that preservation on the ground is easier, less complicated and less expensive than excavating and caring for sites under the ground. Many of the underground vestiges had modern buildings constructed on them. has Important buried architecture has been forgotten due to rapid changes caused by modern development. This is also the reason why a lot of the present generation lacks the profound awareness of their national cultures. The artifacts displayed in museums are invaluable, however, they are not enough to understand those cultures more deeply when there are no historical buildings existing around them. The public cannot envisage past culture in its proper context when observing artifacts. This is sometimes regrettable but it is still easy to make mistakes when facing these challenges and difficulties due to a lack of preservation techniques, that is related to the lack of a preservation budget and policy.

Presently, most of the countries in the Asia and Pacific area have policies for cultural heritage preservation, including archaeological sites. However, in many cases, because of an insufficient awareness of the significance of preservation, many archaeological sites have been damaged or have not been preserved.

This is an international problem. We should try to understand that because of the damage done by gigantic construction projects, invaluable cultural properties left from the past cannot survive. If we are insensitive to this plight and not responsible for the preservation of those cultural properties, it will continue unabated. To conserve these remains it is necessary to have an education project teaching the value of cultural heritage, and simultaneously invest in the training of experts for the preservation and restoration of cultural heritage, especially archaeological sites.

As an archaeologist as well as the first Vietnamese archaeologist to attend the Training course on Preservation and Restoration of Cultural Heritage in the Asia – Pacific region 2004 in Nara - Japan, I have a greater appreciation of the significance of the tasks to preserve archaeological relics. Being a secretary of the archaeological Project at the Thang Long Imperial Citadel (Hanoi) -the famous capital of Ancient Vietnam- I hope to learn from Japanese experts' experiences of methods, techniques, preservation and restoration of the Heijo Palace Site, so as to apply what I learn to the preservation of the Thang Long Citadel.

I realize that the power of many modern cities, like Hanoi (Vietnam) or Kyoto, Nara (Japan) and Beijing (China) doesn't lie in their modern status but in their well-known historical and cultural remains. Therefore, the preservation of ancient capitals becomes more significant the stronger the image of cultural or ethnic relativity it has.

2. Methods and techniques for preservation and restoration of archaeological sites:

During the Training course on the Preservation and Restoration of Cultural Heritage in the Asia–Pacific region 2004 in Nara, I learned many methods for the study, preservation and restoration of archaeological sites. The lectures and experiences from the Japanese experts actually made me very aware of certain issues. Perhaps my first strong impressions were the lectures about the methods for the study, preservation and restoration of wooden and metal artifacts. They are the most difficult to preserve. In Nara and other archaeological sites in Japan, many wooden artifacts have been found. However, Japanese experts are very good at coping with them so as to permanently preserve and display them in the museums, where it is impossible to suffer damage from the environment. There are wooden pillars and slips with Chinese characters found at the Heijo Palace Site. I have also read the reports of the participants of the previous training courses, they all seem to greatly appreciate the Japanese preservation techniques for wooden and metal objects at the National Research Institute for Cultural property (Nabunken) and Ishikawa Archaeological Foundation (Ishikawa Prefecture). I very much admire the investment in the modern equipment and the profound experiences in the preservation of these artifact types. Thanks to long-term experience, in addition to the careful training, as well as the investment in modern equipment, many institutions have set up a very scientific system for the treatment and preservation of wooden artifacts.

Apart from that, the range of the lectures about the study of environmental and faunal remains, especially those about Japanese study of toilets from the ancient time at archaeological sites created interesting impressions for me. Apparently, there is nothing about the discovery of toilets on any Vietnamese archaeological sites,. This matter seems to be trivial, but from the lectures and practical analysis, I learned that the search for parasites in human waste is important to understand the various kinds of food that the ancient inhabitants subsisted on. This is quite an interesting matter, that Vietnamese archaeologists - like me – should learn these methods; I will try to make this a new research trend in Vietnam.

Another interesting matter that impressed me was the on-site lecture trips at the Noto Kokubun-ji Site, the Ishikawa *Maibun* Center (in Ishikawa prefecture), the Ichijo-dani Site, Torihama Shell Mound, and Matsugase *Daiba*: the Battery Fortification (in Fukui prefecture).

Seeing the excavated, studied, preserved and restored archaeological sites in mountainous areas in Ishikawa and Fukui firsthand, I have discovered many things that require further thought. These factual lessons will enable me to improve my knowledge of the significance, importance and especially the lessons about the respect and preservation of past cultural properties from Japanese people. The preservation of archaeological sites in Japan not only focuses on architecture or urban architecture but also on settlements and cemetery sites. Many of these sites have been preserved as open-air museums and next to them is a system of artifact storage buildings and display houses used to explain the excavated results with abundant artifacts found from the excavated areas. The display houses are scientifically and meticulous introduced with the presentation of artifacts, models, plans, maps and pictures. This has a valuable effect on the public regarding the introduction of cultural and historical sites. More remarkably, almost all museums include a separate room for children and visitors to relax, study or learn ancient technology such as methods for making pressed designs on ceramics known from the Yayoi or Jomon periods, and techniques for refitting archaeological artifacts. Additionally, in the display houses, there are various modern and scientific facilities that show films about the excavations.

The Japanese archaeologists are very lucky to be well-equipped with both the knowledge and modern facilities for study, excavation and preservation of archaeological sites. They have enough facilities to conduct work on archaeological site preservation compared to the hardships experienced by many other countries who have difficulty in dealing with the preservation and analysis of cultural resources.

However, the preservation of archaeological sites in Japan, such as the Nara or the Heijo Palace Site, as far as I know, still includes many problems. As we know, Nara is one of the ancient capitals of modern Japan, dating back to the 8th century, where there are many well-known sites as the Heijo Palace Site, along with other architectural features such as Todai-ji, Kofuku-ji, and Horyu-ji temples. The entire complex of these historical cultural sites have become famous for being UNESCO World Heritage sites.

The Heijo Palace Site architecture seems almost to lie underground and the excavated results are mainly foundation traces of wooden monuments, similar to Thang Long Citadel (Hanoi). At this site, wooden pillars, stone bases as pillar supporters and material for architectural roofs were found. Based on this evidence, and other historical resources such as historic drawings from the Nara period, the Japanese experts have reconstructed the plan physiognomy and some important architectures step by step in order to help visitors to envisage the ancient Heijo Capital. This work has been carefully done and studied over the past decades.

The whole plan along with architectural foundations is now covered and lies at a depth of over 1 metre. Above this, an ancient architectural plan that was not in situ and found by the archaeologists was constructed in accordance with current interpretations. At Imperial the Domicile, the Imperial Audience Hall or State Hall and State Assembly Hall inside Heijo, there are architectural foundations which are tarmac, stone-made or arranged with stone bases cemented around them. In some places, the stone bases are made in a sophisticated way, and are not similar to the original bases from this period, which were natural. At the State Hall and State Assembly

Hall, a part of a wooden pillar was put on the base. Beside them, there are very modern water drainage systems and roads. Many questions were asked, for example: Is this method suitable according to archaeological preservation principles? Does the physiognomy plans here truly reflect those from ancient Nara? How many stone bases have been found there? What are their dimensions? What evidences is this based in order to restore the type of bases from the Imperial Audience Hall site? Are there any changes in building techniques between the early Nara and late Nara period (for example: the type of stone bases for supporting pillars) or is there only one style unlike any other reconstructed site?

Obviously, there are many problems surrounding the restoration and reconstruction of ancient Heijo in Nara. Nevertheless, I feel that the Japanese experts have been trying their best to preserve the national cultural properties, and at the same time they have tried their best to provide the best knowledge for visitors. This is respectful, and we should try our best to learn from them.

3. The results from the training course:

Though the lectures only introduce the basic features of methods for study and preservation, and the restoration of cultural properties in general, in such a short time, the ACCU Nara Office participants tried to well organize every lecture, and succeeded beyond all my expectations. Sixteen lectures at the hall and 3 other lectures on-site actually showed the competence and organizing experience of the ACCU Nara Office. I thank Mr. Nishimura, Mrs. Ishii, and Mr. Mark Diab who have taken great care in planning and carrying out the training syllabus as well as the meal and accommodations in Nara during the training course.

It is my pleasure to say that the Training course on the Preservation and Restoration of Cultural Heritage in the Asia – Pacific region 2004 was very successful. The 12 participants and I all perceived that after the one-month course, we received a lot of knowledge about preservation and restoration from the Japanese experts. This course will be very useful for me, and it will contribute, in a practical way to the preservation of cultural properties for each country.

The data collected from the lectures and study trips will certainly be very useful for the preservation of archaeological sites in Vietnam, especially for the Thang Long Imperial Citadel.

I think that the ACCU Nara Office will continue to provide an important service to young archaeologist who will attend similar courses in the future because the courses are very practical giving participants direct contact with sites and artifacts. If archaeologists and specialists from other Asia/Pacific countries are well-equipped with the knowledge of preservation methods and methods of archaeological analysis, they will contribute more practically to the preservation of cultural heritage.

Finally, once again, I would like to thank ACCU, especially Dr. Nishimura and other ACCU Nara Office staff who provided a wonderful chance for me to be able to visit and study in Nara.

Appendixes

Appendix A. List of Participants

Appendix B. List of Lecturers

Appendix C List of Tutors and Interpreter

Appendix D List of Staff Members, ACCU Nara

1. List of Participants

Cambodia

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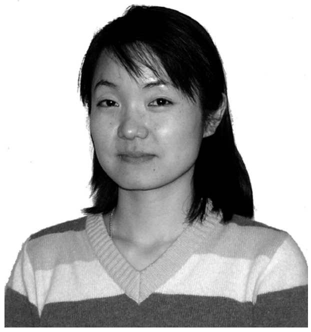

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