ACCU Nara
International Correspondent

The Eighth Regular Report

(公財)ユネスコ・アジア文化センター 文化遺産保護協力事務所
Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU)

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The ACCU correspondents periodically send reports on cultural heritage protection activities in which they have been recently involved. This is a collection of fifteen reports with one special report submitted by international correspondents in the Asia-Pacific region.

The Eighth Regular Report

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Cambodia

Living with Heritage: Kok Preah Phnom Community

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APSARA (Authority for the Protection and Management of Angkor and the Region of Siem Reap)

Kok Preah Phnom community is located in Slat village, Sre Kvav commune, Angkor Chhum district, Siem Reap province about 100 kilometers from Siem Reap town. The ancient road from Angkor Capital to Phimai temple (presently in NoKor Rachasima Province, Thailand) passed through a part of Angkor Chhum district. The Living Angkor Road Project (LARP) on this ancient road was a joint research project between APSARA Authority and the University of Thai Artists.

The project aimed to investigate both tangible and intangible heritages. Researchers focused on the infrastructure of tangible heritage such as stone bridges, chapels of hospitals, chapels of rest-houses, temples, dikes and ancient reservoirs. The intangible heritage was found by observing local people's tradition, because they settled along the ancient road since early times (Im Sokrithy, Ea Darith, Heng Than, Khieu Chan, Srun Tech and Kim Samnang, 2007: 315).

According to the report of LARP team, they discovered that Kol village (located in Kol commnume, Angkor Chhum district) was probably an ancient town in Angkor period. In aerial photos, we can see many ancient infra-structures. During the research, they found three stone bridges, five temples, six ancient mounds, eight ancient reservoirs, two other paths connecting the main road and historic/ prehistoric sites with stone tools, human bones and potteries.

Although Slat village was not included in the LARP's research, Kok Preah Phnom has high archaeological value due to its location; it is about 775 kilometers north of Kol village and about 275 kilometers east along the north-west ancient road.

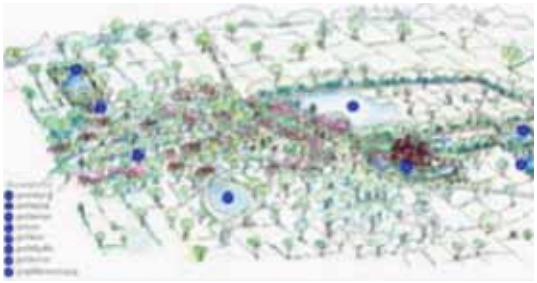
On the other hand, about three kilometers on the north-west of Slat village, there were two ancient mounds. The first was called Kok Andoek Slab (with three surrounding moats) and the other was Kok Prateal (west of Kok Andoek Slab). These two mounds were a kind of prehistoric sites in Sleng Spean village, Sleng Spean commune, Srey Snam district, Siem Reap province.

Kok Preah Phnom community settled on some parts of Preah Phnom temple and Kok Chak (surrounded by a moat with a water reservoir on the north and piles of bricks). Besides, they also found many kinds of stone tools such as axes, hatchets and some potsherds. Based on these evidences, they concluded that Kok Preah Phnom had likely been a place of human activity or human settlement since the prehistoric times until today.

Nowadays, Kok Preah Phnom community set the dwelling on the west dike of Preah Phnom pond for the purpose of agriculture by depending on natural resource with three main ancient reservoirs. In the whole community, most of the houses are built in wood and in Khmer traditional

Archaeological map of Siem Reap

Kok Preah Phnom Temple



Village view

Elevation from east

Elevation from north

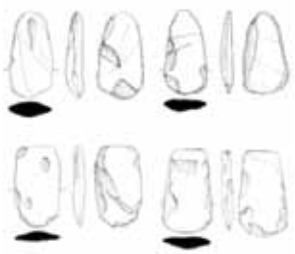
style. Houses are built on stilts where people live upstairs and surrounded by many kinds of fruit-trees.

Preah Phnom temple was built in brick with five towers in two ranges. It had two inscriptions written in Sanskrit. The first one was on the door frame of the southern tower, which was inventoried as K.593 in 930 A.D. in the reign of the king Jayavarman IV. And the other was on the door frame of the central tower, inventoried as K.454 in 1101 A.D. in the reign of the king Jayavarman VI (G. Cœdés, Paris 1951: 119). The third inscription was written in Khmer, inventoried as K.594 in the 10th century.

By reading three inscriptions, we can conclude that this temple was probably built in the reign of the king Jayavarman IV in the 10th century and renovated in the reign of the king Jayavarman VI in the 12th century.

One more point to note is that the villagers are always celebrating agrarian rites, practices of animism and homage to Neak Ta who is a spiritual village protector every year. The ceremony is taken place at Preah Phnom temple asking for good luck, health, the good rice harvest for the year to come, and of course, for the abundant honey for the coming year.

Recommendation:
- Minimize any development projects in the region, because the current landscape and environment provide the high values to the community.
- Preserve the existing landscape and environment, because they are the valuable resources for the future village.
- Encourage local people to preserve their identity and their natural and cultural resources.
- Enhance and promote the community values in present context.
- Any approach for the community should be ensured to reach "sustainable development" which is a mechanism of gradual equilibrium between nature, culture, human, social and economic activities.
- For near future plans, the energy, domestic sanitation and community organization should be taken into account and formalized.



Stone and iron tools were found in the village.

Example: one of wooden houses in Kok Preah Phnom Community

Villagers are celebrating agrarian rites and practices of animism, homage to Neak Ta at Preah Phnom temple.

Offerings to Keak Ta, inside the temple

China

Conservation and Restoration of Longmen Grottoes - World Cultural Heritage

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I. Brief Introduction to Longmen Grottoes

Located 13 kilometers to the south of Luoyang City, carved on the cliffs of the Longmen hill along the banks of the Yihe river, Longmen Grottoes began to be constructed at the time when Emperor Xiaowen of Northern Wei dynasty moved the capital to Luoyang (around A.D. 493), and the carving went on and off for more than 400 years. Kept here are over 2,000 caves and niches of different sizes, more than 100,000 Buddhist statues, and over 2,800 pieces of inscriptions. The statues, inscriptions, paintings and calligraphy decorations made in different dynasties, which reflect such contents as Buddhism, architecture, music, folk customs, sculpture, painting, medicine and cultural exchanges of different times, have important historical and archaeological values in the study of the artistic styles, social features and technical development of different times.

In 1961, the State Council promulgated it a key cultural relic site for special conservation. In 2000, it was inscribed on the World Heritage List by UNESCO. World Heritage Evaluation Commission of UNESCO made a consensus that firstly, the sculptures of the Longmen Grottoes are an outstanding manifestation of human artistic creativity. Secondly, the Longmen Grottoes illustrate the perfection of a long-established art form which was to play a highly significant role in the cultural evolution of this region of Asia. Thirdly, the high cultural level and sophisticated society of Tang dynasty of China is encapsulated in the exceptional stone carvings of the Longmen Grottoes.

During its history of more than 1,500 years, Longmen Grottoes have been damaged by nature as well as human factors. Now it suffers various diseases such as rock dilapidation, grotto leaking and sculpture weathering, which are the most common and severe.

II. Conservation Problems of Longmen Grottoes

It has been 1,500 years since Longmen Grottoes were carved in Northern Wei dynasty. Due to geological/ geographical conditions and the influence of natural stress (caused by denudation, weathering, leaking water, etc.), structure joints and cracks on rock masses have been widening and stress-release crevices have been developing. They looks like cobwebs scattered on rocks and sculptures, threatening the stability and security of the stone carvings. Some of the carvings have broken or fallen off, such as hands of Grand Losana, head of Kasyapa, the Heavenly King and Vajra on the south wall at the Fengxiansi cave, the bases of and Buddhist statues in Bazuosi cave and Dawanwufo cave.

The Grottoes are in face of many problems. For example, some rocks have been corroded, and some sculptures are covered with solidified magma of limestone. The washing of rains, the weathering of rocks, wild grass and trees are also serious problems. As a result, chaps can be seen in the rock bases of the caves, water leaks through some crevices, and some rocks have collapsed. The surface of sculptures is deteriorating and damaged. From geological point of view, the caves are located in a geological environment of fragile karst with a relatively low capacity and fast environment degrading. Once the rocks and sculptures are damaged, it is difficult to repair them. Ever since the 1970s, planned conservation and repair projects have been initiated and implemented. Reinforcing steel riveting was used in the constructions to strengthen the rocks, a seeping-proof layer of cement was applied

Far-view of Longmen

on the top of the caves, plank roadways and staircases was repaired and constructed, and enclosure along the sides of the site to be protected have been established. However, no specific methods have been found to secure long-lasting or permanent conservation and management of the caves in terms of rock mass displacement, cave leaking and weathering of the surface of the sculptures. Meanwhile, further researches are expected to guarantee the durability of previous strengthening by steel riveting and water-proof layers.

III. The History of Conservation

Various conservation measures have been taken in different times ever since Longmen Grottoes began to be designed and constructed. As early as in Northern Wei dynasty, the caves were designed with arch ceilings to increase their stability. In the Tang dynasty, herringbone drain ditches were built over Grand Losana at Fengxiansi cave. And remains of water-proof slates and roofs can still be seen atop some small caves carved on the hill cliffs. In the Song dynasty, nine chambers were built over Grand Losana at Fenxiansi cave for protection. Thereafter, remains of repair works at different historical times can be found in Longmen.

Ever since the 1950s, conservation and restoration work of Longmen Grottoes has been carried out for over 50 years, mainly centered on the collapse of grotto wall rock, the weathering of sculptures and cave leakage. The consolidation of the Fengxiansi cave from 1971 to 1974, was the first grotto conservation and consolidation project in the country, saving and conserving the Fengxiansi cave, and the most representative work at Longmen with modern engineering technology. From 1987 to 1992, Comprehensive Harness Project of Longmen Grottoes was implemented, with the rock body on the east and west hills being consolidated, and the problem of the stability of the rocks basically solved, and cave leakage controlled. In 2002, UNESCO Conservation and Restoration Project of Longmen Grottoes started with a total investment of 1.25

Springs in Longmen

Crevice in the carvings

Weathering on the surface of carvings

Water and microorganism on the surface of carvings

million US dollars, and completed in 2009. The aim of the project is to decide upon the directions of the all-purpose conservation and restoration, with comprehensive protection measures taken. In 2004, the Conservation and Restoration Project of Shuangyao Cave at Longmen, co-implemented by China and Italy, was put in practice. The practice of full-scale restoration of the surface diseases of the Shuangyao Cave will be of guiding significance to the conservation and restoration of other caves at Longmen.

In order to enhance protection work of Longmen Grottoes, we constituted the Layout of Longmen Grottoes Zone and the Protective and Administrative Ordinance of Longmen Grottoes, which provided legal basis for our work. We have had a great deal of hard work on protection of Longmen Grottoes in the past years. Through long time efforts we have solved the stability problem of caves on the whole and amended the leaking condition of caves effectively. In April 2003, the protection zone was closed to public traffic in conformity with the promise to UNESCO. The whole environment quality of grotto protective zone has been improved obviously.

IV. Main Conservation Job at Present

For a long period, we had placed our efforts on conservation for rescue. In recent years, we have been paying attention to daily maintenance and engineering conservation. It always takes us most of time on these works every year. As a result, the grottoes have been in good and stable conditions. However, further research is necessary so as to resolve such challenging works on the weathering of statues, seeping in the caves, and increasing tourist pressure. Along with the inscription on World Heritage List by UNESCO, international and bi-lateral collaborations have become more and more frequent and such affective projects as UNESCO Longmen Grottoes Conservation and Restoration Project lasting for several years have played a significant role as well as civil collaboration projects. Benefiting from this, seven fellows in the Conservation Center have all attended different training courses or other study opportunities these years. However, due to a shortage of fund, the laboratory specialized on cave conservation has not been established for so many years. A simple and low-grade laboratory cannot be suitable for the developing demands of conservation and restoration works. So, we applied for Italian soft loan to establish a modern laboratory two years ago. By the time accomplished two years later, a brand-new advanced and modern laboratory specialized for conservation and restoration will be built before us.

We are searching new methods and collaboration to solve the problem of Longmen Grottoes, and welcoming all walls of international societies taking part in the conservation of Longmen Grottoes, which belongs to all over the world and contributes to the history and memory of human beings.

The stone leaking-proof shelf, remains of Tang dynasty

Cement leaking-proof shelves

The water-leaking project of caves

India

Conservation of Stepwells at Delhi

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Stepwells, (also called *bawdi* or *baoli* or *vaav*) are wells or ponds in which the water can be reached by descending a set of steps. They may be covered and protected, and are often of architectural significance. It can be multi-storied also in which a bullock turns the water wheel ("Rehat") to raise the water in the well to the first or second floor. Mainly stepwells having two parts: a well shaft and a complex of dalans, rooms and stairs leading down to the water. The construction may be utilitarian, but sometimes includes significant architectural embellishment

The concept of stepwells is known from inscriptions to date back as far as circa 5th century A.D. and it may even have its origin from the time of Indus Valley Civilization. However, most stepwells appear to have flourished during the 8th to 18th centuries. They were an essential rain harvesting, groundwater recharging and storage system. But stepwells also express an aesthetic aspect of Indian life and are examples of what water, art and architecture meant for simple folk. They are most common in the west of India. They may be also found in the other more arid regions of the subcontinent, extending into Pakistan.

When the Muslim forces of Mohammad Ghori, led by Qutubuddin Aibak defeated the Rajput ruler Prithviraj Chauhan near Delhi in 1192 and established their empire in India, they were fully aware of the hardship they had faced in the deserts they had traveled through. They knew by experience that water was of prime importance to the welfare of their people and that Rajput Delhi had very limited resources of it, situated as it was on the dry and boulder strength area around Mehrauli.

Amongst the early water reservoirs was one in the Lal Kot area, hardly adequate to meet the growing requirements of the times. No much of it has survived today. Another is Suraj kund built by Suraj Pal ancestor of Prithviraj in the southern part of Delhi. This huge water reservoir was built around A.D. 1061 with stone embankment. It was built at the foot of some gigantic stone steps in a semicircular shape. The masonry work shows splendid engineering skill in the arrangements for letting fresh water and draining the excess.

As per the archival records, there were 629 water bodies, but due to rapid urbanization and development many of them are now dried and have lost their existence. The Archaeological Survey of India has 15 water bodies under its control in Delhi out of which 12 are conserved and revived during the past few years. Steps were taken to ensure and maintain their originality. Most of the stepwells were damaged and in dilapidated condition. Their walls were fallen, Chhajja stones were damaged and missing and the structure were filled with debris and muck. No water was evident.

For the first time in several centuries, these *baolis* were cleared of all rubbish down to their original foundation (in some cases 80-100 feet below the ground level). This had to be done manually due to the compact nature of the accumulated waste. The process was carefully supervised. The work used a combination of ancient technique and modern technology. Building materials and crafts were similar to those used by original builders, as India was fortunate in having living building traditions, and conservation projects are an opportunity to ensure that they continue. At the same time, high-definition survey using 3D scanner and GPR was conducted to understand the underline soil condition and to plan conservation works accordingly. Here the brief description of some water bodies is given and the work done by the Archaeological Survey of India with the photographs.

Uggar Sain Ki *Baoli*

Uggar Sains's *baoli*, situated near Cannaught place, belongs to 15th century. At the level of the ground this *baoli* measure 192' by 45' over all and at water level 129' 3" by 24' 6". It was built of rubble masonry and dressed hard stone. The *baoli* is built in three parts. The first was the rectangular swimming pool like area with a long flight of steps flanked by a thick wall with two series of arched niches. The second part of the *baoli* was a deep circular well having 25' 6" diameter. The area of *baoli* is 435 square meters.

Rajon-Ki-Bain (*Baoli*)

Rajon-ki-Bain a four tier stepped well, lies south of Adham Khan's tomb at Mehrauli and appears to derive its name from the fact that it was for a time used by masons (*raj*). It belongs to the Lodi period and from the inscription in the pavilion, it was buit in A.D. 1512. The *baoli* is oblong with steps leading downwards towards south. The walls of the lowest visible storey are decorated with small but deeply recessed arches. The area of *baoli* is 858.36 square meters.

Gandhak-Ki-*Baoli*

Gandhak-ki-*Baoli*, built with rubble masonry, lies about 100m. South of Adham Khan's tomb is so called because of the smell of Sulphur (*gandhak*) in its water. It is believed to have been built in the reign of Iltumish (A.D. 1211-36). It has five tiers, each tier narrowing as it descends towards the bottom, with a circular well at its southern end. Each tier is reached by way of galleries on the east and west which give access to the circular portion of the well.

***Baoli* at Munirka**

This *baoli*, located at Munirka, is built of random rubble masonry and has a circular well at its southern end

which is flanked by domed turrets and also has narrow winding staircases to reach the water level. Thick walls of eastern and western have a series of arched niches. It is assignable to Lodi period (A.D. 1451-1526). The area of the *baoli* is 350 square meters.

***Baoli* at Ghiaspur (Nizamuddin)**

This *baoli* is situated in the village Nizamuddin, believed to have been built by the Saint Nizamudding, at the northern doorway of the enclosure of the Nizamuddin's tomb. It is said to have been the cause of contention between Nizamud-Din and Ghiyasu'd-Din Tughlaq Shah. It is enclosed by dressed stone walls on the south. This large *baoli* is considered sacred by the followers of Hazrat Nizamu'd-Din Auliya). The area of the *baoli* is 657.80 square meters.

***Baoli* at Purana Qila**

Towards the south-west of the Qile-a-Kuhna mosque, this large stepped well (*baoli*) is situated inside Purana Qila. Since the fort was built on a high ground, the ground water level was far down. So, the *baoli* was constructed to provide the water facility. It was designed in this way that the water should be covered and its evaporation process should be minimized. Its roof was constructed with a series of gradually receding arches. It has eighty nine steps and eight landings. The step portion of the *baoli* measure about 22.25 m in depth. Its northern extreme terminates into a circular well with a series of gradually receding arches. The area of the *baoli* is 675 square meters.

***Baoli* at Red Fort**

The *baoli*, situated at Red Fort, is built of rubble masonry and dressed with hard stone. It consists of an octagonal shaft, having 6.50 diameter and 14.27m deep with an adjoining tank, which measures about 6.10 m x 6.10 m. In the north and west direction there are flight of steps flanked by a thick wall with arched apartments on either side. The total area of *baoli* is 597 square meters.

Hauz-I-Shamsi

On the southern outskirts of Mehrauli, this large tank was built in 1230 by Shamsu'd-Din Iltimish. Originally it is said to have covered hundred acres of land and was lined with red sandstone. It was repaired by Alau'd-Din Khilji and Firoz Shah Tughluq. The tradition says that the prophet appeared once to Iltumish in a dream and pointed out this site to him as suitable for building the tank which he had in mind. The next morning Iltumish noticed here the print of one of the hoofs of the prophet's horse, around which he built a domed platform and excavated the tank. The water of the tank is regarded as sacred, and several graves of Muslims saints lie around it. The area of this tank is 2000 square meters.

Old *Baoli* on the Ridge

Old *baoli*, located on the ridge in north Delhi, is a massive structure of rubble masonry. It was originally encircled by a series of chambers. The water reservoirs and remains of drains were intended for supplying water to the Kushk-i-Shikar or Jahan Numa palace of Firoz Shah. A tunnel was discovered leading from the north wall of the *baoli* but its purpose could not be ascertained. The total area of the *baoli* is 1250 square meters.

***Baoli* at Tughluqabad Fort**

In the Tughluqabad Fort, palace complex has this fairly large *baoli* excavated deep into the bedrock. To give it a proper shape, masonry retaining walls and staircases were provided. While the outer face of the masonry is of ashlars, the core is of random rubble set in lime mortar. Evidence of a projected platform built on the northern retaining wall for drawing water from the *baoli* still can be seen. Construction of the fort was quarried locally and caused depressions which may have served as water reservoirs for use in dry seasons. The total area of the *baoli* is 414 square meters. The citadel complex has another large *baoli*, which lies in 840 square meters.

***Baoli* Arab-Ki-Sarai**

Arab Sarai, is about 325 metres south-west of Humayun's Tomb and was built in 1560-61 by Humayun's senior wife Bega Begum or Haji Begum has a remains of a *baoli*. It is said that the she brought three hundred Arab priests (*Mullah*) with her return from the pilgrimage of Mecca and settled them here, and the *baoli*'s water were used for various utilitarian purposes. This circular step well has a flight of steps to reach the water level. It is built of random rubble masonry and the total area of this *baoli* is 54.64 square meters.

***Baoli* at Kotla Firoz Shah**

In the Kotla Firoz Shah complex, a circular *baoli* stands immediately north-west of the pyramidal lat structure with a range of subterranean apartment, the remains of which are observed at the upper terrace enclosed by a low open stone railing. This circular well has no staircases to reach to the level of water unlike other step wells. It is not covered and has a pulley to lift water. There are two-story rooms around the well. There is a complex system of water channels and pipes to lift the water to the roof from where it is taken out and even animals can drink water. The roof is topped by chhatris and surrounded by railing which probably might have been used for recreational activity. The total area of the *baoli* is 876.13 square meters.

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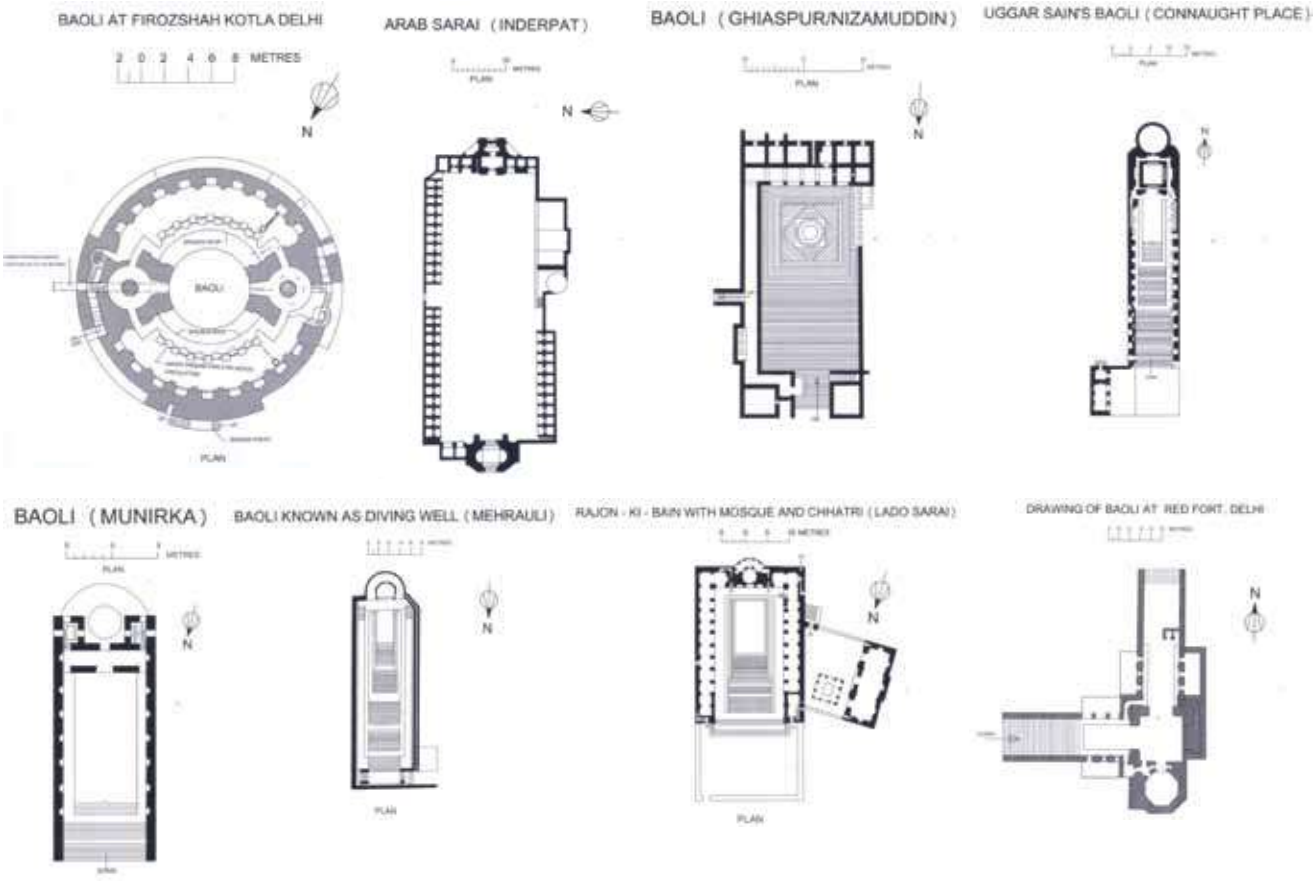

Baoli at Giyaspur (Nizamuddin), bfore conservation

Baoli at Giyaspur (Nizamuddin), after conservation

Gandhk-ki-*Baoli*, before conservation

Gandhk-ki-*Baoli*, after conservation

Baoli at Arab-ki-Sarai (during work)

Baoli at Arab-ki-Sarai (during work)

Baoli at Red Fort in dilapidated condition

Baoli at Red Fort, after conservation

Hauz-I-Shamsi, covered with vegetation

Hauz-I-Shamsi, after removal of vegetation

Rajon-ki-Bain (*Baoli*), in damaged condition and filled with debris

Rajon-ki-Bain (*Baoli*), after conservation

Uggar Sain ki *Baoli*, filled with debris

Uggar Sain ki *Baoli*, after de-silting and conservation

Baoli at Munirka, in dilapidated condition and filled with debris

Baoli at Munirka, present condition

Baoli at Kotla Firoz Shah in damaged condition

Baoli at Kotla Firoz Shah, after conservation

Baoli at Purana Qila, present view

Baoli at Purana Qila, closed in the past

Baoli at Purana Qila, during conservation

Baoli at Tughluqaqbad Fort in damaged condition

Baoli at Tughluqabad Fort, during conservation

Stone Inlay Work in Agra Monuments and its Restoration

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Introduction

A method of inlaying coloured marbles or semi-precious stones into a stone base, often in geometric or flower patterns is called Pacchikaari in India. It became popular in India during the Mughal rule. It is often treated as an imitation of Pietradura so popular in the early 17th century in Europe. However, many of the Indian buildings showed similar decorations in glazed tiles. It appears that the inlay of stone in stone was an extension of the same technique in different medium during the Mughal period. This shift most probably was due to the induction of new building material during the Mughals.

The shift from the lime plastered random rubble masonry decorated with patterns in stucco or with mosaic of coloured ceramic tiles to the stone-veneered brick-work or rubble masonry was more or less responsible for the introduction of the new technique of embellishment with inlaying of stone in the veneering stone.

Of the Mughal monuments the first to be built in Agra was a pleasure garden (AA) Ram Bagh by Babur, though it has been latter embellished by his grandson Jehangir, it does not show any attempt to inlay decoration. Though not many of the buildings of Akbar survive in their original state of construction monuments of this period show robustness and are generally bland on the exterior, however, Humayun's tomb at Delhi being one good exception. Humayun's tomb shows just a little blend of red and white stone, perhaps to define the outlines and to render it a snow peak effect. In the Chatris (cupolas) at the corners do show patterns in coloured tiles inlayed in the stucco. At Humayun' tomb the inlayed pieces are larger in size, still they fall under the category of stone inlay decoration.

At Agra almost all the Mughal monuments such as Akbar's Tomb, buildings in Agra Fort, Itemad-ud-Daula's Tomb, monuments in Fatehpur Sikri and Taj Mahal bear stone inlay decoration. In these monuments a gradually increasing degree of perfection, preciseness and sophistication can be observed which gets itself epitomized in the crowning glory Taj Mahal.

Types of Inlay Work

All the inlay work available at Agra monuments materially can be divided in two broad categories a) Sand stone as base and b) Marble as base. Thematically, it can be categorized as a) simple geometric patterns, b) complex geometric, c) complex floral and d) inscriptions. The last two categories are technically the most complicated. Material used, however, does not differ so much. On the red sandstone base generally white marble is used in combination with black limestone to execute geometric patterns both simple as well as complex. On the marble base, a variety of semiprecious stones (Table. 1) are used for creating the complex floral patterns, while black lime-stone is used in executing the inscriptions.

Name of the Semiprecious stone	Name in the text	Place of Procurement
Ajuba	Not known	Surat
Alabaster	Rukham	Makrana
Black marble	Musa	Jhari
Bloodstone	Abri	Gwalior
Carnelian	Aqiq	Baghdad
Coral	Moonga	Indian Ocean
Emerald	Zamurrad	Not known
Golden stone	Tilai	Not known
Gulabi	Not known	Not known
Jadwar	Not known	
Jasper	Yashab	Cambay
Lapis Lazuli	Lajward	Sri Lanka
Load stone	Maqnatis	Gwalior
Melachite	Dhana- i-farang	Russia
Nakhud		Sabalgarh
Onyx	Suleimani	Deccan
Pitunia	Not known	Not known
Reg	Chambal	
Sapphire	Nilam	Not known
Tarquoise	Firoza	Tibet

Table 1

These carved stones were set in the stone grooves with a cementing or binding agent. This cementing material is also mentioned in the contemporary texts and it included various organic substances as well as inorganic/ mineral material. At present, white cement and marble dust are also included in the cementing agent for fixing the inlays in the grooves. The ingredients and their approximate proportions are:

Ingredient of Mortar	Approx. Quantity (in one quintal)
White lime	15 kg
Marble dust	70 kg
White cement	10 kg
Gond (Gum of acacia arabica)	2.25 kg
Batasha (candied sugar drops) / Gur - jaggery/ jaggeree traditional unrefined non-centrifugal whole cane sugar. It is a concentrated product of cane juice without separation of the molasses and crystals.	1.25 kg
Bael giri (pulp of wood apple aegle marmolus)	0.50 kg
Curd	0.50 kg
or as per equirement	
Urad Dal – Vigna mungo	0.50 kg
or as per requirement	

Table 2

Need for Conservation/ Restoration

Time and the vagaries of nature coupled with human actions (inaction as well) the monuments fall prey to decay. They need to be strengthened from time to time through day to day cleaning, monitoring, fixing the breakage and prolonging the decay – all of which fall under conservation. Thus, conservation becomes a continuous activity about the monument. The causes of decay are generally universal and some are controllable while the others cannot be controlled. At Agra the extreme weather and human intervention are the prominent causes of decay and deterioration. Air pollution and bird excreta mixed with rain also further the deterioration.

Causes of Decay

For the inlay, the main causes of decay are the incompatibility of the two materials used, the mortar behavior and inherent weakness of the base stone. For most of the Agra monuments the base stone is red sand stone except at Itemad-ud-Daula's tomb and Taj Mahal (mausoleum) where it is marble. Red sandstone being a sedimentary rock suffers from inherent weaknesses like exfoliation and fragmenting as well as cracking due to the rusting of iron dowel. The inlay pieces technically are simply set inside a groove made in the base stone with the help of a cementing agent which in case of Mughal monuments is special putty made with a combination of organic as well as inorganic materials.

Problems relating to the inlay are not uniform in all the monuments or in all places in the same monument. Even if the differential exposure to the sun, or the air velocity and direction and the dynamic thrust of the lashing rains is discounted the problems differ from exterior to interior. Indoor problems include the regular dusting and cleaning of the surface and touch by the visitors and rise in humidity and carbon dioxide levels due to human resirat ion. Outdoor effects are multi-fold and almost universal. But all these lead to:

- Weathering of the base stones
- Weathering of the inlay pieces
- Deadening of binding mortar
- Human vandalism

It has been observed that the maximum deterioration of the inlay pieces occurs up to two metres from the base, mainly because:

- Greater moisture content nearer the ground level which initiates the weathering of the base stone, in case of red sandstone, or results in the swelling of the mortar that pushes the inlay piece outside.
- Two-metre-height is within human reach and the already weak inlay pieces fall victims to adventurous human beings.

The Restoration

The method adopted for the restoration involves:

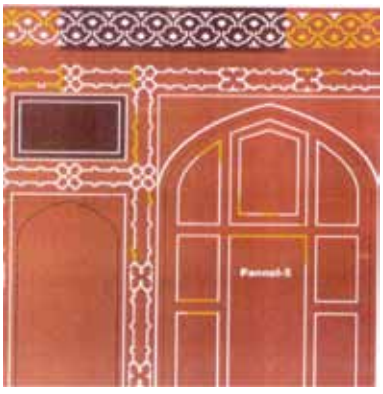
- Identification of the damage or decay
- Documentation of the decayed panel
- Procurement of raw material similar to the quality used
- Preparation of the base, if required
- Preparation of the inlay pieces
- Preparation of the cementing agent/ mortar
- Fixing of the inlay pieces, and
- Post restoration documentation.

The process involves preparation of a document detailing existing and the missing inlay pieces as well as the condition of the base stone. The next step is to trace the missing inlay piece and then a thin metal sheet is cut in the desired shape. It is pasted on the slab of stone from which the inlay is to be fashioned. To cut the stone traditional methods are used. A bow of bamboo with string of twisted wires is used to saw the stone fixed on a frame. Sand is used as abrasive with water to run down the excess sand to facilitate a fine cut. Where the base stone is worn out and needs to be replaced. First the pattern is trace on the finished surface of new slab and the grooves are chiseled with traditional tools by engravers. And then the same process of tracing and fashioning the inlay pieces is followed. While procuring the raw material care is taken to get as similar material as possible to the original used. To ensure it, petrographic reports are obtained and comparative reports are also drawn.

Conclusion

Deterioration and decay of inlay pieces or inlay panels does not bespeak of the structural weakness, and it only makes the monument ugly. It is like a skin disease which if untreated keeps on spreading and when chronic can penetrate the inner fabric of the structure. Therefore, the vigil keeps going and the first sign of weakness is attended to properly. Surely, a stitch in time saves nine. Conservation and restoration have kept the monuments in fine state.

Documentation before restoration: Yellow is the existing and white is the missing inlay.



Post-restoration documentation (not of the same panel) : Chocolate is replaced base stone; white is the new inlay.

A missing inlay piece before restoration

Taking impression of the missing inlay piece with paper

Preparation of format in tin sheet according to the impression

Checking the size of tin format with the missing one

Fixing the format on the frame

An inlay piece is cut using a bow string saw.

The traditional method

Traditional tools

Photographic documentation

Post-restoration photographic documentation

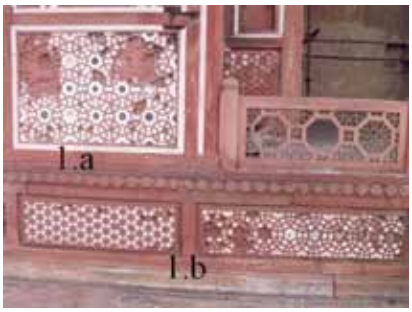
Inherent cracks aided by human vandalism: A broken inlay.

Intricate inlay work: Stone (jasper) of different hues are used to show the folds (above); 53 tiny pieces of camelian make a flower.

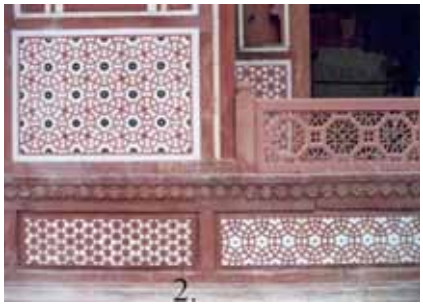
Most delicate work on the lower grave stone

Most complicated inlay work: Inscriptions,
1. Mausoleum façade 2. Main entrance

Moderate weathering of top surface of base stone and deadening of mortar: Restored Akbar's Tomb



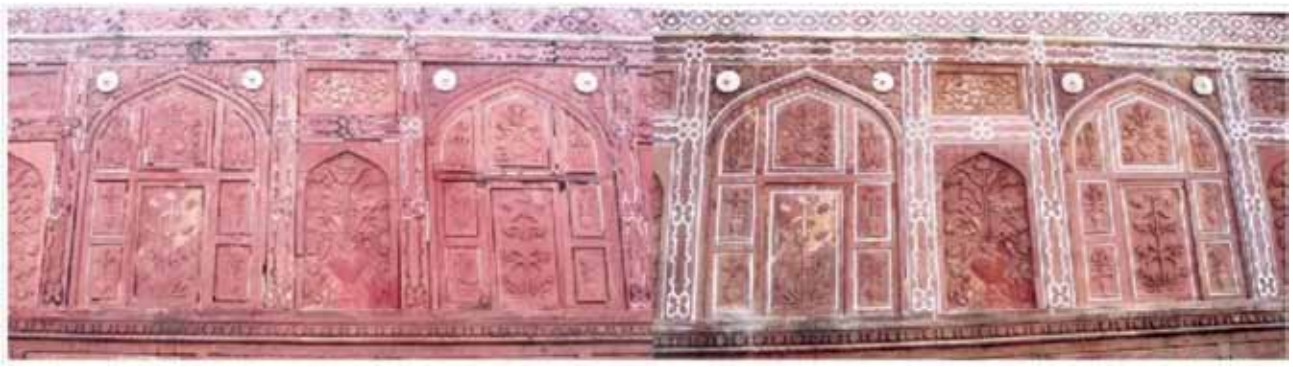
1.a Heavily weathered base
1.b Missing inlay due to deadening of mortar



2. Properly restored Itemad-ud-Daula's Tomb

Weathered base and missing inlay pieces, during restoration base stone was replaced and grooved: Itimad-ud-Daula's Tomb

Restored inlays of turret: Taj Mahal



Restoration of missing inlay pieces: Riverside wall, Taj Mahal

Preservation of Kimpulan Temple

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Directorate of Archaeological Heritage, Ministry of Culture and Tourism

Introduction

The Kimpulan Temple is a newly discovered temple in Indonesia. This temple was discovered incidentally on 11 December 2009, during the construction work of the library of Islamic University of Indonesia. The information about this new temple was then immediately reported to the Archaeological Office of Yogyakarta. On 12 December 2009, Archaeological Office of Yogyakarta conducted a survey. The Kimpulan Temple has a unique history; in the past, the temple had a Hindu background and now rediscovered in the integrated complex of Islamic University of Indonesia.

The Kimpulan Temple located at Kimpulan Village, Sleman District, Yogyakarta Province, approximately 14.5 km from the city of Yogyakarta (figure 1). When Mount Merapi erupted in November 2010, Kimpulan Temple was also affected. The temple located less than 20 miles from Mount Merapi and it was covered by volcanic ashes. As a result of this eruption impact, the restoration work was delayed for one month. The restoration of the temple completed at the end of January 2011.

This report informs the working stages of the temple from its discovery to preservation.

Stages of Preservation

Preservation works included rescue excavation, feasibility studies, technical studies of restoration, and land-use planning. Rescue excavation was carried out for safely collecting archaeology data at the time of the discovery of the structure. The focus of the rescue excavation was to search whole structures horizontally: the main building, the ancillary building and the main yard.

Implementation of a rescue excavation method was conducted by using a system box of 2 x 2 m with spit excavation technique. In order to obtain the maximum accuracy, the interval depth of excavation was set every 20 cm. Rescue excavation activities have resulted in findings of two buildings, namely the main temple with a size of 6 x 6 m and the ancillary temple with the size of 4 x 6 m (figure 4, 5 & 6). Both temple buildings was open without a booth nor a roof, with a height of 213 cm from the wall structure of the ground level. In the main temple, there were a Ganesha statue overlooking the west, the phallus, the yoni, and 12 units of rocks protruding above the floor (figure 4). In the temple there were ancillary Nandi statue pedestal flanked by two pieces yoni phallus (north) and the stone box (south). Inside the temple floor surface, 8 extolled ancillary base was also found, so it was concluded that the temple building Kimpulan possibily had wooden poles and the roof of organic materials. Activities of rescue excavations was conducted from 19 December 2009 to 30 January 2010 in three stages.

The next step was to conduct a study of restoration feasibility. The purpose of this study was to determine the feasibility of Kimpulan temple: is it worth to be restored or not? Based on the results of the feasibility study, data showed that the authenticity of the temple was guranteed with mostly the original materials. So, this temple was worth to be restored.

According to the procedure of restoration of cultural heritage, restoration works began with technical studies. Technical studies of restoration was undertaken to identify the damage, to determine the conservation plan, and land-use planning. At this stage of work, archaeological excavations was also carried out to identify objects and to observe damage of the temple structure (figure 6,7 & 8).

Restoration Works

The restoration works of Kimpulan Temple was made for physical protection, by improving the structure of the main temple, ancillary temple, fence and land-use. Based on the results of technical studies restoration, there were several data obtained: sunked floors and fallen of

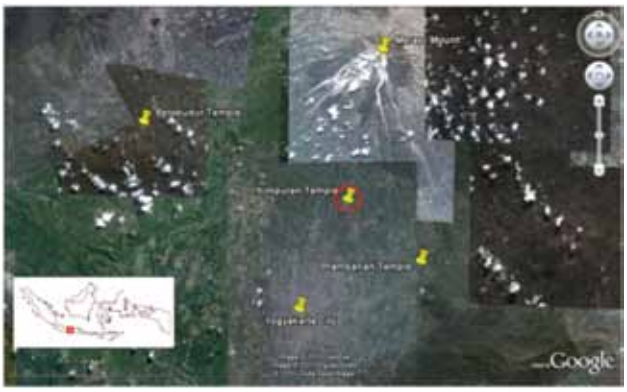

Figure 1. Location of Kimpulan Temple between Borobudur temple, Prambanan Temple and Yogyakarta City

Figure 2. Condition of Kimpulan temple

building component parts of the northwest corner of the temple due to exposure to heavy equipment at work digging the foundation.

The focus of the repair method was directed to repairing the damaged part of the temple building, fence repair, and conservation materials. While land settlement, directed to refund the original maiveld on main yard and the land adjacent to the outer walls of new buildings, as well as rain water channel settings.

The stages of restoration of Kimpulan Temple include:

1. Preparation
   Preparatory work was made for the preparation of facilities and infrastructure supporting the restoration work.

2. Coding
   Coding or signing on stones before dismantling the stone floor was done by marking dismantled stones by certain codes on all four sides of the stone on the upper surface with white paint. The aim of this process is to ease the reinstallment of the stones to its original position (figure 9).

3. Dismantling
   Dismantling was carried out on the floor of the main temple and ancillary temples that have been coded. The dismantling of the stone floor was made for research of materials under the floor (archaeological excavations), strengthening the structure of the carrying capacity of the soil under the floor, and installation of plumbing. The dismantled stones were arranged regularly in the workshop's yard.

4. Archaeological Excavations
   Archaeological excavation was carried out on the ground under the floor of the building and outside the building. It was conducted within the building to determine the soil structure and soil bearing capacity and to search for other important materials. Archaeological excavation at the main temple was conducted to a depth of 100 m, and managed to find a peripih box[1] made of white stones, shards of gold, iron, plates and bowls of bronze. In the excavation on the ancillary temples they discovered fragments of iron in the form of a spatula, and a peripih box of andesite. In the excavation on the yard between the main temple and the ancillary temples, four fragments of pottery and bronze were unearthed. Excavation on the main yard was made to show the original soil. This activity was carried out in January 2011 after the eruption of Mount Merapi. A display of the soil layers in the eastern ancillary temples was made to provide geologic information of Kimpulan Temple (figure 11 & 12).

5. Conservation
   Conservation treatment was done on the stones temple and unearthed objects. Microorganisms (lichen) on the stone were cleaned for preservation and objects were also cleaned and conserved in the laboratory (figure 10).

6. Reassembling
   The stone floor of the temple was placed according to its original layout. Reassembling of the stones is done after the archaeological excavation, soil research, assembly of water lines, and strengthening the structure of the soil under the floor. The damaged or lost stones were replaced with new stones with the same quality as the original.

7. Final Completion
   Final completion was made by sculpting and alignment of the new stones that were installed.

8. Land-use planning
   Kimpulan Temple located within the construction site of library building, Islamic University of Indonesia, so the new land-use was planned based on the redesign of library building and landscapes.

Closing

The preservation work of Kimpulan Temple through several phases was provided in a standard operational procedure of preservation of cultural heritage. The preservation of Kimpulan Temple developed high public appreciation on cultural heritage. Changes in the the original plan of library building to adjust with the condition of the old temple showed true wisdom of knowledge. The complete restoration of the temple and the constuction of library building will be inaugurated at the end of this year.

Reference Photos : Archaeological Office of Yogyakarta

1 **Peripih box** is a stone or ceramic container that is placed in the bottom wells or Hindu Buddhist temple. These containers can be either a box or vessel, in which objects are stored in the form of offering gemstones, precious metals, ash, mirrors, inscriptions, or seeds intended for the worship of certain gods. The number of holes in peripih is generally odd.

Figure 3. Rescue excavation

Figure 4. The Main Temple

Figure 5. The Ancillary Temple

Figure 6. Condition of Ganesha statue on the main temple

Figure 7. Measurement and drawing for technical study

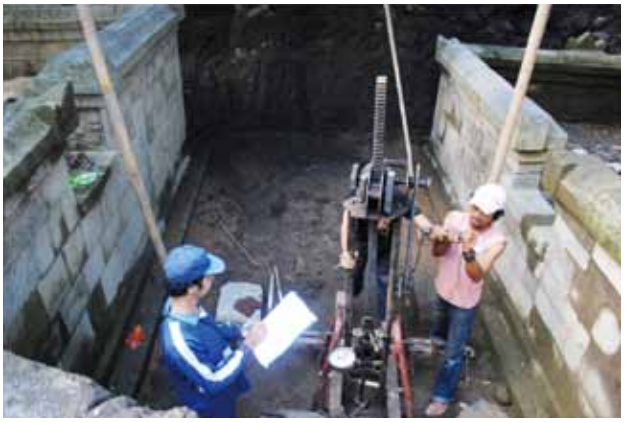

Figure 8. Sondir test

Figure 9. Coding on stones before dismantling

Figure 10. Cleaning of the temple wall

Figure 11. Excavation of yard after eruption of Mount Merapi

Figure 12. Some of the findings under floor of the main temple

Figure 13. The Kimpulan temple after restoration, in front of the new building (library)

Malaysia

Restoration of Building Façade at the Sultan Abdul Samad Building, Kuala Lumpur, Malaysia

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Introduction

Located between the Dataran Merdeka (Independence Square) and the Gombak-Klang River in the heart of Kuala Lumpur, the Sultan Abdul Samad Building has been one of the most beautiful heritage landmarks of the city, attracting local and foreign tourists. Due to its immense architectural, historical and cultural significance, the building was listed as one of the National Heritage in 2007 under the National Heritage Act 2005. In August 2009, the Federal Government had allocated an amount of RM2.37 million (USD 764,516) through the Department of National Heritage for the restoration of building façade at the Sultan Abdul Samad Building. The works included salt desalination, treatment of rising damp, repair and replacement of old bricks, re-plastering and repainting of plastered building elements. The restoration works were carried out through the Design and Build procurement method over a period of eight months from the 17th of August 2009 until the 16th of April 2010.

Historical Background

The Sultan Abdul Samad Building was designed by a British architect, Arthur Charles Alfred Norman (1858-1944). However, it is likely that there were others including Charles Edwin Spooner (1853-1909) as the State Engineer and Director of the Public Works Department; and those who worked under Norman such as Regent Alfred John Bidwell (1869-1918) and Arthur Benison Hubback (1871-1948) who had contributed their design ideas, suggestions and even carried out the detail drawings of the building. Built in 1894-1897 at the cost of 152,000 Straits Dollars, the building was named after Sultan Abdul Samad (1804-1898), the reigning Sultan of Selangor at the time of its construction. The foundation stone was laid by Sir Charles Mitchell, the Governor of Straits Settlements on the 6th of October 1894. The building was once used for several government offices including the Secretariat offices of Selangor, the Selangor State Government Treasury, the Accountant-General's Office, the Marriage Registry; and the Federal and High Courts. The building had been the focal point of many historical events of the country including the declaration of the independence of Malaysia which took place in front of the building (Independence Square) on the 31st of August, 1957 where the Union Jack flag was lowered and replaced with the national flag of Malaysia. The building has since undergone several restoration works including its interior to meet modern office requirements. Today, the building is used to house the Ministry of Information, Communication and Culture, Malaysia.

Architectural Significance

The Sultan Abdul Samad Building portrays the Moghul architectural style constructed entirely of exposed red clay bricks (pressed bricks) pointed with grey lime; and white plaster lined arches. This two-level building occupies a ground area of 4,208.5 square metres (45,300 square feet) with an F-shaped floor plan. The building has a front façade stretching 137.2 metres (450 feet) along Jalan Raja with different forms of arches (key hole, ogee, pointed and horseshoe), an imposing central porch; and three copper domes topped with a copper chhatri. The

Upon completion in 1897, the Sultan Abdul Samad Building has a front façade stretching 137.2 metres (450 feet) along Jalan Raja, making it the largest building of its day.

The building front façade with its immense 41.2 metre (135 feet) clock tower, central porch, three copper domes topped with a copper chhatris; and different forms of arches (key hole, ogee, pointed and horseshoe).

Located in front of the Dataran Merdeka (Independence Square, left), the Sultan Abdul Samad Building has been one of the most beautiful heritage landmarks of Kuala Lumpur, attracting local and foreign tourists.

Porous brick on the brickworks

Surface damage on the brickworks

Salt contamination (primary efflorescence) on the brickworks

5.48 metres (18 feet) high porch in the centre of the front façade is massive with its Gothic arches and thick columns. Besides the central porch, the most imposing feature of the building is its immense clock tower, rising from the centre of the building to a height of 41.2 metres (135 feet) above the ground. This central clock tower is flanked by two circular towers, having stairways leading to the first floor. All towers have onion-shaped domes with copper coverings. Upon completion in 1897, the building had used a total of 4 million bricks, 2,500 barrels of cement, 18,000 pikuls of lime, 4,000 cubic yards of sand, 5,000 pounds of copper, 50 tons of steel and iron and 30,000 cubic feet of timber, making it the largest building of its day.

Restoration of Building Façade

Before restoration works began, a dilapidation survey was conducted to identify the building defects, mainly on the building façade (exterior walls and columns). Among the building defects found at the building façade were salt contamination, rising damp, stained walls and columns, harmful growth; and also broken and porous bricks and mortar joints. The restoration works concentrated mainly on walls, columns, arches, windows, cornices, parapets and balustrades. The restoration works were divided into three main stages as follows:

i. Stage 1: Salt Desalination and Chemical Injection of Damp-proof Course

Salt contamination and rising damp were two common defects found at the building façade. Both defects are closely related. Salt contamination is due to various reasons including the seepage of ground water deriving from the nearby Gombak-Klang River, constant traffic pollution mainly along Jalan Raja, unsuitable chemicals used for cleaning works in the building; and fireworks' carbon dioxide emissions from special celebrations held around the building. Various types of soluble salts are known to cause damages to the brickworks mainly on the walls and columns including sodium chloride, carbonates, nitrates and sulphates of calcium, magnesium, potassium, sodium sulphate and magnesium chloride. The salts, in the form of white powder (efflorescence) and crystallisation (sub-florescence), had caused the bricks, mortar joints and lime plaster to crumble, resulting in a serious damage to the building. The restoration works involved a salt desalination process through the poultice technique called Cocoon; and the chemical injection of damp-proof course (DPC). The Cocoon method, a mixture of pharmaceutical grade cellulose fibers and distilled water, was applied on affected exposed brickworks. After two weeks of the Cocoon application, the dried-out damp-absorbent material was removed whilst drawing away the salts from the walls and columns. The process was repeated twice to reduce the salt concentration to an acceptable level. The DPC was applied before the second treatment of Cocoon to create a moisture-barrier at the base of walls and columns.

ii. Stage 2: Treatment of Old Bricks

A thorough inspection of the old bricks mainly on walls and columns was conducted by the building contractor prior to the restoration works in order to determine the quantity of bricks that needed to be repaired or replaced. From the inspection, a large number of the old bricks suffered from either porosity or surface damage. The old bricks that were found to be porous had to be replaced with new bricks of the same dimensions, characteristics and strength. These porous bricks were carefully removed using rubber hammer; whilst the broken bricks were treated by patching them up with a mixture of brick dust and fine sand. Since there was no new brick available in the market that matched the old bricks, the building contractor had to outsource the new bricks from a traditional brick kiln in Ekor Kuching, Padang Serai, Kedah, a state of northern Malaysia. The new bricks were traditionally produced under firing temperatures of not more than 1000 Celsius. The mineral content of the raw materials (soil), firing temperature and the atmosphere in the kiln had produced the fired colour of new clay bricks that matched the old bricks. Hence, the new bricks blended harmoniously with the existing old bricks. All electrical wirings, power cables, light bulbs, blocked letterings and signages that were previously fixed onto the wall surfaces were carefully removed. Safety nettings were also fixed onto the scaffoldings to provide protection from falling debris. Any harmful growth, dirt and stains on the brick surfaces and arches were removed and cleaned using controlled water jet and soft brush. The restoration works were carried out in five

The sequence of brick replacement on the wall

different zones due to the wide span of the building and the repetitious method of façade treatment.

iii. Stage 3: Re-plastering and Painting of Building Elements

All plastered building elements including arches, cornices, pilasters, columns, balustrades and parapets were inspected and documented before restoration works were carried out. Any cracked or broken elements were carefully repaired and re-plastered using a mixture of lime, sand and pozzolanic additives. The building elements were then painted with a water-based paint that matched the existing colour of the building which is light cream.

Laboratory Tests

Apart from the detailed recording and documenting of the conditions of the building before, during and after restoration; three laboratory tests were carried out on selected building materials. The reason was mainly to identify the level of salt content, the component elements of building materials; and the compressive strength of the new wall plaster. For example, salt samples were taken from various affected areas, before and after the Cocoon application for the ion chromatography tests to determine the ion compositions by specifying the percentages of soluble salts in the samples. Several samples from the existing plaster were also taken for the X-ray fluorescence (XRF) analyses to determine the component elements and proportion. Whilst, testing of the compressive strength of the new plaster was carried out at the site using the Schmidt hammer rebound test.

Conclusion

Restoration of building façade at the Sultan Abdul Samad Building in the capital city of Kuala Lumpur, Malaysia has posed a great challenge to building professionals involved in the project including the building contractor, conservator, architect and quantity surveyor. Understanding the nature of building defects and applying the appropriate treatment of building restoration require in-depth knowledge and experience in building conservation. One of the challenges faced in this restoration work was to outsource new bricks to replace the old bricks in the building since there was limited quantity of traditionally produced bricks available in the market. Brick replacement was carried out accordingly to avoid any further damage to the brickworks. Overall, adopting a clear framework of building conservation has been effective in ensuring all works were carried out satisfactorily. Despite all these challenges, the project was considered successful in maintaining the building façades to its original form, design as well as material. The Department of National Heritage had played a major role in giving advice and guidance to the building contractor and consultants throughout the project duration.

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Close-up view of the newly fixed bricks on the wall (reddish in colour)

Salt desalination through the application of Cocoon method

Chemical injection of damp-proof course

During the façade treatment, safety nettings were fixed on the scaffoldings to provide protection from falling debris.

The front façade of the building before restoration

The new look of the building front façade after restoration. All electrical wirings, power cables, light bulbs, blocked letterings and signages on the building façades were carefully removed.

Thunderbolt Damaged the Pratappur Temple in Swayambhu

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Historical Background

Monument of Nepal is synthesized significantly in the Kathmandu Valley-Kathmandu, Patan, and Bhaktapur; which represents an epitome of harmony in urban design, typical architecture and refined culture. The history of the valley began with the accounts preserved in a number of chronicles, which mention Gopalas and Mahishapalas had ruled the valley as far as in 7th century BC. Later on the Lichchhavi, Malla, Rana and Shah period extended the typical cultural significance relating to the monuments that made them a living cultural heritage these days continuously. However, Lichchhavi period (4th–8th century AD) is known as "Classical Era" and "Golden Age" and Later Malla period (14th–17th century AD) is known as the "Golden Age" for Nepalese architecture and workmanship of bronze, wood and stone in Kathmandu valley. Many of the monuments were constructed in Kathmandu valley during these periods. Pratappur was also constructed in Malla period by very popular king Pratap Malla during his reign (1641-1674 AD). The temple was constructed in Shikhara style architecture. Especially the multi-roofed, the dome and the Shikhara (mountain/hill or peak) style were popular architecture to build temples in Nepal at that time. Shikhar style was also known as Nagara and Gabdhakuta style as well. However, there is lack of evidence on the history of Shikhara style temples construction in Nepal, but it was already developed in northern India around 6th century AD. There are numerous examples of this style during 16th and 17th century AD in Nepal. Acknowledging all these significant universal cultural values, UNESCO listed the valley on the list of World Heritage in 1979, which consists three Malla Durbar Squares (Hanumadhoka, Patan and Bhaktapur Durbar Square), Swayambhu, Bouddha, Pashupatinath and Changunarayan.

Physical Structure of Pratappur Temple

The temple itself is built in Shikhara style and its height is 60 feet, which is located in the east of Swayambhu Mahachaita (the great Swayambhu Stupa), just on the right side of Vajra after the eastern steep sloppy stairs on the hill top and Anantapura is on the left. Length of the temple is 19.9 feet and width is 17 feet as well. The temple is made up of brick wall with lime surkhi mortar and lime sukhi plaster that is built with the wooden skeleton inside it for the better protection during the earthquake. Some stone pillars, stones paving and wooden doors, windows and some other parts were also used in the temple. Actually the bricks for wall, wood for doors and windows, internal skeleton of the temple, pillars, stones for pillars, paving and lime surkhi for mortar and plaster were used in the temple. These are the traditional construction materials in and around Kathmandu valley and Nepal as well especially in the medieval period and later. The temple is physically very beautiful in Shikhara style having a projection above the main gate with beautifully carving in the window which is constructed on the stone pillars and those pillars are fixed on the stone of steps, which followed towards the sanctum of the temple. The temple is dedicated to the Tantrism in Buddhism that no one is allowed to enter inside except the priests.

Damaging of the temple

The temple was once collapsed in 2003 when it was caught by fire. It was reconstructed completely according to the traditional methods and norms of archaeological conservation at that time. Reconstruction of the temple took a year for its completion in 2003. After about seven years of its reconstruction, on 15th February 2011 around 4:45-5:00 in the morning (according to the local people) there was a very big sound striking with thunderbolt and the most of the local residents felt like an earthquake. Most of the residents of Kathmandu valley thought that there was a big thunderbolt somewhere within the core and/or around its adjacent area. Unfortunately it was in the core area of Swayambhu Protected Monument Zone, a component of Kathmandu Valley World Heritage

Recently cordoned temple area

View after the accident

The southern upper part damaged by thunderbolt

Property and it damaged the significant temple in the area. When Department of Archaeology (DoA) got information about it, the morning inspection was made by officials including Director General of Department of Archaeology and immediately the area was cordoned for the security of the visitors because the bricks bats were still falling down from the temple. Significant numbers of pigeons were died due to this disaster around the temple area.

Especially the upper part just below the pinnacle in the northern, western and southern side were badly damaged, cracks were there in almost all of the sides and the foundation close to the main entrance of temple in the southern part was also badly damaged. Everything was documented by the officials (from DoA) for rescue of the temple immediately. With the coordination of Federation Swayambhu Management and Conservation (FSMC), the community based non-governmental organization (looking for the conservation and management of Swayambhu area and it is registered in the government according to the NGO Registration Act of Nepal), DoA has started the preliminary rescue work to stop further damaging of the temple and begun to study for further actions. Now, DoA and the FSMC is preparing for the further renovation work of the temple according to the recommendation of the study which is going on and after the completion of preliminary work. To open the temple to the study for further renovation, traditional religious puja was held for three days.

Conclusion

However, the natural disaster never comes with the pre-information, but harms very badly to the human beings and its environment as well. So, we should be prepared for every possible natural calamities or disaster (during and post disaster) and preparedness should be ready regarding such a disaster. The human beings was not physically harmed by this calamity in Swayambhu, but it was possible after the accident, if the area was not cordoned and not controlled by the authorities. The authorities must consider seriously on such a natural disaster which damaged our valuable cultural heritage by giving priority to immediate renovation. There is no doubt that those cultural heritages are not only the property of the entire community or area, but the property of all human beings and its communities in the world and those are gifted to this generation by our ancestors. In this context we hope, the Pratappur Temple will be renovated very soon coordinating to all of the stakeholders by the government. In the meantime, the preliminary conservation work has been just completed and reported that the temple should be dismantled and renovated as a reconstruction in the same design/style. So, now Department of Archaeology is going to renovate the temple as per the recommendation of the preliminary conservation and study report.

The foundation close to main entrance in southern part

The western upper damaged part

Damaged in the northern lower part of the temple

Northern damaged part of the temple

Damaged-above the main entrance gate of the temple

Effect to the pigeons

Pratappur - during the preliminary conservation

New Zealand

The Origins of Brown Trout *(Salmo fario)* in New Zealand: the *Otago Acclimatisation Society* Opoho Fish Ponds 1868-1885

Matthew Schmidt, *Regional Archaeologist, Otago/Southland*
The New Zealand Historic Places Trust

Introduction

New Zealand's geographical isolation produced a floral and faunal environment unique in the world. Terrestrial fauna was dominated by birds, lizards and insects with no land mammals present, the only native mammals being bats. The fresh water rivers, streams and lakes were also devoid of any large 'sport' fish such as trout, salmon, perch or carp. Although there are ca. 35 species of native or indigenous freshwater fish species, they are small in comparison to the traditional European and American 'sport' fish and many are only active at night (source: NIWA Atlas of NZ Freshwater Fishes 2010). Therefore, both Maori, who first settled New Zealand in ca. 1300 AD, and the later Europeans/Pakeha colonisers, who made first contact with Maori in 1769, depended on fish from the sea. The only fresh water species predated extensively by Maori were tuna/eel (*Anguilla australis, Anguilla dieffenbachii*), kanakana/lamprey (*Geotria australis*), inanga/whitebait (*Galaxias maculatus*) and upokororo/grayling (*Prototroctes oxyrhynchus*)

In the late 1860s, various Acclimatisation Societies around New Zealand began to experiment with the introduction of various European and American faunal species so as to provide terrestrial food resources for the growing colonial population. The introduction of fresh water sport fish was one of the key aims of these societies so as European/Pakeha inland populations had a reliable source of fresh fish. Hence in 1867, the Government introduced the Trout and Salmon Protection Act 1867 which made provision for "*the preservation and propagation of Salmon and Trout in this Colony*".

The *Otago Acclimatisation Society* Fish Ponds at Opoho Creek, Dunedin were therefore built as a result of the Colonial Government's aim of populating the fresh water environments of the Otago region with sport fish. These ponds, built in 1868, are believed to be the origin of the first successful release of Brown Trout (*Salmo fario*) in New Zealand. This event, alongside the later successful release of other sports fish, has resulted in trout fishing in New Zealand becoming a major contributor to the tourism industry today, with the Mataura River in Southland being considered the best river in the world for brown trout fishing.

This first report on the *Otago Acclimatisation Society* Opoho Fish Ponds Preservation Project describes how the ponds were re-discovered, the initial investigations to determine how they were built and how the site is proposed to be preserved and managed as part of a recreational/historic experience.

Re-discovery of the Opoho Fish Ponds

The Fish Ponds were brought to the attention of the New Zealand Historic Places Trust (NZHPT) in January 2011 by Mountain Bike Otago track builders working on a community recreation bike track located in native bush next to Opoho Creek in Dunedin (Figures 1 & 2). The track builders noticed stonework while clearing a path for their track and so ceased their work and contacted the NZHPT. A local resident believed the stonework and associated depressions in the bush were possibly the original 19th century *Otago Acclimatisation Society* Fish Ponds. A site visit by myself with historic records about the ponds, including a map of the ponds drawn in 1880 (Figure 3), appeared to confirm that the features were the original ponds and that the track had been built between the upper and lower ponds, avoiding the main heritage features. This fortuitous re-discovery meant that this significant heritage site for the history of the introduction of fresh water game fish in New Zealand could be examined and investigated and decisions made on its preservation and future management. The site now has a New Zealand Archaeological Association Site Record Number I44/490.

Brief History of the Fish Ponds

The Fish Ponds at Opoho were built in 1868 for the purpose of establishing a viable fresh water sport fishery in Otago. From these ponds brown trout (*Salmo fario*) and other species of foreign fresh water fish were hatched and grown for release not only in Otago, but in other locations around the South Island. As noted above, it was also from these ponds that the first successful hatching of brown trout in Otago occurred in October 1868, with the first successful release of brown trout into a New Zealand waterway occurring in the same year (Figure 4).

The ponds were so successful that between 1868 and 1885, local newspapers the *Otago Daily Times* and *Otago Witness* followed the development and successes of the hatching process and fish rearing at the ponds through publication of the *Otago Acclimatisation Society* articles and meeting minutes.

In 1881, fish scientist W.C Arthur provided a detailed description in the *Transactions and Proceedings of the Royal Society of New Zealand* (Volume 14:196-201) of the *Otago Acclimatisation Society*'s efforts to hatch brown trout (Salmo fario) at the ponds. Arthur noted that the hatchery's manager, Mr Clifford, was sent to Tasmania in 1868 to the Salmon Commissioners to obtain 800 brown trout ova with a further 1000 ova sourced in 1869 and 720 ova in 1870. These ova were almost all successfully hatched and "*These young trout formed the original stock, from which most of the streams in Otago may now be said to be stocked in measure.*" (pg 196).

Arthur (1881) provided a detailed map of the fish ponds and hatchery house showing how the ponds were constructed (Figure 3). Of crucial importance to the ponds was the fresh water system which not only had to provide water free of human and animal contaminants, but also water with a temperature that was ideal for the hatching of the ovum and the rearing of the resulting fry. Arthur's (1881) article on the success of the hatchery and ponds provides a fascinating insight into how crucial

this small hatchery was for establishing fresh water fish species as a food source for New Zealand. He notes that other fish species hatched at Opoho included *Salmo umbla* (the charr), the English salmon (*Salmo salar*), Sea trout (*S. trutta*), Californian salmon (*Salmo quinnat*, or *Oncorbynchus quinnat*) & whitefish (*Coregonus albus*) and in Figure 5 can be seen an illustration by Arthur of the developmental stages of Trout bred at the hatcheries.

In 1885, the hatchery was deemed too small and a new hatchery was built further up the Opoho Creek gully. This larger hatchery continued the success of the first hatchery and was a noted tourist destination for visitors to Dunedin in the late 19th and early 20th centuries.

Archaeological Assessment

The initial site visit in January 2011 identified the two hatchery ponds as 'pits' in the bush covered by extensive leaf litter (Figures 6 to 15). The lower pond was built into the base of a cutting made into a natural slope and measured *ca.* 4m x 6m. The upper pond was dug into a flat area above the cut slope face and measured *ca.* 3m x 5m (Figures 6 & 10). These measurements were only approximations due to obscuring bush, but the ponds were quite distinctive features in the bush and matched those depicted in the 1880 map. How they were constructed could not be ascertained, though some exposed stonework suggested the lower pond was stone lined.

Stonework above the northern edge of the lower pond (Figures 11 & 12) was in the location of a small structure, possibly a hut, on the 1880 map. This structure was in line with the water supply coming from the upper pond and so may have been related to controlling the water flow into the lower pond. The small race that connected the lower and upper pond was damaged by the recently built mountain bike track but the stonework for the overflow from the upper pond to the lower appeared intact (Figure 10). Pieces of roofing slate were found in the leaf litter around the lower pond which implied a roofed structure had been present somewhere at this location (Figure 13). Trees, saplings and ferns were noted as damaging the site by growing out of the original pond walls and any exposed stonework.

Further up the gully, two iron riveted boxes were identified roughly in the position on the 1880 map (Figures 14 & 15). These boxes were possibly part of the filter system noted on Arthur's map of the site and described by him (1881:206) as being located on the outside of the 'Hatching House'. The boxes were in good condition and may confirm the location of the original hatchery house. However, Opoho Creek has been diverted at this location and so it is possible that any remains of the house structure may have been destroyed by this diversion.

Overall, the initial archaeological assessment indicated that the *Otago Acclimatisation Society* Fish Ponds were in a relatively intact state considering their age and location in a forest environment. How they were built, however, needed to be confirmed as did how much impact 126 years of vegetation growth had had on the ponds since their abandonment. The location of the ponds next to a community mountain bike track also meant that there was an opportunity to present the ponds as a recreational/historic experience as part of the mountain bike track design.

The following recommendations were therefore proposed to the NZHPT and Mountain Bike Otago for the management of the ponds:

- An Archaeological Authority from the NZHPT is applied for under Section 11 of the Historic Places Act (1993) for any further track works undertaken around the ponds and for any archaeological work carried out on the ponds.
- The ponds must be fenced in a manner that ensures no mountain bikers can bike through the ponds, over known stonework or lean on the surviving stone structure (possibly a hut) above the lower pond.
- The surface of the bike track must be designed to ensure that the track fill does not slip or creep down onto any surviving stonework or into the ponds.
- Water run-off from the track must be controlled to divert water from running down into the ponds or onto any stonework.
- The ponds should be archaeologically investigated to determine how the ponds were constructed, clarify whether the ponds were stone faced or were simply dug into the natural earth, and advice on what further archaeological work and management of the ponds is required to ensure their preservation.
- Vegetation should be removed from the around the site and the known stonework as soon as possible under direction of an archaeologist. This will provide further information on the site and remove the immediate risks to the stonework.

Archaeological Investigation and Project Support

The NZHPT granted an Archaeological Authority (No. 2011/363) in April 2011 for the mountain bike track construction and for the archaeological investigation and the preservation and management of the fish ponds.

The ponds were archaeologically investigated in May and June 2011. The first investigation in May sought to verify how the ponds were constructed. By test pitting and selectively excavating by trowel around the top edges of the lower pond, it was confirmed that this pond was stone lined, at least in part, with its walls constructed using cobbles from the Opoho Creek (Figures 16 and 17). The stonework for the pond was also more extensive than implied by the shape seen underneath the vegetation cover during the initial Archaeological Assessment (Figures 18). The terrace around the top of the lower pond was test pitted and appeared to indicate that the access around the pond may have been covered by pebbles from the creek so as to provide a dry walking surface (Figure 19).

The second investigation in June involved extensive vegetation clearance by hand around the lower pond to further confirm its layout as shown in Arthur's 1880 map, examine the impact of vegetation on the site (particularly any stonework) and remove vegetation which was clearly damaging site features. It could be

seen after this clearance that Arthur's 1880 map was very accurate in depicting the layout of the surviving ponds. The vegetation clearance also showed that the walls of the lower pond were all stone faced and were being directly affected by plants growing out of the sloping interior faces of the pond forcing out the cobbling on the walls (Figure 20). Two large trees were also destroying the small stone hut(?) located at the top of the pond (see Figures 3 & 21). Without further vegetation clearance and management, the surviving stonework of the lower pond and small hut(?) would eventually collapse. Also found during the vegetation clearance were more broken roofing slates. Their presence indicates that one of the structures, either the small structure/hut(?) at the top of the lower pond or the large pond itself, was roofed.

The two investigations therefore confirmed that the site was in good condition but required direct management to ensure its long term survival. The investigations also showed that the ponds could be presented as a heritage site integrated into the mountain bike track which would help in promoting not only the track but the site as a heritage asset for the community.

Key to any successful heritage preservation and management project is support by way of funding, labour and time. Mountain Bike Otago has been proactive in donating labour, materials and equipment for the Opoho Fish Ponds Preservation Project, and will be contributing funds for an Interpretation Panel to be installed at the site. In addition, *Fish & Game New Zealand*, which represents "*the interests of anglers and hunters, and provides co-ordination of the management, enhancement, and maintenance of sports fish and game (Section 26B of the Conservation Act 1987)*" for New Zealand, will also be contributing funds to the Interpretation Panel through its Otago Region office.

In a later ACCU Nara International Correspondent report, I will present the results of further archaeological investigations of the ponds and the outcomes of the preservation and management of the site as part of a recreation/historic track.

References

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Arthur, W. 1878. *On the Brown Trout introduced into Otago.* Transactions and Proceedings of the Royal Society of New Zealand, Volume 11, Pages 271 – 290.

NIWA Atlas of NZ Freshwater Fishes 2010. http://www.niwa.co.nz/our-science/freshwater/tools/fishatlas

Acknowledgements

I would like to thank Hamish Seaton of Mountain Bike Otago for his support in preserving and managing the Opoho Fish Ponds site, Niall Watson from Fish & Game Otago for the contribution of funds for an Interpretation Panel and Jonathan Howard (Built Heritage Advisor, NZHPT) for his research on the stone walling of the lower pond.

Figure 1. Location of the *Otago Acclimatisation Society* 1868 - 1885 Opoho Fish Ponds in Dunedin.

Figure 2. Location of the *Otago Acclimatisation Society* 1868 - 1885 Opoho Fish Ponds in native bush, next to Opoho Creek, Dunedin. Also shown is the location of the possible remains of the original filter tanks (see Figure 3).

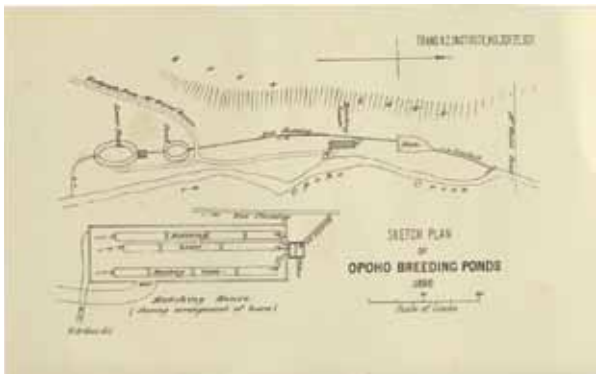

Figure 3. Arthur's 1880 sketch map of the ponds (Arthur 1881:208-209).

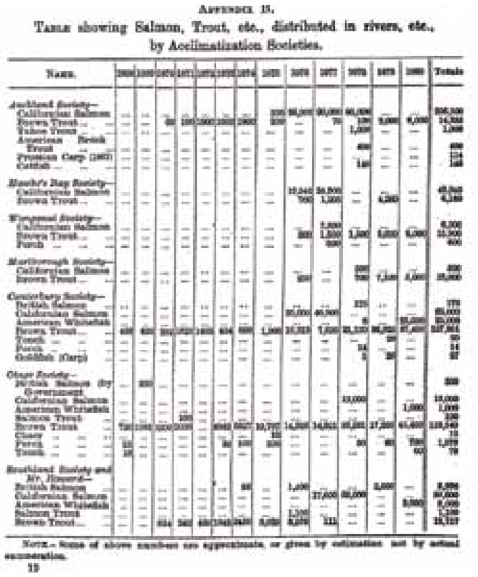
APPENDIX 15.

Table showing Salmon, Trout, etc., distributed in rivers, etc., by Acclimatization Societies.

NOTE.– Some of above numbers are approximate, or given by estimation, not by actual enumeration.

Figure 4. Arthur's table of the 'history' of fresh water sport fish being released by various Acclimatisation Societies around New Zealand (Arthur 1881:208-209). Note the importance the *Otago Acclimatisation Society* played in the release of brown trout (Salmo fario).

Figure 5. Arthur's 1880 sketch of the developmental stages of Trout hatched at the Opoho Hatchery Ponds (Arthur 1881:208-209).

Figure 6. Lower pond. View SE. The range pole sits in the bottom of the pond and on the right of the photograph is the small terrace which runs around the outside of the structure (see Figure 1) (photo: Matthew Schmidt).

Figure 7. Stonework on the south side of the lower pond viewed from inside the pond. This possibly controlled the rate of flow of water out of the pond (see Figure 18) (photo: Matthew Schmidt).

Figure 8. The upper pond obscured by vegetation. View west (photo: Matthew Schmidt).

Figure 9. Start of small race leading out of the upper pond towards the lower pond. View South (photo: Matthew Schmidt).

Figure 10. Stonework on the outside south edge of the upper pond from where the race exited towards the lower pond. Photograph taken from the new track, view North. (photo: Matthew Schmidt).

Figure 11. Stonework on the north side of the lower pond in the location of the small structure, possibly a hut, on Arthur's 1880 map. View SE. Function unknown at present but it is located where the water from the upper pond flowed into the lower pond. The edge of the new track can be seen in the foreground (photo: Matthew Schmidt).

Figure 12. View across new track to the stonework on the upper north side of the lower pond. The structure may be a small hut. View SE. The range pole sits in the lower pond (photo: Matthew Schmidt).

Figure 13. Pieces of roofing slate found in the leaf litter next to the lower pond. The slates may have originated from a roof which was built over the small hut(?) structure noted on Arthur's 1880 map at the top of the lower pond (photo: Matthew Schmidt).

Figure 14. The two iron water stores in the bush in the approximate location noted in Arthur's 1880 map of the hatchery. The stores/boxes may have been the 'filter' used to further clean the water for the hatching boxes (photo: Matthew Schmidt).

Figure 15. Another view of the possible 'filter' stores/boxes (photo: Matthew Schmidt).

Figure 16. Two views of the stone walling of the lower large pond revealed during the first archaeological investigation in May 2011. Vegetation was cleared from around the pond and secateurs used to cut vegetation growing out of the walls. Note the pond was full of water during the site visit so whether the whole pond was stone lined could not be established at that time (photo: Matthew Schmidt).

Figure 17. Another view of the stonework revealed in May 2011 showing the vegetation around the ponds obscuring the structures (photo: Matthew Schmidt).

Figure 18. Stonework present at the outflow point of the lower large pond (see Arthur's 1880 map, Figure 3). The scale sits on the location where the tailrace exits the pond taking water back to Opoho Creek (photo: Matthew Schmidt).

Figure 19. A test pit on the terrace which runs around the edge of the lower pond revealed pebbles which may have been used to create a dry walking surface (photo: Matthew Schmidt).

Figure 20. The lower large pond after clearing of the vegetation. Compare with Figure 16. Hamish Seaton, President of Mountain Bike Otago, is clearing dirt from the pond walls after cutting out vegetation using secateurs and loppers (photo: Matthew Schmidt).

Figure 21. The stone structure which may have been a roofed hut, at the top of the lower pond. A large tree is growing out of the stonework (left in photograph) with saplings and ferns growing out of other areas (see also Figures 11 and 12) (photo: Matthew Schmidt).

Papua New Guinea

Historical Development of Lapita in Papua New Guinea

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Institute of Papua New Guinea Studies

The following report was taken from Sinclaire Solomon's article which was published in the local newspaper – The National's Weekender on Friday, July 15, 2011: p 2.

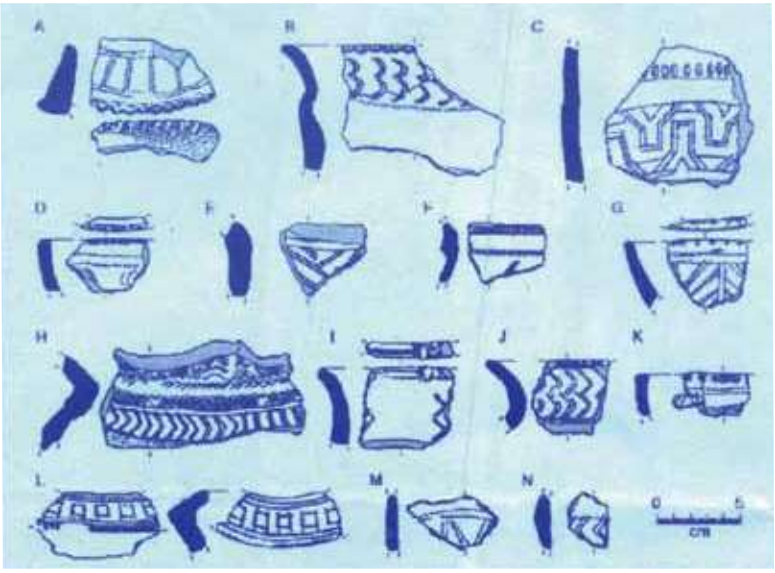
Papua New Guinea is known for its Lapita history which according to an article by Sinclair Solomon which was published in the National's Weekender, "Archaeologists digging at an ancient settlement site near Port Moresby have made a monumental discovery that will most certainly rewrite the history of the Lapita people of the Bismark Archipelago who colonized much of the western Melanesian islands and western Polynesia more than 3,000 years ago. They found Lapita pottery sherds, indicating the first known presence of these island people on mainland Papua New Guinea, thereby quashing the long-held belief that these early settlers had bypassed the mainland on their island hopping conquest". Solomon further reports that the "archaeologists are now hoping to find further evidence that their newly-discovered migrants had pushed further west along the south coast to the Torres Straits and mainland Australia".

This discovery was further stated in the latest edition of the journal Australia Archaeology by Ian J. McNiven of the Monash University's school of geography and environmental sciences and a team from Monash, the University of Papua New Guinea, Queensland University, James Cook University and CSIRO. Solomon describes the location of the discovery as being "20 km northwest of Port Moresby, in Caution Bay, Central province where archaeologists have found remains of an ancient settlement dating back about 4,000 years and started digging into the past in 2009-10, hitting paydirt at between 155cm and 127cm into one of their five digs".

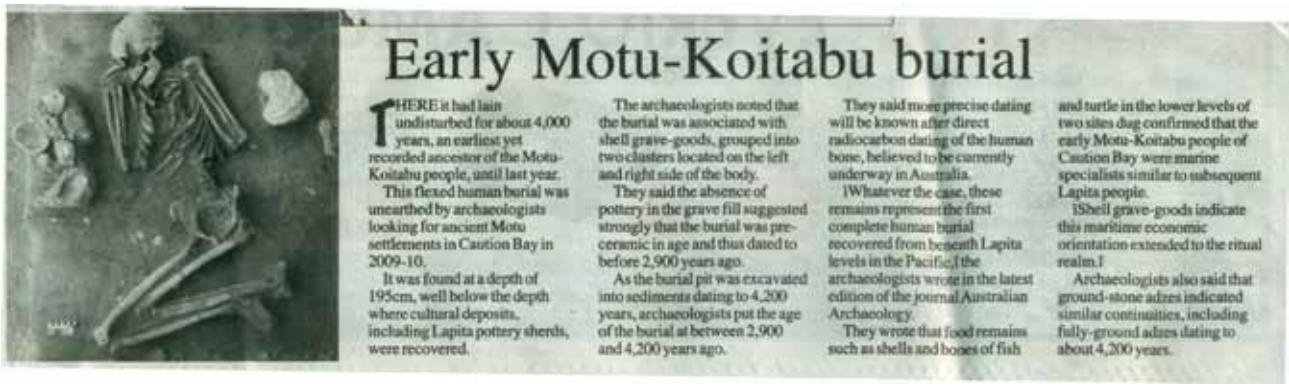
In an email communicated to the National by Professor Glenn Summerhayes of the University of Otago, New Zealand, he confirms that "the research there is re-writing the archaeology textbooks of the western Pacific". Professor specializes on Lapita history and is credited with discovering many Lapita sites in the Bismark Archipelago-from New Ireland to West New Britain. Although not involved directly in the Caution Bay excavations, Summerhayes states in his email that "Lapita was found west of Port Moresby – this is exciting stuff!"

"Lapita is a story of how the first people arrived and settled in the Pacific between 1200 BC and 1000 BC, moving west from the Bismark Archipelago islands of Manus, New Ireland and New Britain to the Solomon Islands, Vanuatu, New Caledonia, Fiji and Western Polynesia including Tonga and Samoa. According to Australian Archaeologists, McNiven and Co, "the migration of these Austronesian speakers represented the last great chapter of human global colonization. The earliest migrants also made a distinct type of pottery with finely-made dentate-stamped designs and known "Lapita" which were found along their westward migratory route. However, the Caution Bay discovery, according to archaeologists suggests that somewhere along the line, a migratory arm of the Lapita people moved westward along the southern New Guinea coast towards Australia. The archaeologists further added that "The new Lapita sites date back from 2900 to 2500 cal BP and represent a newly-discovered migratory arm of Lapita expansions that moved westwards along the southern New Guinea coast towards Australia. These marine specialists ate shellfish, fish and marine turtles along the Papua New Guinea mainland coast, reflecting subsistence continuities with local pre-Lapita peoples dating back to 4200 cal BP. Lapita artifacts include characteristic ceramics, shell armbands, stone adzes and obsidian tools. Our Lapita discoveries support hypotheses for the migration of pottery – bearing Melanesian marine specialists into Torres Strait of northeast Australia c.2500 cal BP…and what is the earliest known evidence for human settlement of the south coast of New Guinea".

"An interesting aspect of Caution Bay was that it was a previously settled coastline before the arrival of the Lapita colonizers unlike their Remote Oceania settlements (see map). Their presence of more than 400 years raised the question of the western limit of these migrating peoples, the archaeologists noted. Pottery dating back to c.2500 cal BP in Torres Strait located 500km west of Caution Bay suggests influences from the Papua New Guinea mainland and/or from long-distance seafaring ceramicists. While recent DNA analyses found no recent Melanesian intrusions into Aboriginal Australia, such conclusions are premature given analytical exclusion of relevant DNA samples from northeast Australia. The presence of pottery-bearing Melanesian peoples on Australia's doorstep allows hypotheses for Melanesian cultural influences down the Australian east coast over the past 3,000 years plausibly to include genetic transfers and even migration".



Lapita pottery from the five sites at Caution Bay dating between 2900 and 2500 cal BP



Early Motu-Koitabu burial

THERE it had lain undisturbed for about 4,000 years, an earliest yet recorded ancestor of the Motu-Koitabu people, until last year.

This flexed human burial was unearthed by archaeologists looking for ancient Motu settlements in Caution Bay in 2009-10.

It was found at a depth of 195cm, well below the depth where cultural deposits, including Lapita pottery sherds, were recovered.

The archaeologists noted that the burial was associated with shell grave-goods, grouped into two clusters located on the left and right side of the body.

They said the absence of pottery in the grave fill suggested strongly that the burial was pre-ceramic in age and thus dated to before 2,900 years ago.

As the burial pit was excavated into sediments dating to 4,200 years, archaeologists put the age of the burial at between 2,900 and 4,200 years ago.

They said more precise dating will be known after direct radiocarbon dating of the human bone, believed to be currently underway in Australia.

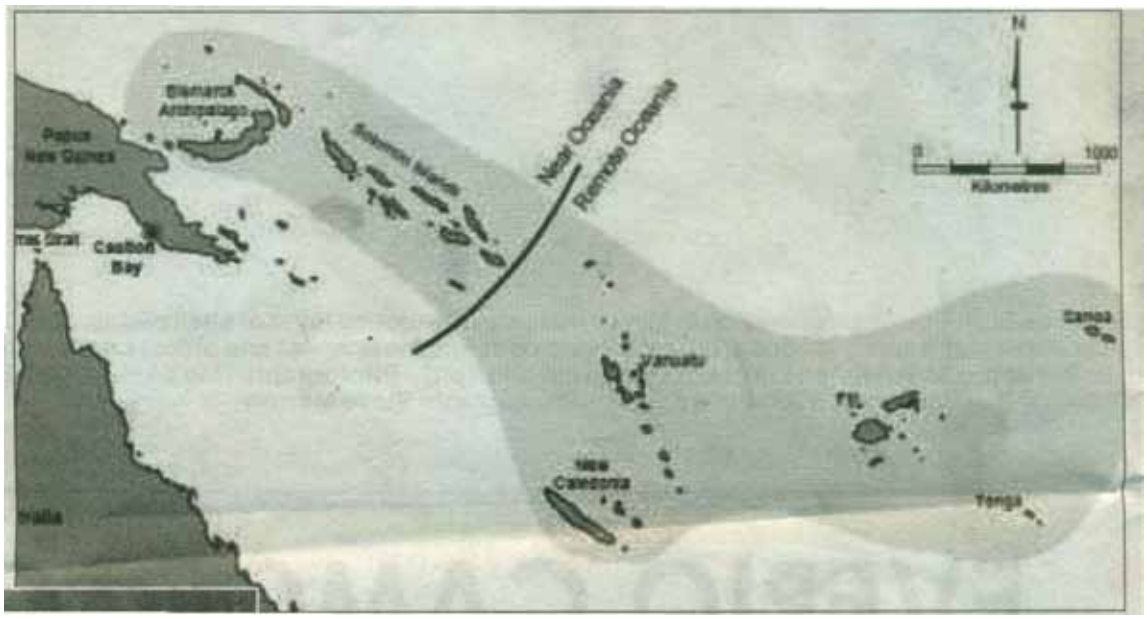
"Whatever the case, these remains represent the first complete human burial recovered from beneath Lapita levels in the Pacific," the archaeologists wrote in the latest edition of the journal Australian Archaeology.

They wrote that food remains such as shells and bones of fish and turtle in the lower levels of two sites dug confirmed that the early Motu-Koitabu people of Caution Bay were marine specialists similar to subsequent Lapita people.

"Shell grave-goods indicate this maritime economic orientation extended to the ritual realm."

Archaeologists also said that ground-stone adzes indicated similar continuities, including fully-ground adzes dating to about 4,200 years.

Pre-Lapita burial dating to between 2900 and 4200 cal BP: Photograph by Ian J. McNiven



Study area (light gray shading indicates previously-known distribution of Lapita)

Philippines

Transforming Perspectives: The Stone Ruins in Barangay Pinagbayanan, San Juan, Batangas, Philippines

Mary Grace Lualhati Barretto-Tesoro, *Associate Professor*
University of the Philippines

We excavated the ruins of two stone houses or *bahay na bato* in the old capital of San Juan, Batangas from 2009 to 2011 (Barretto-Tesoro *et al.* 2009, UP-ASP 2010, UP-ASP forthcoming) (Figure 1). These stone houses date to the late 1800s, based on the recovered artefacts, which correspond to the establishment of San Juan as a separate municipality. According to popular accounts, the capital originally founded along Tayabas Bay in 1843 was officially transferred 7 kilometres inland in 1890 because of constant flooding (Pineda 1992). To date, these ruins are the first stone houses systematically excavated in the Philippines. This research project aims to 1. Identify and interpret the earliest evidence for settlement in San Juan, and 2. Investigate the developmental history of San Juan from its pre-colonial past to the present.

In this short report, I will focus on one of the stone houses labelled Structure B (Figure 2) and how the excavation changed how the locals view the site. We recovered over 4000 artefacts. Each artefact was inventoried and assigned an accession code. Finds include fragments of *baldosa* or floor tiles, *tisa* or roof tile fragments which were used as aggregates to form mortar, earthenware pottery sherds, earthenware lid sherds, glass shards, wine bottle shards, Chinese porcelain sherds, European porcelain sherds, stoneware sherds, square nails of various sizes, round nails, metal bolts, metal screws, pieces of metal roof sheets, animal bones, metal blade, beads, stone pestle, capiz shells, wooden and glass buttons, bullet casings, metal utensils, and metal caps for bottles.

Based on the exposed stone features and artefacts recovered, Structure B most probably functioned as a domestic unit. Its floor plan, architecture, and location within the old town complex of San Juan suggest that it was a *bahay na bato* (stone house). The house is of rectangular shape orientated at an east-west direction. It measures 9.35 m x 24.4 m. Its first floor area is 228.14 m^2. It was made up of two floors, where the ground floor was surrounded by stone walls made of adobe and conglomerate blocks bound by lime mortar and cement. The upper storey was most probably made of wood. We recorded postholes indicating that wooden posts, probably molave (*Vitex geniculate, Bl.*) based on interviews with locals, were incorporated in the walls. Double walling system was utilised where two walls were built side by side. The space between the walls was filled with lime mortar and cement mixture. The workers utilised adobe blocks and mortar for foundations (Figure 3). The foundations for the stone pedestals of the wooden posts were thicker and deeper compared to the adobe foundations of the walls. Four stone pillars in the eastern section of Structure B were recorded. These pillars were enclosed and bounded by the north, east, and south perimeter walls of the house. A possible entrance was found in the northwest side of the house indicated by conglomerate paver. On the opposite side of the house, adobe paver was found on the northeast. It appears that this entrance was closed off after some time. The western section of the house was probably constructed later based on the plaster on the sides of the stone pedestals. Disturbances in the form of pits cut each other signifying several unsystematic excavations most likely linked with treasure-hunting activities. These pits are concentrated between the stone pillars. According to accounts, the main cause of the house's destruction was the collection of stone blocks by the locals for the construction of fishponds and *tungko*. *Tungko* refers to stones used as stands in a hearth.

We commenced archaeological research in San Juan in 2008. Since the first excavation of Structure A, another stone house, in 2009 and the most recent excavation of Structure B in April-May 2011, the local residents are more knowledgeable about their town's history.

The people of Pinagbayanan have realised the potential of the stone ruins as historical areas which can be developed for tourism. At the culmination of the excavation, an exhibit displaying preliminary finds and interpretations communicate to the public the academic and educational aspects of the excavation which locals, initially, associated with treasure-hunting. We firmly believed that promoting archaeology through souvenir programmes, exhibits, hand-outs, public lectures convey the cultural significance of Structure B alongside with other stone ruins in the town. Through these activities, we encourage the locals to alter their perspective regarding stone ruins in their community from a source of stone blocks for personal use to an archaeological heritage site.

It is by engaging the public and disseminating information that misconceptions are clarified and corrected (Barretto-Tesoro 2010; Valientes 2009). Knowledge about the site generated by academic rigour is appreciated by the community. And it is this knowledge which compels people to protect the site as they view the ruins as part of their heritage. Although the stone ruins of Pinagbayanan are not as ancient as other heritage sites - their construction dates to the late 1800s – the young age produces an intimate attachment to the ruins. Informants remember how the ruins were part of their childhood experiences which include playing within the premises of Structure B, knowing people who actually resided there, stories they heard from grandparents, and as participants or spectators in its destruction. In the past, children would run every time they the pass Structure B to avoid the *kapre*, a mythical creature described as a giant male smoking tobacco. The excavation added another dimension to Structure B, from an intact house to ruins to an archaeological site.

We have learned that it is important to involve the public in the protection of heritage sites and this should begin with giving them access to the site and information. The practice of archaeology should no longer be contained within the classroom but must actively listen and interact with the locals whose interests and views must be considered. Locals then develop a sense of ownership and stewardship towards the site.

Acknowledgements
The author acknowledges the Office of the Chancellor in collaboration with the Office of the Vice-Chancellor for Research and Development, of the University of the Philippines Diliman for funding support through the Outright Research Grant. Many thanks also to the University of the Philippines-Archaeological Studies Program 2011 Field School Excavation Team.

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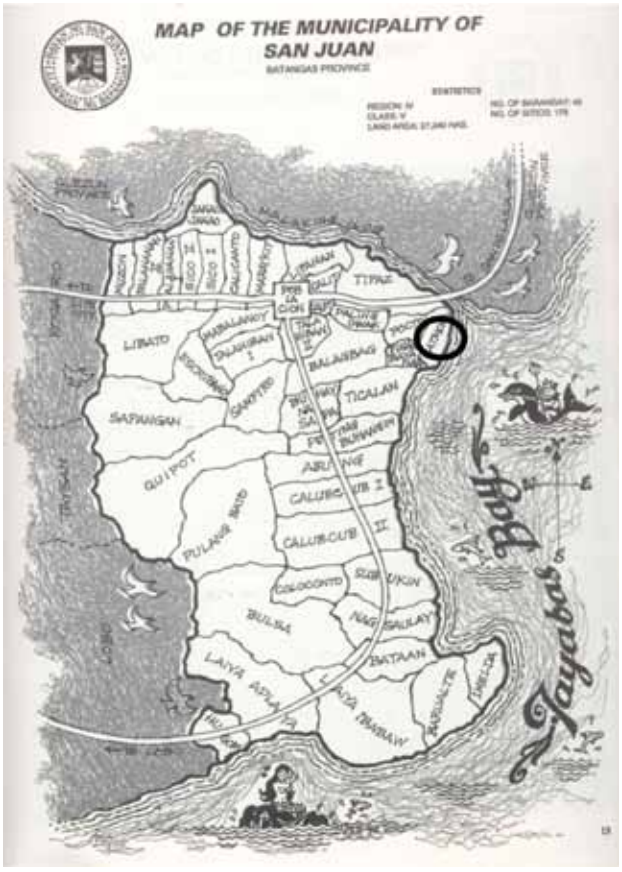


Figure 1: Map of San Juan, Batangas showing Barangay Pinagbayanan (Pineda 1992)

Figure 2: View of Structure B from the east during the exhibit (Photo by Archie Tesoro)

Figure 3: One of the stone foundations of Structure B (Photo by Archie Tesoro)

Samoa

Preservation of Traditional Knowledge in Samoa

Mainifo Viliamu, *Senior Museum Officer*
Ministry of Education, Sports and Culture

Traditional Samoan society was and remains rich in intangible culture and traditional knowledge. Much of this knowledge remains in the minds of people and they have been able to hand them down from generation to generation to the point where they finally reached us. However our heritage is threatened by both inappropriate and abusive exploitation, and by its erosion due to the many forces entering our society. Our concerns are for the protection, preservation and promotion of our heritage and traditional knowledge. Traditional Samoan society was mostly oral this means that culture had to be kept in other forms and now comprises what we know as traditional intangible culture, or traditional knowledge which includes:

1. Folklore which covers tales, legends and myths, their themes and background
2. Expressive arts which include songs, dances and their patterns and movement
3. Language which include oratory speech, poems and the art of forming articulating them
4. Historical documents which record Samoan historical heritage
5. Economic activities which include:
   - Knowledge utilized in gardening/agriculture
   - Fishing and techniques and associated rituals
   - The use of rituals involved in pigeon snaring
   - Rites and ceremonies performed in death
   - Marriages and ceremonial exchange of goods and materials
   - Launching of canoes and associated ceremonies
   - Harvest celebration of first crops (*talomua* and *ufimua*)
   - Tattooing and associated ceremonies
   - Ceremonies for launching of a new Samoan house and associated rituals.

Intangible Cultural Heritage forms the "soul" of our culture and central to its preservation and promotion is the safeguarding and revitalization of knowledge and skills which are the foundation and indigenous culture. The most important, and initial step at this point is the identification and recognition of custodians of indigenous knowledge and skills. The core objective is to build and create links between the custodians and the younger generation and to encourage the transmission of knowledge because it is in danger of disappearing. As custodians pass away, they may take their knowledge and skills with them to the grave. Samoa as a whole is targeting to revitalize navigation and boat building which have been slowly disappeared. But some areas are widely practiced such as traditional agriculture and cooking, oratory, carving and weaving. This means that the products are still readily available, but still they can fall to the same edge and that is as each day passes, we forecast the loss of important information that should have been properly documented. It stands as a warning for all Samoa, when a custodian passes away, without transmitting the knowledge, metaphorically, a "library is completely burnt to the ground."

Objectives

Samoa at the moment has no project because of lack of funds. This was one objective of the workshop held in June 2010 by our organization is to find a way forward where UNESCO can provide financial support for Samoa in its effort to safeguard its ICH.

So I will use what we are doing at the moment. As mentioned before the aim for all these is to

- Build and create links between the custodians and the younger generation
- Encourage the transmission of knowledge because it is in danger of disappearing.
- Document all the gathered information for all research and findings of our ICH.

Methods Use

There are nonetheless a range of activities which we seek to promote intangible heritage. Public, private and mission schools teach Samoan Language, culture and history and organize special events teaching tradition skills and promoting Samoan culture such as Culture Days, Samoan dance competitions and Samoan speech competitions. Samoa also participates in a National Regional and International Festivals including the 4-yearly Festival of Arts which it hosted in 1996.

The MESC, the MWCSD, the women in business association, Handicraft association all involve in the promoting of cultural activities. Some specialists in traditional knowledge and skills have established their

Secondary schools culture day competition

Culture officers interviewing custodian of Falealupo in Savai'i

own associations, for example traditional birth attendants, the Taulasea Association and the Malofie Association, to strengthen their particular area. Church organizations and civil society organizations offer vocational workshops disseminating traditional skills, mainly weaving, carving and *siapo* making. The main objective of this training is also to help families with income generating opportunities.

Nevertheless our Culture Division is conducting quarterly research a year to collect information for the continuation of the Samoa Ne'i Galo. Samoa Ne'i Galo in English is "Samoa Lest we Forget" it is a compilation of oral tradition and the legends of Samoa. We firstly notify particular areas like the villages and the right people to interview. At the same time we are still in negotiation with the owner of Samoa's old yacht for transportation to the selected places and people with the knowledge of navigation methods using the stars and sea currents. It is the same for boat building, less people with the technique of building our own traditional boat some are old and we try our best to capture any information relevant so that we are able to pass on the younger generation thus reviving and bringing our culture to life.

Our culture division also conducted a workshop in June last year, it was the National Workshop on Safeguarding Intangible Cultural Heritage in Samoa it was an effort initiated by UNESCO with the assistance of the Ministry of Education Sports and Culture. Participants and presenters were selected from relevant Government Ministries, Non Government Organizations' Artists associations, individual artists, media, Education Institutions and representatives from the community. Its objectives is to find a way forward where UNESCO can provide support for Samoa in its effort to safeguard its ICH, to raise the level of awareness of the participants regarding Samoa's ICH and issues surrounding it with the emphasis on the Convention for safeguarding Intangible Cultural Heritage, 2003 and to ratify the convention and use as a tool for safeguarding ICH in Samoa. This workshop was one strategy suggested by our Ministry to negotiate with the selected people mentioned before for ways of protecting and promoting Samoa's ICH.

Achievements

These activities helped achieved many things in ways of safeguarding intangible culture in Samoa. The collections of tales, myths and legends have properly documented in the series called "Samoa ne'i Galo" or "Lest we forget" which is an ongoing work throughout the year. We also have the Samoan dictionary or the monolingual collection of Samoan vocabulary in both Samoan and English. Also we have books called "The mafuaala o upu" or words originated from Samoan House, Samoan food and Traditional Samoan games. These findings have been recorded in books and by the help of the old people which we interview. It is a great help for our young people of today these are used in schools and tertiary institutions in Samoa.

On the other hand, we are not only recording our past properly but we are also improved economically. The knowledge and skills from trainings like the vocational workshops done throughout schools, churches and other organization have helped them become individual and earning money for living. Thus by creating business opportunities, they are able to start small business from scratch. All they need are their creative skills and a little bit of capital to start a small business to support their families. This coincides with the government strategies in alleviating poverty through business opportunities.

Conclusion

Even though Samoa has not yet ratifies the Convention but still there is high hope that we can save a lot of our intangible cultural heritage through methods and ideas being practice by our ministry and other organizations. As mention our ICH target is to ratify the Convention 2003 and in priority of negotiation with the Gaualofa ship in Samoa's Navigation. People in the past used to read the time and weather by sea current, stars, moon and the sun, but due to the advance technology of today these skills and knowledge is disappearing. So as with boat building, it is the same problem there are few people left with the understanding of these things so therefore we are doing research, workshops to collect all of these information for documentation. Yet we have collected and recorded a lot of these and being put together in our publication of the Samoa Ne'i Galo series and Monolingual dictionary like Origin of words from different traditional Samoan Culture like traditional food and games. Last but not the least, by exercising these traditional knowledge and skills of doing things people and student that cannot reach tertiary level can become individual and fast money earner to sustain life, for example skills of *elei* printing, carving helped them being creative enough to sell and get money. So not only we are safeguarding our Intangible Cultural Heritage but we also help alleviate poverty with our people.

Legend in Falealupo called the Foot of Moso the giant.

Students are learning and capturing the knowledge and skills of making the elei or the Samoan print

Sri Lanka

Conservation of Stupas in Sri Lanka with Special Reference to Three Selected Stupas : Abhayagiri, Jetavana and Sandagiri

Sujeeva Kaushalyani Peiris Deraniyagala, *Conservation Supervisor*
Central Cultural Fund

Stupa is one of the most venerated entities in a Buddhist temple since it enshrines relics of Lord Buddha or things closely related to Buddha and Buddhism. Stupa has a long history in the island and almost dates back to the times of the introduction of Buddhism to the island by Arahat Mahinda in the 3rd century B.C. Stupas vary in shapes and size and those early mega stupas are mostly bubble shape or heap of paddy shape [other main shapes in Sri Lanka are pot shape and bell shape]. But all the stupas contained essential components and followed same construction principles. Since objective of this article is to discuss the recent issues of conservation in three selected stupas, it will not go into details of stupas and their construction. But in many ancient inscriptions installed near the great stupas and the Great Chronicle [*The Mahavamsa*], which was written in the 5th century, describes these topics in detail.

Ancient people in Sri Lanka built several mega stupas using burnt bricks. It was said that brick is the unit of ancient civilization in the island. Stupa is a unique structure that developed through the times of Lord Buddha in India and the concept arrived in the island with Arahat Mahinda, who brought and introduced Buddhism to the islanders. He himself supervised the construction of the first stupa in Sri Lanka – Thuparama in Anuradhapura in the 3rd century B.C. But with the time, the form and structure of the stupa began to evolve according to the local ideas and concepts, which resulted in stupa's form unique to the Island.

Among these stupas, Jetavana – the tallest brick built structure in the world, Abhayagiri – the second highest brick structure, Ruvanveli Stupa, all in Anuradhapura hold a special place in the minds of Buddhists in the island. From the 3rd century B.C. to the end of the 13th century A.D. [end of Polonnaruva Kingdom] the stupa stood superior in temples. Throughout this period several stupas rising above 100 m were built and then came the gradual decline. After medieval period stupas became smaller in size and later its significance was somewhat diminished – not in the religious aspect but in architecture – with the shrine room gaining elaborate detailing and colour most probably due to the influence of Hinduism.

During the past three decades the Central Cultural Fund has involved in the conservation of many stupas and conservation of Great Jetavana is completed recently. Presently Abhayagiri Stupa in Anuradhapura and the Sandagiri Stupa in Tissamaharama [Southern Province] are being conserved. All these three stupas were built during Anuradhapura period although the Sandagiriya is located in the Southern tip of the island far away from Anuradhapura. During the 1st century B.C. a regional prince Mahanaga, who eloped the Capital in order to avoid assassination, built this small stupa in Tissamaharama.

Abhayagiri Stupa is built by King Valagamba [B.C. 88 – 76] reached 106.7 m height originally, but presently stands at 73 m. Until building of Jetavana, this was the highest brick structure in the world. Burnt bricks were used to build this stupa using butter clay slurry as the mortar. It is believed that the ancient people used some fibrous botanic materials and bee honey to ensure bonding between bricks and mortar. But these cannot be traced now as they have degenerated and reduced to carbon with time. During the excavations the CCF researchers has been able to establish that they have used lime screed at the Cube [*Snh. Hathareskotuwa*] level to strengthen the bricks and to prevent water penetration just like we use concrete in modern times. There were 4 sizes of bricks used in ancient times viz. 320 mm x 280 mm x 85 mm at lowest level [Basal Rings or *Pesawa (Snh)*]; 450 mm x 230 mm x 80 mm at the dome; 250 mm x 160 mm x 70 mm at the cube; and 210 mm x 150 mm x 55 mm at the spire.

Jetavana Stupa, the highest, presently at 70.7 m [original height 121.9 m] is built in the 3rd century A.D. by King Mahasena [A.D. 269 – 296], was a huge brick structure that reached 120 m in height and becoming the third highest structure in the ancient world, after the two pyramids of Giza. Original stupa had a Yupa stone and a pinnacle, but during subsequent restorations it had changed to a pinnacle. Mud bricks were used in varying sizes to suit the position and mortar was thin butter clay slurry, which enabled the bricks practically sitting on top of the ones at the lower layer. This has resulted strong brickwork not weaken by wide strips of mortar. During the excavations carried out at the beginning of the conservation programme it was revealed that although the outer brick work is weaken due to weathering, the dome is stable up to the 84th course of bricks. And it also revealed that the dome was not entirely solid as it was believed, but from a certain height it was filled with brickbats placed in mud mortar.

Sandagiriya Stupa was comparatively small but its age goes back to early Anuradhapura period and obviously oldest of the three. It is built by Prince Mahanaga, a regional ruler and a brother of King Devanampiyatissa (B. C. 250 - 210) enshrining relics sent by Emperor Asoka of India. Therefore this stupa is believed to be the oldest stupa in the southern part of the country, which has undergone periodic restorations and enlargements from time to time. Its shape and form also underwent changes according to the whims and fancies of the restorers. The temple is built on 200 x 200 ft platform. Present height of the stupa dome is 17 m. This stupa has had a Yupa stone and a pinnacle with chatra, which is obviously an Indian style. These ancient granite pieces are now lying on the stupa Terrace.

Conservation processes of these three stupas are different from each other. Conservation of Jetavana was

commenced as early as 1982 and progressed very slowly because conservators were not willing to take any risks. Thus every precaution was taken to avoid a catastrophe situation and many professionals – architects, engineers, archaeologists, and conservators - were involved in the conservation process. Policy was to work with minimal intervention and conserve the dome up to 84th brick course and from then upwards consolidates the bricks taken in 36 ft wide strips at a time. The brick work of the stupa to be left unplastered while the curvature of the dome should not be perfected in order to recognize its historic value. One major step was the decision to insert stainless steel rods radially and circumferentially to stabilize the brick work and to insert a reinforced concrete collar at the base of the cube.

Abhayagiri stupa before conservation

Conservation of Abhayagiri Stupa was more organized and lessons learnt at Jetavana were helpful to do the work more efficiently. It was decided not to use cement on this conservation and a new mortar was developed analyzing the ancient ones. Slaked lime, paddy husk ash, anthill clay and tile powder were mixed in 1 : 1 : 2 : 2 ratio and this were used as the mortar. Presently 70% of the dome is completed while the spire is fully conserved. Another debate was on going at present whether this dome should be lime plastered as in other stupas in the island. It is argued that Sri Lankan temples are living monuments and the devotees would prefer to pay homage and place their offerings at a completed stupa.

Abhayagiri during conservation (1)

Conservation of the historic Sandagiri Stupa is also nearing completion. Its conservation process is similar to that of Abhayagiri and the same mortar is being used. Here also two way opinions on the conservation are experienced. One faction is arguing to complete the conservation with plastering and placing the Yupa stone with chatras as in Indian style, while others argue that Yupa and chatras belonged to a period when the dome is much smaller. The final decision has not been taken yet and it is forwarded to Archaeological Advisory Committee and an expert panel to make a final decision.

Abhayagiri during conservation (2)

Central Cultural Fund has done impressive amount of work towards conservation of historic places in Sri Lanka since its inception in 1980. Conservation of these mega stupas are bold attempts when considered their historic value, age and sensitive religious aspects. Many individuals assisted in the conservation work while one stands tall among them. He is Dr. Roland Silva, the founder Director General of the CCF, whose dedication, determination and leadership was behind the successes achieved.

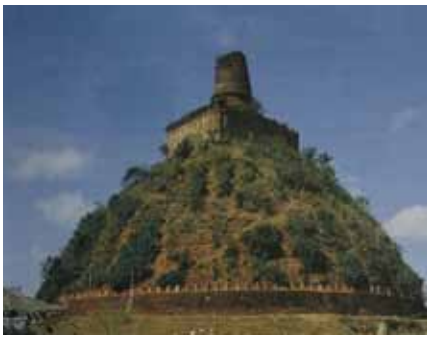
[*I dedicated this article to Dr. Roland Silva, who revived architectural conservation in Sri Lanka and dedicated precious 50 years for the upliftment of conservation and heritage management in the island.]*

Photo Credits: Abhayagiri Project and Archt. Jayatissa Herath

Material transport using manpower at Abhayagiri

Work at Abhayagiri Dome

Jatavana stupa before conservation



Jatavana stupa; conservation at the lower dome

Jatavana dome during conservation

Ancient and new brick layers at the cube, Jetavana stupa

Base of the pinnacle, Jetavana stupa

Jatavana stupa conservation of the dome

Restoration of mouldings, Jetavana stupa cube

Ancient brick layers of Sandagiriya

New bricks are being laid at Sandagiri stupa.

Sandagiriya brick work at 10 m level

Sandagiriya from the entrance

Restoration of Ubosot (Main Hall) of Wat Borom Nivasana Raja Vora Vihara, Bangkok

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Office of Archaeology, Fine Arts Department, Ministry of Culture

Introduction

Wat Borom Nivasana Raja Vora Vihara is a royal temple situated in Phathumwan district, Bangkok. The former name was Wat Borom-sukkha or Wat Naok. The temple is a hybrid of eastern and western decorations. Therefore, it is an original temple in changing architectural planning design in relation to the reform of Buddhism in the reign of King Rama IV, the dawn of time change of Siam from traditional society to society influenced by western countries.

In 2009, temple was in deteriorated condition because of inappropriate maintenance for a long time and a change in the surroundings. Hence, Fine Arts Department, Wat Borom Nivasana Raja Vora Vihara and Crown Property Bureau established the restoration projects of Wat Borom Nivasana Raja Vora Vihara. Here, the paper presents the first phase of the project that is the restoration of Ubosot (main hall of the temple). It took one year and the cost was 13,000,000 Baht ($ US 434,000).

History and Location

In the reign of King Rama III, Prince Mongkut (King Rama IV) was a monk. Wat Borom Nivasana Raja Vora Vihara was built by governor of Prince Mongkut. In 1832, the descendabt of the gover nor presented the temple to Prince Mongkut and then the reconstruction had been done until 1851. At that time, the name of the temple was Wat Borom Sukkha (The Great Happiness).

Wat Borom Sukkha was known in general name as Wat Naok since it was out of the city wall. The temple was closed to Klong Mahanak that was the main route to eastern part of Thailand. Prince Mongkut used the temple for meditation and for seeking asylum. He dedicated himself in Buddhism study together with studying several technologies from western countries. He found that, in Siam, any belief in Buddhism was inappropriate. Hence, he started to reform Buddhism in Siam. An improvement was done in the planning of shrine area in order to make it a sacred area.

Planning of Shrine Area (Buddha Vasana)

Commonly, there are two areas in a temple, shrine area (Buddha Vasana) and monk residential area (Sankka Vasana). The shrine area is composed of Ubosot, stupa,

Figure1: Old picture of Ubosot, taken before the first Restoration in 1889

Figure 2: King Rama IV

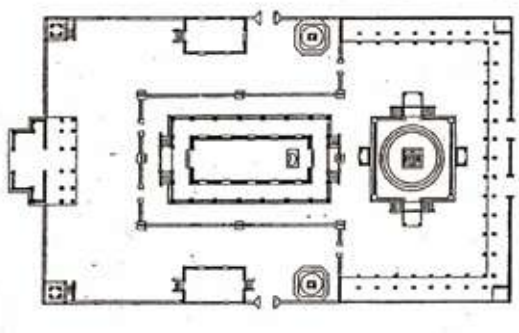

Figure 3 : Lay out of Wat Borom Nivasana Shrine area

Figure 4 : Aerial view of Wat Borom Nivasana Shrine area, taken in 1946

Figure 5 : View of Ubosot before restoration

Figure 6 : Gable of Ubosot before restoration, decorated with gilded stucco and colourglass mosaic

Figure 7 : Window of Ubosot before restoration; Gable of Ubosot before restoration, decorated with gilded stucco and colour glass mosaic; Wooden pane, decorated with gilded and colour glass mosaic

and vihara. The monk residential area consists of Kutti and a multipurpose hall. The shrine area is the important part in temple and is the area of worship. The planning design is related to Buddhism regulations in order to make sacred area.

After the restoration in 1832, the new plan of the shrine area was designed and the plan has been used nowadays. The plan is in the main axis, east to west axis, composed of Bodhi tree, Ubosot, the main stupa, and the cloister enclosing the main stupa. The plan has been used and developed in building of royal temples in the reign of King Rama IV.

Architecture and decoration of Ubosot

The characteristic of architecture of Ubosot is traditional Thai style. According to Buddhism reform in Siam and for easy maintenance, the size of Ubosot is smaller than Ubosot in the past. The wall structure of Ubosot is wall bearing, brick, and mortar. The structure of roof is made from teak wood. The roof tiles are earthen glazed tiles together with colour glass mosaic decorated roof ornaments. The Ubosot has special characteristics; the decoration is a hybrid of Thai and western styles, for example, the use of colour style in building and ceiling decorations (evidence from during work) and mural painting. The mural painting is a well-known painting in Thailand. It is painted by Khau-in Khong, the 19th century Thai famous painter. The story of painting is about questions in Buddhism by applying western astrology and scenes of western people's life in the painting that are different from other traditional paintings usually telling about Lord Buddha's life.

Restoration work

The work was started with a condition survey in order to get information on deterioration and to assemble basic data of Ubosot such as materials, change in structural, architectural, and decorative objects of Ubosot as well as environment of Ubosot, behaviour and the need of the owner. Then, data analysis and the communication to whom related to the temple were conducted in order to establish the action framework. After that, architectural drawing of restoration plan was done and the cost was estimated.

From the survey, the main problems of Ubosot deterioration were revealed, which was inappropriate methods and materials used in restoration in the past and change in architectural and decorative objects.

Therefore, the restoration work aimed
1. to restore and stabilize architecture and decoration of Ubosot by using traditional materials and techniques in respect to the value of historic monument;
2. to investigate and collect evidence in the original building and the past restoration in term of techniques and materials that may be found during the work;
3. to preserve and conserve original objects as many as possible.

Then, the Ubosot restoration projects were to set scaffold up, to build a temporary roof to cover the roof of Ubosot, to pull the roof tile down, to repair any damaged parts of Ubosot, and to investigate evidence of Ubosot. It was found that structural and architectural members of Ubosot and details of decoration were repaired at least 2-3 times and were changed from original ones. From the results of works and documents, the detail of action framework was improved and the cost was recalculated to meet the actual expenses.

Conclusion

The restoration work of Ubosot of Wat Borom Nivasana Raja Vora Vihara, revealed what happened in the past 175 years. The development in arts and techniques of construction in any periods was learnt from restoration works. Moreover, it shows that Siamese society in the time of changing learned how to adjust itself to eastern countries while influence of western countries was growing.

Figure8 : Corridor ceiling of Ubosot before restoration, decorated with gilded stencil pattern on red colour

Figure 9 : The haven scene in mural painting inside Ubosot, Saturn in western astronomy and traditional angles

Figure10 : Tracing for the original decoration of ceiling, inside Ubosot, light green layer

Figure 11 : The simulated perspective of the original decoration of corridor ceiling, gilded stencil pattern on blue colour

Figure12 : Project parties on discussion about the evidences

Figure13 : Engraving the new architectural ornament by traditional craftsmen

Figure14 : Restoring the stucco on the gable by using traditional lime

Figure15-16 : Restoring wooden panes by traditional craftsmen

Figure17-19 : Ubosot after restoration

Figure 20 : Ubosot after restoration

Figure 21 : Inside of Ubosot after restoration

Uzbekistan

Foreign Experience on Conservation of Museum Objects

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Introduction

In the first quarter of this year, I took part in the training program in National Museum of Korea organized by Korea Foundation on fellowship for field research. The program includes two sessions:

1) General museum works (introduction of galleries, museum facilities, environments, etc.)
2) Training in the Conservation Science Laboratory (hereafter referred to CSL).

I can't experience whole museum works and treatment at the conservation laboratory in particular, but I learned a brief overview of researches as a whole.

The National Museum of Korea is the representative cultural establishment of Korea. Despite the various difficulties and hardships connected with history in Asia, the museum has not only survived, but also managed to expand and enrich its collections. According to statistics, the number of visitors of NMK in 2010 has made 3 million, and 15 million during 5 years (2005-2010). These figures rated NMK as abreast large museums of the world (detail in: www.museum.go.kr).

CSL of the museum is one of the biggest conservation centres in the country. It deals with all criteria and a requirement of the world standards, and in some technical parameters it even surpasses other laboratories of large known museums of the developed countries. CSL (Team) is subdividing into 9 sectors: Museum Environment, Stone and Wall Painting, Metal Objects, Wooden Objects, Wooden Craft, Paintings and Papers, Potteries and Ceramics, Textile, Scientific Analysis. Apparently from the aforesaid, each sector is intended for a certain category of museum subjects. As the term of training was short, I can only work in some sectors. However, the experience in the museum was successful and useful for me. One of the successful practice was in the stone and wall painting sector (Instructor: Mrs. Jo, Yeon-tae) of CSL.

Stone and wall painting section is one of the major sectors of Conservation Science Laboratory of NMK. Here researchers hold practical conservation works on stone objects, such as tools of labor, sculptures, pagodas, etc., covering from the Neolithic age to the late Middle Ages. Besides those, conservation works on the wall paintings on the stone or clay basis are carried out.

Practice I. Conservation of the stone tools: a plow of the Neolithic period

1. Visual survey

Instrument of labor (the plow) was made of hard stone in good quality. The sizes were 33 cm in length, 16.5 cm in width, 3.2 cm in thickness, and 2,850 g in weight. The object was broken in the middle for unknown reasons to us. At the previous restoration works it was stuck together by acrylic glue (cyanacrilate glue 401). Along the edges of the object, approximately two-third of the surface was lost. At the top of the left corner, the surface was broken away. On two parts (at the left - on top, on the right - below), cracks were observed. They were more appreciable on the back part of the object. There were stains from oil substances on a surface on both parts, but more on the back part. The object was in satisfactory condition and needed mechanical clearing.

2. Cleaning

In visual observation, it was not noticed that there was an inscription of a field code number on the surface. The inscription was located in a prominent part and inscribed by a large, black font. Therefore, first of all cleaning had to begin with an inscription.

Materials for clearing: Universal Paint Remover (UPR[1]), Vulpex Liquid Soap, White Spirit, Sterilizing Liquid (SL), Blotting Paper.

2.1. Removing of an inscription by UPR

At first, on a surface of an inscription, UPR was applied by a wadded tampon. Through 15 - 20 minutes, the dissolved, softened paints were removed with wadded tampons. After that there still were dirt traces on the surface. Liquid soap with water, in the ratio of 1:10 (500 ml of water and 50 ml SL) were put on the polluted surface and were cleared by a brush. Thus, clearing was repeated until dirt leaved completely.

After the cleaning, the object was washed away by means of distilled water. In the laboratory, they used the Sterilizing Liquid of local manufacture. It was possible to treat it in the various ways: means of a brush or a spray. During dispersion the object was regularly wiped by a blotting paper.

2.2. Mechanical clearing

After the clearing, traces of inscription were still remained, so the object was cleared by a mechanical way. That is, clearing was made by a scalpel with illuminated magnifier. After removal of traces, the object was again washed away by liquid soap and the distilled water.

2.3. Chemical processing

Chemical clearing was applied when dirt can't be removed by means of usual and mechanical clearing. Such clearing make by means of ethanol and acetone solvents. After chemical clearing, it was washed by liquid soap and the distilled water.

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[1] **Universal Paint Remover** – using for remove oil colors or acrylics. Apply with a brush. Leave it for 15-30 minutes, remove with a scarper. Rinse with water. Source: www.pebeo.com

3. Filling
After the clearing, filling of cracks of object followed. This process was made by means of filler - putties from Epoxy Putty (Quick Wood[2]) which was dissolved in spirit, acetone, ethanol, etc. These solvents help softening of pitch and hardening prolongation that helps deeper penetration of a solution in cracks. After careful puttying, pitches were leveled with cracks, and at level it was a little below an object surface.

4. Coloring (Toning)
Coloring of the filled cracks and object followed and it was one of important processes of conservation and consequently demanded special attention. At first, filled parts were colored with a mixture prepared from glue Cemedine, Mikro-ballon and a pigment. Then toning was made by acrylic paints.

5. Photography
Process of conservation work finished with taking photography. Photographing was carried out at the special photo-studio equipped with the modern equipment, photo devices and all necessary accessories. The object was recorded on a film (for archive), and in a digital format for use (for example, at the edition of publications or processing's on the computer).

Practice II. Creation of replica (copy) a fragment of wall painting and its conservation

1. Coating
- on a ready framework of the necessary size was stretched fabric of an impressive grade (for example, flax or other);
- a fabric surface was processed some times by rabbit-skin glue[3].

2. Portraying and Coloring
- on a ready framework with the grounded fabric drew graphic drawing of wall painting with;
- outlines a sketched in ink;
- necessary colors approaching to the original. Here are applied the mixtures prepared from powdery pigments on the basis of glue made from seaweed *funori*[4];
- after general toning painting were detailed, and it is artificially grew old (cracks, peelings and losses etc.).

3. Conservation
3.1. Covering of surface of painting by special paper:
- nine rectangular sheets of a cellulose paper (Rayon Paper[5]) completely covered a surface of a framework with lateral edges;
- then, the sheets were pasted on a surface of painting by *funori* glue, one after another. When standard sheets are pasted, it is necessary to pay attention to the paper texture. At gluing of the next sheet, the next sheet should cover edge of the previous;
- behind the first layer stuck second layer of paper, but, this time took whole sheet of paper, named "The Korean paper" (Mulberry Paper[6]).

3.2. Removing of a paper and processing of painting (stabilization)
- after drying a paper unstuck. For this purpose the surface was humidified with the distilled water, and surpluses of water were removed by a two-layer absorbing paper;
- the humidified, softened paper was removed stage by stage with special care. At first, remove the top layer, then the bottom.
- the following was "stabilization"; cracks were covered with *funori* glue. At the closing stage all surface became covered with *funori* glue.

Conclusion

In summary, what only I can conclude is that it is impossible to capture whole picture of museum work and conservation work in this short training. In addition, Korean National Museum is very large with multidimensional exhibitions. Each gallery has an independent theme for research. Galleries in the aggregate reflect whole history, culture and a life of the people lived in the Korean peninsula. It is only possible to tell that Conservation Science Laboratory of the museum is the (significant) model, and exemplary and the ideal establishment for Korea and other countries. To date, in my country this level of the museum isn't reached yet. On this occasion, I would ask the Korea Foundation to support us and make opportunities to participate in the future research.

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[2] **Quick Wood** – Epoxy Putty Stick is a hand-knead able, fast-setting polymer compound for permanent repairs to wood. It also bonds to metal, glass, masonry and many plastics. It comes in a handy "Tootsie-roll®" form with the curing agent encapsulated in the contrasting color base material. Source: www.polymerics.com

[3] **Rabbit-skin glue** is a sizing that also acts as an adhesive. It is essentially refined rabbit collagen, and was originally used as an ingredient in traditional gesso.

[4] ***Funori*** is 100% seaweed, used primarily for repairs of old works on paper or textiles. Adhesive is not too strong and therefore will not damage original pieces. Add *funori* to boiling water, stirring well. Continue to cook until desired stickiness is achieved. Source: http://store.hiromipaper.com/funoriseaweed.aspx

[5] **Rayon paper** is a manufactured regenerated cellulose fiber. Because it is produced from naturally occurring polymers, it is neither a truly synthetic fiber nor a natural fiber; it is a semi-synthetic or artificial fiber. Rayon is known by the names viscose rayon and art silk in the textile industry. Source: http://en.wikipedia.org/wiki/Rayon

[6] **Mulberry paper** – *Morus* is a genus of flowering plants in the family Moraceae. The 10–16 species of deciduous trees are commonly known as Mulberries. They are native to warm temperate and subtropical regions of Asia, Africa, Europe, and the Americas, with the majority of the species native to Asia.

Before conservation

After conservation

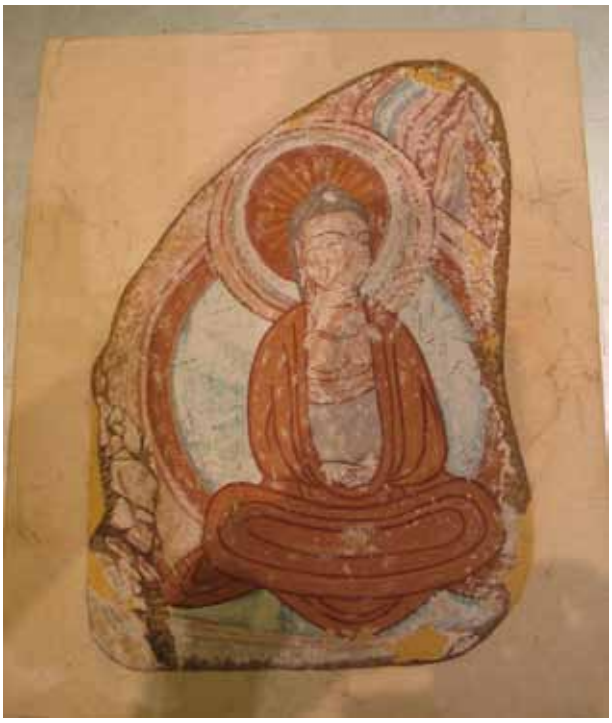
Process of drawing

Process of painting

Sticking of paper

Consolidation

Sticked paper



Final image

Viet Nam

The Two Ancient Graves in Luc Trieu Age

Nguyen Chi Cong, *Staff*
Center for Preservation of the Co Loa Historical Site and Hanoi Citadel

Recently, when a construction company tried to lay sluices in Hanoi Ciputra, (Nhat Tao village, Dong Ngac commune, Tu Liem district), two 2000-year-old ancient graves with 30 antiques were accidently found. An ancient bed was also found soon at 200 m in distance, which was similar to one of ancient wells found in Thang Long citadel sites.

Excavators lost some brick lines upper the well's wall, however the main body of the well was rather undamaged. Bricks inside the well were of many different dates, from 6th century to 15th century, which proved long existence through time of residents in regions next to Red river and formed Dai La citadel's outside.

The two graves were found in parallel, built in rolled boss including grapefruit section-shaped bricks on top. Patterned bricks were in the walls inside and grave's roof. The bigger grave had 'coin' structures, 'diamond - crossly shaped' structures, and the left part had 'fishbone' structures. In particular, in the bigger grave we found that about 40 bricks had Chinese characters in the edges.

The Eastern Han grave dated about 100-200 BC. The two graves were deepened underground about 2.0 m. The bigger grave was 4.7 m long and 2.0 m high. The left one was 3.9 m long, 1.2 m wide and 1.0 m high. The grave's walls were made by heaping up terra-cotta brick(s) without any adhesive agent, but they have been preserved until now. On the surface of bricks had 'coin-shaped' and crossing diamond-shaped structures which were very complicated. Although the police force of the commune protected around the region, the artefacts were hidden because of being afraid of loss.

In the near distance, an ancient well was also found which looked like the ancient well found in Thang Long royal citadel sites. Archaeologists believed that there may exist an old settlement, or a village along the Red River buried in thousands years.

After ten days of excavation, the artefacts were gradually unearthed. The bigger grave had 27 artefacts in total, mainly consisting of glazed or non-glazed pottery. The smaller grave had five artefacts, notably which included a chicken's head shaped ceramic vase that was very beautiful: its crest, eyes, tails can be still seen clearly. This was the most valuable item in the excavation. Based on the grave's structures and excavated artefacts, it was acknowledged that the first grave was dated a little earlier than the second grave. However, two valuable artefacts were almost destroyed by evildoers like many other graves around the region. As a measure to preserve the ancient well and two above- mentioned graves, both scientists and leaders of the department of Ha Noi Culture Information and Tourism agreed to number each brick of the two graves and cut sections of the ancient graves for relocation to be displayed into the museum.

The two ancient graves in Luc Trieu age (4th to 6th century during the Chinese domination)

Chinese characters on the brick

Workers are digging the ancient well.

Patterned bricks of coin and diamond shape

For the Contribution to Cultural Heritage Studying

-In Tashkent Young Archeologists Have Received the Incentive Award of Ikuo Hirayama-

Akmaljon Ulmasov, *Researcher*
Fine Arts Scientific Research Institute, Academy of Arts of Uzbekistan

On 15th June 2011, in the International Caravanserai of Culture (ICC) Academy of Arts of Uzbekistan, there has been a ceremony of the Incentive Award of Ikuo Hirayama in the field of archaeology.

Five young experts from Uzbekistan, Japan and Russia who have brought the special contribution to the development of archaeology in scientific and practical spheres became winners of the award founded by the well-known Japanese public figure with a view of encouragement of young scientists-archaeologists and historians.

In the awarding ceremony many honorable guests attended: Mr Yoshihisa Kuroda, the ambassador of Japan in Uzbekistan; Mr Tursunali Kuziev, the former chairman of Academy of Arts of Uzbekistan; representatives of the foreign and domestic organization; scientific and creative public; and mass media.

In welcoming speeches, Mr Shigeo Aoki, Professor of Cyber University, Tokyo, Japan, an expert in conservation of archaeological objects addressed that Incentive Award of Ikuo Hirayama in the field of archaeology was founded for the purpose of encouraging young scientists, archaeologists and historians to study for the revival and popularization of centuries-old traditions of the Great Silk Road.

The award will stimulate young experts to devote more profound research of this unique part of the world cultural heritage and to new discoveries. It once again confirmed an important role of Uzbekistan in the world civilization development, and marked itself steadfast attention of the country leaders to preservation and popularization of the richest heritage of the Great Silk Road.

Incentive Award of Ikuo Hirayama was awarded to five young experts from the different countries, who were active participants of archaeological researches, restoration and preservation of a cultural heritage of the countries of the Great Silk Road.

Winners of the award of Ikuo Hirayama of 2011:

1. Mitsuru Haga (Japan), Professor of Tohoku University, the representative of Management Center for the Advancement of Higher Education.
2. Gorin Alexey Nikolaevich (Uzbekistan), Research Assistant, Department of History of Arts of Fine Arts Institute, Academy of Sciences of Uzbekistan.
3. Shunpei Iwai (Japan), Lecturer, Ryukoku Museum Central Asian Archaeology, for the contribution of researching the history and archaeological monuments in Uzbekistan.
4. Tikhonov Roman Vladimirovich (Russia), Post-graduate Student, Eletsk State University named after I.A. Bunin.
5. Kayumova Dilfuza Abdurahimovna (Uzbekistan), Restorer, The State Museum of the History of Uzbekistan.

Published by
Cultural Heritage Protection Cooperation Office,
Asia-Pacific Cultural Centre for UNESCO (ACCU)
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