

ACCU Nara
International Correspondent

The Ninth Regular Report



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

ACCU Nara International Correspondent

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

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Contents

Cambodia	1
Srun Tech News from Angkor Archaeological Park	
China	3
Ma Chaolong Application Research on Monitoring Mode of Leaking Water in the Longmen Grottoes	
India	8
Vasant Kumar Swarnkar Conservation and Restoration Work at Chanderi: A Medieval City	
India	13
Bhuvan Vikrama Conservation of Brick Structures at Ahichhatra: Ethical and Historical Perspective	
Indonesia	18
Mohammad Natsir Ridwan Muslim Safeguarding of Cultural Heritages from Volcano Cold Lava Flood: Relocation of Lumbung Sengi Temple, Magelang Regency, Central Java Province, Indonesia	
Malaysia	21
A Ghafar Bin Ahmad Restoration of the Teh Bunga House, George Town, Penang, Malaysia	
Nepal	24
Suresh Suras Shrestha Conservation and Management of Lumbini, Birthplace of Lord Buddha; World Heritage Property, Lumbini, Nepal	
New Zealand	26
Matthew Schmidt Worlds Apart - Celebration of Japanese Culture in a New Zealand Port Town in 1892: Preservation of a Japanese Themed Mural	

Philippines — 33

Grace Barretto-Tesoro

Heritage Structures in Two Manila Cemeteries

Samoa — 37

Mainifo Viliamu

Archaeological Site Found at the Tanoa Tusitala

Sri Lanka — 39

Sujeeva Kaushalyani Peiris Deraniyagala

Conservation of Malvana Fort

Thailand — 42

Pongthorn Hiengkaew

Determination of the Reconstruction Model for Restoration from Existing Condition of Historic Building and Architectural Order: The Case Study of the Tripitaka Hall, Wat Mai-Thong-Sen

Uzbekistan — 47

Akmaljon Ulmasov

Semantics of Ancient Architectural Forms and Art Images (as exemplified by architectural monuments of Southern Uzbekistan)

Viet Nam — 51

Nguyen Chi Cong

New Excavation in Thang Long Royal Citadel

Special Report

Samoa — 55

Mainifo Viliamu

The Exhibition of the Regional Assistance Mission to Solomon Islands (RAMSI)



News from Angkor Archaeological Park

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

From September to October 2011, Cambodia was affected by the heavy rain. After that rain, the north part of the country was seriously flooded, meanwhile the Angkor region was also flooded. It destroyed some of ancient hydraulic structures and temples. In this report, I just focus only on the first temporal impacts on Angkor Thom walls because it was the worst disaster. The 12-kilometer-long wall is formed by laterite stone with earth bank shaping nearly perfect square which today we call Angkor Thom (or literary term Maha Nokor, both meaning "Great Angkor").

That wall, called "Jayagiri" in old inscriptions, itself is surrounded by a wide moat called "Jayasindhu". One inscription explicitly compares this ensemble to the mountain range and the Sea of Milk which encircles the universe in Indian cosmological conceptions adopted in ancient Cambodia. Thus Angkor Thom was in its entirety the world created or recreated after the city sacking by the Chams in 1777, emerging as ambrosia after the Churning of the Sea of Milk. This explains why the churning episode was represented at each of the five gates giving entry to the city. (*Angkor Thom, a short historical guide*: APSARA Authority, 2001, pp: 16-17).

Responding to that problem, I took the urgent actions to survey damage and found the common reason for each collapsed point as follows (see the risky map and diagnosis figures):

- The rain caused weakness and erosion of the wall foundation.
- After raining, the stone absorbed the water and became loose.
- The tree roots were also the cause of collapse.

- Most of trees grow on the wall or the temple and can be dangerous to the structure. Some of these trees have a hole inside. When they broke or fell during storms or heavy rain, rocks of the temple or walls opened up, which made it to lean or collapse.

In order to save the temple, technical teams from different departments of APSARA Authority took the emergency measures to rescue the temple by:

- Controlling the water level by diversion of water flows in the temple area
- Cutting down the trees which are growing on the erosion area
- During the restoration work, forbidding visitors by covering the erosion area with tents and signing boards
- Shoring up the laterite wall in the risky areas by installing the wooden scaffolding
- Building the retaining walls by using the hard wooden sticks and sand bags in order to protect the existing walls and earthen walls



Map of Angkor region

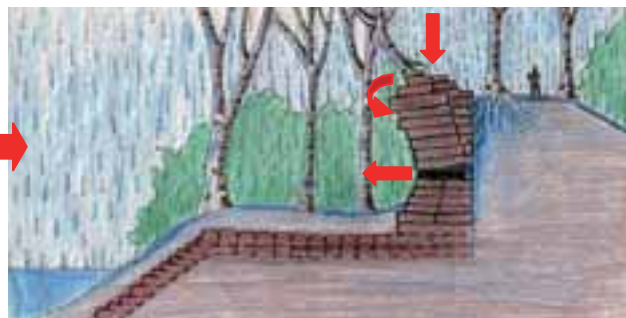


Risky map of Angkor Thom

Here are diagnosis figures:



Wall in the normal condition



Wall condition after heavy rain



Collapsed wall condition



Collapsed wall in 17 m length on 11 Oct. 2011



Collapsed wall in 15 m length on 13 Oct. 2011



Collapsed wall in 18 m length on 14 Oct. 2011



Collapsed wall in 5 m length on 15 Oct. 2011



Application Research on Monitoring Mode of Leaking Water in the Longmen Grottoes

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1. Foreword

The Longmen Grottoes has over 1,500 years' history since it was excavated in Northern Wei dynasty. Besides man-made destruction, it has been suffered many deteriorations as weathering, flaking-off, water erosion, dissolving corrosion due to natural factors and environment, which severely endanger the long-term conservation of the Longmen Grottoes. Among them, leaking water is one of major deteriorations, therefore, for a long run, treatment on leaking water is the basis and precondition of relics conservation in the Longmen Grottoes. The Conservation Institute has made long-term tracking observation of leaking water, mainly by qualitative observation, such as employing people to record leaking water and to take related pictures; furthermore, in the analysis on changes of leaking water and evaluation on treatment, researchers' personal experience would play very important roles to a certain extent. Therefore, the previous leaking water observation mode can't satisfy with requirements for treatment and research on leaking water any more.

In the conservation and restoration program executed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2002, a relatively complete environment and deteriorations monitoring system was established according to the leaking water

conditions in the Longmen Grottoes, to carry out environment monitoring on cave areas, at the same time, to take advantage of new leaking water monitoring mode to make all-around continuous monitoring on experimental caves (the Qianxi Temple Cave, the Ludong Cave, and the Huangpugong Cave) and a lot of monitoring information was gathered. By in-depth understanding and analysis research on the information, it can provide scientific references for research on cave leaking water as well as important reference value for treatment of cave leaking water. This monitoring mode can also help to summarize experiences in treatment plan and construction, after treatment construction, it can carry out a long-term accurate qualitative and quantitative inspection on anti leaking water achievements, and examine the results of treatment plan and construction.

2. Leaking water in the Longmen Grottoes

2.1. Leaking water status

The Longmen Grottoes was excavated on the carbonic acid rock cliffs on both the Xiangshan Mountain and the Longmenshan Mountain along the banks of the Yi River. Cave rocks are composed of dolostones of the Middle to Upper Cambrian and limestone stratum, the Upper Cambrian dolostones can be divided into a set of deep layer and massive layer of fine-crystalline, micro-



Fig. 1. Leaking water on the roof of the Wanfo Cave



Fig. 2. Water-storage on the ground of Wanfo Cave



Fig. 3. Leaking water running through cracks on the north walls inside the Ludong Cave



Fig. 4. Biological deterioration on the ground caused by drip water from the roof of the Yaofang Cave

crystalline and reef shoal dolostones, while the Middle Cambrian dolostones are divided into a thin-deep layer of soil zebra limestone and reef shoal limestone. Most of caves and sculptures were excavated on the middle and top part of deep layer and massive layer of fine-crystalline, micro-crystalline dolostones from the Upper Cambrian, as well as reef shoal limestone and soil zebra limestone of the Middle Cambrian. The mineral composition of rocks where the caves are located is single, with big mechanics intensity, good anti-denaturalization performance, but with dissolubility. Even though rocks themselves are impervious to water, a space lattice percolation network has been formed by the development of many kinds of cracks, such as layer cracks, unloading cracks, weathering cracks and tectonic cracks, which are intersected and incised with each other. The seepage network became a good seepage tunnel and provided access for rainfall to seep into. Almost every big and medium caves in the Longmen Grottoes have the leaking water problems at different degrees, some are very severe, such as the Qianxi Temple Cave, the Wanfo Cave and the Kanjing Cave, etc. After careful research, it is confirmed that layer cracks and unloading cracks are the main causes responsible for cave leaking water in the Longmen Grottoes.

2.2. Damage caused by leaking water

The carbonate rocks where the caves are located are easy for erosion affected by leaking water. Rain seeps through caves through tectonic cracks and layer cracks, and corrodes rock surfaces along the sides of cracks, and then enlarges the existing caves, dykes and trough, etc. It directly destroys sculptures, meanwhile, it can also cause surface sediment on cave walls and sculptures, and the developed limestone coagulated slurry sediment covers cave walls and sculptures so that the artistic value can't be recognized. Percolating water can cause the increase of humidity inside mini-environment after entry into caves, in the summer the condensation water is accelerated, and the salt inside sculpture has water loss and crystallization in the change of dry and humid environment, and various problems together accelerate the break of rock surface granules connection and expansion of cracks, as a result, cause the deteriorations for sculptures, such as surface cracking, crispy separation and flaking off, etc. After entry into caves, percolating water, together with

gaseous carbon dioxide, sulfur dioxide and nitrogen oxides cause hydration, oxidation and acidification on sculpture surface, and can result in surface disintegration. Percolating water runs through sculptures and promotes the growth of microorganism, and acid products are created during the growth and decease of microorganism on sculpture surface. According to the analysis, the pH value of percolating water on microorganism surface varies from 5.6 to 6.2, which is acid. Its erosion on sculpture can't be neglected.

3. Leaking water monitoring system

In the conservation and restoration program executed by UNESCO in 2002, an advanced environment monitoring system was established inside caves areas, in order to comprehend the effect on artefacts inside the Longmen Grottoes caused by environment, in particular, temperature and humidity, wind direction, wind speed, atmospheric precipitation, light intensity, air pollution, river water, spring water, underground water, soil water content, rock surface temperature, rock depth temperature changes, etc. in caves conservation central areas, at the same time, to supervise the changes of temperature, humidity, percolating water and rock surface temperature in three experimental caves, which are the Qianxi Temple Cave, the Huangpugong Cave and the Ludong Cave, all together 24 monitoring contents.

Leaking water monitoring system is not independent from the general monitoring system of the Longmen Grottoes, but a composite of the environment and deterioration monitoring system, which is divided into the outside caves and inside caves monitoring system:

3.1. Outside caves monitoring programs

The outside cave monitoring contents of the leaking water monitoring system include seven items: atmospheric temperature, atmospheric humidity, precipitation, cave leaking water quantity, underground water level, and mountain soil water content.

3.2. Inside caves monitoring programs

Inside caves monitoring contents include six items: temperature, humidity, rock surface temperature, cave leaking water quantity, and leaking water time and area photographed by digital cameras.



Fig. 5. Weather observation station in the Longmen Grottoes



Fig. 6. Temperature and humidity meters and drip measuring apparatus inside caves



Fig. 7. Vidicon for photographing changes of leaking water inside caves.

4. Analysis and application of leaking water monitoring data

The monitoring system has collected many kinds of data and photos since its establishment, and the first step for analysis is to how to classify and process those data. All data should be classified according to monitoring contents, and then for data summary, maps drawing and curves of changes so that we can make a further analysis. All digital photos about observing leaking water should be filtrated for a complete periodic photos before and after rainfall, and then be classified, processed and stored for analysis on each cave.

4.1. Analysis on the relationship between leaking water and precipitation

The Longmen Grottoes lie on the west mountainous part of Henan Province and on the southern edge of the Helou Basin within the temperate continental monsoon climate. The climate shows distinct characteristics with four seasons: cold and little rain and snow in the winter, and hot and more rainfall in the summer.

According to the rainfall observation year from 2003 to 2004 in the Xishan Mountain area, the total yearly rainfall is 1,061 mm. From the chart, one can see that rainfall gathered in June, July, August and September with total quantity of 800.5 mm, occupying 75.5% of yearly rainfall. Combining data on cave leaking water, it shows the most severe time is from June to September. However, each cave has its own leaking water characteristics due to the difference of cave location, rock status and crack development, but in general the precipitation is the main source of leaking water in the Longmen Grottoes.

Here, we take the Qianxi Temple Caves, the Ludong Cave of three experimental caves for examples, where the observation apparatus was set inside to analyze leaking water:

Leaking water characteristics in the Qianxi Temple Cave

The roof is very thin inside the Qianxi Temple Cave, so that the leaking water is the most severe one among three experimental caves during the rainfall. According to data analysis, the leaking water here is mainly shown as follows: when rainfall is small, the leaking water mainly starts from cave roof to flow downwards, there are many water-burst points on the layer cracks on the southern wall, the percolation points appear on the next day after rain with duration of 2 to 3 days, the leaking water quantity is small and no drip will appear normally; when rain is heavy, the leaking water is also from roof and southern wall to seep downwards, but the percolation area and quantity are larger, with duration of 5 to 10 days, simultaneously the drippings appear, there will be a dripping zone along the unloading cracks on the cave roofs inside cave gate, in the worst time, more than 30 drippings within 8 square meters, and it lasts a week even after rain stops. The leaking water status is complicated inside the Qianxi Temple Cave, it has both short-time percolation and long-time one; severe percolation on roofs, severe seepage along walls from the roof with obvious water-burst point along cave walls, as well as ones on sculptures.

Percolating water gathers at the cave floors, and flows outside of cave through the ancient threshold drain, but

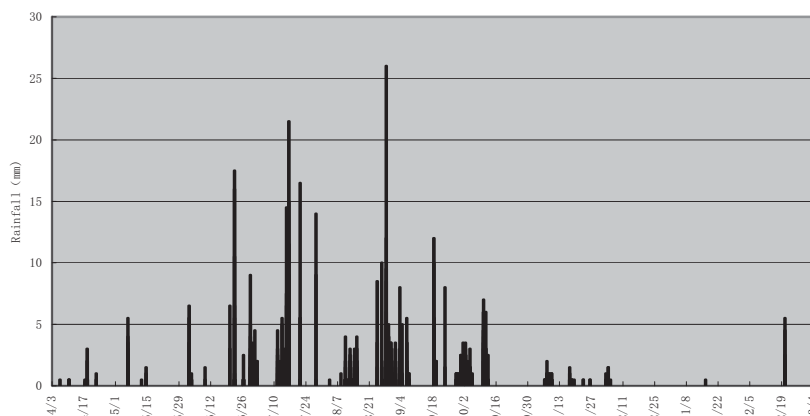


Fig.8. Rainfall Map from the Xishan Mountain Observation Station in 2003-2004

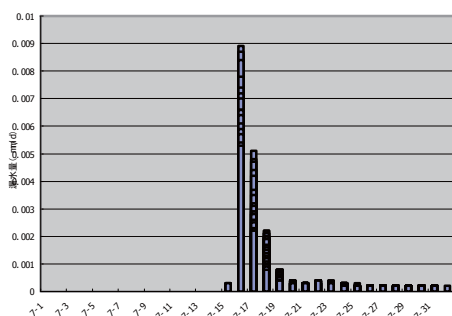


Fig. 9. Leaking water map of the Qianxi Temple Cave in July, 2003

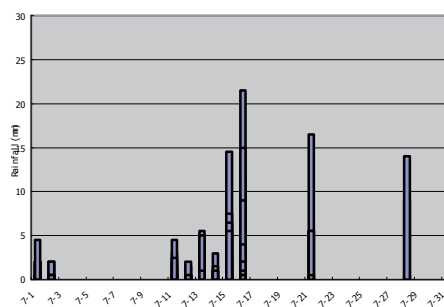


Fig. 10. Rainfall map of the Xishan Mountain in July, 2003

still a lot of water exits on the uneven floor, which causes the increase of cave humidity, at the same time, the spatial depth is deep to 5.6 m, and there are cave brim structures outside caves, to some degree, the ventilation is affected. This is also the reason why the average humidity inside the Qianxi Temple Cave is higher than the other two experimental caves.

The leaking water status here is complicated, with intersection of unloading cracks, tectonic cracks and layer cracks, runoff, crack seepage and rock inner water all flow into caves and cause leaking water. Dealing with the special status inside the Qianxi Temple Cave, such as big catchment areas, multi-resource crack water, and complicated geographic structure, no single treatment measure can fulfill treatment results, so a comprehensive treatment measures should be adopted here.

☒☒ Leaking water characteristics in the Ludong Cave

The monitoring apparatus inside the Ludong Cave observed one leaking water point on the northern wall cracks and southeast part of the roof, the analysis shows that the northern wall percolation is obviously affected by rain, in five percolation pints, water burst out quickly, usually happens in 1 to 3 hours after rain, with prominent characteristics of big water-burst and short percolation. Fig. 11 and 12 represent the changes of leaking water in the biggest rainfall on the northern wall, the rainfall time was from 18:00 28th August to 11:00 30th August with duration of 43 hours and quantity of 139 mm, the biggest rainfall of the year. From the Fig. 11 the percolation

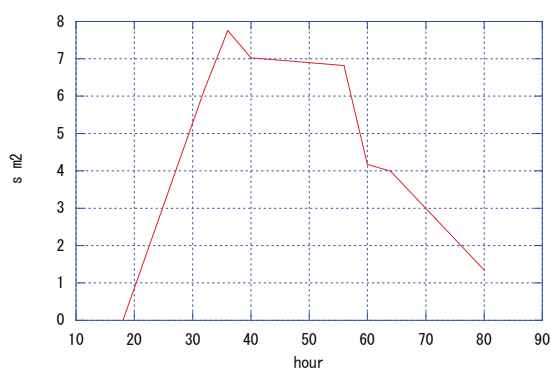


Fig. 11. Map of percolation area changes on the northern wall of the Ludong Cave in 28-30, August 2003

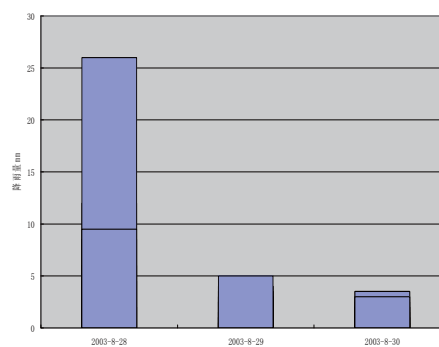


Fig. 12. Map of rainfall change in 28-30, August 2003

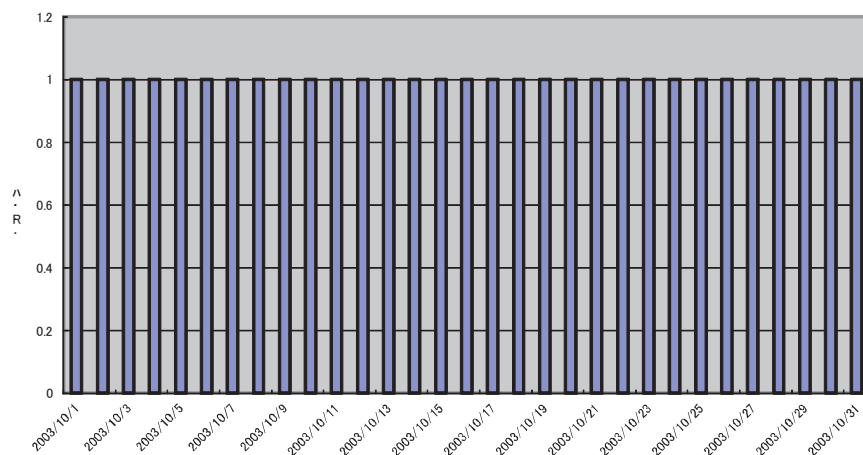


Fig. 13. Map of leaking water inside the Ludong Cave in October, 2003

area changes map, we can see that the percolation area increased from 0 square meter to the maximum 8 square meters in very short time in this rainfall, and then gradually reduced, and finally stopped one day after the rain stopped, the whole percolation process lasted 62 hours.

Fig. 13 shows the percolation quantity of a long-term water-burst point on the southeast cave roof. From the analysis of the drip data chart inside the Ludong Cave, we can see that the drip water-burst was stable in certain rules; the drips appeared in both summer and winter time were not much affected by the rainfall. The resource of water-burst point was wide and far, maybe because of slow release of storage water inside mountain during rainfall, and water flowed into the cave along cracks, and as a result, the water-burst was small but stable.

The percolation mode inside the Ludong Cave can be simply summarized as follows: unloading cracks were the major and controlling percolation tunnel. Unloading cracks directly cut through rocks, and water seeped into caves through uploading cracks and made problems. There were many water-burst points inside, and all related to unloading and tectonic cracks. On the roof there was a small road of even mesa, which was able to have temporary water-storage. Unloading cracks extended to the small road, which became one of the water resources for the unloading cracks. Therefore, treatment should be focused on the surrounding unloading cracks.

4.2. Affects made by underground water and river water on Grottoes

After summary of the observation data of underground water level and river water level through upright drills, the underground water level varies from 149 meters to 151 meters above sea level inside the Longmen Grottoes area, which is lower than the cave floor height of the major cave inside the Longmen Grottoes. In addition compared with previous observation, the underground water has slight affects on the caves.

Between the east and west mountains of the Longmen Grottoes, the water level of the Yi River is about 149 meters above sea level, which is lower than the visiting route of 150 meters in front of the caves. It has some affects on the buried sculptures along the cave visiting routes. However there are many records on the flood in the Yi River, which in 1982 the flood caused severe casualty. Even though the Luhun Reservoir on the upper reaches controls the river flow to some extent, the riverbed increases annually compared with history records, and what's more, the ability of Longmen valley mouth on resisting flood has been reduced compared with the past. In 2003, 2004 and 2005, the river overflowed the roads inside cave areas. In addition, the 30 years period of the Yi River is coming soon, so we must make good preparation for Longmen Grottoes in order to reduce the damage on artefacts and people to minimum degree.

4.3. Relationship among soil water, rainfall and leaking water

The apparatus of soil water content analysis is buried into the surface soil coverage layer on the half mountainside of the Xishan Mountain with depth of 0.5 meters. In June and July of heavy rainfall, it is obvious that the soil water content is much higher than that in January and February with little rainfall. In one rainfall process, the soil water content increases distinctly during the rainfall, and then decreases after rain stops to a certain value and become stable, and then changes again in the next rainfall. On a long and heavy rainfall of 16 July 2003, the water content reached the maximum of $0.3788 \text{ m}^3/\text{m}^3$, almost close to saturation. Through every observation of water content after each rainfall, one 2-hour 20 mm rainfall can make the water content increase from $0.04 \text{ m}^3/\text{m}^3$ (dry) to $0.2 \text{ m}^3/\text{m}^3$ within one hour. With the ending of rainfall, soil loses water by vaporization and seepage, and the water content gradually decreases. The water content will recover to below $0.1 \text{ m}^3/\text{m}^3$ in 2 to 7 days according to different rainfall quantity, and the total recovery to dry status will take 10 to 15 days.

The earth layer on the Xishan Mountain is composed of shiver mineral clay with high to medium permeable soil with good percolation ability. The mountain is covered by a number of soils meanwhile a lot of plants well-developed root system, which benefits the storage and

percolation of precipitation. Therefore, the water content inside soil seeps down along the slopes and cracks, while some water enters into the caves. The resource of the percolating water is full and long in seepage pass, and it's the major resource of temporary and long-term percolation inside caves, which causes severe problems in the caves.

The change of the soil water content is in accordance with the change of cave percolation to some degree, and it reflects that the cave leaking water has been affected by the water quantity of the mountain accumulation horizon. The slow release of storage water inside the accumulation horizon causes medium and long-term leaking water inside some caves. Therefore, the medium and long-term percolation symptom has the characteristics of long duration and small water evaporation.

5. Conclusion and suggestions

The Longmen Grottoes has established an advanced monitoring system on cave leaking water with relatively complete monitoring categories and monitoring methods such as 24-hour digital shooting and collection on leaking water, which has some innovation concepts. Since its establishment, it has collected large amount of monitoring data, made good monitoring results, and provided important reference for the following treatment on cave leaking water.

In the future, monitoring functions and scopes need to be further improved in particular in the following aspects:

1. The complexity of leaking water mechanism should be fully recognized in the Longmen Grottoes. To avoid any destruction of artefacts by leaking water is the objective of cave deterioration treatment work and it is also a long-term and difficult task for conservators
2. Because the monitoring programs are currently carried out on the Xishan Mountain and three experiment caves, in the future, some other observation station should be added on the existing base, such as the Dongshan Cave and some major caves.
3. Importance should be attached to the analysis and research on cave leaking water. A continued analysis and monitoring should be made aiming at different cave types (drip, seepage), different percolation time (preliminary, medium and ending time) and compared with composition of rainfall and spring water, to analyze and research on the effects of leaking water on stone relics.
4. For future cave percolation treatment works, all collected data and information should be fully made use of and for analysis and research, to comprehend the characteristics of leaking water, and to make different treatment plans according to different zones and percolation characteristics, to ensure the best results of leaking water treatment.



Conservation and Restoration Work at Chanderi: A Medieval City

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Chanderi (Lat. 24° 40' N; Long. 78°10'E) is one of the oldest surviving towns of the Madhya Pradesh. It is situated at a distance of 60 km from the district headquarter Ashoknagar and 40 km from Lalitpur, the nearest railway station in Uttar Pradesh. Besides historical monuments such as Kushak Mahal, Badal Mahal Gate, Malwa Gate, Shahjadi ka Rauja, Jama Mosque, Madrasa, Battisi Baoli, Delhi Darwaja, Jageshwari Temple, Khandargiri, Chaubisi Mandir, Kalyan Rai Temple, Kirtisagar, Budhi Chanderi, Samadhi of Baiju Bawra, and Singhpur Mahal etc., Chanderi is also known for its weaving of artistically embroidered silk sarees. Chanderi also has a grand historical background with extremely healthy climate located in the picturesque and fertile valley of the ancient Betwa river. It is surrounded on all sides by the Vindhyan range with dense forests and is excessively rich in lakes, tanks and baolies which provide an extremely fascinating environment.

In a number of booklets, documents and popular write-ups, the glory of Chanderi has been depicted as a magnificent place with plenty of wealth and property. It is believed that Shishupal was the king of Chanderi during the Mahabharata Period. There are references about Chanderi in Puranas as well. At a distance of about 18 km, Budhi Chanderi, another historical city, still have archaeological remains of Jaina Temples, Palaces, Hindu Temples and architectural fragments dating back to the 10th to 12th centuries A.D.

Among the early Persian writers, Minhaj-us-Siraj was the first to mention Chanderi as a prominent town during the 13th century A.D. The famous Moorish traveler, Ibn Battuta visited Chanderi around 1342 A.D. and noticed it as a big city with thronged markets and palaces. This city enjoyed the status of an important provincial capital under the sultans of Delhi. Further, it has been glorified during the reign of Malwa sultans.

It was possibly one of the largest towns in central India during the late 14th to 15th centuries. Even in the late 16th century when Chanderi started declining, it was furnished with 384 bazars, 360 large caravansaries, 1,200 mosques and 14,000 stone houses besides the monumental palaces and gateways of historical importance. However the town seems to function a little more than a local Bundela Rajput centre. They have constructed some buildings and especially hunting palaces in and around Chanderi as their rest houses.

The hill-fort of Chanderi stands overlooking the town. According to a Sanskrit inscription, the nucleus of the fort was built by Pratihara king Kirttipala in the 11th century and was named Kirtti-durga after its builder. At present, there are no old buildings of importance on the fort except the ruins of a palace (Naukhanda or Hawa Mahal)

of Bundela period and a mosque beside the fortification wall, bastions and gateways.

Badal Mahal Gate is quite an imposing and interesting structure against the background of the hill-fort though there is no Mahal or palace with which it may have been connected. Such isolated gateways are not uncommon and were probably erected to commemorate certain important events. This gateway is a double arched entrance with circular and tapering bastions at sides and the height of the structure is about 50 feet.

There are innumerable baolies or step-wells at Chanderi, of which the Battisi Baoli is the largest and best preserved. It is so called as it sinks by 32 flights of steps arranged in four stages or stories with eight staircases in each. According to a Persian inscription on it, the well was built in the reign of Sultan Ghiyas Shah of Malwa in A.H. 890 (A.D. 1485).

Bada Madarsa is a square tomb, having an arcade of five arches supported on stone pillars on each side and a 6.1-meter-wide verandah girding on all sides. There are no struts or any other ornamental features on the exterior. The cenotaph is square with 9.96 m on a side. Except for the entrance, it is closed on all sides with stone jali. Arches are built with the help of voussiors and are truly radiating. They have a very assertive ogee. The dome has fallen down.

Jama Masjid has a spacious (31.42 m x 24.38 m) open court with sanctuary on its west and arched cloisters (dalans) on its north and south, while the one on the eastern side has been destroyed. The sanctuary, which measures 37.49 m x 11.73 m has three aisles deep with a corridor running from north-south. The nave and the square hall are roofed by elongated massive domes, having padmakosa, kalasa and amalaka finial. The quibla wall has been ornamentally divided into a series of beautiful mihrabs with prominent ogee curves. The skilful use of the building techniques and the refined taste for exquisite ornamental effect in the structural masses show that the building could not have been built later than A.D. 1450.

Koshak-Mahal is the most important palace at Chanderi. It is a square building with 35.36 m on a side. It is like a Roman cross in plan. The Koshak Mahal is a complex of four palaces of equal dimensions with three stories standing at equal distance from one another on the sides of passages which connect them as much as it separate them. It allows each adjunct to stand independently and draw its ventilation and light freely on all the four sides and interconnected through the overhead covered corridors. The superstructure was destroyed.

The ASI has undertaken the work of conservation of monumental remains scattered in a large area. Badal Mahal gateway complex area was taken up first. The accumulated debris was cleared and scientific clearance work started to find out the original working level. During the work a beautiful baoli (water body) was discovered, which is cleared and conserved in a presentable manner and now it is filled with fresh water. The surrounding area was aesthetically landscaped. The lime plaster which was applied in the later period over the walls of Jama Masjid was manually removed and chemical treatment was done to bring the original appearance of the structure. In the fort complex, number of works were undertaken at different monuments. To trace the original pathway or its alignment, trial trenching has been done at different locations. The structures of Navkhanda Palace was made water-resistant and pointing of masonry in lime surkhi mortar was done to strengthen the structure, and missing chhajja stones were also provided fitting with existing stones. Wherever required the portions of the structure were restored as per the available evidences.

Due to different factors in a long span of time, the fortification wall was damaged and bulged out at some places. These portions of walls were taken out and reset properly. The process adopted for this work was traditional i.e. each stone was marked before it was taken out with the number to fix its place in the original course of the structure so that each and every stone should be placed again in its original position while

resetting of the wall. The original combination of mortar was adopted during the construction as mentioned in the contemporary texts. Scientific analysis was also done to verify the components of the original mortar used. The portion of a fortification wall between Khalji mosques and Baradari has been completed recently. Besides this, the lintel, beams and pillars of other structures have been provided support, joined with stainless steel rods using epoxy resin to provide sufficient strength to the structure. Wherever required these stones were replaced with matching stones for the survival of the structure.

The architectural remains, sculptures and antiquities found during the conservation and scientific clearance were displayed in the site museum. The city was proposed for the nomination onto the World Heritage List.

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Koshak Mahal before conservation



Koshak Mahal during conservation work



The arch of Koshak Mahal before conservation



The arch of Koshak Mahal during conservation work



The rear view of Jama Masjid before conservation



Jama Masjid after conservation



Jama Masjid (inside) before conservation



Jama Masjid after removal of lime plaster



A part of an arch in Jama Masjid is left half done (covered with lime plaster) for reference.



Navkhanda Mahal before restoration



Navkhanda Mahal after restoration



Navkhanda Mahal (inside) before conservation



Navkhanda Mahal after conservation



Shahzadi ka Roza before conservation



Shahzadi ka Roza after conservation



Badal Mahal Gate before conservation



Badal Mahal Gate after environmental development



Badal Mahal Gate and Fort in background



Fallen fortification walls of the Fort



Fortification walls after restoration



Fallen structures inside Chanderi Fort



Chanderi Fort after restoration



Navkhanda Mahal in damaged condition



Navkhanda Mahal after conservation and restoration



Preparation of mortar using ancient technique



Conservation of Brick Structures at Ahichhatra: Ethical and Historical Perspective

Bhuvan Vikrama, *Assistant Archaeologist*
Archaeological Survey of India

Introduction

The urge to 'save something for future' has been there and its existence is responsible for the emergence and carving out the discipline of Archaeology. Conservation, preservation and restoration, primarily, are terms given to the same urge to protect and save something or objects for the future, they differ mainly in the methodology and ethics. In the crudest form conservation may mean survival repairs, preservation may stand for maintaining status quo and restoration may denote recreating the past in the present with evidence at hand. The debate about what being right and which is wrong may go on in the future too but there is no denying the fact that if we have to protect our past for the future generation which sure will be much more distant than the present generation from the past with more missing links in between the world will have to adopt a combined approach to better represent all the phases of past.

Time takes turn, materials change, evolve and get refined, and technology also is improved with every passing day. There are many archaeological sites which preserve the signs of such attempts at conservation and preservation. Such sites present a good study of gradual improvements not only in the conservation methodology but also in the human approach towards such projects. Ahichhatra (Ramnagar, Subdivision Aonla, District Barreilly, Uttar Pradesh, India) is one such site where large scale excavation was carried out between 1940-44 and a large city was exposed. Some important structures were allowed to remain exposed while many of the small and routine structures were reburied for preservation.

Ahichhatra: History and values attached

Ahichhatra, as a settlement, began in the prehistoric period about 2500 BC when the Ochre Coloured Pottery (Redware??) using people first arrived here. They evolved in time and space into Painted Grey Ware pottery using people and in course of time graduated to Northern Black Polished Ware. By 600 BC or slightly before, the NBP Ware using people had developed a large settlement which qualified to the status of a fortified city. Public structures had begun which lasted for centuries before getting replaced by newer constructions or modified or transformed into something else with every dynastic change at the city. Thus the city that began in 600 BC continued with changing times till 11th century AD.

The structures discussed in this paper were constructed in the 4th century AD on the ruins of earlier public structures and survived till the beginning of the 13th century AD when a vicious movement in the earth shook it down. For almost seven centuries, since then, the city lay forgotten, buried under its own debris. The city was brought to light during a large-scale excavation project taken up during 1940-44. The excavation revealed two large pyramidal structures unique in the style of construction.

Structures

The two large pyramidal structures designated as Temple-1 (Fig.1) and Temple-2 (Fig.2) consist of only terraced plinth with no trace of temple spire. Temple-1 rises to a height of 18 m and Temple-2 to about 14 m from the general ground level. Taking the thickness (1.70 m) of the walls and area of the sanctum, a modest estimate would take the spire to approximate height of 20 – 30 m (hundred feet by Cunningham's estimate). These temples were built during the reign of Gupta dynasty of North India in the 5th century AD using baked brick of large size set in mud mortar. Similarly built structures are found at Sravasti, Nalanda, etc., however, as Buddhist stupas.

Conservation challenges

Decay is a continuous natural process which can only be slowed down and cannot be stopped. Foremost agency of decay is nature and the rate of decay depends upon the nature of interaction between nature and structures. In other words, in different natural settings causes of decay are different and so is the case with different building materials used in the construction which react differently to the causes of decay. In order to investigate the causes of decay a brief knowledge of the natural setting is essential.

Natural conditions at the site

The Ground

The under-surface over which structures stand is composed of alternating bands of clay, silt and calcareous formations. Ground is firm and provides stable foundations. The silty top soil in summer acts as sand-blast on the buildings in the hot summers when the strong breeze and winds carry them.

Water

Water table is quite high at 4 to 5 m in summer which results in high moisture travelling to the top. Wind and sun induce evaporation and leaves a layer of salt crust.

Rainfall

The average annual rainfall is approximately 1,040 mm (40.9 inches), most of which is during the monsoons in July and August.

Wind

Site being abandoned and in open wilderness with very few trees, it is quite breezy and is prone to high velocity winds from March to May-June.

Temperature

Bareilly region has a humid subtropical climate with high variation between summer and winter temperatures. Summers are long, from early April to October, with the monsoon season in between. Winter starts in October and peaks in January and is notorious for its heavy fog. Extreme temperatures range from 4 °C to 44 °C. The annual mean temperature is 25 °C (77 °F), monthly mean

temperatures range from 14 °C to 33 °C (58 °F to 92 °F).

Vegetation

Site is almost devoid of large trees but rainfall and fertile soil give rise to thick vegetative growth during monsoon which dry-out by winter.

Specification of structures at site

Building Material

Baked bricks as building blocks and mud as binding material are all that the ancient architects used to construct the most gigantic building of the time.

Construction Method

Common houses are simple structures with no specific construction method involved; however, the larger structures show box foundation type structures for providing desirable height to the structure. Land being devoid of prominent land mass architects raised the plinth by constructing a grid of thick walls leaving a series of chambers which were filled with earth excavated from habitation area and paving them to make a platform (Fig. 3) and raising in similar manner the inner walls to next level and repeating the same process for creating terraces.

Causes of decay

The construction method, building material and the natural setting together dictate the causes of decay. As long as there exists the compatibility of the three, decay is very slow, but once the compatibility is lost it becomes fast. It appears that the collapse of the superstructure had covered the terraced plinth though damaging it with the impact. Lapse of time with no human activity around had given enough time to nature to round off the things and mitigate whatever evidences remained. All materials had reached a state of total compatibility with nature, and as soon as the excavation exposed the structure in its damaged condition and with lot of moisture the crack became wider with drying and the mortar dried and lost all its cohesiveness. (Fig. 4 & 5)

Now since the structure is standing naked without any outer covering it is not only exposed to eyes but also to the elements of nature. Ground water along with soluble salts travelling to the surface only to be evaporated causes efflorescence at the surface. Local whirlwinds carrying dust particulate matter blast the efflorescence which gradually crumbles and leaves an ever-increasing scar on the wall surface. This process affects the structures at the lower portions to a height up to which ground water is sucked by the capillary activity.

The rain water that manages to get absorbed in the earth-filled boxes, makes the earth swell exerting pressure on the walls and finds its way out through the exterior wall loosening the binding mortar with and resulting in efflorescence in the upper reaches. Temperature variation widens the cracks in the brick. A load of the structure also acts adversary in the weaker zones where cracks become deep and flakes come off.

Cyclic growth of brushy vegetation also increases the danger to the structure.

The earliest efforts at conservation

The first conservation was carried out immediately after the excavation, when some of the walls were found

bulging, cracked and tilting. Method used, perhaps, was opening up the walls and resetting them after grinding the bricks to give them proper edges and finished looks, as the size at some portions are slender than the usual. The top of mud filled chambers were not capped and as a result rain water again seeped down and opened-up weaker sections which were later filled in using cement-sand mortar. It was surely an example of bad conservation.

Identification of problem specific to the site

All the above variables – natural setting as well as of building material and construction style – were considered and problem appeared to be relating to mainly water both from rain and from ground which damaged the lower margins and upper areas of the structures. Though the building material and construction method were at fault but they cannot be changed. Strong breeze that gushes along the ground was identified as the second most potent factor of decay in tandem with ground water. Use of cement which sealed the vents for water seepage was also one of the causes of faster decay.

Remedial conservation: Some experiments

Once the ailments were diagnosed it was time for writing prescription and implementing it. Steps decided were –

- Clear the debris from top in order to reduce the sheer weight.
- Open the wall down to the point they have loose/open joints.
- Provide proper slop to the top surfaces of mud-filled chambers
- Lime based mortar to be used with fine brick-crush (surkhi) with very little cement to reset the walls
- Pack the top surface of the mud-filled chambers with lime mixed with earth and small portion of fine brick-crush.
- Low height thick brushes to be planted around the structures at a distance of 3-4 metres

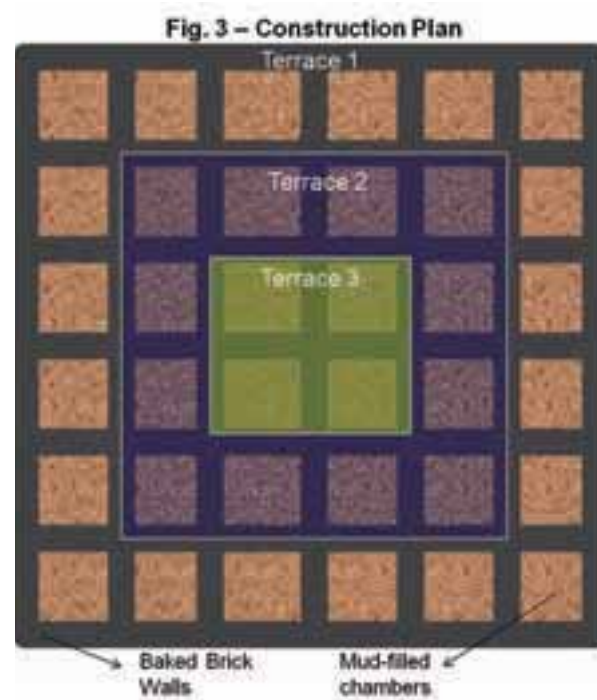
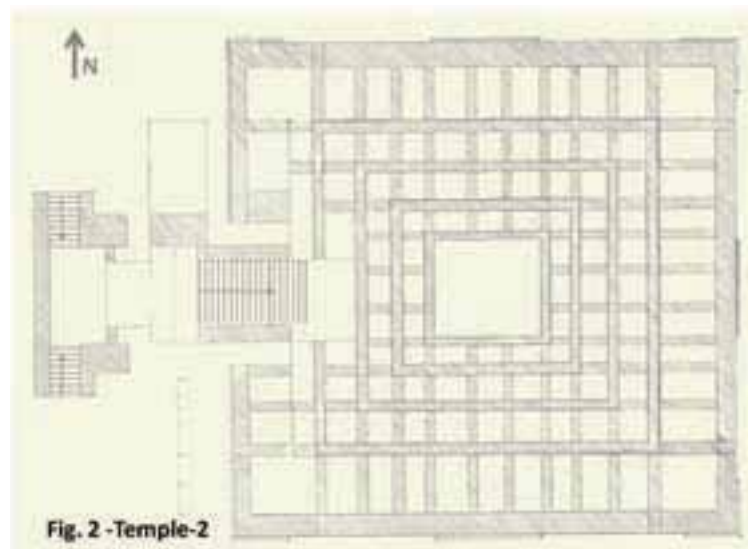
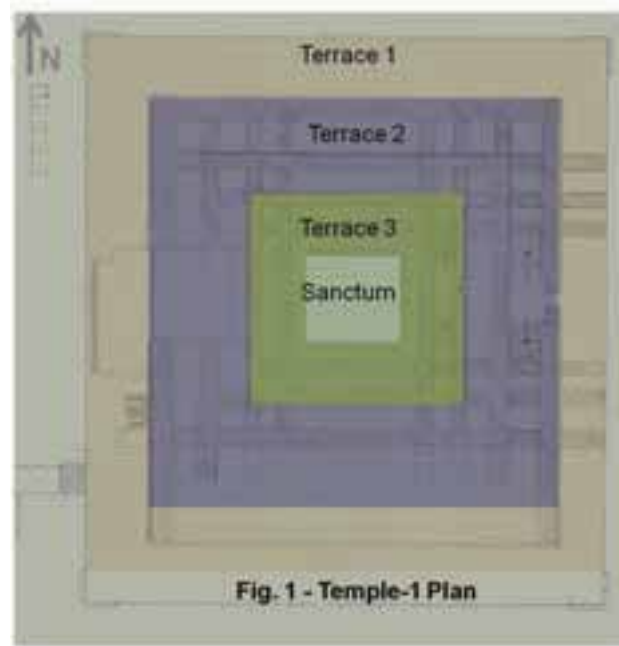
Lime mortar was decided instead of original mud mortar as binding material as it is stronger than the mud and at the same time provides easy movement of air and water (Fig. 6 & 7). Since the ground water cannot be stopped from rising up into the structure, a layer of thin plaster of clay mixed with lime was experimented over the walls at lower levels to allow evaporation of moisture from the surface of plaster instead of brick and thereby protecting them. The problem with this experiment is that it is not a permanent solution as the layer is to be repeated annually.

Last Word

Conservation of brick structures is certainly a big concern and a challenging job. In this task a team of civil engineers and archaeologist has to contribute equally. The structure has been conserved in this way and it is still to be seen at what time gap the process will be required to be repeated. Time will tell.

Acknowledgement

Author is indebted to the supervising conservator engineers who deftly accomplished the task and provided some of the inputs; and is also grateful to the Archaeological Survey of India for the B/W photographs, rest of the photographs are author's own.



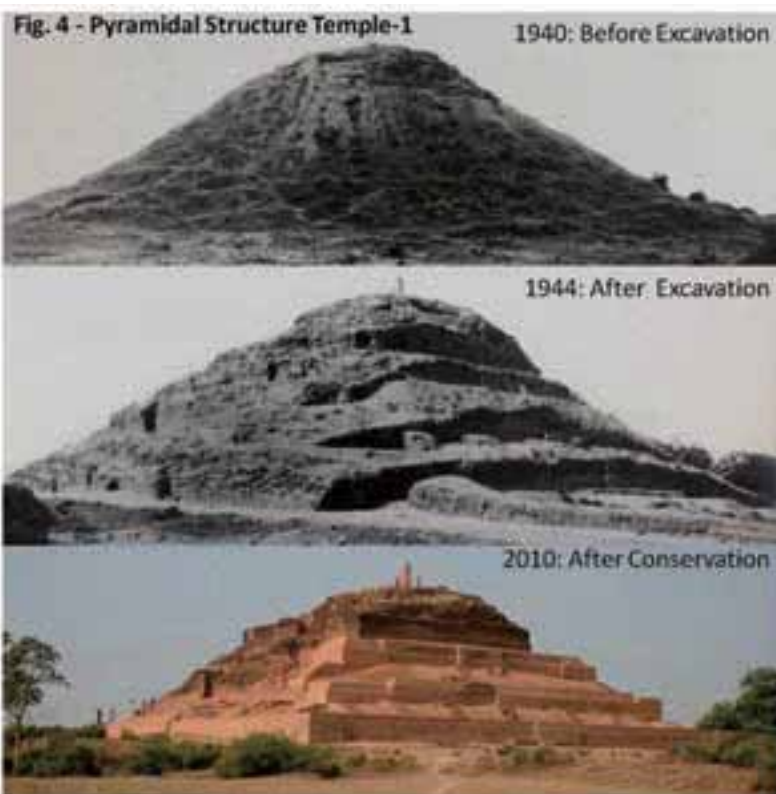




Fig. 6 - Stages of Conservation - 2010

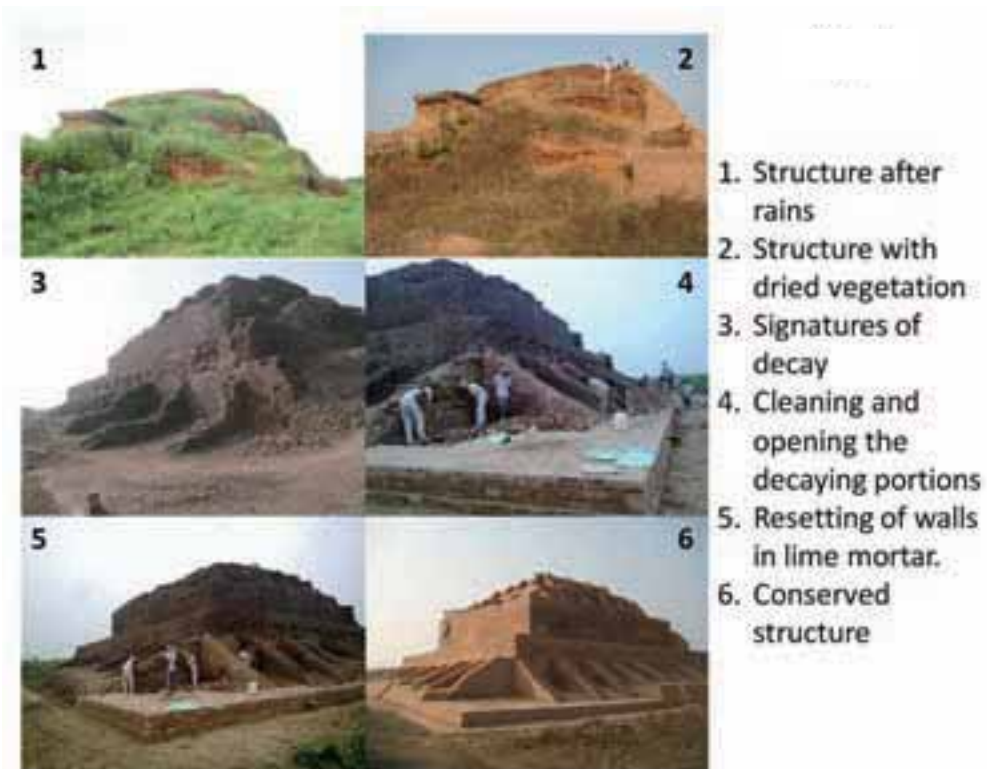


Fig. 7



Safeguarding of Cultural Heritages from Volcano Cold Lava Flood: Relocation of Lumbung Sengi Temple, Magelang Regency, Central Java Province, Indonesia

Mohammad Nasir Ridwan Muslim, *Section Head*

Directorate of Archaeological Heritage, Ministry of Education and Culture

The threat of cold lava disaster

Mount Merapi that erupted in the late 2010 is still a serious threat. In the earlier article published in *The Seventh Regular Report*, I reported the impact of the eruption of volcanic ash which covered the temple of Borobudur. According to the data from the Center for Volcanology and Geological Hazard Mitigation, Mount Merapi volcanic material had reached 150 million meters cubic before the eruption in the late 2010. The amount of volcanic material is expected to accumulate in the last 100 years. From the total amount of volcanic material, volcanic materials in a form of cold lava is still very little, and estimated to be less than 40%. At the time this article was written, the glide of cold lava continued and is expected to increase along with the coming of the rainy season in Indonesia with its peak in early 2012 (Source : Indonesian Meteorological, Climatological and Geophysical Agency).

The impact of cold lava flow from the eruption of Mount Merapi does not only cause human casualties and property damage, but also cause damage and threats to cultural heritage. One of the cultural heritage affected by a serious threat is Lumbung Sengi Temple.

Lumbung Sengi Temple is situated in Tlatar, Krogowanan village, subdistrict of Sawangan, Magelang regency, Central Java Province. Geographically, the temple is located 7°31'41.822" south latitude and 110°20'57.562" east longitude. The temple is located on the edge of Apu river which is a branch of the Pabelan river. The Pabelan river is located in the peak of Merapi within a radius of less than 20 km. Thus, it is highly prone to a cold lava

flow. Based on technical studies conducted in Central Java Heritage Office in February 2011, Lumbung Sengi temple is in dangerous and hazardous condition because of the serious threat of avalanche, therefore emergency rescue needs to be done.

Safeguarding of Lumbung Sengi Temple

Lumbung Sengi Temple is one of the important cultural heritage located in disaster-prone area, therefore the conservation efforts should also consider the preservation of the temple, security of the sites and weather factor. The implementation is conducted in three stages.

1. Short Term

The objective of Phase I is to transfer the temple to a safe place. The location was chosen by considering the potential expansion of the lava flow in Apu river, the accessibility, and the security of the temple stones. The new location of the temple is at a distance of ± 315 from the original location. The transfer is only temporary for 5 (five) years, considering that the flowing of volcanic material from Mount Merapi is still 2 years away. In order to quickly, properly and correctly relocate the temple, the transfer should refer to the principles of authenticity: the shape, materials, workmanship technologies and layout.

Some of the activities undertaken to transfer the temple include:

- Preparation

Preparation of transferring includes procuring equipment and working materials, land clearing, land equalization, and preparation of the temple foundation. Because the original location of the temple is near the river bank, with

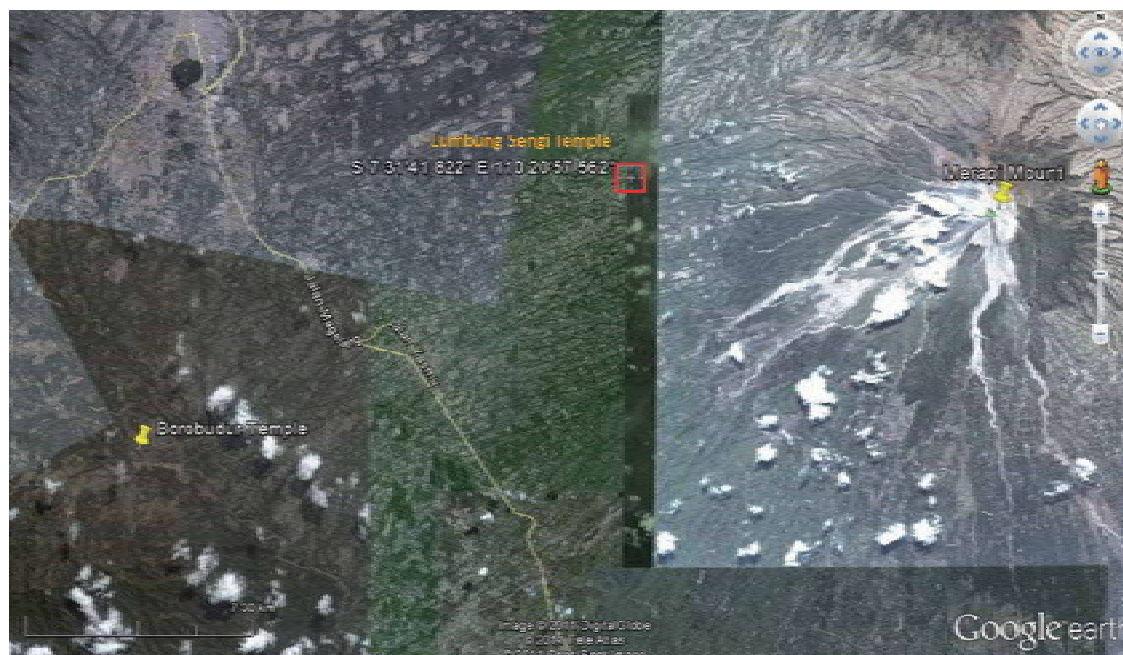


Figure 1. The Location of Lumbung Sengi Temple and Mount Merapi (source Google earth)

the displacement is manually conducted using the tools of wooden boards.

- **Measurement**

To reconstruct the temple to its original location, we need exiting map data and the detailed size of the building. Measurement includes mapping of 250,000 m² area, making three polygon points and detailed measuring of the temple.

- **Drawing**

The detailed measurements of the temple include a blueprint, cuts, details of the temple, soil stratigraphy, and grid map of the temple. Delineation is also performed during dismantling work with layer by layer. For each layer of dismantling, the horizontal arrangement of rocks and outside stones are drawn with a scale of 1:20 to facilitate the registration and the re-arrangement of the stone.

- **Dismantling**

Before the dismantlement, temple stones were marked to facilitate reassemblage. Disassembled parts are the roof covering as many as 3 layers, body parts of 16 layers, and the foundation parts as much as 3 layers. In dismantling the 10th stone layer at the center of the temple, there are sinks (box) measuring 1.2 m x 1.2 m with a depth of 1.2 m. The total volume of dismantled stone was 500 m³ of rock. The inner sides of the stone are composed of crude carvings (holes) and between square-well stone and stone filler there are soil filler and stone filler structures near the wall arranged consistently. The transfer has been completed within three months (September-November), by a total of 30 workers.

- **Technical Archaeological Research**

Excavation was conducted to find out the original foundation, the subgrade condition, and archaeological evidences. From excavations, we found round stone structure (boulder) as much as 8 layers with a diameter of 9 cm. From the depth of 255 cm, bones of deer teeth and femur were also found

- **Stone Arrangement in temporal relocation**

The dismantled stones were grouped according to their parts (a roof, a body and a base). Then the stones of this temple will be fully restructured at a predetermined location. Thus, building pads need to be prepared for land equalization and base enforcement. Rearrangement of the stones of the temple is planned to complete in mid-December 2011.

- **Conservation**

Before the temple stones are rearranged, the stones of the temple will be cleaned and mechanically repaired. Repairing process is based on the research conducted prior to and during dismantling. This activity is also carried out contour soil sampling of the eastern cliffs of the temple facing Apu river. Furthermore, analysis of stone samples, stone filler and soil filler is conducted and information of sand content, hardness, water content, porosity and compressive strength is gathered.

2. Medium Term

The medium-term target is to improve the basic infrastructure and to control erosion of Apu river banks around the site of the temple. As a result of cold lava flood in 2010, physical infrastructure of the Tatlar dam collapsed, the Apu Check dam in the upstream section was covered by the material of volcanic lava, the temple on a cliff was destroyed, and the Apu river was eroded.

Improvements of infrastructure and environment are planned after the volcanic material released (2013). The infrastructure repairing process will take two years for completion. Improvement works are carried out in cooperation with the stakeholders (Ministry of Public Works, Ministry of Forestry and the local government).

3. Long Term

The long-term target is to replace the temple to its original location, where the basic stabilization and river banks are secured. In addition, the necessary arrangement of Lumbung Sengi Temple will be conducted.

The series of rescue activities of the temple are accompanied by complete documentation both visual (photos, videos, pictures) and literal. Rescue activities are conducted in an integrated manner by Central Java Archaeological Heritage Office (BP3 Central Java), Archaeological Office of Yogyakarta, the experts from the University of Gajah Mada in Yogyakarta, the Government of Magelang Regency and the local community.

Closing

Global climate change has affected Indonesia during the shift on the rainy season. Rainfall in this year started in October 2011 and is expected to reach its peak (extreme) in early 2012. Meanwhile, the amount of volcanic material is still a lot. So, disaster preparedness is needed to face the cold lava flood. Rescuing process was done by temporarily moving the temple building to a safe location to avoid the danger of damage. Displacement of the temple was referred to the rules of cultural heritage preservation and restoration of standard operating procedures of cultural heritage. In addition, preparedness has been done by the Government, among others by creating early warning systems and disseminating threat of cold lava volcano.

Source of the Photographs : Central Java Archaeological Heritage ☐ ☐ ce



Figure 2. Map of Lumbung Sengi Temple



Figure 3. Bridge / Check Dam interrupted by a stream of cold lava and Mount Merapi in the background



Figure 4. Apu River conditions after the cold lava flood



Figure 5. Apu River viewed from the Lumbung Sengi Temple



Figure 6. Conditions of the temple before dismantling



Figure 7. Mapping activities prior to removal of the temple



Figure 8. Marking activities / stones registration before dismantling



Figure 9. Manufacturing stone sliding boards made of wooden



Figure 10. Dismantling activities by using board sliders; stones are tied to prevent damage.



Figure 11. Temporary square-well located at the center of the building



Figure 12. The temporary shelter at the relocation site



Figure 13. Examination of excavations prior to lifting up the findings from 255 cm depth



Figure 14. The molar teeth of deer beneath the temple



Restoration of the Teh Bunga House, George Town, Penang, Malaysia

A Ghafar Bin Ahmad, Deputy Commissioner of Heritage

Department of National Heritage, Ministry of Information, Communications and Culture

Introduction

Built in 1893 the Teh Bunga House is an outstanding building that embodies the spirit, fabric, character and lifestyle of the early communities of George Town, Penang, Malaysia. The building is aptly named as *Teh Bunga* (or chrysanthemum tea) as its yellowish-colour tone resembles that of a brewing tea. Located on Hutton Lane, the building is commonly referred to as *Rumah Jalan Hatin* (or house of Hutton Lane) by the Malay community of Penang. During its heyday in the mid-19th century this building was home to many generations of the *Jawi Peranakan* of Penang Malay community, who were pioneering merchants engaged in spice trading during the early days of Penang. The *Jawi Peranakan* refers to the local-born descendants of mixed Indian-Muslim and Malay ancestry, well-known for their wealth and elitist social status. Due to its immense architectural and cultural values, the Teh Bunga House was declared as a Heritage building on the 6th of March 2010 under the National Heritage Act 2005.

Architectural Significance

The design of the Teh Bunga House reflects a timeless Sino-Malay influence combining the Malay Limas roof style with unique Chinese elements (fanlights and glazed wall tiles) which is typical of the Sino-Malay architecture of the period. This exclusive building has classical columns, marble and terracotta floor tiles, clay roof tiles, and timber doors and windows with intricate design. The moon and star motif on the front façade symbolises the religion of Islam of the original owner.

The two-storey building consists of the main building, a connecting section, kitchen block and a garage. The main building comprises a porch, living room, four bedrooms, family area and an upper balcony. While the kitchen block has a kitchen work area, worker quarter, shower, toilet, food storage area and open area. The garage located next to the main building has a living quarter, two horse stables and parking for horse carriages. A dilapidation survey conducted on the building, prior to restoration works, diagnosed serious problems affecting the building exterior and interior which require major restoration works including repair of the roof tiles, wall plaster, timber structures and elements, and floor tiles.

Restoration Works

The Department of National Heritage, Ministry of Information, Communications and Culture, Malaysia commenced the restoration works of the Teh Bunga House on the 23rd of December 2008 and work was successfully completed 8 months later on the 22nd of August 2009. The restoration works involved restoring the building back to its original design, form and façade, taking into account its historical and architectural significance. The restoration works involved a total

cost of RM 1,583,500 (USD 504,708) received from the Federal Government through the Department of National Heritage.

V-shaped Roof Tiles

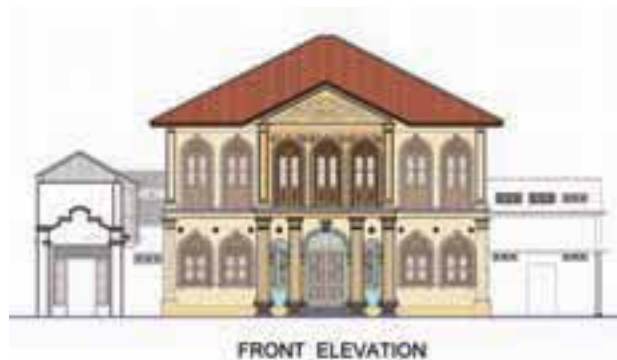
The restoration on the V-shaped roof tiles (also known as the Indian tiles) was carried out using appropriate and proven conservation methods and techniques. The V-shaped tiles were dismantled and stacked away carefully to avoid fracture and damage. The useable tiles were cleaned with soft-bristled brushes, before they were treated and coated with a water repellent acrylic layer to prevent moss and fungus growth, and rain water seepage. The treated V-shaped tiles were fixed onto the roof trusses in reverse overlapping rows. The original roof tiles of the main building were salvaged for use on the kitchen roof, while the new roof tiles for the main building were obtained from a local source. Replacement tiles of similar design and material were used in this work in parallel with the conservation principles of minimum intervention and authenticity.

Wall Plaster

Damaged plaster on the affected walls were documented



A dilapidation survey conducted on the Teh Bunga House, prior to restoration works, diagnosed serious problems affecting the building exterior and interior



The design of the Teh Bunga House reflects a timeless Sino-Malay influence combining the Malay Limas roof style with unique Chinese characters such as fanlights and glazed wall tiles.

and marked for remedial treatment. Samples of lime plaster were extracted from the affected walls to determine the composition of the original materials used. The new wall plaster was matched as closely as possible to the original composition in order to retain the authenticity of the building.

Timber Structures and Elements

The timber structures and elements of the building including fanlights, windows, doors and floors were badly damaged and need to be restored. The shape, size and species of the original timber were documented before they were treated to prevent termite infestation. The damaged timber was replaced with new timber of similar design and size to retain the original building design and authenticity. All new timber structures and elements were of the same hardwood species which is Chengal. All new timber structures and elements were tagged and labelled accordingly using metal plates for identification and future references.

Terracotta Tiles

Terracotta tiles on the floors were inspected to determine the nature and extent of damage. Floor tiles which are still in good condition were documented and retained. While the damaged floor tiles were replaced with new terracotta tiles of similar type, material and size as the original. All terracotta tiles were treated with damp-proof course to protect the floors from dampness and damages.

Conclusions

After all restoration works were completed, on the 6th of March 2010 the building was officially opened by the Minister of Information, Communications and Culture, Malaysia. A brass plaque was then placed by the Minister at the front wall to commemorate the completion of the restoration project. The Teh Bunga House now functions as the Gallery of Penang Malay Heritage and is open daily for visitors. Artifacts and special items related to the Penang Malay community are on display here to showcase the unique heritage of the Jawi Peranakan community. The section at the back of the building is turned into the Department of National Heritage branch office (Penang Office).

The restoration of the Teh Bunga House highlights another successful heritage endeavor undertaken by the Department of National Heritage. Once again, good communications and collaborations among all parties involved in the restoration works are the key factors in ensuring a fruitful reward. All stakeholders involved in the project including the federal, state and local authorities; and other professionals had played their roles effectively so that all works were completed satisfactorily. As the guardian of national treasures, the Department of National Heritage will continue to support all efforts in conserving heritage properties for the future generations of Malaysia.



The Teh Bunga House before and after restoration



The original roof tiles of the main building were salvaged for use on the kitchen roof, while the new roof tiles for the main building were obtained from a local source.



Damaged terracotta floor tiles at upper floor were replaced with the new ones of similar type, material and size as the original.



Timber floorboards at upper floor were carefully removed, inspected and replaced with new timber of similar size and species to retain the building authenticity.



View of the building interior at upper floor after restoration.



View of the main building and its garage (left) after restoration. The front section of the garage was converted into toilets for the visitors.



Conservation and Management of Lumbini, Birthplace of Lord Buddha; World Heritage Property, Lumbini, Nepal

Suresh Suras Shrestha, *Archaeological Officer*

Department of Archaeology, Ministry of Federal Affairs, Constituent Assembly, Parliamentary Affairs and Culture

Lumbini, the Birthplace of Lord Buddha, is about 300 km southwest from Kathmandu, the capital city of Nepal. Many Buddhist literatures mention that Lumbini was a beautiful recreational garden and it was known as *Lumbini Vatika*, *Lumbini Upavana*, *Lumbini Chittalata vana* etc. in ancient times. It indicates that Lumbini was a garden or forest, where Lord Buddha was born and the Ashokan Pillar Inscription, Marker Stone are the evidences for proving it.

Lumbini was hidden for a long time in the history and it was only rediscovered in 1896. Then many excavations, restoration and conservation works have been going on. On the same way, Government of Nepal and UNESCO has signed on the agreement for the preservation of Lumbini and launched a three year project named as “Strengthening Conservation and Management of Lumbini, the Birthplace of the Lord Buddha, World Heritage Property” The project launched in July 2010, financially supported by Japan Funds-in-Trust and Government of Japan through UNESCO World Heritage Centre.

The three-year project was led by Professor Yukio Nishimura of Tokyo University, Japan. The project was established in 2010 to address a number of outstanding issues and challenges facing Lumbini, which consist of deterioration of the Marker Stone, Ashokan Pillar and ruins contained within the new Maya Devi Temple to the inadequately understood and mapped associated archaeological remains both within the property and in the adjacent buffer zone.

There is a need to identify the presence or absence of archaeological deposits invisible below the surface, so that appropriate placing of pilgrim facilities may be made without damaging valuable archaeological resources. There is also a pressing need to prepare a plan for the area immediately outside the levee of the Sacred Garden

in order to ensure that other developments within the master plan are implemented in compatibility to the World Heritage Property.

The ‘Strengthening the Conservation and Management of Lumbini, the Birthplace of Lord Buddha’ Project has five integral components:

1. The urgent conservation of the Ashokan Pillar, Marker Stone and Nativity Sculpture;
2. Identifying, evaluating and interpreting the physical archaeological signature of Lumbini;
3. Review the present state of the Sacred Garden in respect to the master plan formulated by Kenzo Tange;
4. Establish an integrated management process with a view to preserve Lumbini’s Outstanding Universal Value in the long term;
5. Improve the knowledge and skills of conservation personnel and archaeological staff of the Lumbini Development Trust and the Department of Archaeology, Government of Nepal.

For the first season of field work in Lumbini in January 2011, a team of archaeologists from the Department of Archaeology, Government of Nepal, and Lumbini Development Trust have begun work with a group of international archaeologists on a UNESCO mission to the World Heritage site of Lumbini, Nepal - the birthplace of Lord Buddha. The team was directed by Professor Robin Coningham, Pro-Vice-Chancellor and Professor of Archaeology at Durham University in the UK and Mr Kosh Prasad Acharya, former Director-General of the Department of Archaeology, Nepal and co-ordinated by UNESCO. The team was focusing on the evaluation and interpretation of three main areas of the World Heritage Property of Lumbini: The Maya Devi Temple, the Sacred Garden and the Village Mound.



Augering in the Village Mound, January 2011



GPS mapping in Lumbini, January 2011



Conducting geophysics survey in Sacred Garden area, Lumbini, January 2011

In the Temple, the archaeologists temporarily removed the modern protective fills of the earliest brick-built Temple and clean the original surfaces in order to take scientific samples for dating the monument and investigating its character and sequence of development. The team also mapped the other monuments surrounding the Temple and conducted non-intrusive geophysical survey to investigate the presence of additional monuments not visible on the surface. The team excavate and surveyed the Village Mound to the southwest of the Maya Devi Temple, allowing for the character and sequence of development of South Asia's earliest named village, *Lumbini game* as named on the Ashokan Pillar, to be explored.

After the completion of the first year of archaeological investigations the outcomes will be:

1. the identification and evaluation of the different levels



EDM mapping in Lumbini Sacred Garden area, January 2011



Excavation in Lumbini Village Mound, Lumbini, January 2011



Section drawing of excavated (1992-96) trenches inside Maya Devi Temple, January 2011

- and phases of the Maya Devi Temple;
2. the reconstruction of the early natural and cultural layers of the Sacred Garden and the early natural and cultural layers of the *Lumbini game*
3. the mapping of sub-surface archaeological deposits in the Sacred Area as part of an integrated GIS database to ensure their long-term management and protection.

In the mean time, a team of architects from Tokyo University, led by Professor Yukio Nishimura also started its first season field work in Lumbini on reviewing the master plan prepared by Professor Kenzo Tange.

In February 2011, the Chemical Conservation Team, led by Dr. Costantino Meucci conducted a two-week conservation training to make familiar and produce trained manpower within the national personnel from Lumbini Development Trust and Department of Archaeology, Nepal. Six national staff were trained so that they can be involved in further conservation of Nativity Sculpture, Marker Stone and Ashoka Pillar. After the training session, the team was involved in conservation activities. Effort for the establishment of integrated management plan is also going on smoothly in coordination with Mr. Kai Weise, Consultant of UNESCO Kathmandu Office.

In this way, the three-year project has launched and its work has been going on continuously for the strengthening the conservation and management of Lumbini, the birth place of Lord Buddha World Heritage Property in Lumbini Nepal. This is the second year of the project, and all of the activities for the year were also sanctioned by second meeting of International Scientific Steering Committee (ISSC) in July 2011.



Extracting samples for scientific test for OSL dating, January 2011



Worlds Apart - Celebration of Japanese Culture in a New Zealand Port Town in 1892: Preservation of a Japanese Themed Mural

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Introduction

New Zealand's European/Pakeha colonial history is short when compared to other European colonial countries. New Zealand/Aotearoa was first discovered and colonised by Polynesians in ca. 1300AD who then developed their own unique culture known as the Maori culture. Although Dutch explorer Abel Tasman briefly visited New Zealand in 1642, he did not make landfall and so European/Pakeha colonisation did not occur until after Captain James Cook made contact with Maori in 1769. Substantial colonisation then only commenced in the early 1800s. The European/Pakeha colonial built heritage period for New Zealand therefore only dates from this time with the oldest surviving building being the wooden Kerikeri Mission House (Kemp House) in Northland built in 1821-22 and the oldest stone building being the neighbouring Stone House built 1832-36. The archaeological investigation of New Zealand's built heritage from the 19th century through buildings archaeology is hence important in understanding this period of New Zealand's/Aotearoa's history.

Port Chalmers near Dunedin was a major New Zealand port for domestic and international trade during the last half of the 19th century community (Figure 1). Government and public buildings were therefore constructed during this period to support the port activities and local. New Zealand in the 19th century was geographically and thus culturally isolated from the rest of the world with knowledge of foreign cultures, other than European, only coming through the usual communication channels of the day such as by newspapers, magazines, mail, trade and through contact with foreign people who visited the country for business and entertainment purposes, such as Chinese and Japanese circuses. The dominance of the European/Pakeha population meant that the public celebration of an unfamiliar culture, particularly Asian, was a novelty. Some New Zealander's were familiar with Chinese culture through communications between European/Pakeha and Chinese on the Otago/Southland goldfields, and some were familiar with the Japanese culture, such as through goodwill visits to New Zealand by Japanese naval ships which commenced in 1882 (these visits often including fireworks displays and the opening of the ships to the public (Figure 2)), but the majority of New Zealander's viewed Asian cultures as mysterious. Therefore to have a substantial Asian themed mural painted and mounted on the walls of a major Port town community hall during the late 19th century was an event of some note.

This report describes how a Japanese themed mural dating from 1892 was discovered during the archaeological investigation of a late 19th century community building, known as the Garrison Hall, prior to demolition in Port Chalmers near Dunedin. The steps taken to the preserve this unique and nationally important cultural artefact/

artwork for future public display is also briefly explained as is the importance of such a find for New Zealand's colonial history.

The Archaeological Authority Process and Buildings Archaeology in New Zealand

The New Zealand Historic Places Trust ("NZHPT") is New Zealand's lead heritage advisor and is entrusted to protect and manage archaeological sites under the Historic Places Act (1993). One of its roles is to administer the Archaeological Authority process where the NZHPT can grant an Archaeological Authority for an archaeological site to be damaged, modified or destroyed. An archaeological site is defined under the Historic Places Act (1993) as a location of human activity which pre-dates 1900AD and which can be investigated through archaeological methods. Pre-1900 buildings are included as archaeological sites and because of this the demolition of such buildings can be managed through the Archaeological Authority process. This ensures important and historically significant buildings can be investigated in a controlled manner before, during and after demolition so information about their history can be revealed and recorded. Considering the short period of European/Pakeha history in New Zealand, buildings archaeology is crucial to understanding New Zealand's early colonial built heritage.

The demolition of the Garrison Hall was managed under the Archaeological Authority process and it is because of this that the 1892 Japanese themed mural was discovered.

The Building of the Garrison Hall

The Garrison Hall was built in 1887 for use by military and naval volunteers. Williams (2011a:5 & 6) notes:

"Volunteering began in Port Chalmers with the establishment of the Port Chalmers Naval Brigade in 1864. Captain Thomson was commanding lieutenant, with Captains Bain and Goldie as petty officers and J.B. Robertson as drill instructor. Initially drills were held in a store, and later in the Royal Assembly Rooms. Membership quickly grew to 130, and the officers received commissions from Sir George Grey on 25 August 1865 (Church 1994: 31). In October of the same year the Port Chalmers Rifle Corps formed after a meeting at the George Hotel. The Rifle Corps was short lived and mostly absorbed by the Navals, for marksmanship was an important feature of their programme (Church 1994: 31).

In 1870 an artillery unit known as 'L' Battery was established. Two 32lb Armstrong Guns were mounted at Battery Point overlooking the Port Chalmers wharf area.

The Garrison Hall was built in 1887 as a 'drill shed' to cater for both volunteer companies. The two units

amalgamated under Captain W.J. Waters' command on 23 July 1894, and renamed the Port Chalmers Naval Artillery Volunteers."

Volunteers were essential for the defence of New Zealand due to its very small permanent population and the volunteers were seen as crucial by the Government of the 1880s because of the 'Russian Scare' where it was believed that the possible expansion of Russian Empire at this time may include easy targets such as New Zealand.

The drill hall when built had a gabled roof, measured 20.4 m long by 15 m wide and had side walls measuring 4.2 m high. At the time, the hall was the largest covered open space for public use in Port Chalmers and was therefore in demand for public events from the outset of its construction. Its opening was welcomed by a carnival and during its 124 year life historic records show that it was a major community asset with it not only being used for military/naval volunteer purposes, but also for many public meetings, protests, carnivals, bazaars, sports events etc. right up until its demolition (Williams 2009; 2011a:8 - 10).

Discovery of the Japanese Themed Mural

In 2010, the Dunedin City Council applied to the NZHPT for an Archaeological Authority to demolish the Garrison Hall as the building had become unsafe and was too costly to repair. The NZHPT granted an Archaeological Authority for the demolition with conditions requiring the building to be systematically investigated and deconstructed by hand before demolition so as to retrieve information about the building not gleaned from historic records (Archaeological Authority 2010/112). In Figures 3 to 6 are shown views of the exterior and the interior of the hall prior to the intrusive buildings archaeology investigation.

The initial archaeological and built heritage assessment of the building did not indicate that a mural may be present behind the interior wall linings. The walls of the building were believed to be most likely of standard 19th century construction for a wooden building of this type, age and use i.e. interior timber wall linings, timber framing and exterior weather board cladding. It was known that the interior of the building was originally not lined when constructed in 1887 and that linings were added after

1894 (Williams 2011b:5).

When the buildings archaeology specialists, Guy Williams and Associates, began to systematically remove the interior wall linings on the north wall of the building to investigate the construction technique, timber species used etc., they discovered behind the first lining timbers removed a small area of what appeared to be painted linen tacked to the timber framing. As further linings were removed, the extent of the painted linen revealed itself, resulting in the north wall of the building being mostly covered in a mural depicting a rural and sea landscape (Figures 7, 8-11). Investigation of the south wall uncovered further sections of a rural and sea landscape mural, though substantially less of the once full extent of the artwork on this side of the hall was preserved (Figures 7, 12-15). Once all linings were removed from all four walls of the hall, it was clear that on the north and south walls of the hall remains of a mural of an Asian inspired landscape was preserved, the landscape being most likely of Japanese origin. The mural was found to have been painted on long sheets of cotton linen measuring 1.8m wide and 3.6m long which had been tacked directly onto the interior wall framing of the hall. Tempera type water based paints had been used to paint the mural probably sourced from dry powder prior to mixing with water (Williams 2011c:2-4).

The Mural's Origins and its Recovery

Research on the mural in historic records by the buildings archaeologists succeeded in uncovering an *Otago Daily Times* newspaper article from 1892 which identified what Asian country landscape was being depicted, when the mural was painted and why. This historic record also meant that the missing pieces of the mural could be identified. The newspaper article noted:

"TH JAPA' S VILLA" AT PORT CHALMERS. The Port Chalmers Garrison Band have opened a varied and excellent entertainment in the Garrison Hall, which has been fitted up to represent a Japanese village. Great credit is due to one and all of the promoters, whose success was manifest on Saturday evening when the carnival was opened in the presence of fully people. The interior of the hall the largest building in Port Chalmers had been very tastefully decorated by Messrs D. A. De Maus and D. Marr, while the entire sides and ends of the building



Figure 1. Location of the Port Chalmers near Dunedin



Figure 2. Two small children visiting the Japanese naval ship the Iwate in 1916. Goodwill visits of Japanese naval vessels to New Zealand from 1882 to the 1930s were regular and were a public event. (source: history from Tessa Copland. 'Japanese', Te Ara - the Encyclopedia of New Zealand, updated 1-Sep-11, URL: www.teara.govt.nz/en/japanese/1/3/1/; image from Alexander Turnbull Library, Reference: C-27791-1/2).

are covered with artistically painted scenery of the most interesting parts of Japan, from the pencils of Mr D. O. Robertson long a resident in that part of the east assisted by Mr D. Fletcher and a staff of assistants. Indeed, it is doubtful if anything of the kind has been presented to a New Zealand audience before. On the left wall of the hall a scene on the Island of Isumu is depicted, with a bridge crossing a small stream leading to a Sinto temple, which is erected on the summit of a cliff, at the foot of which nestles a snug little watering place the adjacent islands stand boldly out, while several trading junks are excellently depicted, one of them hauled up on the beach for repairs. On this side of the building a Japanese house with its interior is also shown. At the upper end of the hall an old feudal castle, standing boldly on the brow of an island, has been designed by Mr Robertson from memory, and it reflects very great credit on his artistic taste. In the centre of the hall there is a pagoda from which the ladies take part in the entertainment make their exits and entrances attached to this is a very prettily-designed garden scene, with mountains in the background and an arm of the sea intervening.

On the right hand side of the hall is an excellent representation of the great sacred mountain Fujiyama, surrounded by a range of smaller hills. A very large junk stands prominently forward in the middle distance of this part of the scenery, while to add to the realistic part of the interior a Japanese house has been shown with its blue and white tiled walls and red tiled roof. The gallery has been artistically fitted up under the direction of Mr D. Marr, and a really comfortable lounging-place is to be found there, from which persons desirous of escaping from the crowd in the lower hall can comfortably overlook all that is going on, and partake of light refreshments, which are dispensed at moderate rates by the Misses J. Ignall, Smith, Rutherford, Fullarton, Ranklyn, M. Kelly, and Pickard.

All kinds of pretty and useful articles are exposed for sale on six large tables in the hall. Each of these tables is sheltered by a huge Japanese umbrella, and the fair vendors seemed to do an exceedingly good trade. The ladies who preside over and assist at these stalls are the Misses Moir, Tulloch, L. Osborne, A. Clark, H. Kelly, J. Smith, C. Smith, Cashman, A. Bell, J. Oddy, Crawford, Donald, Fletcher, Eoman, J. Fletcher, Hare, Buchan, and J. Clarke.

At p.m. the aikorai Band, under its conductor, Mr Stratton, assembled in Custom House Square, and headed a torchlight procession through the principal streets of the town, in which Captain Leech, took a prominent part, the band playing a choice collection of popular music. On reaching the hall the procession entered and took up a position, while the gay dresses of the lady stallholders and of a host of little people, who have been trained to go through some quaint Japanese dances by Mr Marr, made the place a blaze of colour.

It had been arranged that Mr J. Mills, M. H. R., should formally declare the carnival open, but, owing to the pressure of events in Wellington, he was prevented from doing so. He, however, telegraphed to his Worship the Mayor Mr J. Allen, explaining the cause of his absence, and requesting that gentleman to act for him, at the same time forwarding a cheque for £22s in aid of the band funds.

The Mayor expressed his pleasure at seeing so numerous an audience present, and complimented the committee of management of the completeness of their arrangements. It spoke well for the band, his Worship said, that they had succeeded in reducing the debt incurred for their instruments, some £1,000, down to between £500 and £600, and he trusted the result of the carnival would be such as would enable them to entirely free themselves from debt. Music, as they all knew, was an important factor in the world's concerns, and the Port Chalmers Garrison Band were deserving of the very greatest credit for their efforts in catering for the public amusement. He had very great pleasure in welcoming the numerous assemblage to the carnival, and formally declaring it open. Cheers.

Mr D. A. De Maus, the musical director, thanked his Worship for his presence and patronage, and after the aikorai Band had played a selection of music, the musical burletta, "A Broken Piece of China," was produced. In the burletta, the opening chorus, "We are ladies of Japan," was excellently rendered. The music is sparkling and the words very catching. Miss J. Ignall, who took the part of Myama, Prince Satsama's daughter, did remarkably well throughout, and her solo, "My love is vain," was an excellent piece of vocalisation. The other young ladies also acquitted themselves remarkably well and Mr De Maus may safely congratulate himself on the success of his little musical sketch.



Figure 3. The facade of the Garrison Hall in an undated photograph (left) and prior to demolition in 2011 (right). The stucco render to the facade was applied in the late 1950's (source: Guy Williams & Assoc's).

During the evening the stallholders did a brisk business, and it is expected that a very profitable week will be the result of the band's venture." *Otago Daily Times*, October 1 - 2: .

The description of the mural from the *Otago Daily Times* describes it as being *"from the pencils of Mr D. O. Robertson"*. David Ogilvie Robertson was a well known painter in Port Chalmers at the time and he lived in Japan for two years from 1871 to 1873, returning to New Zealand at the age of 25 after his father died. He travelled to Japan again at some time prior to the mural being painted to visit his father's grave in the foreigner's cemetery in Yokohama. While there he sketched various Japanese scenes (Figures 16 to 17) (Williams 2011a:13 to 16). It is clear that the mural was based on Robertson's sketches but unclear whether he actually took part in the creation of the mural, though being a resident of Port Chalmers and considering the skill of execution, it is quite possible he had some direct involvement.

Prior to removal of the mural, a number of heritage, art conservator and art history specialists advised on how the mural should be recovered and how much of the artefact should be retrieved. A decision was made that all of the surviving pieces of the mural were important to recover as, even though some sections appeared poorly preserved, only after close analysis of the artefact in totality in a conservation laboratory could preservation decisions be made based on better knowledge of the mural's condition. This approach also meant that decisions on the future of the mural would not be made in haste as the hall was required to be demolished as soon as possible.

In Figures 18 to 21 can be seen some of the process of the recovery of the mural by Guy Williams & Assoc's, Murray Robertson and Art Conservators Jenny Sherman (Dunedin City Council Art Gallery) and Marion Mertens. Close views of the mural were photographed at high resolution by professional photographer Gerard O'Brien before the artefact/artwork was carefully taken down. Each linen panel of the mural was gently cleaned by a soft dry brush and vacuum on the back during removal and then the painted side was cleaned using this method once it was laid out face up on a Tyvek cloth sheet after recovery so as to remove obvious contaminants only. The painted side of the panel was then covered by a Tyvek cloth sheet and rolled onto a 300mm diameter cardboard tube, which had been pre-wrapped in Tyvek. The panels were then un-rolled in a warehouse and let to dry for three weeks under controlled atmospheric conditions, re-

rolled, and then treated with Methyl Bromide treatment prior to storage at the Settlers Museum in Dunedin (Williams 2011c:1-4b).

The Future of the Mural

The Japanese themed mural originally covered all four walls of the Garrison Hall in 1892 but today only incomplete sections of the original remain. However, the preserved sections together with the detailed historic account of its creation makes this cultural artefact highly significant to New Zealand archaeology and history as it illustrates how two different cultures a world apart during the 19th century were brought together by a small European community group in a manner best understood by the people of that time. The discovery and recovery of the mural also illustrates the importance of buildings archaeology in New Zealand even though the European/Pakeha built heritage period is short.

The mural is now in storage in a controlled environment at the Settlers Museum in Dunedin. The challenge for the future is to source funds for the conservation work on the mural and to prepare it for presentation to the public 119 years after its creation.

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Figure 4. Exterior photographs of the hall (south, north and west/back walls) showing its weather board construction and alterations over time, such as pressed steal cladding replacing the weatherboards on the south side of the building and the lean-to added on to the west (back) wall (source: Guy Williams & Assoc's).



Figure 5. Interior views of the hall looking west (left photo with the north wall on the right) and looking east towards the entrance (source: Guy Williams & Assoc ō).



Figure 6. The north wall (left) and south wall (right) before removal of the linings (source: Guy Williams & Assoc ō).



Figure 7. The Japanese themed mural in-situ as revealed behind the 20 m long north (top photograph) and south (bottom photograph) walls of the Garrison Hall during archaeological investigation of the structure prior to demolition (photographs: Gerard O'Brien).



Figure 8. Close view of a series of linen panels on the north wall section of the mural showing a junk in the water in front of rolling hills and mount 'Fusi Yoma'. Presumably the newspaper article of 1892 meant Mt. Fuji rather than 'Fusi Yoma'. (photograph: Gerard O'Brien).



Figure 9. Closer view of the junk and hills seen in the lower left corner of Figure 8.



Figure 10. High resolution picture of the junk seen in Figure 9 (photograph: Gerard O'Brien).



Figure 11. Close view of a series of linen panels on the north wall section of the mural showing a Japanese house (photograph: Gerard O'Brien).



Figure 12. Close view of a series of linen panels on the south wall section of the mural depicting a 'bridge crossing a small stream leading to a Sinto temple' on the 'Island of Kinsu' [Kyushu?] (photograph: Gerard O'Brien).



Figure 13. Close view of a series of linen panels on the south wall section of the mural showing a bay by the 'Island of Kinsu' [Kyushu?] with small Japanese houses on the shore (left of photograph) (photograph: Gerard O'Brien).



Figure 14. Closer view of Japanese houses on the shore of the bay seen in the lower left side of Figure 13. (photograph: Gerard O'Brien).



Figure 15. High resolution picture of one of the Japanese houses seen in Figure 14 (photograph: Gerard O'Brien).



Figure 16. "Hut in the Country Japan", 1876. David O. Robertson. From "Rough sketches and photographs of oil paintings by D. O. Robertson" held at Hocken Library, Dunedin. (Research source: Guy Williams & Assoc's).



Figure 17. Sakura Japanese Hotel Yokohama, ca. 1876? David O. Robertson. From "Rough sketches and photographs of oil paintings by D. O. Robertson" held at Hocken Library. (Research source: Guy Williams & Assoc's).



Figure 18. Recovery of the mural. Scaffolding enabled careful removal and cleaning of the back of the mural during recovery. On the right of the photograph can be seen the conservators working on panels of the mural on the floor (source: Guy Williams & Assoc's).



Figure 19. Cleaning dust and grime from the back of the mural during recovery (source: Guy Williams & Assoc's).



Figure 20. The work area during recovery (source: Guy Williams & Assoc's)



Figure 21. Rolling of a panel of the mural in Tyvek cloth after initial cleaning in preparation for transport and treatment (source: Guy Williams & Assoc's)



Heritage Structures in Two Manila Cemeteries

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Introduction

In 2008, as part of my Archaeology 241: Mortuary Analysis in Archaeology (at the University of the Philippines) we visited various cemeteries around Manila and in neighbouring provinces. The main objective was to understand attitudes towards death through material representations in cemeteries. One outcome of the visits was the discovery of old mausoleums, cemetery chapels, old tombstones and graveyards. Although most of these are now in dilapidated condition, we feel that these old buildings, memorials, and structures are significant to Philippine history. In this short report, I will describe the structures found in some Philippine cemeteries and argue why they should be treated as cultural properties. I will draw from M.H. Unakul's (2010) talk how to determine the heritage values of structures and identify the risks to these cultural properties. I shall end by calling for the protection of key heritage buildings in Philippine historical cemeteries.

Cemeteries in the Philippines

Prior to European contact in the 1500s, ancient Filipinos bury their dead in many ways. Intact bodies or bones were placed in jars, wooden coffins, or wrapped in mats or blankets, then the receptacles deposited in caves, buried under houses or within the settlement, or even placed in trees (Barretto 2000, 2002). Burial locations are often determined by the nature of death (Barretto 2000). Spanish occupation of the Philippines have resulted in reorganising the indigenous settlement following the Laws of the Indies, issued by King Philip II in 1573, including the disposal of the dead (Dakudao 1998). The centre of Spanish-established towns was the church, which served as the new burial location. Elites were placed inside the church and non-elites were buried in the churchyard (Dakudao 1998). By 1789, a Royal ordinance was issued ordering the creation of cemeteries primarily because churches could not accommodate the increase in death due to cholera epidemics of the 18th century (Dakudao 1998). A separate document dated 1689 indicated that a detached cemetery in Bohol was already established because of similar reasons (Dakudao 1998). During the Spanish Period, churchyards and cemeteries were reserved for Christians; people of other faiths were buried in separate plots. Under the American rule from 1898, public cemeteries accommodated burials of individuals regardless of ethnic or religious affiliations (Dakudao 1998). In addition, the creation of public cemeteries was in response to issues of health and sanitation that was due to victims of battles between Americans and Filipinos and those who died of epidemics. In this paper, I shall focus on two Manila cemeteries. The first one is the La Loma Catholic Cemetery created in 1884 and the Manila North Cemetery established in 1904.

Assessing the heritage value of key areas in the Manila North Cemetery and La Loma Catholic Cemetery

According to Unakul (2010), there are several ways to assess the heritage value of a site or monument. These values include aesthetic, artistic, architectural, anthropological, historic, economic, scientific, and social/spiritual. Similarly, the Philippine Presidential Decree 374, defines cultural properties as 'old buildings, monuments, shrines, documents, and objects which may be classified as antiques, relics, or artefacts, landmarks, anthropological and historical sites, and specimens of natural history which are of cultural, historical, anthropological, or scientific value and significance to the nation'. By applying the criteria adopted by Unakul and the Philippines, I will discuss why key areas in the Manila North Cemetery and the La Loma Catholic Cemetery should be treated as cultural properties and heritage areas. I have grouped these key areas into group plots, politicians' tombstones, mausoleums, and religious structure.

Established in 1884, the La Loma Catholic Cemetery only allowed burials to Christians; victims of epidemics and subversives were not permitted during the Spanish regime. La Loma Catholic Cemetery continues to function as a cemetery until today. Parts of the cemetery are located in Manila and in present-day Caloocan. The Manila North Cemetery was the first cemetery created under the American Rule. Built in 1904, the public cemetery was open to all.

The group plots

Several group plots can be found in the Manila North Cemetery including the Tomb of the Boy Scouts, Jewish Cemetery, Firemen, Thomasites, and the *Mausoleo de los Veteranos de la Revolucion*. More than the architecture itself which fulfils the aesthetic, artistic, and architectural measures, these group plots have historic values and significant to the Philippines. I would like to discuss the Tomb of the Boy Scouts, Jewish Cemetery, and the *Mausoleo de los Veteranos de la Revolucion*. The stories of the people interred in these burial plots do not end at death. The designs on the tombstones and mausoleums are in themselves full of information on the dynamics of representing the dead.

Designed with the symbol of the Scout's Honour, the Tomb of the Boy Scouts have been considered a shrine and visited by boy scouts on the death anniversary (Figure 1). The Boy Scouts were victims of an airplane crash in July 1963. Due to their tragic end, intensified by the young ages of the boys, the accident gripped the nation. Although, not all bodies were recovered, each Boy Scout was represented by a niche (Tantuico and Choa 2011). Some of the identified bodies were buried in the boys' hometowns which were likewise visited on the date of the crash.

The *Mausoleo de los Veteranos de la Revolucion* housed the bodies of the veterans of the Spanish revolution and the Philippine-American War (Figure 2). Ragragio (2011) gives a full account of the mausoleum's history including its motifs, and argues its historical significance. It was recognised as an important historical site by then National Historical Institute (now the National Historical Commission of the Philippines) in 1993. There were 28 revolutionaries interred in the mausoleum; five bodies were later exhumed and transferred elsewhere. Ragragio (2011) further narrates the circumstances of the occupants' status as a revolutionary. Many of the revolutionaries here are not familiar to a non-historian. The *Mausoleo* impels its viewers to ask who were these revolutionaries and attempts to augment historical knowledge. The Spanish revolution and the Philippine-American War were defining events in the Philippine's history. In 2004, Administrative Order 99 mandated commemoration activities every 12 June, the Philippine Independence Day (Ragragio 2011).

The Jewish Cemetery exposes aspects of Philippine history that are generally unknown to the public (Figure 3). Jewish presence had been recorded in the Philippines in the 1500s and in the late 1800s (Lim 2011). Jews have continued to arrive in the Philippines before and after World War I. In 1919, a Synagogue was built in Taft, Manila. The years leading to World War II saw the increase of Jews in the country. In 1924, they bought a burial plot in the Manila North Cemetery which was extended in 1940. The plot can accommodate 300 burials and as of October 2011, seven are still unoccupied (Lim 2011). I have included this group plot in this paper because this little known fact can contribute to the history of Jewish diaspora in the world.

Politicians' tombstones

Since the Manila North Cemetery was the first public cemetery in the American Colonial Period and also the premier cemetery in the early 1900s, many of the elite families including Filipino politicians were buried here (Barretto-Tesoro and Reyes 2008). Some American administrators were also interred here. Senators, national artists, members of the government administration, past Philippine presidents, and mayors comprise the

politicians' group. The mausoleums exhibit mosaic, art deco, and art nouveau styles. Some former presidents' coffins were encased in granite. An alternative Philippine history can be told by visiting these graves, by analysing the designs of the burial structures, and by re-examining stories regarding the bodies after death whether they had been moved, transferred or even absent. These stories that do not appear in books make the study of cemeteries worthwhile.

"rand mausoleums

According to Manolo Noche (personal communication, 20 November 2010), world architecture is present in the Manila North Cemetery. A variety of architectural designs are found in the cemetery and they are often a reflection of the architectural style of the period. The styles include the use of marble, pebble-washed outs, crazy-cut finishes, flag mosaics, art deco, synthetic adobe finishes, art nouveau, granite finishes, precast concrete, glass cut-outs, gothic, concrete finishes, Greek, Roman, and Egyptian elements (Figures 4a-5e). Scholars of architecture should consider visiting the Manila North Cemetery to observe eclectic structural and design elements.

Capilla in the La Loma Catholic Cemetery

During our visit in the La Loma Catholic Cemetery, apart from the outstanding architectural styles found in the older mausoleums, the *capilla* or chapel was the most interesting structure (Figures 6a-6d). From the present main entrance, the *capilla* is located in the southeast section of the cemetery. Further south is the Chinese Cemetery. The *capilla* was foremost a funerary chapel from 1884 to 1962 (Hilotin 2011). It also served as a fort during the Philippine-American War from 1899 to 1902; a *cursillo* retreat house from the 1970s to the 1990s; and at present is abandoned and padlocked (Hilotin 2100). It is currently referred to as the 'Lumang Simbahan' (Old Church). On top of the arched entrance, the year '1884' and the Latin text "Beati mortui qui in domino moriuntur" (Blessed are the dead who die in the grace of Lord) are inscribed. South from the chapel's entrance are remains of the original posts of the iron gate to the cemetery. The chapel is empty except for some beds found at the back. Its impressive architecture and façade is a surprise to visitors of the La Loma Catholic Cemetery. The chapel has been the subject of bloggers and



Figure 1: Tomb of the Boy Scouts



Figure 2: The *Mausoleo de los Veteranos de la Revolucion*



Figure 3: The sign on the entrance to the Jewish Cemetery

photographers (i.e. Hilotin 2011) which I think has been a symbol of the emerging interest in heritage by non-heritage workers. Now the La Loma Catholic Cemetery is not just a cemetery. Its significance and meaning have been transformed. Visitors and heritage enthusiasts now appreciate the historical significance of the La Loma Catholic Cemetery that is represented by the *capilla*.

The major risk to these heritage areas is the general lack of awareness of the values of these structures that leads to the neglect and vandalism of some of these mausoleums. Generally, Filipinos will not think that heritage structures can be found in cemeteries. In recent years, local architects, anthropologists, and archaeologists (Barretto-Tesoro, in press) are now realising the academic potential of historical cemeteries. Perhaps through such studies

people will have a different perspective when it comes to cemeteries.

Conclusion

In this short report, I have assessed the heritage value of some key areas in two Manila cemeteries. These key areas are significant to Philippine history because of their unique nature. These mausoleums, graves, and chapel provide another perspective in examining history. People do not only visit the dead but to admire the grandiose architectural styles of the structures in cemeteries. And these architectural styles ought to be understood in the context of the milieu when they were built and in the case of the *capilla* how they were utilised. I highlighted historical cemeteries as not just places for the dead but also valuable sources of data in various disciplines



Figure 4a: Flag mosaic style



Figure 4b: Bas-reliefs style



Figure 5a



Figure 5b



Figure 5c



Figure 5d



Figure 5e

Figure 5a-5e: Examples of grand mausoleums (Photos by Archie Tesoro)

including heritage studies. The challenge is to protect and restore these structures that more people can appreciate them for their aesthetic, artistic, architectural, and historical values.

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Figure 6a: The La Loma Catholic Cemetery capilla as of 2009 (Photo by Archie Tesoro)



Figure 6b: The La Loma Catholic Cemetery capilla as of the early 1900s (source: <https://www.facebook.com/media/set/?set=a.102319897766.89873.101164622766&type=1>)



Figure 6c: The original iron gate attached to stone posts of the La Loma Catholic Cemetery with the capilla in the background (source: <https://www.facebook.com/media/set/?set=a.102319897766.89873.101164622766&type=1>)



Figure 6d: Remains of one of the old stone posts of the iron gate to the La Loma Catholic Cemetery as of 2009 (Photo by Archie Tesoro)



Archaeological Site Found at the Tanoa Tusitala

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

An archaeological excavation was taken place at Tanoa Tusitala Hotel under the guidance of a resident archaeologist Tautala Asaua-Pesa. She is the first Samoan archaeological lecturer and also the previous participant of the ACCU Nara 2008 training course. There, she and eight students from the National University of Samoa (NUS) were researching the recent man-made structure. Early interpretations of this structure had varied from a bunker during German times, an ice cellar and a septic tank. Nothing had found to support any of these suggestions.

The initial stop order on construction activities at the site was issued by the Planning and Urban Management Agency (PUMA), who holds legislative authority to cease any construction when sites of heritage value have been discovered. The owners of Tanoa Tusitala Hotel and Lee Collet and the Tanoa project manager, were supportive of this action and expressed willingness to preserve the structure by incorporating it into their building site, thus providing the opportunity for further archaeological research.

Salvage work commenced at the beginning of NUS

mid-semester break. Students from the 100 and 200 level Archaeology courses were happy to give up their mid-semester break in order to participate in this rare opportunity. Students were introduced to excavation methods which involved setting up test units in order to find out if there was any other human activity around the structure and the site.

A total of 7 test pits were dug which required the students to excavate carefully and sift through the soil that was removed from these pits to see if any artifacts might be found. Artifacts such as pieces of ceramic bottles made in Germany in the late 1800's, broken glass, one intact wine bottle, animal bones, metal objects, a German Mark (1900) and a British pence were recovered.

Another interesting find was an oxidized copper pipe with wood still attached to it along with two wooden panels also lined with oxidized copper found in an upright position directly above the copper pipe. This was located 50 cm from the brick feature.

The students learned that archaeological digs required a lot of patience due to the importance placed on being meticulous and careful in recording and documenting finds. They endured long hours in the sun, rain showers that slowed down the work, and also the challenge of removing water from their test pits.

However, this did not dampen their efforts or enthusiasm in being a part of a unique opportunity to uncover aspects of their history. Ms Asaua- Pesa was heartened by her students' enthusiasm.



Lapita exhibition

A special exhibition on the archaeology of Samoa was held at the Museum of Samoa, Malifa. This was part of the International Lapita Pacific Archaeology Conference which was held at the National University of Samoa (NUS). It was officially opened by Prime Minister, Tuilaepa Sailele Malielegaoi attended by cabinet ministers, members of the diplomatic corps, the participants of the Lapita Archaeology Conference and members of the community. It was a very successful night which showcased the talents of the NUS archeology students and the new exhibition space devoted to archaeology.

The exhibition was jointly organized by Associate Professor, Helene Martinson-Wallin, of Gotland University in Sweden, and a resident archaeologist, Tautala Asaua-Pesa with her archeology students from the National University of Samoa. ACEO for Culture Division of the Ministry of the Education, So'onaalofa Sina Malietoa warmly welcomed those who attended.

This was the first time that the Museum of Samoa hosted such an event during an international conference. All the top archaeologists from all over the world viewing the students work were so exciting. The exhibition documents the last 3,000 years of human occupation in Samoa. It also provided information on the findings archaeologists have uncovered, which outlined the various developments and changes seen in the archaeological history for Samoa. Another highlight of the exhibition included the findings from the recent excavations at the Tanoa Tusitala Hotel in Sogi.

Lapita archaeology conferences

The Lapita Archaeology Conference was hosted by the National University of Samoa through the Centre for Samoan Studies. Over 70 professional archaeologists and biological anthropologists from all over the world attended the conference to present their researches on the theme "Documenting the Past 50,000 Years to the Presents". This conference was jointly hosted by the National University of Otago in New Zealand. It was a very successful conference and the participants shared many new discoveries and techniques.





Conservation of Malvana Fort

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

Located along the river Kelani, Malvana Fort is a key stronghold of the Sinhalese which was captured and developed by Portuguese and the Dutch in the 17th century. Although the credit of making this stockade into a major fortification goes to Portuguese, it had been an administrative outpost of ancient Sri Lankan kings during the Kandyan and Kotte periods [16th to 19th centuries]. Since the island is dotted with many historic monuments and ruins dating back to 2,500 years, the significance of structures like Malvana was overlooked for many years.

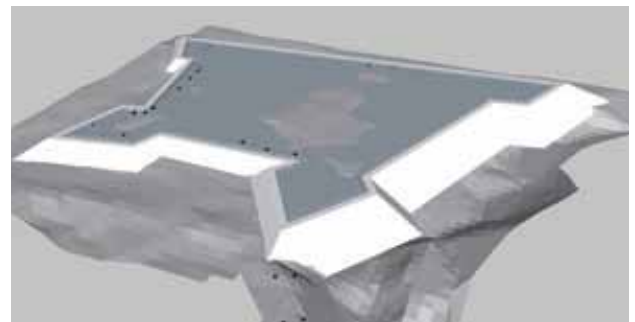
Malvana is the first inland fort along river Kelani after the Colombo Harbour. It is located 20 kilometers east of Colombo and until its recent restorations, lay hidden among the sleepy home gardens. The authorities knew its existence and poor condition but they could not execute any conservation work because the land belonged to a private owner whose father bought it from a Muslim. Although Malvana should be declared as a protected monument, the authorities have not been able to secure the land or protect the ancient structure which suffered under negligence and lack of maintenance. Further it was heavily affected during the 2007 floods. During this disaster, the fort lost its north walls and northwest bastion and the whole structure became vulnerable to further erosion.

The Sri Lanka National Trust in its research studies identified the importance of documenting and restoring this important fort, which played a decisive role in the island's history. As a first step the Sri Lanka National Trust mediated with the Department of Archaeology to get it declared as a protected monument. They have also opened a dialogue with the present owner and were successful in convincing him the importance of protecting this historic structure ensuring its survival for the sake of future generations. Reluctant at first he finally gave permission to carryout documentation and restoration work. The Prince Klaus Foundation of the Netherlands

readily extended the financial assistance, without which the heavy restoration work of this nature would not be possible. The Central Cultural Fund supported the effort by providing expertise in the form of supervising officers and skilled labour. The whole exercise was carried out with the blessing of the Department of Archaeology, which is the legal authority of historic structures within the island.

History

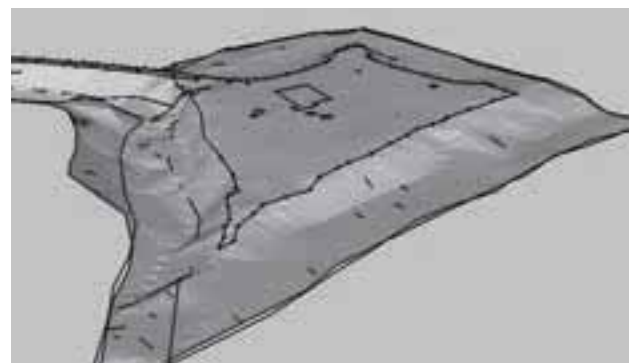
A Portuguese fleet commanded by Lourenço de Almeida was blown into Colombo by adverse winds in A.D. 1505. They were received by Sinhalese king and soon perceived the strategic positioning of the island, which will be valuable for monopolizing the East as a trading and ruling power. They were eyeing the spice, elephant and pearl trade of the natives and sensed the importance of grabbing the stockades along river Kelani managed by the native rulers and chieftains in order to get the monopoly of the trade. They succeeded in deceiving the natives and get hold of these stockades one by one. Their scheme further justified since Kelani was the only river that provided direct access to the Colombo port and up to several miles inland it facilitated the goods transport by large barges. There are four other forts apart from Malvana and all these were located near cinnamon grown lands enabling easy access via River Kelani.



Conjectural view



Contour survey map



3D profile of the fort before conservation

Through development of the grabbed stockades into imposing forts the Portuguese gradually established and became the rulers of the coastal plains by the late 16th century. After that they became very aggressive to the natives, until they are disliked and finally expelled from the island with the assistance of the Dutch. Square in shape it was a tranqueira [wooden fort] in 1590's and then developed into a major fort during A.D.1626 – 1630 period. Bastions were faced towards northwest, northeast, southwest and southeast directions. The ramparts of the fort were built using laterite blocks and earthen embankments. Housed within these walls the Portuguese had gone into several fierce battles against the natives.

For the Dutch Malvana Fort provided strategic maneuver to rule the coastal region for they also became an annoyance to the natives after a while. During the period the Dutch also made improvements, especially to the ramparts and further strengthened them. The British was not interested in these inland forts but used them time to time as strategic location to place armies to attack the Kandyan Kingdom.

Conservation

Under the restoration programme, the site was surveyed using the modern equipment and present contour profile was identified. Using the data, a 3D model of the

existing site was created and matched with the available literary records. Conjectural conservation proposals were prepared using the data before carrying out any intervention. The conjectural plan was set out on site and trial pits were executed to determine evidences of possible ancient structures that may found along the rampart. During the exercise the vestiges found further strengthened the accuracy of the conjecture and the shape of the Fort.

It was decided to carry out the restoration using rubble and laterite blocks to match the existing undisturbed original walls that revealed during the excavations. Since there was a difficulty in finding laterite blocks similar to the original's size and shape, some of the areas were strengthened with rubble lining wall with its face finishing using laterite blocks to get the appearance.

The bastions at southeast and southwest were completely restored along with the southern rampart. But the bastions at northeast and northwest were washed away by the small stream running alongside and this condition has been aggravated during inundations. This seasonal phenomenon was causing considerable damage to the walls until 2007 floods; there occurred a severe drastic damage which caused the northwestern bastion to collapse.



Unrestored western section of the wall



Gabion wall, constructed to prevent erosion



National Trust officials, inspecting the work



Original wall, unearthed during excavation

Initially the plan was to restore the embankment along the canal on northwest and northeast bastions, but it was not possible due to financial constraints and restrictions. But the National Trust managed to erect a part of a gabion wall to arrest further erosion at the canal bend at which water directly hit on the bastion wall. The Sri Lanka National Trust hopes to make a further request to Prince Klaus Foundation to extend their assistance to full restoration of the embankment.

Objectives of this restoration are to present a complete picture of the historic monument and to arrest its gradual degradation, and to introduce a continuous maintenance programme involving the owner of the premises. And it will help the owner to work out a

sustainable maintenance programme while residing in the site through attracting potential sightseers and provide facilities under the guidance of the Department of Archaeology. Sri Lanka National Trust, Prince Klaus Foundation with assistance of the Central Cultural Fund made a timely interference and if not this historic structure would be vanished forever and with it a part of history of the island will also be lost.

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Maps, Plans and Photographs: Architect Jayatissa Herath Associates, Architectural and Conservation Consultant



Parts of the original wall



Preserved parts of the ancient wall



Restored southeast bastion



The southeast bastion during restoration



The southern wall during restoration



Determination of the Reconstruction Model for Restoration from Existing Condition of Historic Building and Architectural Order: The Case Study of the Tripitaka Hall, Wat Mai-Thong-Sen

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Office of Archaeology, Fine Arts Department, Ministry of Culture

Introduction

A hypothetical reconstruction model of a historic building is necessary for restoration, particularly in the site with much change or serious deterioration. The reconstruction model is used to determine the finished model and is a guiding principle in restoration. However, is a hypothetical reconstruction model correct?

The hypothesis on reconstruction model of a historic building may be inaccurate, leading to an erroneous restoration. Thus, basic evidence to support the hypothesis is necessary, which is obtained by studying the existing conditions of the building. In addition, architectural order and tradition are essential to analyse the information. In this report, the restoration of the Tripitaka hall, Wat Mai-thong-sen is given as an example how the final decision of the reconstruction model was made.

The Tripitaka hall is one of historic buildings in Wat Mai-thong-sen, Dusit, Bangkok. It was built in 1822 in the reign of King Rama II. The building was registered as a national historic monument in 1996. The nation raised a fund to restore the building in 2009. The restoration was under Fine Art Department, Ministry of Culture.

Architectural significance

The Tripitaka hall, Wat Mai-thong-sen is the traditional Thai architecture in the early Bangkok period (1782-1868), which was built to keep the Tripitaka, the Buddhism scripture. The building is small with splendid and delicate decorations, having good Thai architecture proportions. Its size is 7.20×5.80 meters. The wall is plastered with traditional lime. The building is composed of corridors with roofs around three sides. The lotus shaped capital of octagon poles is decorated with gilt stucco and coloured glass mosaic. The outside of doors and windows are decorated with gilt lacquer painting in the Thai style, but the insides are painted in Chinese manner. The portico is decorated with gilt stucco and coloured glass mosaic. Inside the building is gilt in Thai style patterns on the red wall. The roof is made of teak and the roof tiles are glazed. The gable is decorated with gilt stucco and coloured glass mosaic. The inside and outside of ceilings are made of teak painted in red and decorated with gilt patterns.

Preliminary survey of the building before restoration

The Tripitaka hall in Wat Mai-thong-sen had been abandoned for a long time after it was a residence of monks. The building was in a badly-damaged condition. The corridor and the roof in the west disappeared, and those in the south were almost ruined. The roof tiles were broken so the wooden frame structure of the roof was exposed. The ruined roof was a cause of severe damage of the inside painting.

From the preliminary survey, it was revealed that the existing model of the building was completely true to the early traditional Thai architecture and according to the Thai architecture order. In addition, the ruin of brick structures, such as a wall extending a short distance from the lower part of building into the north with a little remaining stucco, was found on the top part of it. This raised a question “Can the existing condition of building from the survey accurately inform us about the original model of the building?”



Figure 1: Exterior existing condition of The Tripitaka hall in the preliminary survey: (a) the north, (b) the south



Figure 2: Interior existing condition of the Tripitaka hall in the preliminary survey.



Figure 3: The Tripitaka hall of Wat Raja-nudda, an example of architectural order and tradition of the Tripitaka hall.

Restoration processes

The restoration project started in 2009 and its aim was to reconstruct the Tripitaka hall of Wat Mai-thong-sen to the state of complete functioning.

The first process of restoration began with a question, “What is the original model of this Tripitaka hall?” Therefore, efforts to find the answer on the exact original model started. At this stage, excavation around the building and intensive survey of the structure, architecture, and decoration of the building were done in order to investigate deteriorations and evidences, to trace the former restorations, to explore the style, building techniques and used materials. From the excavation, a remaining building base extending from the Tripitaka hall in the north as well as in the south was found. Laying bricks of the remaining building base and the evidence of the existing building demonstrated no restoration of the building for 187 years and indicated that the remainder of the building base and the existing building were built at the same time. Thus, the fundamental hypothesis of this remainder was not correct because it was assumed to be a part of the Buddhist shrine wall and, then, ended at the Tripitaka hall. Furthermore, the excavation in the west found the brick patio, the gutter and the base structure of the disappeared corridor. Therefore, the hypothetical

model of the building, according to the preliminary survey, was not completely correct.

Next, how do we interpret what we found during excavation? And what is the complete picture of the building? At this stage, the comparative study of buildings in the same period was conducted. The components of architecture and decoration were studied. From the excavation, the remaining structure, a brick wall extending a short distance from the lower wall of building in the north, was the base of the platform. However, from the study of the Tripitaka hall style in Thai architecture order, such a platform was not found. It was believed that construction of the platform aimed to connect the space of the corridors of the Tripitaka hall and the ground around the building in harmony. In addition, the platform improved the height proportion of the building.

From the data analysis, an architectural reconstruction model was proposed to summarise a frame of restoration. The conclusion was to reconstruct the Tripitaka hall of Wat-Mai-thong-sen to the complete state for function. For the remaining of the platform extending from the building, there were some risks to restore since the reconstruction model of it may not be accurate. Hence, it was proposed that the remainder should be restored



Figure 4: The ruin of brick structure like a wall extending a short distance from the lower part of the building in the north.

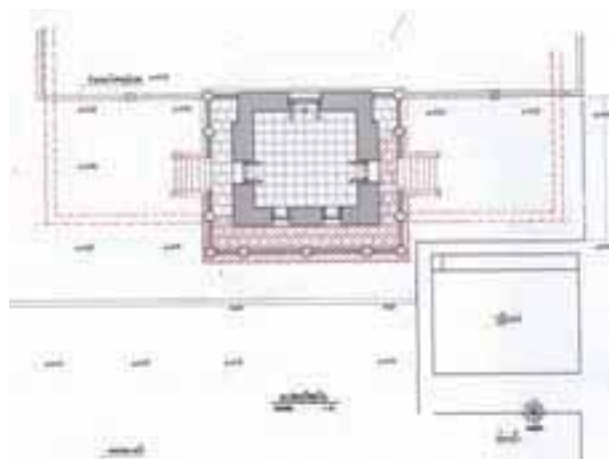


Figure 5: Plan of reconstruction model of Tripitaka hall after finishing the preliminary survey. The ruin of brick structure was assumed to be a part of the Buddhist shrine wall and, then, ended at the Tripitaka hall, showed in the red dash.



Figure 6: The perspective drawing of reconstruction model of the Tripitaka hall after finishing the preliminary survey.

according to its condition to support the strength of its structure. For the landscape, it should be also repaired in harmony with the historic site. Unfortunately, the restoration of the remainder and the improvement of the historic site landscape were cancelled because of no enough budgets. Finally, the ruin of the extended platform was covered with sand in order to protect further damage and stay for restoration in the future.

For the restoration of the Tripitaka hall, the corridors in the west and the south were reconstructed. The technique and materials used in the reconstruction of the corridor structure were different from the previous. The reason was the severe damage of the remaining base

structure and settlement prevention of the reconstructed structure. However, the original remaining structure was conserved. For the restoration of the wooden structures of the roof and the ceiling, the decayed wooden members were replaced according to its size, its position and its decoration. The technique and style of the restoration was as same as the former. For the roof tiles, they were ordered to make according to the previous style. For the decoration, the deteriorated parts were renovated with the materials true to the original style. The decorating materials were fitted in the same positions as they were. The renovation was done with the traditional technique used in the past.



Figure 7: From the excavation, a remaining building base extending from the Tripitaka hall.



Figure 9: The existing plan of the Tripitaka hall after finishing the excavation. The remaining building base extending from the Tripitaka hall in the north as well as in the south (red) and the brick patio and the gutter (orange).



Figure 8: The remaining base structure of disappeared corridor, the brick patio and the gutter after finishing the excavation in the west.



Figure10: The examples of platform from the comparative study in architectural components, (a) the Vihara of Wat Na-phra-meru in Ayutthaya and (b) the Bud-dhai-sawan throne hall at national museum in Bangkok



Figure 11: The complete picture of the Tripitaka hall with platform, reconstruction model after finishing the excavation and comparative study in architectural components.



Figure 12: Drawing of the west corridor reconstruction structure.



Figure 13: The new structure, I-shape steel, in the west corridor reconstruction. The original remaining structure was protected by the textile to conserve it in the existing state before starting reconstruction.

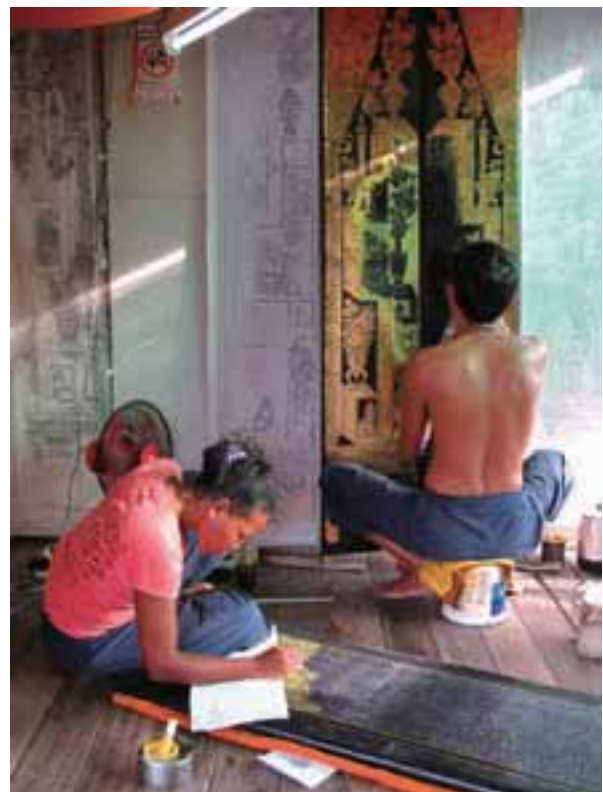


Figure 14: The door and window decoration and gilt lacquer painting in restoration

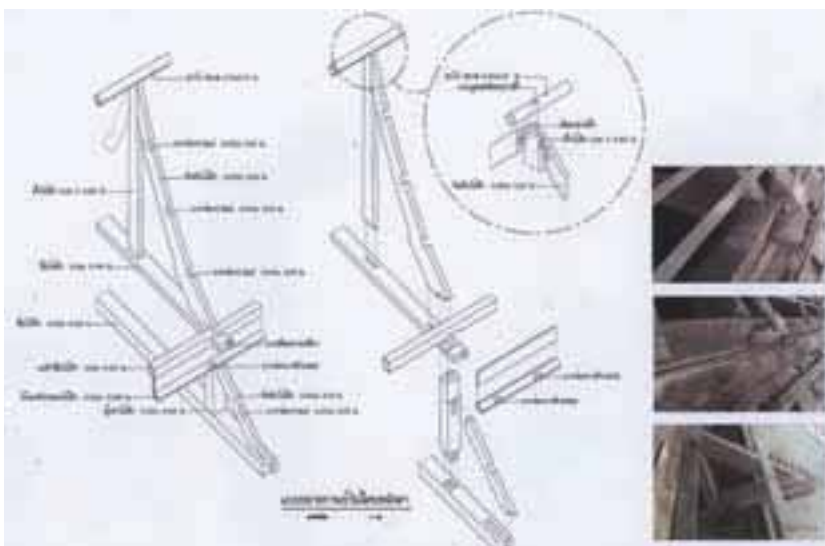


Figure 15: The documentary drawing of the roof structure.

Summary

The question about the accuracy of a hypothetical architectural model of the Tripitaka hall of Wat-Mai-thong-sen is one example in several questions arising during the restoration process. The questions lead us to

revise our hypothesis to obtain the proper reconstruction model. This is a way to reduce risk of making mistakes in restoration in order to maintain the values of the historic building.



Figure16: The Tripitaka hall after finishing the restoration, (a) the ruin of the extended platform was covered with sand in order to protect damage and stay for restoration in the future. (b) View from the south.



Figure17: The Tripitaka hall after finishing the restoration, (a) interior view, (b) decoration detail of gilt painting.



Figure18: The decoration of lotus shape capital after finishing the restoration.



Semantics of Ancient Architectural Forms and Art Images (as exemplified by architectural monuments of Southern Uzbekistan)

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In ancient times, the territory of southern Uzbekistan was part of Bactria – a historical and cultural region that made a substantial contribution to the development of global civilization. This is evidenced by not only written sources, but also numerous culture artifacts discovered here during archeological excavations. Over the two bygone millennia, these monuments have reached us in the form of ruins or the remains of foundations and lower parts of the walls, which, nevertheless, make it possible to determine the building's layout. Due to the durability of construction materials (lime, processed clay, etc.) and natural "preservation" under cultural and soil layers, some structural and decorative elements of individual buildings remained in a rather good condition. These finds became valuable materials for researchers, offering an important source of knowledge for the restoration of ancient structures.

Despite the fact that Bactrian building décor of antiquity has been researched in a number of studies, some important aspects of it still remain unexplored. These include the identification of structural and artistic purposes of the décor, as well as disclosure of its philosophical essence and religious-ideological interpretation, that is, its semantics. Issues relating to the interpretation of images in some architectural elements were covered in a fundamental monograph of L. I. Rempel [8] and academic works of G. A. Pugachenkova [6, 7]. A monograph by H. S. Karomatov [1], containing a lot of information on architectural décor and its motifs, is also worth mentioning.

This article considers some architectural forms and tries to interpret the art imagery thereof by dividing them into several functional groups. It is known that since ancient times wooden pillars are commonly used in oriental architecture to support the ceilings of verandas (*ayvan*) and large rooms. Bactrian masters have left no information on the semantics of wooden pillars, while the Greeks said this: «They associated wood (wooden pillars) with a living organism: the trunk was compared to bones, the new layer to meat, the crust to skin, and water to blood, and believed that all these elements were present in all types of timber» [10].

Stone bases for the wooden pillars were made, using special stands, of local limestone and were of two types: attical and toroidal. When viewed from above, these bases consist of two geometrical shapes: a square with an inscribed circle. Naturally, it is hard to say whether ancient masters used these shapes to render any religious or philosophical ideas. However, these two traditional geometrical shapes occur not only in architecture, but also in pictorial and applied art and always have some kind of semantics.

Square is one of the four basic symbols, the symbol of

earth opposite the sky; it also symbolizes the Universe and expanse. This shape expresses the idea of anti-dynamism and stillness. In astrology the square denotes earth, matter and limitation.

Circle is also believed to be one of the basic symbols, which represents movement, sky, infinity, actuality, time, protection and other notions. This expanding point (center) has a general symbolism. Circle is associated with fire, heroes and the worshipping of gods.

Triangle is a geometrical element that has become part of an arch and volutes. Besides Bactrian architectural elements, it was employed on decorative friezes in India, Greece, and Rome. Pointing upwards, it denotes mountain, fire and creative masculine energy; pointing downwards, it symbolizes mountains, water streaming down the mountains, fertility and feminine element. An isosceles triangle represents deity, harmony and proportion [3].

The capital is another structural and decorative element of a column that constitutes the architectural order. The capital usually served to evenly distribute the beam weight on the columns. Wooden capitals that existed in ancient times were replaced by stone during Classical antiquity era. In Bactrian architecture also, some types of Ionic and Corinthian stone capitals have been identified. On the sides of Ionic capitals there are downward volutes, which also have symbolical value, besides esthetic one. Common people identified them with the horns of a ram and believed that they can protect them from evil spirits. In some places this tradition still lives on. Volute, being spirals, also represent evolution, expansion and development as well as temporal and eternal continuity. They express evolving energy and motion originating from a center and directed into infinity. A scroll is associated with the moon, fertility, continuation of life, evolution, etc. [3]

Corinthian capitals also have volutes, but their prevailing feature is the beauty of a décor in the form of acanthus leaves. Acanthus (Lat. *Acanthus*, Greek *a-kamptos*, meaning imperturbable; "akanta" – a thorn) is a Mediterranean brankursine plant. *Acanthus spinosus* (thorny) has leaves with small thorns. This motif was very common in the ancient art. As a decorative element, it was used in capitals, eaves, friezes and other elements of a building. However, unlike the Greeks, the Romans employed the motifs of a branching field buttercup (*Ranunculus acris*). Roman architects used this motif in a capital decor of Corinthian order. As these capitals were richly decorated, they were also used in the Renaissance architecture as well as later on, with the arrival of the Baroque style. Exquisite dynamics and plasticity of acanthus ensured its longevity in art.

In the Middle Ages acanthus leaves were presented as "thistle" and "crown of thorns" meant to express the torment of Jesus. Therefore, the motif contains the symbols of life, motion, growth and sin as well as a sense of ailment and sympathy for the near and dear human being. This content of acanthus is also reflected and in medieval book miniatures. One may thus argue that acanthus denoted eternal life and immortal spirit. Texts also mention that acanthus was a classical Greek-Roman symbol of triumph. Some suggest that acanthus developed from a shift of ancient Egyptian and Assyrian palmettes [3].

Lotus motifs, too, occasionally appear in the capitals décor. Lotus has been known to the Eastern peoples for long time, and its semantics is interpreted differently. The Egyptians, in particular, regard the lotus leaf as a symbol of benevolence, light and love [5]. Lotus can also be a solar symbol. It has a very special import in Buddhism where it is quite common and stands for the divine manifestation and relatedness of Buddha. Lotus leaves adorn ceramics, and lotus flowers can be found in murals. Buddhist stupa, platforms, monument pedestals, thrones and other architectural elements are decorated with the images of lotus leaves and flowers. According to archeologist Sh. R. Pidaev, twelve lotus leaves on a Termez capital meant to represent the state of nirvana and as such are worth a reference. All this brings another example of influence produced by the concepts of Buddhist religion upon all spheres of art in the Kushanian Bactria. However, one cannot say that such capitals were used only in Buddhist cult structures; they can be found in secular buildings, too [4].

The images are quite vivid in the capitals' décor, and depending on shape, content and décor specificities, they can be divided into anthropomorphic and zoomorphic. Anthropomorphic images used in the architecture of Northern Bactria can seldom be found on the capitals of Ionic and Corinthian orders. Examples include the image of two men and two women on stone capitals from Shahrinav, and the image of a female body on a plaster capital in Corinthian style found in Merv. These, however, tend to be found more frequently on composite capitals, eaves and friezes of different pilasters.

Academic literature interprets human images on Ayrтам friezes as musicians and gift-bearers. Due to the fact that friezes were used in Buddhist structures, they are associated with Buddhist theme, and the images are associated with Buddhist mythology. According to the opinion of S. F. Oldenburg, which he shared with M. E. Masson, the composition shows "Ganga Mahashabd" musicians and may represent three of five great sounds [2]. As suggested by G. A. Pugachenkova, they are the five musicians of "Pancha-Mahashabda", i.e. the divine harmony of sounds of five skies; the other characters adorn Buddha's path with garlands and sprinkle it with incenses [2, p.144]. H. S. Karomatov sees a connection of women with garlands on the Ayrтам frieze and in the Halchayan palace interior with public rituals dedicated to Dionysus and Mina, showing a festivity involving singers, musicians and masked people [1, pp. 360-361].

Zoomorphic images appear on monumental stone capitals, including Corinthian and composite ones, where a lion (or a tiger) is considered to be the most popular image. This image is also common in the art and architecture of ancient Middle East and India, and its genesis and semantics are thoroughly covered in academic literatures. For instance, according to L. Rempel, the meaning of the lion image has dual interpretation: the first is related to cosmogony and is interpreted as the symbol of the sun or its attributes; the second meaning has to do with animal kingdom and denotes the king of animals. Lion is metaphorically known as the king of all animals [8, p. 19]. Sh. R. Pidaev holds that the lion or tiger image on the Termez friezes refers to Buddha Shakyamuni in Buddhist art. Some finds suggest that the image was common in Bactria during the last Kushan epoch, and, besides stone architectural elements, also appeared on a small sculpture forms, etc. The image shown on these items looks more like a lion than a tiger. Here it manifests itself as "protector". At each stage in history the predator's image changes depending on the requirements of time.

Griffins The image of a griffin is traditional in the ancient art of the East, especially in Assyria, Babylon and Achaemenid Iran. In ancient Bactria two kinds of griffin images were common: the lion-griffin (a winged lion), and a bird-griffin (a beast of prey with bird's head and wings): here the animal represents the earth symbol, and the bird is the symbol of sky. In different times different nations considered griffins to be either a symbol of benevolence, or evil. According to A. Pugachenkova, the griffin image was used as a charm against evil spirits and witchcraft [6]. If Mesopotamia and India knew the winged lion, the art of Iran, Central Asia and Scythian Siberia pictured griffin with horns. Unlike the typical winged lions, it had spiraling horns, widening towards the tips.

As already noted, a griffin is considered to represent double nature and be the symbol of good or evil forces. In one instance, a griffin serves the man by protecting his cattle, and on another occasion it drives away malicious sorcerers. For nomads, a fighting griffin probably represented the idea of struggle between good and evil. This cosmogonical idea developed in totemic notions, yet stood above these notions ... [8, p. 45].

Such winged lions or sometimes horned lions-griffins are polymorphic mythical creatures known since the Achaemenid epoch. Column and pilaster capitals sometimes terminated with the image of griffin-lions. They are believed to have gone through a very long evolutionary path, and scholars link their appearance in Bactria with mythological art and myths created by the imagination of ancient Asian people and believed to possess protective value [7, p.180].

The Central Asian griffins were closely associated with monumental architectural décor, where occasionally, in

¹ **Shahrinav** (literally "new city") is one of the ancient Bactrian cities (presently in Tajikistan).

² **Mari** is an ancient Parthian city (Mari is a city in contemporary Turkmenistan).

the Shahrinav capital, for example, one can find stylized griffins. Hellenism introduced freedom of portraying nature's emotional qualities to the Ancient East. According to L. I. Rempel, «During the Kushan epoch griffins and lions "returned" to the art of Central Asia. However, a careful look at the Termez capitals shows that their griffin has lost its former imperial stance and turned into a wild beast» [8, p. 45]. H. Karamatov, building on I. Pyankov's argument, wrote: «... the Greeks and the Persians were introduced to the griffin image in Bactria, and their historians borrowed the image from Bactrian legends». Ctesias in his *Indica* dating to the late 5th and early 4th century BC wrote stories about Bactrian griffins. The opus says, in particular: «The people of Bactria find gold in the mountains, where griffins live. These birds have four legs and talons resembling lion's claws, and a big body like that of a wolf. They have wings, but don't fly... Their feathers are red on the chest and black on the body, the wings are white, the beak is like an eagle's, and their eyes burn. This makes it difficult to look for gold, as Bactrians gather gold dropped by griffins... Griffins yield only to elephant and lion... At night-time, hiding from griffins, people go to find gold». In his opinion, the ancient saying that «griffins cannot counter an elephant» became part of popular religious belief and art. But «...later on, griffin became a good beast and entered Buddhist legends as a creature helping people» [1, pp.118-121].

In ancient times the bull, the horse, the camel, the wild sheep, the goat, the boar and other animals were cosmogonical symbols. The bull was considered one of the ancient motifs in the animal theme. While ancient people pictured the bull in rock paintings as a totem animal, later on it came to represent the source of fertility and masculine element. The bull appeared in a composite capital and on the vessels of the Kushan period. It should be noted that the bull image, having passed through totemic, mythical and historical stages, turned into Gavomard and Gopatshah as early as in the ancient times [1, p. 22].

Wild sheep and goat As noted by researchers, during the Hellenistic epoch, wild sheep and goat became deity's attribute and part of a worshipping cult involving secret religious practices. At that time they represented cosmic powers [1, p. 29].

Birds The eagle and other birds, besides their natural qualities, represent different ideas, symbols and metaphors. A bird is an image for a conscious being and a symbol (a sign) of nature. It personifies deep human experiences and spiritual world. The eagle is the king of birds. Its image was central to art of the Ancient East and Scythian Siberia as a symbol of cosmos or dynasty. During Antiquity, birds of prey in Central Asia symbolized the victors of powerful heavenly creatures, embodied strength and agility, and, keeping their aggressive stance, expressed either sorcery, or cosmogony. In cosmogony the eagle is one of ancient symbols of sun. At the times of heroic epic tales and cattle-breeding, the eagle posed as a symbol of strength and power [1, p. 32].

There is very little information about images that appear on antefixes in Northern Bactrian architecture (Khalchayan, Dalvarzintepa). Some sources treat acanthus

and palmette on antefixes as the Tree of Life [1, p. 231]. The fragments of many antefixes found on the hills of Khalchayan, besides acanthus and palmette motifs, also bear other vegetable ornaments [11]. The only anthropomorphous image on the antefix from Zindantepa expresses the same meaning as that in antefixes from Asia Minor and Etruria. That is, they are interpreted as symbols protecting a sacred place from evil spirits, for they were often used in cult buildings. For example, in Etruscan shrines, antefixes functioned as apotropaic items to protect against and ward off evil spirits [9].

Merlons of embattlement parapet, a common architectural feature of ancient Middle East, had only functional value. Later on, in the Middle Ages this motif could be found on terracotta ossuaries where merlons were pictured along with columns and arches and together represented the look of a particular building. Fire worshippers believed that ossuaries, which resembled an architectural structure, provided shelter for the deceased in the next world.

Naturally, imagery types in architectural décor on large territories evolved and developed throughout many centuries. The aforementioned examples prove that images in architectural décor were used not only as structural or decorative elements of the buildings, but also had certain ideological and philosophic significance. Many of them became firmly entrenched in the nations' lifestyle. One can still see sheep horns or a horseshoe on doors and gates of some houses as evidence of adherence of Central Asian people to ancient religious and philosophical beliefs. In conclusion, it should be noted that the study of architectural décor not only helps to shed some light on the history of architecture and historical and cultural developments on the given territory, but also broadens the knowledge on lifestyle, perceptions and aspirations of our ancient ancestors.

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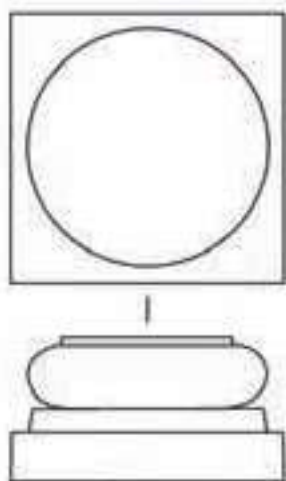


Figure 1. Base of a Khalchayan column. (2nd- 1st century BC)



Figure 2. A capital in the shape of a lion's head. Old Termez. (3rd - 2nd century BC)



Figure 3. Stylized Corinthian capital, Ayrtam. (1st - 2nd century AD)



Figure 4. A pilaster capital in the shape of a bull's head, Karatepa. (1st - 2nd century AD)



Figure 5. A kharmika capital with a lotus décor, Karatepa. (1st - 2nd century AD)



Figure 6. Eaves fragment. Entablature, Old Termez. (2nd - 3rd century AD)



Figure 7. Acanthus (fragment of a capital), Kampirtepa. (1st - 2nd century AD)



Figure 8. Volute (fragment of a capital). Dalvarzintepa. (1st - 2nd century AD)



Figure 9. Griffin, Old Termez. (1st - 2nd century AD)



Figure 10. Anthropomorphic antefixes, Zindantepa. (1st - 2nd century AD)



Figure 11. Antefix, Khalchayan. (1st century BC - 1st century AD)



New Excavation in Thang Long Royal Citadel

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Center for Preservation of the Co Loa Historical Site and Hanoi Citadel

Institute of Archaeology has cooperated with Center for Preservation of the Co Loa Historical Site and Hanoi Ancient Citadel to excavate five holes with total area of 100 m², in which four holes are around the dragon scored terrace of Kinh Thien Temple and one hole is near Tay Nam Hau Lau. Followings are results we have got from the investigation.

I. ARCHITECTURE VESTIGE

1. Excavation at Hole H1

Hole H1's area is 10 m² and 1 m in depth, close to Western South edge of dragon scored terrace which is in front of Kinh Thien Temple.

1.1. Architecture vestige of Nguyen dynasty.

- *Architecture vestige*

In Hole H1, only a small part of floor made of Bat Trang's brick remains in the eastern south angle. This layer is right under the surface with 25 cm in depth, being equivalent to the surface of two layers.

- *Vestige of architecture consolidated foundation.*

The consolidating layer appears at three layers with 60 cm in depth from the surface. This consolidating layer is beaten by crushed bricks with 70 cm in width in order to consolidate all dressed stones which are outside of dragon scored terrace of Le dynasty.

- *Dressed stone of dragon scored terrace.*

At front and west of dragon scored terrace, we discovered flagstones consolidating the terrace. This dressed stone

was put directly on the consolidating foundation layer with above crushed brick.

1.2. Architecture vestige of Le dynasty.

1.2.1. Vestige of architecture consolidated foundation of Le Trung Hung dynasty

This foundation vestige was found out at the east of dragon scored terrace with 75 cm in depth from the current surface. The foundation was reinforced closely with crushed brick.

1.2.2. Architecture vestige of Le So dynasty

At the fifth layer, 96 cm in depth, grey slag brick spreads overall investigating area: 2 m in depth in southern north direction, 2.6 m in length in western east direction; red slag brick is along western east direction, and horizontal in southern north direction.

2. Excavation at Hole H2

Hole H2's area is 10 m² and its depth is 1 m at east edge of dragon scored terrace in direction of Kinh Thien Temple top-down.

2.1. Architecture vestige of Nguyen dynasty

2.1.1 Remains of a wall and architectural foundation.

Remains of a wall and architectural foundation were found at the second layer of 22 cm in depth from the surface. Whole brick floor was built with square Bat Trang brick of 30/31-30/31 cm and 5 cm - 5.5 cm in



thickness. The floor was 5 m in length in north-south direction and 2 m in width in east-west direction. It must be broken down in the later period, therefore it did not cover the total surface of the area.

2.1.2. Vestige of architecture foundation consolidating dragon scored terrace.

The consolidating foundation of the dragon scored terrace was detected at 60 cm in depth. The foundation was reinforced with crushed bricks and tile. It was forced in 70 cm in width.

2.2. Vestige of wall's foundation consolidation.

The whole wall included 18 brick lines which were piled each other while the top and foot of the wall were built with rectangular stone blocks. Under the foot of the wall, the foundation was reinforced with crushed bricks and tile at fourth layer which was 0.89 m in depth from the surface.

2.2. Architecture vestige of Le dynasty

2.1.2 Vestige of slag brick floor

The slag brick floor appeared at 5th layer of 95 cm in depth from the current surface. Brick floor was in northern east direction of the area and built with red and grey slag bricks.

3. Excavation at Hole H3

The H3's area is 20 m² and its depth is 160 cm, dug at front of dragon scored terrace behind Kinh Thien Temple.

3.1. Architecture vestige of Le dynasty

3.1.1 Vestige of brick floor

Two vestiges of brick floor were discovered.

- The 1st brick floor appeared at the 5th layer, close to the south wall. It was 1.94 m in length of west-east and width of 0.5 m in the southern north.
- The 2nd brick floor appeared at the 6th layer, close to the western wall. It was 1 m in length and width of 0.82 m. It still deepened into the wall.

3.1.2. Vestige of architecture consolidating foundation

In the current excavation, three architectural consolidating foundations were found out:

The 1st consolidating foundation: It was consolidated with crushed bricks and tile layers. It was 2.3 m in eastern west direction and 4 m in length in southern north direction. Pier foundation was 2.3 m far from west of excavating site and 0.7 m south from the wall (landmark

was edge outside).

The 2nd consolidating foundation: It was similar to the 1st foundation. It was 4.2 m in length in southern north direction and 1.4m in width in western east; and it remained at the unexcavated west wall area. Consolidating foundation was 0.8 m far from south wall of excavating site.

The 3rd consolidating foundation: It appeared at the east wall of the excavating site. It was 4.05 m in length in southern north direction and 0.25 m in width in western east direction and the major part of consolidating foundation remained at 3 m east of second consolidating foundation. Hence, distance between centers of two consolidating foundations was 520 cm (Assumed that the 3rd consolidating foundation was 203 cm in width)

3.2. Architecture vestige of Tran dynasty

3.2.1 Vestige of brick floor

Two vestiges of brick floor, which were built with red and grey bricks, appeared at 8th layer. We have not determined clearly structure of these two brick floors.

4. Excavation at Hole H4

4.1. Architecture vestige of Le dynasty

The site was wide to east-west direction and to north-south direction. Its area was 20 m² and 250 m in depth at east of dragon house.

4.1.1. Two vestiges of brick floors

Vestige of the brick floor at northern west corner. It was discovered at the northern west corner in the 8th layer on surface of architecture consolidating foundation and it still remained at the north and west walls where were not excavated.

Vestige of brick line at east wall. This could be vestige of the wall foundation. It exposed only two grey slag bricks which were built directly on the surface of architecture consolidating foundation. Therefore, this brick vestige and architecture consolidating foundation had the same architecture.

4.1.2. Vestige of consolidating foundation.

H4 had two vestiges of consolidating foundation: one was close to north wall and the other was in the center of excavating site.

Vestige of the 1st consolidating foundation. The foundation was discovered at the 8th layer close to the



north wall. It was 3 m in length and 1.6 m in width consolidated with crushed bricks and tile remaining into north wall of excavating site.

Vestige of the 2nd consolidating foundation. The foundation was discovered at the 8th layer at the center of the site, extending in western east direction across hole's width, and widening 230 cm in southern north, far from north wall of the excavating hole. It was consolidated with crushed bricks and tiles closely, creating adhesive powder layers among consolidating layers. The consolidating layer was made in order, one was made from clay, one was made from crushed bricks and tiles.

5. Excavation at Hole H5

Hole H5's area is 40 m² (10 m x 4 m), 5.2 m in depth close to northern west area of Hau Lau.

5.1. Architecture vestige of the French age.

5.1.1 Vestige of wall foundation

The wall foundation was built with red brick of 20 cm in length, 20 cm in width and 5 cm in thickness jointed with mortar. It was built in the French age. The foundation was along western east direction and 4.0 m in length and 0.4 m in width, which remained into east and west walls of excavated area.



Pottery in the 13th-14th centuries



Pottery in the 15th century



Pottery in the 17th-18th centuries



Terra-cotta in the 13th-14th centuries

2. Architecture vestige of Nguyen dynasty

2.1 Two vestiges of wall foundation:

The 1st wall foundation: discovered at west of the area, 1.96 m in length and 0.32 m in width, made from red brick sized 20 cm by 11 cm with 4cm to 5cm thickness. The wall foundation was 3.2 m far from the south wall.

The 2nd wall foundation: discovered at southern east corner of the excavated area. It was 2.4 m in length and 0.3 m in width, and 1.1 m far from the north. This was also made from red brick same as the first one. The bricks were closely arranged and brick layers alternate with clay slurry.

II. RELIC

During the excavation, many varieties of archaeological relics were unearthed such as architecture materials, terra-cotta, and pottery from the Ly-Tran age to the Nguyen age.

III. COMMENTS

1. Characteristics of architecture vestiges through dynasties.

- **Nguyen dynasty:** including vestiges of brick floors, wall foundations and consolidating foundations.

Brick floor was discovered in two excavated areas: Hole H1 and H2, 20 cm from the surface. The brick floor was built with Bat Trang square brick with a dimension of 30/31-30/31 cm, 5cm-5.5cm in thickness.

Wall foundation was discovered at Hole H5. Two vestiges of the wall foundation were built with red bricks of 20 cm in length and 11 cm in width. The brick was arranged very close to each other. The adhesive joint material among bricks was clay and no mortar was used.

Consolidating foundation was discovered at Hole H1 and H2. It was found at the 3rd layer, 60 cm far from the current surface. It was consolidated with crushed bricks and tile which were pressed into one block. Consolidating foundation in this period was dug through slag brick floor of Le dynasty, and the top was big and it became smaller down to bottom.

- **Le dynasty:**

Le So dynasty: detected vestiges of a yard and the architecture consolidating foundation.

Yard was detected at Hole H1 and H2 in the 5th layer, 95 cm far from the current surface. The brick floor was built with red and grey slag brick. The brick was not uniform.

Architecture consolidating foundation: A vestige of architecture consolidating foundation was detected at the 5th layer, 1.1 m far from the current surface. The consolidating foundation was 4.2 m in length and 2.3 m in width, reinforced with crushed bricks and tile in order. The one was made from bricks and tile, and the other was made from clay. The consolidating foundation was in trapezium shape that the top was big and became smaller down to the bottom.

2. Relic

Many kinds of relics were excavated such as: architecture materials, terra-cotta and pottery from Ly-Tran age to the 20th century.

3. Value

During the investigation, excavated areas were so small that we could not determine the scale and form of architecture. However, all vestiges provided us with valuable information of architecture in this area.

1. Slag brick yard of Le dynasty

The slag brick yard of Le dynasty spread from Doan Mon Kinh Thien Temple which was built with slag bricks. Vestiges of this yard were detected in the same height, same kinds of brick, and the same construction technique at all three small investigating sites: Doan Mon, Kinh Thien Temple and 'Cuc Tac Chien' yard. This was 'Dan Tri' vestige of Le dynasty from Le So to Le Trung Hung.

2. Vestige of Kinh Thien Temple of Le So dynasty

Kinh Thien Temple of Le So dynasty is not intact anymore because it has been repaired many times through different periods.

Under the floor of Kinh Thien Temple, we detected architecture vestiges of Le So dynasty and three architecture consolidating foundations, 4.2 m in length (not completed) and 2.3 m in width. It was very large architecture and belonged to Kinh Thien Temple of Le So dynasty.

At the dragon scored terrace of Le So dynasty, we detected that they were repaired through many periods. We can temporarily conclude as follows:

- In Le Trung Hung dynasty, it was repaired to lift up the terrace. It was kept intact till now.
- In Nguyen dynasty, the terrace was reinforced and repaired twice:

The 1st time: Kinh Thien Temple's terrace was reinforced with crushed brick and tile with addition of many stone plates.

The 2nd time: A brick footing which was in front of dragon scored terrace was built with Bat Trang square bricks.



The Exhibition of the Regional Assistance Mission to Solomon Islands (RAMSI)

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

A photographic exhibition was set to showcase the history and achievements of one of the Pacific's biggest success stories, the Regional Assistance Mission to Solomon Islands (RAMSI), to which Samoa had been an important contributor.

The exhibition, *"RAMSI: A history in pictures"* opened in the Museum on 26th of July 2011 as part of a tour of the Pacific region. It covered the history and progress achieved by RAMSI in partnership with the Solomon Islands – and the people, places and events that have shaped this unique regional mission since it commenced in Samoa's Pacific neighbour of Solomon Islands in 2003. The free exhibition was on show at the Museum of Samoa from 26th July, and featured a wide range of spectacular images from across the Solomon Islands, including many from the initial period of weapons being surrendered, the arrest of key militants and the riots that shook the Solomon Islands capital, Honiara, in 2006.

The exhibition also charted the progress made in Solomon Islands in areas including the strengthening of the Royal Solomon Islands Police Force, the fight against corruption, and the rebuilding of the Solomon Islands economy. The exhibition included separate presentations on the 15 countries that made up RAMSI, including many of the 100 Samoans who served with RAMSI since 2003.

Special Coordinator of RAMSI, Nicholas Coppel, said the exhibition was a tribute to the true Pacific spirit displayed by the thousands of civilians, police and military personnel from across the region who have supported the Mission and its work in Solomon Islands over the past eight years.

"RAMSI: A history in pictures" is a tribute to the thousands of men and women from across the Pacific who has served with RAMSI over the past eight years," said Mr Coppel. "Their work has helped to make Solomon Islands future a great deal brighter."



CEO Galumalemana Nuufou Petaia welcomed the guests.



Mr Prime Minister officially opened the exhibition.



Mr Prime Minister with some of the Parliament Ministers, Nicholas Coppel Special Coordinator for Regional Mission to Solomon Island at the opening of the RAMSI Exhibition



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