

公益財団法人 ユネスコ・アジア文化センター
文化遺産保護協力事務所

Cultural Heritage Protection Cooperation Office,
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ACCU Nara
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The Seventeenth Regular Report



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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 fifteen reports submitted by international correspondents in the Asia-Pacific region.

The Seventeenth Regular Report

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Especial Type of Ancient Pottery — Northern Black Polished Ware (NBPW) — Obtained from Mahasthangarh (Ancient Pundranagara) Archaeological Site and Its Chronological Study

Mst. Naheed Sultana, *Regional Director*

Department of Archaeology, Ministry of Cultural Affairs, People's Republic of Bangladesh

Introduction: Clay or mud is a very ordinary thing, and is simply a covering of earth. This earth has been used for different works since 10,000 years ago (Singh 1979:1). For our existence in the world, in our daily work, in religious, cultural, and political works and royal orders, clay has been the greatest and most invaluable material. This is evident from the antiquities unveiled from excavations in different parts of the world. "Several thousand years ago this quality came to be recognized by man and delighted in making pottery. Thus a beginning of civilization came into being" (Singh 1979:13).

Flourishing of NBPW: The NBPW culture started in the Indian Subcontinent during the Iron Age (1700 BC to 230 BC). At the same time, two other special types of pottery cultures were also succeeding. The Painted Gray Ware (PGW) culture and Black and Red Ware (BR) culture thrived alongside the NBPW culture. The NBPW culture was prominent at the end of the Vedic era (700 BC) and it rose to the pinnacle of its glory in the 1st century B.C. At first, NBPW culture spread out in the great Mahajanapada or 16 districts of Northern India and subsequently proliferated throughout the entire Indian subcontinent. "The NBPW period witnessed the emergence of urbanization in the Ganga valley and existence of a strong central administration under the Mauryas, and the rise of Buddhism and Jainism. All these events were turning points for the subcontinent" (Rahman 2000:138).

Besides Black Polished Ware, some other varieties of NBPW have been found, such as grey, red, ochre, silver and gold colour with slip. And these wares are very exceptional or extraordinary quality NBPW, and were of the highest degree of technological excellence in the 6th century BC.

A number of specimens of NBPW have been discovered in the ancient archaeological sites in the Indian subcontinent. "Early discoveries of the NBPW were at Sharnath near Varanasi (Marshall in ASI-AR 1904-5:59), at Bhita near Allahabad (Marshall 1909:40), where it was described as Fine Black Lustrous and Lower Levels of Bhir mound, Taxilla (Marshall 1951:432), where it was regarded as Greek Black Ware. (Ghosh 1989:251)". R.E.M Wheeler and Krishna Deva published a report in 1946, and they christened these potteries as "Northern Black Polished Ware" (Ghosh 1989:251). They identified that the Ganga basin is the main centre of NBPW and mentioned the names of 18 archaeological sites, of which Tamluk, Bangarh and Chandrakatugarh were the most noteworthy.

The discovered NBP Wares from Mahasthangarh were vessels, large dishes, small dishes, cups, beakers, lipped basins, shallow dishes, and noteworthy pitchers. Some of them were featureless with an in-curved rim, and some had an externally thickened featureless rim, or an externally

thickened grooved rim. There was very fine fabric, with a grey and black core and well levigated. Both surfaces were very smooth, and were black slipped, red slipped and polished.

NBPW was not made or used in all regions in a certain era or at the same time. Actually this culture flourished and reached the pinnacle of its glory from the 7th to 1st centuries BC. For the first time, Northern Black Polished Ware has been found at Saranath and Bhita archaeological sites, dating from the Pre-Mauryan period (6th to 4th centuries BC). The NBPW culture spread continuously from the Upper Ganga to the Lower Ganga and gradually entered ancient Bengal and Bihar. It has been proved that the NBPW culture was widespread in the Indian subcontinent from Peshawar to the Swat District in Pakistan, Anuradhepura in Sri Lanka, Chebrolu, (Krishna district in India) in the south, Prabhas to Patna in Odisha in the west, Tildah and Tamluk in Midnapur in the east, Bangarh in the Dinajpur district, Chandrakatugarh in the 24 Pargana district, Mahasthangarh (Pundranagara) and Bhasu Bihar in the Bogra district, and Wari-Bataswar in the Narshindi district.

Naming of the site: The literal meaning of the word Mahasthan is "famous place." According to some, this place should be called Maha Snan or "famous bathing place." The old Pundranagara is now buried under Mahasthangarh. It is the ruins of the oldest provincial capital city of Bangladesh. It is known from the archaeological information that the location of this city emerged as a rich and resourceful place from the 4th century BC to the 15th century AD. The ruins of this old city on the west bank of the river Karatoa is a famous feature of today's Bogra district.

Location: This place is very important in terms of historical and archaeological value. It is situated on the west bank of the old 'Karatoa' river by the northern side of Bogra-Rangpur highway, 16 kilometers from Bogra district town. This fortified old city is 1524 meters long and 1371 meters wide, and 6.5 meters above the surrounding plain. The city was well-protected, being surrounded by a deep trench on the northern, southern and western sides and with the wide Karatoa river to the east.

Excavation at Mahasthangarh: Archaeological excavations started at Mahasthangarh fortified city in 1907 led by the District Engineer Mr. Nandi (Gazetteers 1910). In the first half of the 20th century, excavations were carried out irregularly. But excavations were continuing almost every year in the second half of the 20th century. Since the beginning of the 21st century, archaeological excavations have been continuing at Mahasthangarh fortified city.

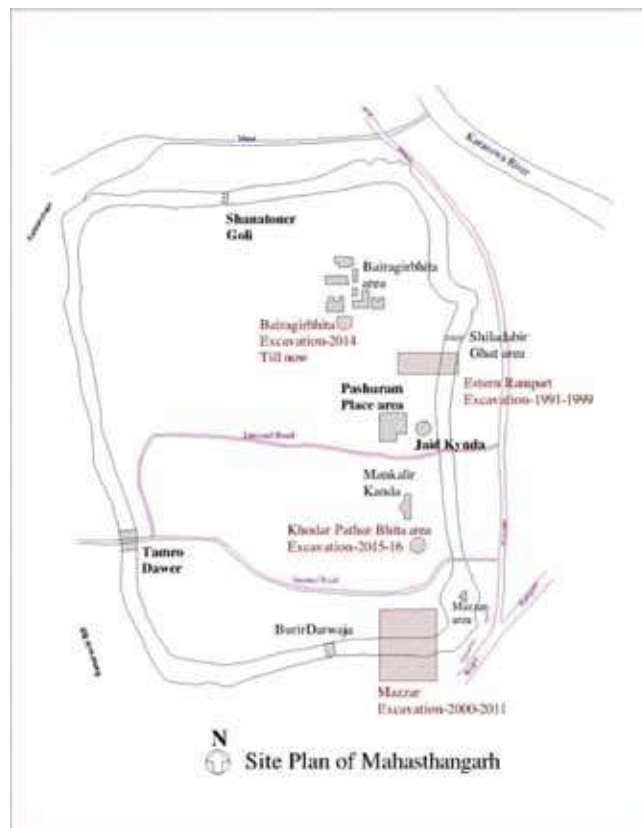
At first, specimens of NBP Ware were found at Gobindavita



Map of Shibganj Upazilla



Map of Bogra District



Site plan of Mahasthangarh (Ancient Pundranagara) Fortified city

excavation very close to the fort city of Mahasthangarh in 1960 (Ahmed 1997), and by Mankalir Kunda in 1965-66 (Ahmed 1997). After that, NBPW was discovered at the Eastern Rampart area in the city of Mahasthangarh. A Bangladesh-France joint venture excavation started at the Eastern Rampart area into the fortified city in 1993 and this continued until 1999. A systematic research paper was published (1993-1999) about the unveiled ancient structures and antiquities from the site. The results of the excavations are 18 building levels discovered from the unveiled site. A number of NBPW items have been discovered from the lowest level (Building Level 1). The lowest depth was excavated at 15.82 m above sea level (1997) (Alam and Salles 2001:83).

Archaeological excavation started here at 23.80 m above sea level and deep sounding excavation was conducted up

to the virgin soil. A total of 50 samples were collected for radiocarbon dating from the different layers excavated by both teams (Alam and Salles 2001). Level 1: NBPW was mainly found on Building Levels 1 and 1B (lowest layer) and these items had been created and used in the late 4th century BC. Level 2: Mostly NBPW with some Rouletted Ware and Red Polished Ware were found from Level 2. Level 3: Again mainly NBP Ware with some rouletted shards found on Building Level 3. Level 4: Only some NBPW obtained from Building Level 4. Level 5: Again mostly NBPW was found on Level 5 along with terracotta plaques, terracotta animal figurines, small objects, stone and glass beads, and a rock crystal ring (Alam and Salles 2001:159).

Among the 18 Building Levels, NBPW was discovered from Building Levels 1 to 5, with their time period being



Excavation at Mahasthangarh in 1993-1999



NBPW from Mahasthangarh excavation

late 4th century BC to 1st century BC. There was no NBPW found on Building Levels 6 to 18, which date to the 3rd century BC to 18th century AD. However, besides the NBP Ware, innumerable precious antiquities and potsherds were also retrieved from the excavated site.

After that, archaeological excavation was conducted in the Mazar area of Mahasthangarh (ancient Pundranagara), from 2000 to 2011 with an interruption between 2001 to 2003. A few NBPW items were retrieved from the excavation. It is true that neither team (Bangladeshi and French) did not conduct a deep sounding excavation in this area. For this reason, NBPW was not discovered here.

Again, both teams (Bangladeshi and French) have initiated

archaeological excavations close to the Bairagir Bhita site (inside the fortified city) since 2014 until now. Both teams have collected some NBP Ware from here with ancient brick structures and precious antiquities. The huge perforated terracotta tiles, Sunga terracotta plaques, and some beads prove that these NBPW items were used at the earliest occupation level. The same result comes from the 1993-1999 excavations which are well described in the "First interim report of Mahasthangarh" (Alam and Salles 2001).

Besides Mahasthangarh, NBPW specimens have been discovered in four different parts of Bangladesh: Sitakot Bihar (Archaeology 6:1969:4) (Buddhist Monastery site) in the Dinajpur district, Bhat Bhita (Buddhist Monastery site)



Recent excavation at Mahasthangarh

in the Magura district (excavation 2002-2004), and Bhasu Bihar site (Buddhist monastery site) near Mahasthangarh and Wari Bateswar in the Narsindi district. It is mentioned that the exact time period of discovered NBP Ware of Sitakot Bihar. "Discovery of Northern Black Polished Ware at the lower level of the western cell may eventually prove to be significant. After Mahasthan, this is the first site at which this type of ware generally associated with the Maurya and Sunga periods has been recorded" (Archaeology1969:4). At other sites, namely Bhasu Bihar and Wari Bateswar, the NBPW is the same as Mahasthangarh NBPW.

Conclusion: In continuation of the development of human civilization, the role of NBPW was immeasurable in the Indian subcontinent. Although the NBPW culture arose in the northern part of India, this culture gradually spread throughout the entire Indian subcontinent. In continuation of the special type of NBPW Wares have been discovered from the earliest level of the Mahasthangarh (Ancient Pundranagara) excavation and some other sites in Bangladesh. This NBPW proves that the Great Mauryan

Emperors ruled over Bengal, and that Pundranagara was a rich provincial capital city from the 4th century BC to the 15th century AD.

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Restoration of Wangditse Lhakhang

Phuntsho Wangmo, Engineer

Division for Conservation of Heritage Sites, Department of Culture, Ministry of Home and Cultural Affairs

Background

Wangditse Lhakhang under Thimphu Dzongkhag is one of the most important heritage sites in Bhutan. It is said to have been built by the 9th Desi, Druk Rabgye, in the early 18th century. However, the Lhakhang has suffered several areas of damage to the masonry walls, which worsened during the earthquake of September 2011.

Therefore, the renovation of Wangditse Lhakhang started in July 2011. During the renovation, an archaeological survey was carried out and it was discovered that there were some remains of the stone foundation southwest and northwest of the current existing external wall. The existence of a circumambulation room around the main shrine room was also discovered.

Reconstruction of external walls

As per the findings of the archaeological survey, construction of external walls on the southwest and northwest sides began. The existing southeast external wall was dismantled to be reconstructed, since the wall was in poor condition and unstable. Special stones ordered from Dawakha quarry under Paro Dzongkhag are being used for wall construction while granite stones from Sha Ngawang under Wangduephodrang are being used for corner stones.

Consolidation of walls

The old walls with cracks were consolidated by stitching and grouting as per the recommendation of conservation specialist David Michelmore. The areas where the walls were to be stitched were cut and cleaned thoroughly by removing loose mortar. The cut surface was wetted with sprinkled water, and mortar was laid over it. A stainless steel wire mesh was then placed above a layer of mortar and the new wall was constructed over it. The stitching was carried out at certain intervals. The grouting was carried out in order to fill up the voids that had developed inside the wall due to the crack and also to bind the inner and the outer leaf of the wall using an overhead tank and a 20 mm diameter flexible pipe. The grout was prepared on site by mixing local soil, lime and water in the ratio of **3:1:2.5** (3 parts of sieved soil: 1 part of lime: 2.5 parts of water). Holes 30 mm in diameter and 45 mm deep were drilled into the wall at certain intervals using a core drill. The grout was then injected into the holes.

Use of unripe green persimmon as a natural wood preservative

It has been challenging when it comes to preserving timber components, which deteriorate much faster than other historic building materials, timber being an organic material. While carrying out the renovation works, it was found that most of the timber components were not reusable. Timber inserted into the wall and unexposed to the air was found to have decayed, thus hampering the structural stability of the Lhakhang. Timber is also affected

by relative humidity, causing it to expand and contract. Therefore, various interventions in historic timber structures have become necessary in order to preserve them.

Meanwhile, Her Majesty the Royal Mother advised us to use unripe green persimmon as a natural wood preservative, which is called "Kakishibu: Traditional Persimmon Dye of Japan". It is known that kakishibu has preservative and adhesive qualities. In Japan, kakishibu is used to reinforce paper, preserve wood and clarify sake. Following the Royal command, the project team collected unripe persimmon from Shelgana, Punakha on August 24, 2016. The very next day preparation of persimmon preservative liquid started following the proper kakishibu procedure. The persimmons were washed and their calyxes removed with the help of sharpened timber. Use of a knife was restricted. They were then put into a traditional mortar made from an oak tree and then pounded by a pestle which was also made of oak. The crushed persimmons were then put into a bucket and mixed thoroughly with distilled water, which was poured in until it reached the level of the persimmon pulp. Then the bucket was covered with a lid and additional cloth was used to cover it to make it airtight and prevent dust from entering. The mixture was thoroughly mixed twice a day. A week later, the fermented liquid was extracted from the mixture by filtration through a piece of cloth. The liquid was then applied to all the timber components.

Conclusion

The restoration of Wangditse Lhakhang is still in progress. Fabrication of all the timber components has been completed. Construction of the external walls has reached the first floor. Overall, 65% of the renovation works has been completed as of today. The project is planned to be completed by the end of 2018.



Fig.1 Front facade (East) of the Lhakhang before renovation

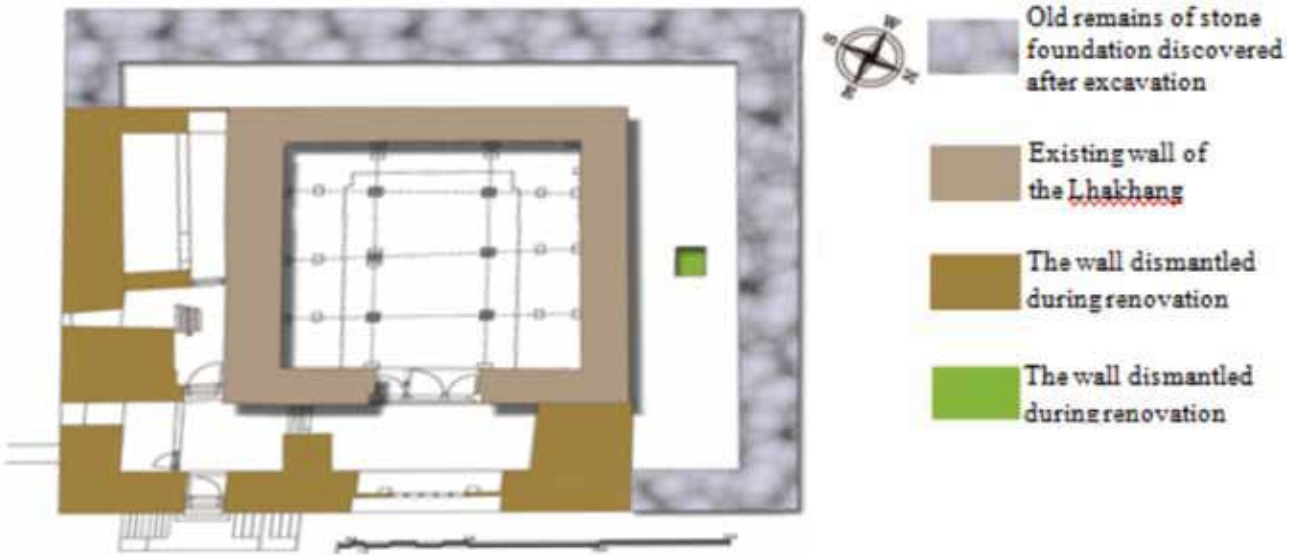


Fig.2 Plan showing existing wall, dismantled wall and stone foundation discovered after excavation



Fig.3 Surface being prepared for wall stitching



Fig.4 Wire mesh laid over the layer mortar



Fig.5 New wall constructed to stitch cracks on old wall

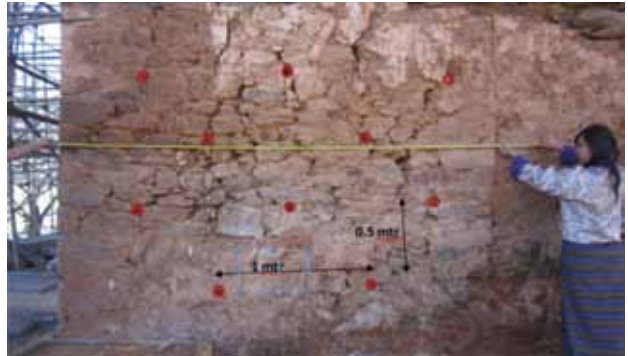


Fig.6 Red mark showing the location of drilled holes into which the grout was injected



Fig.7 Decayed timber components which were not exposed to the air



Fig.8 Reusable old timber members



Fig.9 Persimmon being crushed with traditional mortar and pestle made of oak



Fig.10 Crushed persimmon being mixed with distilled water



Fig.11 Applying fermented persimmon liquid to new timber components



Fig.12 The timber components being allowed to dry after application of the persimmon liquid



Risk Mapping and Monitoring of Ancient Monuments in the Southern Region of Cambodia

Vitharong Chan, *Deputy Director*

Department for Safeguarding and Preservation of Monuments, General Department of Cultural Heritage, Ministry of Culture and Fine Arts

The Ministry of Culture and Fine Arts will implement a risk mapping and monitoring project of ancient monuments in the southern region of Cambodia. This project is funded by the U.S. Ambassadors Fund for Cultural Preservation 2016. The signing agreement for this project between the Ministry and the U.S. Embassy in Cambodia was held on September 26, 2016 at Phnom Da, in front of Prasat Asram Moharusi.

The project aims to contribute to the safeguarding of temples in the southern region. There are more than 2,238 temples in the southern part of Cambodia, but only 64 temples still remain standing. The 24 most important temples are the following:

No.	Site*	Province	Coordinates	
1	Pr. Phnom Cheung Prei (group of monuments)	Kampong Cham	12° 3'46.66"N	104°59'23.43"E
2	Wat Tang Kok	Kampong Cham	12° 8'5.54"N	104°56'24.00"E
3	Pr. Kok Khvet	Kampong Cham	12° 6'16.61"N	104°56'58.30"E
4	Pr. Preah Theat Tuk Chha (group of monuments)	Kampong Cham	12°10'53.31"N	105°11'39.44"E
5	Pr. Han Chey (3 towers)	Kampong Cham	12° 9'43.88"N	105°31'41.64"E
6	Pr. Kampong Preah (2 towers)	Kampong Chhnang	12°29'35.12"N	104°28'26.65"E
7	Pr. Phnom Ponnareay (2 towers)	Kampong Chhnang	12°24'35.90"N	104°44'24.50"E
8	Pr. Sakhla	Kampong Chhnang	12°25'6.41"N	104°47'41.01"E
9	Pr. Srei	Kampong Chhnang	12°23'57.34"N	104°48'39.46"E
10	Pr. Thnam Phdei	Kampong Chhnang	12°22'54.65"N	104°48'0.41"E
11	Pr. Kaek Pong	Kampong Speu	11°25'13.46"N	104°23'19.24"E
12	Pr. Phnom Chngok	Kampot	10°38'34.51"N	104°16'9.64"E
13	Pr. Phnom Khyang	Kampot	10°36'32.65"N	104°31'0.70"E
14	Pr. Phnom Toteong	Kampot	10°41'47.80"N	104°31'22.04"E
15	Pr. Wat Tani	Kampot	10°46'31.60"N	104°39'47.51"E
16	Pr. Preah Theat Chong Srok	Prei Veng	11°44'55.82"N	105°21'32.29"E
17	Pr. Phnom Ta Mao	Takeo	11°18'4.94"N	104°48'5.66"E
18	Pr. Phnom Thma Doh	Takeo	11°18'6.15"N	104°47'57.52"E
19	Pr. Phnom Da (2 towers and 7 grottos)	Takeo	10°57'51.88"N	104°59'18.63"E
20	Pr. Phnom Bayang (group of monuments)	Takeo	10°38'39.33"N	104°50'20.53"E
21	Pr. Cheung Ang	Thbong Khmum	11°52'49.90"N	105°48'23.65"E
22	Pr. Preah Samdei	Thbong Khmum	11°52'42.92"N	105°47'7.09"E
23	Pr. Prei Ki	Thbong Khmum	11°51'19.89"N	105°47'24.64"E
24	Pr. Banteay Prei Nokor (group of monuments)	Thbong Khmum	11°47'49.03"N	105°44'50.37"E

* Pr. = *Prasat* (temple)

These temples are uniquely noted for their primitive architecture and man-made caves, and were mostly built of brick during the late 6th to early 9th centuries CE. Most of them were classified as the principal temples for the most significant pre-Angkorian period monuments, which are very important to the Khmer cultural heritage and for ancient architectural studies. The architecture, works of art and inscriptions of those sites constitute the most significant and complete early expression of a distinct Khmer culture that drew upon and adapted Indian architectural concepts and iconography and their accompanying artistic styles, which means that the temples exhibit the achievement of advances in Khmer architecture in the primitive period. Additionally, those sites continue to be used for the purposes for which they were established, namely architectural extensions and traditional worship, from the pre-Angkorian to post-Angkorian periods.

Aims and activities of the project

This project will create technical and architectural documentation in order to help protect the temples from emergencies. As a result of this project, architectural drawings will provide a detailed extension of the national database of Khmer monuments known as CISARK (<http://www.site-archeologique-khmer.org>). This project will lead to the sustainability of efforts to safeguard and conserve the monuments in the future; however, human resource training activities are also included in the project. The result of the project will be provided to the Ministry's long-term conservation framework for the southern region.

The project and related budget will cover 24 months' worth of activities along with other main activities. The first activity will involve an architectural survey of the existing features of each temple. This survey of architectural data will be the

first step among other working processes. The necessary data will be surveyed through photography and 3D Photoscan for example. For some special classified temples, architectural measurements will also be taken such as plans, elevations and sections by a total station measurement instrument. The documentation will be preserved in a digital archive for future research and conservation.

The second one will be carrying out risk mapping. The risk mapping will begin at the same time as the architectural data survey. This work is the most important part of the project, and will apply to each temple at least once. The technical team will evaluate the risks of each temple in advance before starting the data survey and risk mapping. On the other hand, temples with decoration remaining such as bas-reliefs, paintings and inscriptions will also be paid much attention. A digital data survey of those decoration parts will be done. For the inscriptions, rubbing on the inscriptions will be done and this new documentation will be used as a comparison with any old documents that still exist. These data will then facilitate the study of art and inscriptions.

The third main activity will be to provide first aid / emergency conservation. After the first risk assessment, we also have a project for carrying out emergency work on those bas-reliefs, paintings and inscriptions which are at high risk. To conserve these elements of temples including those at high risk or susceptible to hazards, they will be supported to prevent any further loss and in fact strengthened.

The fourth activity will be risk monitoring. After obtaining the result of the data survey and evaluation of the risks of all temples, the plan to observe the progress of those risks will be conducted by the technical team. The monitoring will mainly focus on: a. Movement/vibration of the parts in danger, b. Strength of materials, c. Problems in the construction technique.

For temples which have a problem with trees and unwanted plants, we will do clearances, but only if it will not affect the balance of the temples. This project will also endeavor to find a better solution for tree clearance from the temples. The result of this step will be used for the next conservation activities. At the end of this project, a report will be prepared and published. A final report will be drawn up based on the results of the project.

Result and Outreach Plans

We intend to publish the architectural drawings of temples in a separate volume from the final report as an extension of the previous documentation. Moreover, these drawings and selected photos of the state of conservation will complement the Khmer Archaeological Sites website (<http://www.site-archeologique-khmer.org/>) as part of the technical development efforts of the Ministry.

Additionally, to afford the public diversity of information on Khmer architectural studies, we plan to create a database in the Document Center at the Department of Safeguarding and Preservation of Monuments of the 3D Photoscan results for university students and researchers, as well as conservators. To help with the sustainability of the conservation project, RUFA students will be selected for training as surveyors in a six month program. They will be trained by technical staff from the Department to assist the technical staff in surveying and measuring the existing architecture. Additionally, they will also be introduced to how to map and monitor the risks to the temple.

Furthermore, the activities under the project will be joined by people surrounding the site, who will be part of the effort to increase awareness of how to care for their community's heritages.

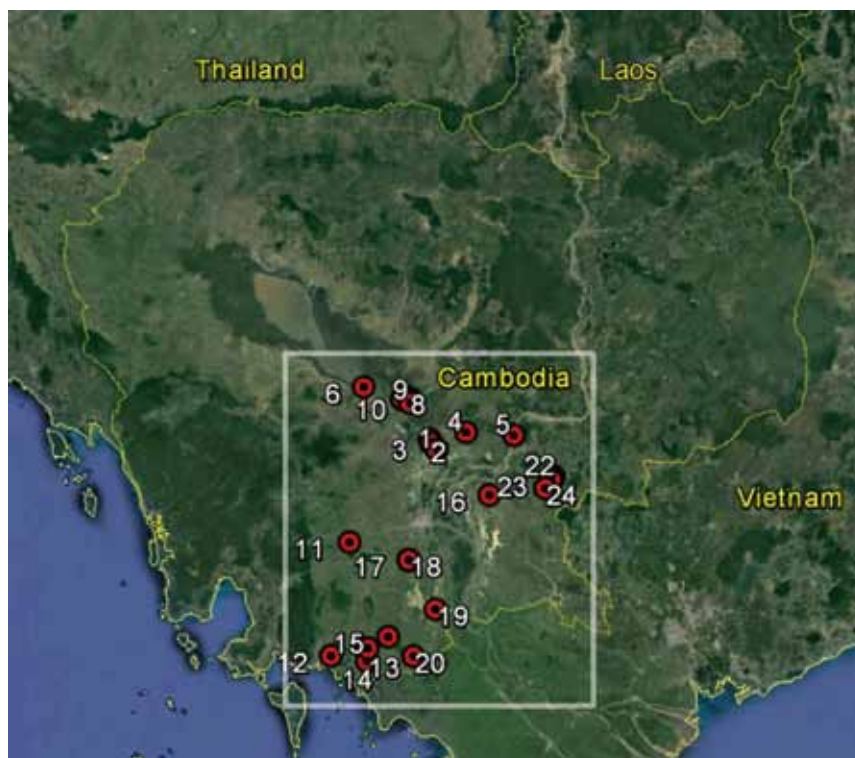


Fig. 1 Location map of the sites and detail (Map: Google Earth 2016)

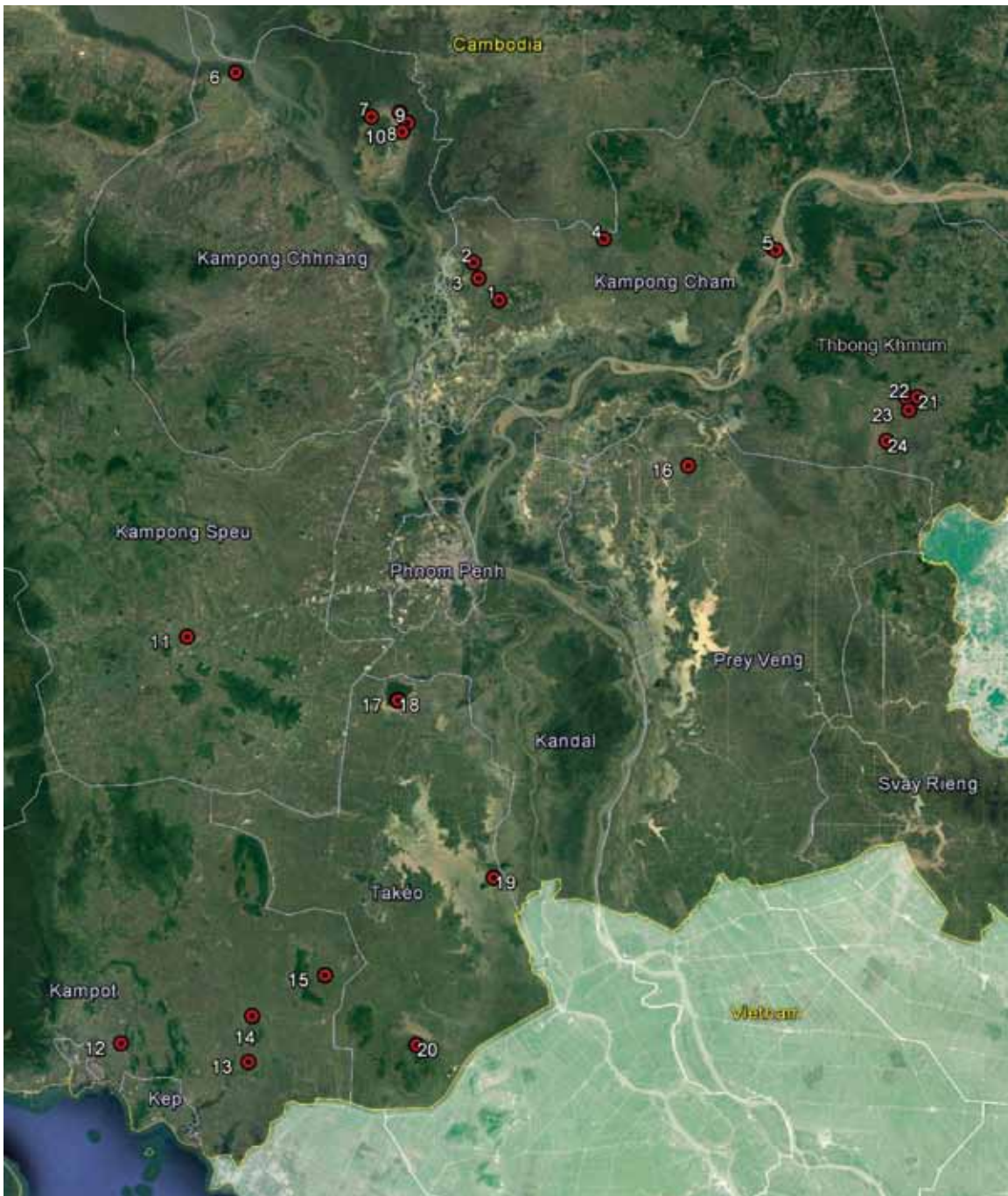


Fig. 2 Location map of the sites and detail (Map: Google Earth 2016)



Fig. 3 The main tower of Prasat Phnom Cheung Prei



Fig. 4 Stupas of Wat Tang Kok



Fig. 5 Prasat Kok Khvet (Photo: LENG Piseth)



Fig. 6 The main tower of Prasat Preah Theat Tuk Chha



Fig. 7 A tower of Prasat Han Chey



Fig. 8 Prasat Kampong Preah



Fig. 9 Prasat Phnom Ponnareay



Fig. 10 Prasat Sakhla



Fig. 11 Prasat Srei



Fig. 12 Prasat Thnam Phdei



Fig. 13 Prasat Kaek Pong



Fig. 14 Prasat Phnom Chhgok



Fig. 15 Prasat Phnom Khyang

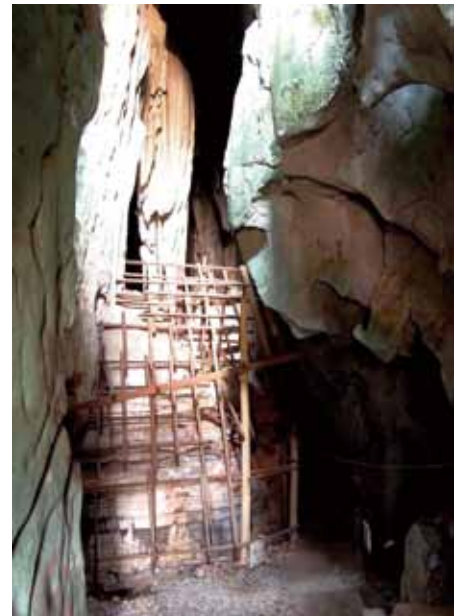


Fig. 16 Prasat Phnom Toteong



Fig. 17 Prasat Wat Tani



Fig. 18 Prasat Preah Theat Chong Srok



Fig. 19 Prasat Phnom Ta Mao



Fig. 20 Prasat Phnom Thma Doh



Fig. 21 Prasat Asram Moharusi, Phnom Da



Fig. 22 Main tower of Prasat Phnom Bayang



Fig. 23 Prasat Cheung Ang



Fig. 24 Prasat Preah Samdei



Fig. 25 Prasat Prei Ki



Fig. 26 Prasat Preah Theat Thom, Banteay Prei Nokor



Fig. 27 The signing ceremony attended by the Minister of Culture and Fine Arts and the U. S. Ambassador in front of Prasat Asram Moharusi, Phnom Da (Photo: Ministry of Culture and Fine Arts)



Exterior Restoration of the Chhatrapati Shivaji Maharaj Vastu Sangrahalaya Mumbai, India

Kunkuma Devi Kishore, *Architect and Conservation Consultant*
Good Earth Office, Bangalore, India

Introduction

Chhatrapati Shivaji Maharaj Vastu Sangrahalaya, formerly known as the Prince of Wales Museum of Western India, is one of the premier art and history museums in India. It



A view of the Chhatrapati Shivaji Maharaj Vastu Sangrahalaya Museum from the entrance

A Brief History

The foundation stone of the museum was laid by the Prince of Wales in 1905, and the museum was named Prince of Wales Museum of Western India. The building was completed in 1914 but it opened to the public much later in 1922. Until then it was used by the military as a hospital and for Children's Welfare Exhibitions. The architect of the building, George Wittet, was selected after an open competition in 1909, and is more popularly known for his design of the Gateway of India. Wittet is widely known for the Indo-Saracenic style of architecture of which this museum is one of the best examples in Mumbai.

The Architectural Style

The Indo-Saracenic style combines native Indo-Islamic and Indian architecture with the Gothic revival and Neo-Classical styles favoured in Victorian Britain, and was used by the British in India in the late 19th and early 20th centuries. The Indian pillared hall, the arched pavilion, and the dome rising above the huge intersecting arches forming a beautiful geometrical pattern together make the museum building a typical example of the Indo-Saracenic style. Small openings in the traditional Indian style known as *jalis* for light and wind add to the grandeur of the building. The dome of this building is designed after the Gol Gumbaz of Bijapur and the finial is copied from the Taj Mahal at Agra. Today, this museum houses about 50,000 artefacts and has an outstanding collection comprising sculptures, terracotta and bronzeware, excavated artefacts from Harappan sites, Indian miniature paintings, European paintings, porcelain and ivories from China and Japan, etc. Besides these, the museum has a separate Natural History section.

The Mysore-based firm Ravi Gundu Rao and Associates was awarded the contract for execution of the exterior restoration works. I was fortunate enough to be assigned

is situated on the southern tip of Mumbai close to the iconic Gateway of India and is listed as a Grade I Heritage Building. It has been awarded the 'UNESCO Asia – Pacific Heritage Award' for Cultural Heritage Conservation.



A view of the left wing of the Chhatrapati Shivaji Maharaj Vastu Sangrahalaya from the garden

the role of Project Leader (execution) for the restoration project. This article comprises a number of excerpts and photos taken from the conservation report prepared for the restoration works undertaken, in addition to the author's descriptions.

Assessment of Existing Condition and Implementation of Restoration Works

A detailed assessment of all the components of the building exterior was undertaken to analyze the existing condition and propose repair works to restore and conserve the building. The flat roof area was found to be in fairly good condition. The cracks in the existing china mosaic, which was perhaps a later addition, required resealing along the entire surface area and wall junctions so as to ensure total water proofing of the roof. The coastal city of Mumbai receives very high rainfall during the monsoons and damage due to water is a major concern along all the building components. The central main and the adjacent smaller domes too required similar treatment to enhance their water proofing efficiency. The china mosaic surface also required a thorough cleaning as lots of dirt and grime had covered the entire surface over decades. The inappropriate terrace slopes, where present, were to be corrected so as to ensure smooth runoff of rainwater and prevent stagnation. If not done, stagnant water would inevitably seep into the roof through the waterproofing layers and eventually cause damage. All the drain mouths were required to be protected by SS (stainless steel) mesh so as to prevent dry leaves and other dust particles from choking the CI (cast iron) rainwater down-take pipes.

The cement chemical membrane coating on the china mosaic of the main dome was removed by scraping and water washing with a non ionic detergent, followed by further scraping and cleaning with brass fine wire brushes.



The discoloured main central dome with dust and grime deposits



The original shine on the white dome after the non-abrasive and non-chemical cleaning process



The China mosaic dome during the cleaning process



Leaking rainwater pipes and poorly managed storm water drainage on the terrace

The process of removal of the membrane was repeated until the original shine of the china mosaic was seen, followed by rubbing dry white cement to bring back the original glaze. The small domes were grouted by drilling holes through the china mosaic surface of the dome up to the depth of the inner concrete base and fixing 12 mm diameter pipe nipples at 1 meter c/c staggered spacing in both directions with removable putty. Acrylic polymer grout mixed with white cement was used in a standard grout pump, with calibrations to avoid rupturing of the shell. The same procedure was followed to grout the flat terrace area also. All the drain-mouths on the terrace were

cleaned, the objects that had led to choking cleared, broken spouts replaced, and inner slopes corrected and protected by SS mesh.

The original rainwater drainage system was thoroughly inspected during monsoons to check for leakages and seepages as well as assess the functioning of the existing CI down-take pipe sections, and those found to be faulty or extensively corroded were to be replaced entirely or in part and along the bends. Faulty down-take pipes were causing moisture ingress in the masonry walls. The soil pipes were also to be replaced in part if there were any



Clogged drain-mouths on the terrace surface that had prevented complete drainage of surface runoff rainwater



Removal of ficus growth and application of chemicals in the crevices to kill roots and prevent further growth



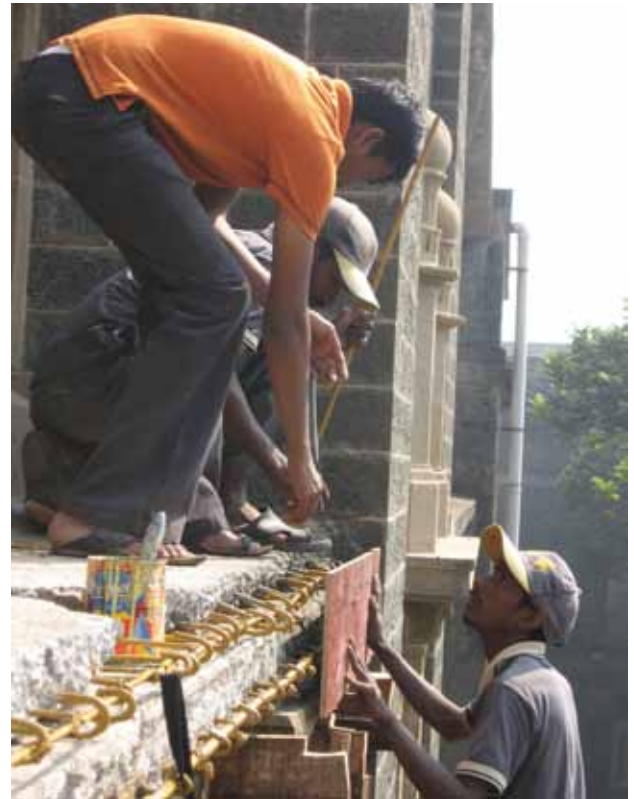
Leaking water pipes give rise to ficus growth and seepage of water into the masonry surface

damage or malfunctions found. New 100 mm diameter CI rainwater down-take pipe sections and soil pipes were fixed using MS clamps, screws and fixtures along specified locations including bends, and the joints were filled with lead. These were painted with primer enamel paint to match the stone color. Barbed wire was wound around the pipes and MS clamps were fixed, where missing, along all the rainwater and soil pipes.

The *chajjas* (sunshades/eaves/overhang) with brackets, beams and slabs beneath were found to have deteriorated, and there was de-laminated plaster along some portions as well as exposed and/or corroded steel reinforcements. These needed to be structurally consolidated. The deteriorated plaster and concrete of the *chajjas*, beams and slabs were removed after adequate propping, the steel reinforcements were cleaned with wire brushes and rusticide, and chemical coating was applied. Acrylic



Discoloured masonry wall surface with dirt grime and salt deposits on the left and a cleaned clear surface on the right



New reinforcement along the chajja and shuttering in progress for repair using acrylic polymer, cement and quartz sand

polymer, cement and quartz sand in appropriate proportion of weight were applied in layers to repair the chajja slabs after suitably shuttering along the edges.

Ficus growth was found on the wall surfaces along the different components of the building, indicating defects in pointing and the presence of cracks and crevices in cornices and walls, brackets and other ornamental stone works. It was also proof of inadequate drainage of storm water. The plant growth was removed by pulling out the root systems embedded in the masonry, cutting the stems and roots, and the application of patented chemical biocide such as 'Glycol' so as to prevent any re-growth. The area was then made good with lime and mortar.

The building is constructed using two types of stone: dark and hard basalt stone, and soft beige trackite. The stone surface had discoloured due to dust, dirt, pollution and



Discoloured urns and finials and other decorative elements with dirt grime and salt deposits on the right and a cleaned and repaired surface on the left

salt deposits over the decades and required water and chemical cleaning.



Cleaning discoloured surfaces using the water misting technique with a calibrated pressure pump and nozzle

façade before commencing the restoration works. The stone surface of the walls were gently cleaned with the 'Water Misting' technique employing an air water jet using a fine nozzle sprinkling system calibrated to spray a fine mist along the stone surface followed up by gentle brushing with soft nylon brushes. Chemical thinners and solvents were used to remove stubborn oil and emulsion stains on the stringer courses, decorative elements and stone surfaces. Clay poulticing was also adopted where required.

The original lime mortar pointing on the stone facade had been replaced by cement-based ribbon pointing on many



Tools used to remove the stubborn cement pointing, rake out incongruous mortar and carry out re-pointing in lime mortar

Parts of the ornamental Malad Stone urns like the finials, carved bases or the domes were either missing or damaged. Some portions of the masonry walls had small as well as major cracks and severely distressed stone sections in Kurla Basalt. New finials, stone bulbs and caps etc in matching Malad stone were carved by skilled craftsmen and fixed to damaged, missing stone guldastas, chhatris and other ornamental stone work in the urns. They were fixed with SS dowels and epoxy plugs by making the necessary grooves, keys and jointing etc with lime mortar and pozzollanic additives such as brick surkhi or white cement.

Temporary partitions using 4 mm thick commercial plywood were fixed to isolate the windows and other interior areas from the water misting and other works on the exterior



Masonry walls with ribbon cement pointing removed, re-pointing done in lime mortar, and washing using the misting technique after blocking all openings temporarily using plywood boards

portions of all the walls at some point in time, which not only ruined the aesthetic value of the building but also prevented the effective breathing of the masonry walls. All the hard ribbon cement pointing was removed by raking out incongruous mortar very carefully so as not to damage the masonry, and re-pointing was done in lime mortar in a 1:3 ratio to match the original colour using traditional additive materials like katha. The missing pointing work along the entire exterior surface of the building masonry and decorative elements was also undertaken in a similar manner. Specialised tools and masking tape were used to ensure clear lines and a high level of workmanship on site.



The ribbon cement pointing seen on the upper half of the corner tower has been added, while the original lime mortar pointing can be seen on the lower half

Where such elements of the ornamental work were found to be loosely held or lying around on the ground, they were re-fixed using the same method as above.

The cracks in the cornices and masonry walls were repaired by raking out to form a groove and grouting, using acrylic polymer embedding 12mm diameter pipes. Wider, bigger or structural cracks in cornices and masonry walls were stitched using two 250 mm long 8 mm diameter SS bars for every 400 mm of crack. A certain type of repair called Dutchman repair was adopted for severely distressed Kurla basalt stone



Removal of ribbon cement pointing



Re-pointing in lime mortar after covering the sides with masking tape



The domes and finials of the *guldastas* were in a damaged condition. The fallen domes were collected and refixed again



A newly carved *guldasta* dome and finial fixed beside an original and existing one

pieces of the masonry sections. It involved fixing new pieces of stone by using stainless steel pins threaded at the end after carefully cutting out the damaged profile.

The windows and doors also required major repair work, given their exposure to extensive rainfall over the years. Some of the shutters required complete replacement due to the dilapidated wooden members while parts of the decorative molding and details were missing in others. The clear glass glazing panels were also broken, cracked or missing in many windows. The painted layers on the exteriors of doors and windows and the polished layers on the interior side were cracked, peeling off and discolored. All the pointing along the doors, windows, and ventilators were distressed and in need of replacement to prevent further damage due to water seepage through these joints. The existing paint and polish layers from all the door and window frames and shutters on the exterior of the building were removed by careful scraping using sandpaper. One coat of primer and three coats of enamel paint were applied to the exterior surface, and French polish was applied to the inner surfaces. New window shutters were made and fixed with heavy duty brass hardware and clear glass glazing, all matching the original design. Where parts of the windows and doors like moulding, details and frames were damaged or missing, they were restored by the carpenters retaining as much of the original wooden members as possible, or replaced with new well-seasoned good-quality Burma Teak wood (BTC) where required. The glass

panelled fanlights that were in poor condition were also repaired using BTC, and received enamel paint on the exterior surface and French polish on the inner surface.

The building line was edged with lawns, shrubs and green trees, which would eventually lead to damage of the building foundation and seepage through the plinth. The building did not have proper site drainage to drain the storm water collected from the roof through rain water pipes. This had caused rising dampness in the wall through the foundation, thereby leading to serious damage to the interior plaster. An effective method for storm water management of the main museum building was proposed. The area along the building perimeter was excavated up to a width of 1 metre and a depth of 1.2 metres for the foundation and tuck pointing provided with cement mortar for the stone masonry. Grouting was injected through holes in the masonry foundation by a pressure pump using cement slurry and plasticised expanding admixtures to fill any hollowed out portions, thus strengthening it. The bed was prepared for the foundation and after the necessary backfilling, ramming and watering, soling was done using 80 mm size trap metal in 15 c. The voids were filled with sand.

The exterior restoration works were followed by a detailed study of the interior conditions, and interior restoration works were undertaken.



Cibanten River Expedition

Dewi Puspito Rini, *Archaeologist*

Heritage Preservation Office of Banten, Ministry of Education and Culture

Rivers, which we know as the waterways that drain water from upstream to downstream regions, have long played an important role in human civilization. It has been proven by history that rivers in the past were an integral part of a community's activities that formed its cultural character, which make rivers as an important part of human life.

The oldest such historical evidence is the very well known role of the Euphrates and Tigris Rivers to the civilization of ancient Iraq, and the role of the Nile River to ancient Egyptian civilization. Rivers also led to the rise of the ancient Indonesian kingdoms. In Sumatra, for example, the Musi River contributed to the growth of the kingdoms in South Sumatra -Sriwijaya and Palembang Sultanate- as did the Batanghari River to the kingdoms in Jambi. In Kalimantan, we obtained proof that the great kingdoms in this region grew on the banks of rivers, which were the Mahakam and Kapuas Rivers; in Java, the Bengawan Solo for the Hindu Buddhist kingdoms in Central Java and East Java; and the Brantas River to the kingdoms in East Java, which were Kediri, Singhasari, and Majapahit. In the western part of Java, there were some important towns whose growth was affected by the presence of the rivers that connected them to the coastal and inland areas, such as the Ciliwung River for Sunda Kelapa port city and the Cibanten River for the central government in Banten Girang and Banten Lama.

In the past, one of the roles of rivers in the Indonesian archipelago was to act as transportation lines, connecting the heartland to coastal areas. The heartland in the past produced a variety of crops that were exported to other regions. To transport the crops, rivers were the main choice and the easiest method for sending goods toward the coastal areas at that time. Also taking into account the need for water sources for daily use, it is not surprising that people in the past lived not far from a river.

As mentioned above, one of the rivers in Banten province, Indonesia which had such a role in the past was the Cibanten River. Cultural remains that were discovered around the river prove that the Cibanten River played a significant role in the past. One of the best-known remains is Banten Girang. This kingdom chose to place the administrative center of the kingdom on the banks of the Cibanten. After Banten Girang ceased to exist, the administrative center was taken over by the Sultanate of Banten, which also placed the central government not far from the Cibanten River, located in the coastal areas of Banten Gulf. In the same way, the center of colonial rule in Banten, which was housed on residency, was also located at the edge of the Cibanten River.

The connection between Banten Girang as the central government of the Hindu kingdom and the Sultanate of Banten in Banten Lama was the Cibanten River. In fact, the



Banten Girang site

canals in Banten Lama were connected with the Cibanten River. It should be understood that along the Cibanten River, from Banten Girang to Banten Lama, there is still a lot of data that has not been revealed. Of course, there were many factors involved in the location of governments in the past, but they always looked at the river as a starting point in selecting the location of the central government in Banten. Based on that historical evidence, in October 2015, the Heritage Preservation Office of Banten held a Cibanten River Expedition. The Heritage Preservation



Cibanten River expedition team down in the river

Office of Banten invited people from all walks of life to participate in the event. The objective of the expedition was to record the potential of cultural heritage along the flow of the Cibanten River, Banten Province.

After they went down into the Cibanten River, the expedition team obtained some important data. Based on archaeological evidence found along the stream, the area around the Cibanten River has been inhabited by humans since prehistoric times. In the next period, the role of the Cibanten River increased in importance and served the Sultanate of Banten as an international port. Some cultural heritage was successfully recorded by the Cibanten River Expedition, as follows:

1. Banten Girang Site

Banten Girang site is located in Telaya Kampong, Sempu village, Serang city. Banten Girang existed between 932 and 1030 AD. At Banten Girang site, there is a cave with three rooms, which were used for meditation. In the mid 1990s, a Dwarapala statue was found in the Cibanten River, not far from Banten Girang site. It shows that Banten Girang still holds many interesting questions for further study.

2. Kaujon Ancient Mosque

Kaujon Ancient Mosque is located in RM. HS. Jayadiningrat Street, Kaujon Afternoon Market Kampong, Serang Village, Serang city. The construction of Kaujon Ancient Mosque was influenced by Hindu-Buddhist decorative art. The lower profile of the mosque was adapted from a temple. The terraced roof of the mosque was also adapted from a temple roof.



Kaujon Ancient Mosque

3. Gedung Juang 45



Gedung Juang 45

Gedung Juang 45 is located on Ki Mas Jong Street, Serang City. During the Japanese occupation of Indonesia, this building was used as the headquarters of the Kempeitai.

4. Banten Residence Building

Banten Residence Building is located on K.H. Syam'un Street, Serang city. The building, which dates back to around 1814, initially served as a residence office.



Banten Residence Building

5. Kenari Mosque

This mosque is located in Kenari Kampong, Kasemen subdistrict, Serang city. There is no exact data about the establishment of Kenari Mosque. Folklore says that Kenari Mosque was built during the rule of Sultan Abu Mufachir Abdul Kenari (1596 - 1651 AD). He was the first ruler of the Sultanate of Banten, who acquired the title "sultan" from Mecca.



The gate near Kenari Mosque

6. Kasunyatan Mosque

Kasunyatan Mosque is located on Karangantu Port Street, Kasunyatan Village, Kasemen subdistrict, Serang city. There is no exact data on the construction of Kasunyatan Mosque. However, based on folklore, the mosque was founded by the spiritual teacher of Sultan Maulana Muhammad around the mid-sixteenth century.



Kasunyatan Mosque

7. Kaibon Palace Site

Kaibon Palace site is located in Kroya Kampong, Kasunyatan Village, Kasemen subdistrict, Serang city. This palace was built in 1815, and became the second palace in the Sultanate of Banten after Surosowan Palace. Referred to by the name of Kaibon (Motherhood),

the palace was built for the mother of the Sultan, Queen Aisyah. At that time, as the 21st sultan of Banten kingdom, Sultan Maulana Rafiudin was too young (five years old) to hold the reins of government. So, Queen Aisyah temporarily acted as a regent until her son was ready to rule.

The Cibanten River Expedition is trying to remind Indonesians that one of their cultural roots in the past that may have been forgotten is the culture associated with rivers. The Cibanten River Expedition is trying to gather information about the Cibanten River from different angles, as well as to raise public awareness about the preservation of cultural heritage. The Cibanten River has great potential to be developed, because the area along the flow of the river still has some remains of the culture which spread from Banten Girang to Banten Lama in the past. Expected later, the Cibanten River Expedition can encourage and motivate preservation of the Cibanten River that divides the city of Serang.



Kaibon Palace site



Restoration and Relocation of Rumah Bugis Traditional Timber House from Kuala Selangor to Shah Alam, Selangor, Malaysia

Professor Dr. A Ghafar Bin Ahmad, *Professor*

School of Housing, Building and Planning, Universiti Sains Malaysia

Introduction

Built in the early 1900s, *Rumah Bugis* (Bugis house), also known as the Red House, was owned by a Bugis chieftain (*penghulu*). The traditional timber house was erected and decorated with features and elements of the Bugis identity. Nonetheless, with the passage of time after three generations, the house was left abandoned. The building deteriorated due to termite infestation, roof leakage and poor maintenance. Restoration works of the Bugis house started on 25 June 2015 with a contract value of RM498,806 (USD119,888) secured by the Selangor State government agency, *Perbadanan Adat Melayu dan Warisan Negeri Selangor* (PADAT), who took the initiative to salvage, restore and relocate the house from Kampung Permatang, Kuala Selangor to the grounds of the Sultan Alam Shah Museum in Shah Alam, Selangor, a distance of 73 km. The project lasted for 10 months and was completed on 27 April 2016. The historical and architectural accounts of the Bugis house were narrated by Haji Roslan Zainal, the third heir to the Bugis house property.

Historical Background

The Bugis house was built by Mat Taib, a trader-cum-carpenter from Makassar (South Sulawesi, Indonesia) who migrated to the Malay Peninsula during the period of Dutch colonisation of Indonesia. This timber house was built during the reign of Raja Lumut, the first Sultan of Selangor. Timber, which is available in abundance in the tropical Malay Peninsula, was drawn to the construction site from a nearby village, Kampung Sawah Sempadan at Tanjong Karang, Selangor using bullock carts. The use of good timber and appropriate techniques of timber treatment can extend a house's life by about 100 years. Before the construction of the Bugis house at Kampung Permatang, Kuala Selangor, an important ritual process, was performed by the owner and local folks to select the best site and position for the house.

Architectural Significance

Raised on timber stilts upon granite stones, the Bugis house is divided into three sections: lowered verandah (*serambi jatuh*), main area (*rumah ibu*) and kitchen (*dapur*). There is a small external staircase leading up to the main entrance at the front verandah. An interval space (*selang*) exists between the main area and the kitchen. The entire building is relatively small in size with the main area measuring 28 square feet, and with a height of 20 feet from floor to roof. The verandah, located at the front of the house, has many openings including louvered casement windows and carved lattice panels which provide good ventilation. It is a common space for entertaining guests, villagers' meetings and discussions. The women folk and children spend most of their time in the main area, which also leads to the master bedroom. The Bugis house has a storage attic which can be used as a resting space as well as for keeping home appliances, mats and cooking pots used during weddings

and festivities. It is customary for young girls of the host family to keep themselves hidden in the storage attic when there are guests around in the house. Like most traditional timber houses, the Bugis house used thatched attap roofing material made of palm leaves called *nipah* (*Nypa fruticans*). The slightly curved and pitched roof of the Bugis house features double-layered gable ends (*tebar layar*) with a small window opening for both cross and stacked ventilation. The entire house was constructed without the use of a single nail. Instead, each building panel was locked using timber peg frames and wedges. The building and carpentry work was all done manually without any machinery. The building frames including trusses, columns and beams secured the timber wall panels, windows and doors. Apart from providing good ventilation, the Bugis house offers natural lighting through carved lattice panels called *kerawang*. These intricate lattice panels decorated in floral motif carvings and geometric patterns adorned the upper walls of the house.

Building Defects

The Bugis house, which was left abandoned for a period of time, deteriorated rapidly due to decayed timber structures, termite infestation, roof leakage and poor maintenance. The kitchen section fell into a state of disrepair and was demolished. A new annex was constructed using bricks, timber and zinc roofing to replace the kitchen section. A dilapidation survey was conducted prior to restoration works to identify major defects of the house, causes of the defects, methods and techniques of restoration as well as relocation. Decayed timber structures, poor condition of the palm leaf roofing, decayed windows and broken lattice panels were revealed as some of the common building defects. An architectural drawing or measured drawing of the house was drawn accurately to scale for reference during restoration and relocation.

Restoration Works

During the restoration works scaffolding was erected around the Bugis house to support the building structures, while temporary roofing of steel frames and corrugated metal decking was constructed above the house. This was to ensure that the house was well protected from heavy rainfall, particularly when the palm leaf roofing was removed and brought down to the ground. Two local carpenters, Mazlan Haji Anuar and his young nephew Muhammad Shafiq Kamaruddin, were engaged by the main contractor to restore and reconstruct the Bugis house. The Bugis house was dismantled from roof to bottom during a period of two weeks. Handling the broken and decayed timber structures and building elements required extra caution. Workers on site had to document the building structures and elements in detail in order to reconstruct the house at a new site in Shah Alam, Selangor. The dismantling process started from the roof to the roof trusses, walls including lattice panels, windows and doors,

floor boards, roof beams, floor beams, and finally, the main columns and stilts. The strut (*tupang*) system was used in the dismantling process to avoid building collapse. All building structures and elements were salvaged and marked systematically before they were temporarily stored on site. Preventive measures such as storage above ground surface and termite treatment were conducted during temporary storage. Restoration and relocation of the Bugis house involved three main stages as follows:

Stage 1: Coding, Dismantling and Salvaging

- Provide special codes for building structures and elements for reference.
- Dismantle the entire house and document the dismantling process in detail.
- Verify existing timber species and strength group.
- Identify timber condition.
- Salvage any existing timber for reconstruction.
- Document the condition of the house through the Historical Architectural Building Survey (HABS).
- Conduct video documentation of work on site.

Stage 2: Treatment, Transport and Relocation

- Mark or label existing timber structures and elements for reference.
- Transport all dismantled building materials from the site to a sawmill in Kelang.
- Conduct timber treatment including repair, replacement and replication.
- Upgrade timber species and strength group.
- Pack and store treated old and new timber.
- Transport the timber structures and elements from Kelang to Shah Alam.
- Document the treatment, transport and relocation process.

Stage 3: Remeasuring, Reconstruction and Repainting

- Identify a new site at museum grounds for reconstruction.
- Remeasure and peg the new site based on measured drawings.
- Store building materials on site.
- Reconstruct the house in its original form and design.
- Prepare for additional electrical appliances.
- Repaint the house with the original type of paint and colour.
- Document the reconstruction process in the HABS and final reports.

Timber Verification and Strength Group

All dismantled timber structures and elements were transported to a sawmill at Kampung Padang Jawa, Kelang, Selangor (a distance of 63 km) for the process of timber selection and classification. Seven samples of existing timber structures and elements were taken from the Bugis house and sent to the Malaysian Timber Industry Board (MTIB) in Kuala Lumpur for verification of the timber and strength group (SG). Results from the MTIB showed that six out of the seven timber samples were between SG 4 and SG 6, i.e. moderately strong and very strong (see Table 1). One timber sample which was used as the main column was found to be extremely strong (SG 1). In terms of the new house structures, all existing columns were replaced with extremely strong timber (SG 1) of either *Chengal Batu* or *Balau* species. Other timber structures and elements were a mix between new and old timber, and both were treated against termite infestation. Overall, 65 per cent new timber was used in the reconstruction of the Bugis house, mainly for the main columns, wall panels, floor boards and the attic staircase.

Table 1: Timber Verification and Strength Group for the Bugis House

No.	Timber sample	Sample size (mm)	Species name	Scientific Name	Strength Group (SG)
1	Gable end	11 x 72	<i>Light Red Meranti</i>	<i>Shorea spp.</i>	6
2	Window	16 x 90	<i>Dark Red Meranti</i>	<i>Shorea spp.</i>	5
3	Wall panel	20 x 90	<i>Dark Red Meranti</i>	<i>Shorea spp.</i>	5
4	Wood carving	12 x 68	<i>Yellow Meranti</i>	<i>Shorea spp.</i>	6
5	Floor board	20 x 75	<i>Perupok</i>	<i>Laphopetalum spp.</i>	4
6	Column	15 x 50	<i>Kapur</i>	<i>Dryobalanops spp.</i>	4
7	Main column	7 x 16	<i>Chengal Batu</i>	<i>Shorea maxwelliana</i>	1

Source: Malaysian Timber Industry Board (MTIB), Kuala Lumpur, 2015

Reconstruction

Reconstruction of the Bugis house in the grounds of the Sultan Alam Shah Museum began with the construction of a concrete mix foundation floor to create a level surface. Based on the measured drawings, the original granite stones were positioned on the foundation floor in the exact layout as those laid at the old site in Kampung Permatang, Kuala Selangor. Once all the granite stones were secured in place on the foundation floor, timber stilts were erected followed by floor beams, columns, beams, roof trusses, wall panels and other building elements including windows, doors, carved lattice panels and new staircases. During reconstruction of the Bugis house, scaffolding was erected to

support the building structures and elements, installation of new roofing materials, and repainting. One of the new elements introduced for the Bugis house is the roofing material. Palm leaf roofing is not suitable because it requires regular maintenance and replacement as well as being prone to natural decay and insect attacks. Asphalt shingles of a dark grey colour were used instead as the new roofing material for the Bugis house. Asphalt shingles are comparatively more durable, lower maintenance, less expensive in terms of up-front costs, and need only simple installation. They are also flexible to match the original roof shape and form. The Bugis house was repainted in its original dark red colour using locally-produced oil-based

paint (*Cap Rumah* brand from Kepong, Selangor). The wood carving fixtures in the house interior were repainted in a shade of gold to revive their original colour. On 21 July 2016, the newly reconstructed Bugis house was officially handed over to PADAT Chairman YB. Datuk Dr. Ahmad Yusuf Hairi, witnessed by PADAT CEO Faizul Fitri Muslil, the PADAT conservator, representatives of government agencies, consultants, contractors, carpenters as well as family members and relatives associated with the Bugis house.

Conclusion

The restoration and relocation of the Bugis house presents a good example of a building conservation success story in Malaysia. To ensure the project's success, the Selangor State government agency PADAT worked closely with the conservation team including the consultant quantity surveyor, building conservator, building contractor and carpenters to monitor the work progress and resolve any technical matters through site meetings. At an earlier stage, attempts to secure a storage space on a neighbouring lot had failed due to a dispute over the rent to be charged. Moreover, the approval letter issued by the Shah Alam City Council to allow reconstruction of the Bugis house was delayed due to land conversion matters on site. More delays were observed in the appointment of a third party for site preparation and laying the foundation floor. The project team also faced a number of challenges since most of the building sections included decayed timber and were badly damaged due to poor maintenance and termite infestation. The salvaged timber was insufficient to reconstruct the entire house. Outsourcing of new timber with an upgraded strength group also took considerable time since certain timber species are more suitable for particular building structures and elements. Using asphalt shingles as the new roofing material posed another challenge to carpenters and roof installers, who needed to maintain the original shape of the slightly curved and pitched roofs.

Despite these challenges, the reconstruction of the Bugis house shows evidence of inheritance, with invaluable carpentry knowledge and skills being passed down from an older and more experienced carpenter to a young apprentice. It is recommended that more trainee carpenters involve themselves in the traditional methods and techniques for the conservation and repair of traditional timber houses. The initiatives undertaken by PADAT in ensuring the

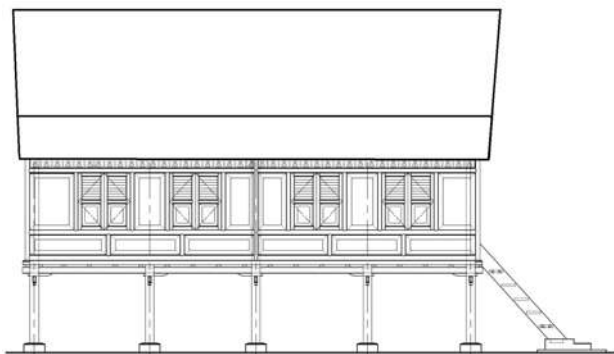
protection and restoration of traditional timber houses in Selangor including the Bugis house are highly commendable. The restoration and relocation of the Bugis house could not be completed successfully without the full support, good communication and amicable cooperation of those involved in the project at all levels. The entire team must be equipped with the necessary knowledge, materials, and skills, as well as a positive attitude and outlook to retain and upkeep the legacy of traditional timber houses. Today, the Bugis house stands proudly in the grounds of the Sultan Alam Shah Museum, to be valued and appreciated by all generations, and it has become a popular attraction amongst local and foreign tourists in Shah Alam, Selangor, Malaysia.

Acknowledgements

The author wishes to thank the Selangor State Government, particularly *Perbadanan Adat Melayu dan Warisan Negeri Selangor* (PADAT) and its Chairman, YB. Datuk Dr. Ahmad Yusuf Hairi, CEO Faizul Fitri Muslil, and Project Officers Intan Salina Idrus and Mohamad Noor Hisham Ibrahim; QS Consultant SG Contract Services, Contractor Saharruddin Construction Sdn. Bhd., Building Conservator Shahrudin Shabri, Carpenters Mazlan Haji Anuar and Muhammad Shafiq Kamaruddin; the School of Housing Building and Planning, Universiti Sains Malaysia (USM); and USM LRGS Local Knowledge Project 3 Team (LRGS/TD/2012/USM-UKM/KT/03) for making this project and article possible.

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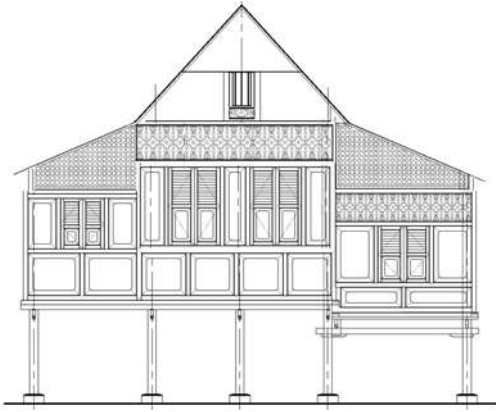
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The front elevation of the Bugis house showing its timber stilts, louvered casement windows and decorated wall panels.



The right elevation of the Bugis house showing its external staircase leading to the entrance door, carved lattice panels, louvered casement windows of two sizes, double-layered gable end with a small window and a pitch roof.



The left elevation of the Bugis house showing the two floor levels which are the lowered verandah (*serambi jatuh*) and main area (*rumah ibu*).



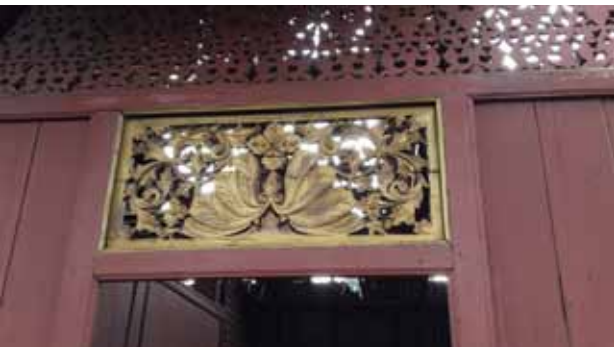
The front view of the Bugis house in 1999 revealing building defects such as a missing gable end, broken carved lattice panels and decayed thatched attap roof made of palm leaves.



View of the Bugis house in 2014 after it was left abandoned and had deteriorated rapidly due to decayed timber structures, termite infestation, roof leakage and poor maintenance.



Carved lattice panels (*kerawang*) decorated in floral motif carvings and geometric patterns adorned the upper walls of the Bugis house.



Painted in a shade of gold, the intricate floral motif carvings above the door frame reflect highly-skilled carpentry.



The entire Bugis house was constructed without the use of a single nail but it was locked using timber peg frames and wedges.



Decayed timber stilt and floor beam due to natural decay and termite infestation.



During the dismantling stage, scaffolding was erected around the Bugis house to support the building structures, while temporary roofing was constructed above the house to protect the interior from heavy rainfall.



Special codes were marked on timber elements before dismantling and salvaging.



All timber structures including stilts, floor beams and floor joists were marked and coded for reference.



Dismantling the Bugis house.



Dismantled louvered casement windows were taken down to the ground for investigation and salvaging.



All dismantled timber structures and elements were transported to a sawmill for the process of timber selection and classification.



Timber structures and elements were repaired, replaced and replicated at a sawmill in Kampung Padang Jawa, Kelang, Selangor.



Restoration of casement window panel in progress.



All new and old timber structures were treated against termite infestation.



Carpenters handling a newly restored gable end.



Treated timber structures and elements were loaded onto a truck at the sawmill before being transported to the new site.



The Sultan Alam Shah Museum in Shah Alam where the Bugis house was reconstructed at a new site next to this museum.



Reconstruction of the Bugis house in the grounds of the Sultan Alam Shah Museum began with the construction of a concrete-mix foundation floor to create a level surface.



During reconstruction of the Bugis house, scaffolding was erected to support the building structures and elements, installation of new roofing materials and repainting.



Installation of asphalt shingles on the roof.



View of the Bugis house during reconstruction.



Front view of the Bugis house after reconstruction.



Right elevation of the Bugis house after reconstruction.



Interior view of the verandah after reconstruction.



Newly restored floral motif carvings and geometric patterns on the upper walls.



Storage attic featuring double-layered gable end, small opening and pitched roof ceiling after reconstruction.



On 21 July 2016, the newly reconstructed Bugis house was officially handed over to PADAT Chairman, YB. Datuk Dr. Ahmad Yusuf Hairi, witnessed by PADAT CEO, Faizul Fitri Musliil and PADAT conservator Profesor Dr. A Ghafar Ahmad.



View of the Bugis house at night illuminated with floodlighting.



Cowrie—an Early Global Commodity: An Archaeological Research on the Islamic Period of the Maldivian Islands

Shiura Jaufar, *Archaeologist*
Department of Heritage, Republic of Maldives

Cowrie shells, most importantly *Cypraea Moneta*, played a pivotal role and were a valuable commodity during the early global trade and exchange that took place around the world. They were used as a currency in many parts of the world and were exchanged for various kinds of goods as well as African slaves. According to several historical sources, it has often been suggested that the Maldives were the main exporter of these shells. The use of cowries in the trade links along the Indian Ocean trade network as well as the production and importance were mentioned by several authors from the ninth century onwards; however, this had never been tested archaeologically. Thus in December 2014, Prof. Anne Haour from the University of East Anglia received a grant from the Leverhulme Trust to conduct research in the Maldives as part of a research project investigating the timescale and nature of the importation of cowrie shells into West Africa from 1150 to 1900.

This paper will briefly report on the archaeological fieldwork undertaken in early 2016 in the Maldives, which involved test excavations at three sites (Ha. Utheemu, K. Male' and M. Veyvah). Broader surveys were also conducted mainly in Raa Atoll, which will not be discussed in this paper. The field team consisted of the Principal Investigator Prof. Anne Haour, Post-Doctoral Researcher Dr. Annalisa Christie, and the author as the PhD candidate for the project. The aim of the research was to identify sites likely to date to the medieval Islamic period.

The first site excavated was the island of Utheemu in Haa Alifu Atoll. Utheemu is a rather important island in the country's history, and reports of the discovery of a cowrie hoard along with various artefacts (including pottery and glass) apparently indicative of medieval trade had been received from the island. Five test pits were dug in four different areas of the island, including two units inside the Utheemu Palace. The other three units were placed within the current football field, a mound behind the palace and within a field nearby that had been marked as a tourism zone on the island. Test-pit methods and sizes differed per unit according to the nature and occurrence of the site within the area. Of the five units excavated, the palace and the tourism

zone trenches were the most productive. Finds included several sherds of pottery, glass (including bracelets) and metal fragments, charcoal, shells (including cowries), faunal remains (mostly fish bones), coral stone blocks as well as a female grave in one unit of the palace and one bead.

Male' was the next site to be excavated—this had been historically, as well as today, the capital island of the Maldives. The Sultan's Park where the former palace once stood was selected for excavations since it is one of the only remaining open spaces in Male', being one of the world's most densely populated islands with few prospects for a study of undisturbed remains. This park consists of the only surviving building of the former palace structures (*Usgekolhu*) and eight shovel-test pits were established within the empty area in front of the building. The finds were similar to Utheemu with the exception of human bones and beads. There was less pottery than at Utheemu, but more cowries.

The island of Veyvah in Meemu atoll was the final site for excavation and was selected due to the presence of an ancient coral stone mosque (about 400 years old) on the island, and also because it offered good prospects for a study of undisturbed levels. Due to most of the open spaces being used for habitation, excavations were targeted within the agricultural fields around the island. Five units were excavated in different areas, of which three units provided promising results. The finds from this island were also similar to those discovered at Utheemu and Male', again with the exception of human bones and less pottery. One bead was also discovered on this island.

To sum up, this is an ongoing project and the findings and results of the first season are currently being studied. The second season of fieldwork will take place next year. At this point, the author would like to thank the project team at the University of East Anglia, United Kingdom; Department of Heritage, Maldives National Museum, Academy of Dhivehi Language, Boduthakurufaanu Memorial Center and all the atoll and island councils in the Maldives for their continuous support for this project.



Fig 1: Female grave found in trench 5 in Ha. Uttheemu (Jaufar 2016)



Fig 3: Excavations at K. Male' (Haour 2016)



Fig 2: Unit 3 in Ha. Uttheemu (Haour 2016)



Fig 4: Pot sherd from the excavations (Jaufar 2016)



Fig 5: Excavations at M. Veyvah (Haour 2016)



The team: Prof. Anne Haour, Shiura Jaufar and Dr. Annalisa Christie (from left to right)



Protection of Cultural Heritage in Urban Areas in Mongolia: The Tonyukuk Complex

Munkhtulga Rinchinkhorol, *Researcher*

Institute of History and Archaeology, Mongolian Academy of Sciences

The Tonyukuk complex is situated 40 km to the south-east of Ulaanbaatar city, the capital of Mongolia, along the border between Nalaikh district, which is one of the most populated urban areas near the Tuul River valley, and Erdene soum, Töv aimag. There is a small settlement, the Ar Janchivlan Springs Resort, 2.6 km to the south-east of the complex.

In 1897, this complex was discovered by a team from the Orkhon Expedition of the Imperial Russian Geographical Society, which was led by Je.N.Klementz. [Vojtov 1996:13] From that time onwards, the complex, which is not far from the Mongolian capital, has been studied by many researchers and expeditions. In particular, the inscriptions of its two steles have been translated into many languages by generations of Turkologists.

In 1902, C.W.Campbell, who was British, came to the Tonyukuk complex and wrote a brief description. He seems to have been the first Western traveler to see the Tonyukuk complex and write about it. [Campbell 1903:516]

To date, various scholars and expeditions have excavated the site of the Tonyukuk complex as follows: G.J.Ramstedt and S.Pälsi (1909), B.Ja.Vladimirtsov and B.Baradin (1925), N.Ser-Odjav (1957), and Mongolian-Turkish Joint Expeditions (2015-2016). [Pälsi 1982:57, 124-126; Ser-Odjav 1970:29-32; Enkhtör et al. 2016; Battulga et al. 2016] It should also be noted that G.Menes and V.Je.Vojtov, who were members of the Mongolian-Soviet Joint Historic-Cultural Expedition at the same time, carried out archaeological documentation work including a plan of the complex and drawings of human-figure stone statues and stone slabs of enclosures of the complexes, in 1983. [Menes 1983:21-26]

This complex was built in memory of Bilge Tonyukuk, who was a vizier during the reigns of three Khagans of the Second Ancient Turkic Empire, in c. 720 AD.

In the middle of a plain surrounded by mountains, which is an example of the best fertile pasture in the region, there is a rectangular earthen platform enclosed by an earthen ditch and a canal. A building identified as a shrine in memory of Tonyukuk was erected in the central area of the platform. Two quadrangular enclosures made of stone slabs and many human-figure stone statues were also erected on the platform. To the east of the platform, there are *balbals*, many standing stones in a row; the length of this important element of the complex structure is 1.3 km. In all the above elements, the Tonyukuk complex shares the same structural features as Ancient Turkic aristocratic memorial complexes in Mongolia.

There are two other Ancient Turkic monuments near the Tonyukuk complex. (Fig. 1) One of them is known as Complex 2 and is located 582 m to the north-east of the Tonyukuk complex. (Fig. 1 and 28) Complex 3 is located 740 m to the north-west of Complex 2 and 1167 m to the

north of the Tonyukuk complex. (Fig. 12) Individuals to whom these two complexes were devoted probably belonged to Tonyukuk because of the common features of all three complexes and the short distances between them.

On the plain, where the three above-mentioned complexes are situated, there are many other monuments. However, the state of protection of only these complexes will be considered in this article.

The Tonyukuk complex was partially protected by the state in accordance with an act of the 79th meeting of the Little State Khural's Presidium of the Mongolian People's Republic in 1941. [Perlee (1942) 2012:16, 18]

In 2002, in accordance with the 71st decision of the government of Mongolia, the protection zone of the Tonyukuk complex was enlarged to 65.58 km². Also the local authorities were ordered to take measures to forbid activities likely to threaten the conservation, protection, and completeness of the monument, including the construction of buildings inside the protection zone. [Tüükh soyol 2008:79; www.legalinfo.mn/law/details/4767?lawid=4767]

During the last two decades of the 20th century, the preservation of the Tonyukuk complex was restricted to fencing around only the steles and enclosures. The people who erected the fences at least twice at the site have damaged the floor of the complex platform when they dug postholes directly on the platform. They have also filled the postholes with bricks, roof-tiles, and stones from the building and the platform floor of the complex. (Fig. 3) Furthermore, they mixed the cement for the bases of the iron posts with roof-tile pieces of the shrine. (Fig. 4) Traces of all these actions have been revealed by our excavations in 2015-2016.

Some part of the floor made of bricks which had covered the platform were uncovered by the excavation of 1957, but it has never been reburied. Thus, the bricks of the platform floor have deteriorated due to human-caused factors and natural impacts over 60 years. (Fig. 5) The last iron fence for the complex measures 59.7x45.6 m. (Figs. 13 and 16)

A prominent thing that distinguishes the Tonyukuk complex from the other Ancient Turkic aristocratic complexes in Mongolia is the inscription on two steles. (Fig. 2) In the text of the inscription, Bilge Tonyukuk's biography is written in the Ancient Turkic Runic alphabet. It contains some interesting information concerning Inner Asian socio-political history of the early 7th to late 8th centuries AD, including the relationship between Tang China and the northern nomads, nomadic politics, and "secrets" of the independence of the Second Ancient Turkic Empire, which are not mentioned in other sources. The 62-line inscription is also an important language source for Altaic historical linguistics because it is one of the earliest written documents

of the early medieval Inner Asian nomads themselves.

The human-figure stone statues of the complex are the basic source materials for reconstructing the society and culture to which the lord of the complex and his followers belonged. [Bayar 1997:69] In terms of the number of human-figure stone statues, the Tonyukuk complex is the third largest complex of that period. (Table) However, a stone statue with the most unique depiction and a long cylindrical stone, which might have been a representation of a vessel used for containing liquids, perhaps koumiss, have been looted.

Enclosure 1 of the complex is the second largest enclosure in terms of slab size among the other enclosures of Turkic

aristocratic complexes. A very unusual component of this enclosure is a standing stone engraved with rosette decorations, which is erected in each of its four corners. When the complex was discovered, there were seven relatively well-preserved slabs in these two enclosures, including a cover slab for Enclosure 1. After the 1957 excavation, some of them were looted and damaged. (Table)

Another element indicating the social status of the deceased is *balbals*. There are many *balbals* in the complex of Tonyukuk. (Table) However, it should be mentioned that most of the standing *balbals* have been erected using a non-scientific method and even without the necessary documentation.

Year	Number of stone statues	Number of enclosure slabs		Number of balbals
		Enclosure 1	Enclosure 2	
1909	7 (?)	4 slabs and half of the cover slab	2 slabs	?
1957	9	4 slabs and half (?) of the cover slab	2 slabs	~400
1983	8	3 complete slabs, 2 fragments of a slab and ¼ of the cover slab	1 slab	286
2015	7 (2 at the site, 3 in the storehouse near the site and 2 at Mongolian National Museum)	3 complete slabs, 2 fragments of a slab and ¼ of the cover slab	No slab	<280

In 2014, after construction of the 11 km long road located 25 m to the west of the Tonyukuk complex was completed, some local authorities began to give permission for the use of the virgin land adjacent to the heritages. (Fig. 1) Then the whole plain where the heritages are situated began to be demarcated by tires and iron rods. (Figs. 6, 7 and 14)

Ploughed field. To the south and adjacent to the row of balbals in the complex there is a rectangular iron fence. (Figs. 8 and 9) The field inside the trapezoid fence, measuring 440x420x165x84 m was almost entirely ploughed three years ago but nothing has yet been planted there. Now there are not only furrows and mounds, but also garbage that has been dumped inside the fence. (Fig. 10)

Holiday camp. In the spring of 2015, the judges of the Constitutional Court of Mongolia built a holiday camp, including a house and concrete walls, for their own use. (Fig. 11) It is located 239 m to the west of Complex 3. (Fig. 12) This immoral action of a superior organization of the state inevitably affected the people who want to use the virgin land around the memorial complexes.

Large iron fence. In August 2015, after the camp of the Constitutional Court was built, several men came to a place 648 m to the south-west of the Tonyukuk complex and began to dig there. (Fig. 13) Having dug post holes, they erected a large iron fence. (Figs. 14 and 15) In the spring of 2016, they planted potatoes inside the southern part of the fence.

Off-road racing. In August 2015, at a place 630 m to the west of the Tonyukuk complex, virgin soil was dug up by an excavator to create a place for short course off-road racing. (Figs. 16 and 17)

Other fenced and ploughed areas. In the spring and summer of 2016, several large fences were erected between the camp of the Constitutional Court and a point 520 m to the north-west of the Tonyukuk complex. Some parts have

already been cultivated. (Figs. 18 and 19)

Trenches for bases of block fences. Also in spring 2016, very long trenches for bases of three extremely large rectangular block fences and numerous circular hollows for mixing cement were dug between the Tonyukuk complex and Complex 3. (Figs. 20-27) These trenches are located 80 m to the north of the Tonyukuk complex and 420 m to the south of Complex 3. Furthermore, the trenches are very close to Complex 2, which is located to the east of them; the distance between Complex 2 and the eastern line of the trenches is only 12 m. (Figs. 28 and 29) The area enclosed by these trenches is approximately 179200 m², almost 66 times larger than the fence around the Tonyukuk complex. (Fig. 1)

Conclusion

The 1300-year-old Tonyukuk complex is one of the many endangered immovable historic-cultural heritages in urban areas in Mongolia.

All the facts clearly indicate that a number of state organizations, companies, individuals and especially local administrations in Mongolia break the laws and ignore various legal documents of the state concerning protection of the immediate surroundings, natural environments and cultural landscapes of historic-cultural heritage sites.

Unplanned and uncontrolled development projects encroaching upon immovable historic-cultural heritage sites in or near urban areas in Mongolia increasingly lead to the destruction, demolition and alteration of land-use of the sites and their legally designated settings and protection zones.

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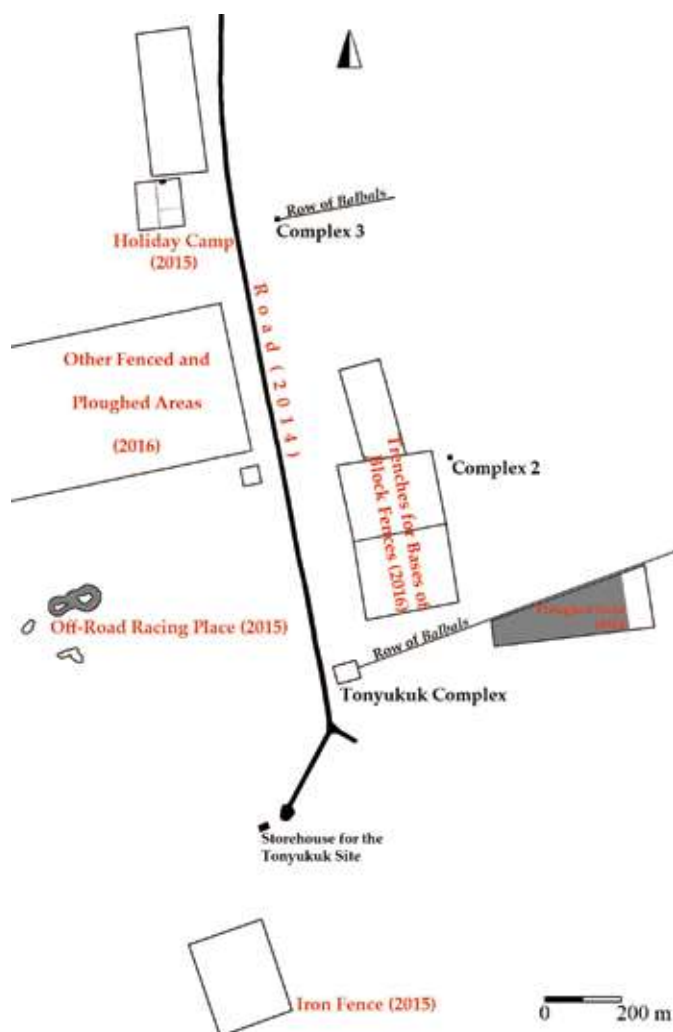


Fig. 1: Plan of the immediate surroundings of the complexes



Fig. 2: Stele of Tonyukuk



Fig. 3 Brick from the Tonyukuk complex has been used to fill a modern post-hole



Fig. 4: Post-hole cement with roof-tile pieces



Fig. 5: Brick floor on a platform of the Tonyukuk complex



Fig. 6: Tires used for land demarcation



Fig. 7: Iron rods used for land demarcation and the Tonyukuk complex. From the south



Fig. 8: Tonyukuk complex, its *balbal* row and ploughed field adjacent to the *balbals*



Fig. 9: Tonyukuk complex, its *balbal* row and ploughed field.
From the south-west



Fig. 10: Row of *balbals* and the north-west corner of the ploughed field



Fig. 11: View of the holiday camp of the Constitutional Court from the Tonyukuk complex



Fig. 12: Complex 3 and the camp of the Constitutional Court. From the east



Fig. 13: Tonyukuk complex, road and large iron fence. From the north-east



Fig. 14: Large iron fence. From the north



Fig. 15: Large iron fence. From the north-east



Fig. 16: Tonyukuk complex, road and place for short course off-road racing. From the south-east



Fig. 17: View of the off-road racing place from the Tonyukuk complex



Fig. 18: Newly-fenced areas. From the south-east



Fig. 19: Newly-fenced areas and the camp of the Constitutional Court. From the south-east



Fig. 20: Trench for base of block fence and the Tonyukuk complex. From the north-east



Fig. 21: Trench for base. From the south



Fig. 22: Trenches for base of block fences and the Tonyukuk complex.
From the north



Fig. 23: Trench for base.
From the south



Fig. 24: Trenches.
From the north-east



Fig. 25: Trenches.
From the south-east



Fig. 26: Trench.
From the north-east



Fig. 27: Trench and Complex 2.
From the north-west



Fig. 28: Complex 2.
From the west



Fig. 29: Complex 2 and trenches for bases of block fences.
From the east



Post Earthquake Conservation, Reconstruction and Rehabilitation in Nepal: Current Status

Dr. Suresh Suras Shrestha, Head

World Heritage Conservation Section, Department of Archaeology, Government of Nepal

1. Background

The April 2015 Nepal Earthquake (magnitude 7.6 on the Richter scale), which struck on 25th April 2015, badly affected 14 districts with a huge amount of physical destruction as well as human casualties, and impacted 35 districts in total. Another large shock was recorded on 12th May 2015 and several aftershocks occurred over a period of more than six months. These were continuous and frequent, and frightened the general population. Things have been returning to normal after around a year, and post earthquake reconstruction and rehabilitation activities have gradually been implemented by the relevant authorities.

2. Emergency Rescue Operation for Cultural Heritage

It has been the practice worldwide that human beings should be the first priority for rescue in any kind of disaster situation. Accordingly, several rescue teams from different agencies—either from the government of Nepal or non-government agencies—responded almost immediately, just an hour after the earthquake. However, it was a devastating situation and no one could think about heritage, the creation of humankind, which always comes after human beings. Some of us from the Department of Archaeology did inspect various sites as far as possible, to try and find and identify collapsed or damaged monuments, at least immediately within an hour of the earthquake. We knew that there wouldn't be anyone else identifying and rescuing heritage instead of human beings in such a situation, as everyone would be focused on finding human casualties and rescuing them, which is our basic priority as human beings, but someone should be there to take care of the precious heritage as well, as we are aware that in a disaster there could be measures that we could take which could save our precious heritage.

Aftershocks continued for more than three months. We continuously visited the sites and assessed the sites and monuments affected by the earthquake, which was the preliminary assessment of the monuments. During that time, there was another earthquake on 12th May 2015, which was also dreadful. Most of us were in the field at an earthquake affected monument site, and that was a terrible situation, as everyone was forced to leave the site, and more vulnerable private buildings collapsed. Luckily, we didn't have any information that monuments had collapsed due to the second earthquake in the Kathmandu Valley; however some collapsed or were damaged outside the valley.

At the beginning, from right after the earthquake, we were yet to identify the condition of the staff and the situation they were in, but whenever they themselves got in contact with us, we decided to send them to the sites to conduct preliminary assessments on an ad hoc basis, which could be done from the second day after the earthquake, as most

of the staff contact us and we could therefore do it systematically, or at least whatever we could do in that situation.

Within a week, however, the preliminary assessments had been done, and the Department had deployed teams consisting of an archaeological Officer, an engineer/architect and a photographer as *EMERGENCY HERITAGE RESCUE TEAMS* to the various sites. The teams urgently worked through the preliminary data, identifying where it would be possible to ensure the emergency rescue of art objects, examining the vulnerability of structures, and undertaking other necessary activities right at the sites. The rescue teams worked jointly with units of the Nepal Army and Armed Force Police as well as the Nepal Police. The units were deployed specially for post-disaster activities as they were skilled through their many years of training for rescues in disaster and post-disaster situational activities. All the teams were very closely coordinated by the Department of Archaeology regarding the whole range of post-earthquake activities for cultural heritage during that time. The main objective of this joint team was to salvage the art objects and other elements scattered around the collapsed and damaged structure at the sites; therefore, the team salvaged all elements and stored them in the proper place with on site documentation - photographs, listing or preparing the name and number of objects salvaged, the storage location, and custodian and other required data as per the Nepalese *MUCHULKA* (a kind of traditional legal documentation system for preparing to handover or store anything). Most of the sites were salvaged by the rescue teams, but at some sites, especially at Patan and later at Sankhu, the local communities with Department of Archaeology representatives had salvaged the items in this way as they are very much aware of the need to safeguard heritage. They also stored all elements/objects in the proper place as guided by representatives from the Department of Archaeology. Kathmandu Valley Preservation Trust and Patan Museum made their best effort for this as well.

At the same time, very soon after the earthquake, the Department of Archaeology published a public notice in the national daily newspapers asking for support to secure any kind of cultural heritage and related elements from vandalism, theft and any other activities that may harm cultural heritage, and advising that all such activities would be punished under national legislation, which made people very much aware of the need to protect their cultural property.

Some officials coordinated with the teams at the sites, while other government and non-government agencies, international rescue teams for heritage, teams of international experts, donor agencies and many other groups coordinated with the office; however, the office

building was also at risk due to secondary quakes and hundreds of aftershocks, so the situation they were working in were awful.

During this time, the Department of Archaeology sent a letter to ICCROM requesting the assistance of their experts in salvage efforts and conducting proper scientific documentation, but the team was too late to participate in the initial phase. However, a Joint Mission Team came to Nepal, consisting of experts from ICCROM-ICOMOS-ICOM-Smithsonian Institution. The Mission worked for a week on evacuation, salvage and emergency documentation, and was the first formal mission for heritage rescue after a disaster in Nepal including related staff from the Department, through which an opportunity was provided to build the capacity of local experts in such situations in the future.

The joint rescue team did their work very quickly and cleared the sites as well. Most of the sites were cleared within two weeks to four weeks, however, it took more than two months at some sites, but it was very good that the sites were secured. Many vulnerable parts were dismantled as per the instructions of the experts, which were minimal as they gave support for the protection of the structures immediately.

In this way, the Department of Archaeology played its role in the post-earthquake situation in coordination with several other agencies.

3. Temporary Protection of Cultural Heritage

The Department of Archaeology has been doing its best, and due to the leadership shown by our enthusiastic staff in support of and in coordination with national experts and other government agencies, it was possible for all heritage sites to come under the Department's control. Then it was possible to prepare as much documentation as possible through the preliminary assessments. Due to the closeness of the rainy season, it was very important to protect the sites that may have been badly affected by rain damage. Therefore, tents and other materials for covering those structures were acquired and more shoring or supports were provided to protect all of the monuments at each site. These activities have continued in the year following the earthquake as well, due to the possibility of decay and temporary protection on the monuments, which are much larger and also yet to be studied; however almost all of the rapid and detailed studies have been done.

The Department of Archaeology formulated NATIONAL EXPERT TEAMS immediately in that situation, consisting mostly of structural engineers, architects, archaeologists, earthquake engineers, legal experts and other necessary experts. The expert teams visited sites as and when necessary, and are now in the process of making detailed assessments of all sites. The expert teams are also involved in providing proper instructions for the stabilization of vulnerable and remaining structures for their rehabilitation, conservation, or renovation after proper planning.

As per the invitation from the Department, the Joint Mission Team from ICCROM (as mentioned above) came

and conducted training and worked with the teams of the Department including the site engineers, architects, and traditional carpenters who work on shoring/supports. Masons and some contractors were included as well. It was also an opportunity for the national experts and the staff of the Department for capacity building in this process.

As the Department of Archaeology has limited manpower, it is not possible to conduct all activities; however, it has managed to appoint more than 65 engineers (sub-engineers, engineers and architects) on a contract basis for preparing all the drawings, designs and cost estimates of all collapsed, partially damaged and partly collapsed monuments for their reconstruction, conservation and renovation.

In this context, the Department of Archaeology made a public appeal to provide older documents (historical or prepared before the 2015 earthquake) and/or photographs on the collapsed, partially damaged or partly collapsed monuments, for which drawings and any other reliable documents are not available in the Department. Due to this public notice, some sketches and photographs were provided by different stakeholders and individuals, but nothing was found for many of the monuments. Therefore, detailed drawings have been prepared and are still being prepared by the newly appointed architects and engineers through either searching the photographs or other reliable sketches and other documents or related materials as well as preparing cost estimates; however, it is mostly not possible to provide cost estimates for these kinds of archaeological structures which are not completely damaged and/or collapsed.

4. Joint ICOMOS/ICCROM/WHC Reactive Monitoring Mission – Decision of 40th Session of UNESCO WHC, Turkey

Immediately after the earthquake in Nepal, the 39th session of the UNESCO World Heritage Committee was going to be held in Bonn, Germany in July 2015. One of the draft agendas prepared by the UNESCO World Heritage Center proposed putting Kathmandu Valley World Heritage property on the List of World Heritage in Danger due to the significant damage caused by the earthquake. But this was not acceptable to the Government of Nepal and it requested that this not be done, by way of a formal letter as well as during the session. The committee then decided before discussing the matter that the World Heritage Center send a Joint Reactive Monitoring Mission to assess the site and to discuss the matter further at the next session.

As per the decision of the World Heritage Committee, a Joint ICOMOS/ICCROM/WHC Reactive Monitoring Mission observed the site (27th September – 2nd October 2015). This was reported and also discussed during the 40th Session of World Heritage Committee in Istanbul, Turkey. Due to the progress in the work being done by the Government of Nepal, which was acknowledged by the report of the mission and reports by the Department of Archaeology/ Government of Nepal, the committee decided to send another mission to Kathmandu Valley. However, the conservation, reconstruction and rehabilitation works are

being carried out smoothly and it has already been estimated that all projects will be completed within seven years, thus reviving the outstanding universal values of the site.

5. Long Term Planning

The earthquake very badly damaged the significant monuments within the Kathmandu Valley World Heritage Property and other heritage sites as well. There is a lack of original detailed drawings and designs; however, all the monuments should be renovated and reconstructed within an adequate time interval. Therefore, the Department of Archaeology, the leading and sole authority of the Government of Nepal for cultural heritage, has been preparing a long-term plan. The long-term plan includes the preparation of detailed drawings and designs depending on detailed assessments; conservation, renovation and reconstruction planning; amendment of related legislation; preparation of conservation guidelines; and other related issues as well. Discussion and interaction programs have been conducted internally and externally, in which all the related experts are included: structural engineers, architects, legal experts, archaeologists, conservators, earthquake engineers, disaster risk management experts, local communities, traditional craftsmen, masons, contractors, NGOs/INGOs and many other stakeholders.

6. Detailed Study Reports / Archaeological Researches and Documentation

During the post-earthquake situation, DoA/GoN conducted many emergency assessments and studies in cooperation with national as well as international experts; these were used for the immediate and temporary protection of monuments and sites as well. In the meantime; several studies are still continuing as part of a somewhat endless process. Some of them have been completed and used for the implementation of conservation, reconstruction and rehabilitation projects. The detailed assessment of seven monument zones focusing on the earthquake-damaged monuments was carried out by the national experts.

Rescue archaeological excavation and post earthquake archaeological research was carried out in Hanumandhoka, Patan and Bhaktapur Durbar Square Protected Monument Zones in cooperation with UNESCO Office in Kathmandu and technical support from Durham University, UK.

The elements and fragments of cultural heritage that were salvaged during and immediately after the earthquake were stored on an ad hoc basis in any place that was available, but they were not stored in a proper way, which was actually not possible during such a situation. Therefore, DoA/GoN has been carrying out some significant projects for the salvaged elements and fragments of monuments and other cultural heritage from the site. The sorting, identification and documentation of wooden elements of monuments within Hanumandhoka Durbar Square PMZ is one of the significant projects which is still continuing due to financial support from UNESCO Office in Kathmandu. National experts, skilled carpenters and architects have been involved in this project, which has been identifying wooden elements, from which monuments they come from, and where they belong, including the

evidence; assembling as a complete part, i. e. , window, door, strut etc. ; and full documentation with a recommendation that either the part would be reusable in the same (previous) position or not, and if not, what can be done with that fragment or element. Therefore, this project is a very significant kind of research which helps to revive the OUV of most of the monuments that had collapsed in the area. In the same way, wooden elements which were salvaged during the earthquake from Patan Durbar Square area are being assembled and documented. Kathmandu Valley Preservation Trust (KVPT), an NGO, has been supporting the DoA in this regard, as KVPT has been working on the conservation of cultural heritage at Patan Durbar for around a decade.

All these studies, researches and activities have been significantly supporting the ultimate conservation, reconstruction and rehabilitation of earthquake damaged cultural heritage.

7. Amendment of Act, Rules and Formulation of Guidelines

The Ancient Monument Preservation Act, 2013 (1956) is the major legislation for conservation, reconstruction and rehabilitation of cultural heritage in Nepal, and there are several other acts, rules and procedures as well. However, at the time of the earthquake, there were no provisions regarding the conservation, reconstruction and rehabilitation of cultural heritage in a post-earthquake or any other disaster situation. Therefore, the DoA/GoN has been preparing for the amendment of related acts, rules and other procedures to introduce adequate provisions addressing disasters and other similar contexts, especially the amendment of the Ancient Monument Preservation Act and rules. In the meantime, the DoA/GoN has prepared and executed the Basic Guidelines for the Post-Earthquake Conservation, Reconstruction and Rehabilitation of Cultural Heritage, 2072 (2016). It was prepared in cooperation with national experts, professionals, other governmental institutions and related stakeholders as well; therefore, it is a very useful set of guidelines which has filled some of the gaps in addressing disasters and cultural heritage.

8. Current status of Conservation, Reconstruction and Rehabilitation Projects

The Department of Archaeology has been working hard to reconstruct, renovate/conservate and rehabilitate damaged cultural heritage since immediately after the 2015 earthquake. As the post-earthquake activities are already mentioned above, the conservation, reconstruction and rehabilitation of monuments is one of the great challenges which is being carried out as part of a long-term plan by the Government of Nepal, Department of Archaeology. However, several government and non-governmental agencies have also been involved in this process. The DoA has been carrying out 49 projects on the conservation, reconstruction and rehabilitation of cultural heritage in FY 2015/16 (2072/73); some of them were one-year projects which have already been completed, and some are multi-year projects which are still ongoing.

Similarly, the DoA/GoN has been implementing 102 projects; many of them are multi-year projects due to the irtechnical nature and size, comprising archaeological

conservation, research-based activities, preparation of drawings cost estimates and so on.

The conservation and rehabilitation of Kileshwor Temple at Changunarayan has already been completed, and which was done as per the MoU between the DoA/GoN and Heritage and Environmental Conservation Foundation Nepal; Narayan Temple at Bhaktapur Durbar Square by Bhaktapur Municipality and Sri Yantra Vatsala Temple at Bhaktapur Durbar Square, *Pati* (Rest house) at Pyanggaon, Lalitpur by the DoA/GoN have also been completed. The broken stone pillar in front of Bhimsen Temple at Patan and stone pillar of Yog Narendra Malla in front of Patan Durbar have been reestablished; KVPT has supported these projects as well.

The projects supported by the Government of Sri Lanka for the reconstruction of Rato Machhendranath Temple at Bungamati and Anandakuti Vihara at Swayambhu are already being implemented and works are in progress.

Many other projects are also in progress, such as Anantapur Temple at Swaymbhu, Vatsala Temple at Bhaktapur, and others.

9. Conclusion

In any kind of disaster situation, no one thinks about cultural/natural heritage or any other thing except human beings and their rescue. The Department of Archaeology responded immediately after the April 2015 Nepal earthquake to help save cultural heritage with the coordination and support of its own dedicated staff, national and international experts, agencies and individuals who also showed their concern and responded as quickly as possible. Humanitarian considerations are very important in such a situation and in the post-disaster period as well; however, cultural heritage, which actually is the creation of human beings and representative of certain periods of history, should also be important. Realizing this, the DoA/GoN has been working smoothly in facing several challenges and implementing many projects as mentioned above for the conservation, reconstruction and rehabilitation of cultural heritage damaged by the 2015 earthquake—hopefully completed within the allotted time frame as well. A high level of coordination, cooperation, support and patience is needed, as the conservation, reconstruction and rehabilitation of cultural heritage, especially monuments, is not as easy as constructing new buildings, bridges and other modern structures. It takes a comparatively long time, requires a huge budget and progress is slow due to its nature, character and structure.



1. Kileshwor Temple, Changu Narayan Damaged by the Earthquake



2. Kileshwor Temple, Changunarayan After Completion



3. Sri Yantra Vatsala Temple, Bhaktapur



4. Reconstruction of Fasidega, Bhaktapur



5. Reconstruction of Fasidega, Bhaktapur



6. Completion of Conservation Work of Bouddha Sutpa After Earthquake 2015



Heritage on the Move: The preservation of William Gilbert Rees ca. 1864 Meat Shed

Dr Matthew Schmidt, *Regional Archaeologist Otago/Southland*
Heritage New Zealand Pouhere Taonga

Introduction

During the late 1850s and early 1860s, the region of Otago was being broken up by colonial Government surveyors into massive pastoral runs (farms) (Figure 1). For ca. 600 years prior to this the land in the Central Otago and the Lakes Districts was only traversed by Maori journeying through these areas by foot from the west and east coasts and Southland. Millions of acres of land were covered in native scrub, forest and wetlands and the colonial Government was keen on exploiting this land resource for the new European/Pakeha colony. Although by the early 21st century many pastoral runs had become private farms or land managed as Public Conservation Land for the public to enjoy (see Figure 1), today in the South Island there is still over a million hectares of land which are managed as pastoral leases owned by the Crown and managed by farmers leasing the land.

William Gilbert Rees was part of a syndicate with businessmen Colonel William Lewis Grant & George Gammie wanting to invest in farming in New Zealand in the early 1860s. In 1859, Rees and his companion Nicholas Von Tunzelman ventured into the central South Island in search of farm land. After 3 weeks of toil through this challenging wild landscape, they made it to the un-spoilt land surrounding Lake Wakatipu and explored the whole basin assessing its potential for farm development. Returning to Dunedin from their six week arduous journey, Rees began to purchase pastoral runs around Lake Wakatipu on behalf of his business partners. He initially purchased Run 346 which consisted of most of the east shore of the lake down to where Queenstown township is today. He then purchased Run 356 (The 'Shotover Run'), the Kawarau Falls Run 345 and then Run 331 (the 'Staircase Run') which extended his farm almost down to Kingston at the bottom of the lake. The total area of leases purchased was ca. 250,000 acres (Figure 1). Von Tunzelman purchased a lease on the western side of the lake, Run 350 located around Mt. Nicholas. In 1860, Rees set about establishing the homestead for his pastoral leases on the shores of Lake Wakatipu in preparation for a life of farming in this beautiful lakes area (Figure 2).

This paper briefly looks at the history of Rees second farmstead at Kawarau Falls Station which he moved to in 1863, what happened to this farm in later years and how two remaining buildings from of his Kawarau Falls Station were preserved as part of a modern development on the shores of Lake Wakatipu.

Rees, his farm and the goldrush

It is important to understand the story behind Rees arrival and departure from Lake Wakatipu so as to appreciate why the remaining two buildings at his Kawarau Falls Station are so important. When Rees returned to Lake Wakatipu in 1860, he decided to base his homestead on

the shores of Lake Wakatipu where modern Queenstown is today (see Figure 2). This was a good location as there was easy access to the lake and there was a good amount of room for his homestead (originally wattle and daube), ancillary buildings and yards. Rees had purchased a boat in Bluff on the Southland coast and brought it up to Kingston at the southern end of the lake, he named his boat the Undine. This gave Rees the transport across the lake he needed so he could bring in building supplies and other goods from his suppliers in Southland. He then began cutting down Beech Forest to open up the land. All was looking good for Rees and he quickly brought in 3000 merino sheep driving them up over the Crown Range and down into the Wakatipu Basin. He also had with him his wife Francis and he hired musterers to help him on the lease. But, in 1862, Rees fortunes changed dramatically.

One of his musterers called John Tewa had discovered gold in the Arrow River in mid-1862 and soon after so did two of his shearers, Thomas Arthur and Harry Redfern, in the Shotover River on 15 November 1862. It is believed that Rees asked them to keep their discoveries quite for as long as possible as he knew what the consequences would be, this being the loss of his grazing rights to parts or all of his pastoral leases if his leases were declared a goldfield. Unfortunately, at the close of 1862, word got out about gold in the Arrow River and Shotover Rivers and thousands of miners flooded to Queenstown and its surrounding rivers and creeks to seek their fortune. The area around Rees lakefront homestead, woolshed and yards etc. was declared part of the new Wakatipu Goldfield in 1863 and by law, he either had to move or buy the newly created town lots his buildings were on in Queenstown. Although Rees fought in the court for his right to retain full grazing rights on his pastoral leases, he lost this battle but he and his business partners did receive compensation of £10,000. Rees therefore moved his homestead to Kawarau Falls Station in 1863 and bought property in Queenstown (Figure 2). It was not all bad news however.

With the influx of miners, Rees started to make good money supplying the miners with meat from his land and with goods brought into the town via his boat service from Kingston. Rees became the main contact for supplies to the goldfield early on as he was a 'station' owner. The term 'station' during the 1860 and 1870s referred to homesteads associated with the pastoral leases that were deemed primary supply contacts for miners and other parties in isolated areas. Rees therefore quickly cornered the market as a private supplier and by 1863 he ensured his business interests were focused in Queenstown itself away from his Kawarau Falls homestead. He converted his woolshed in the town to a hotel, owned various leased properties and it has been suggested he had up to 14 businesses running in the town by the time he left Queenstown in 1867 (today, the 19th century Eichardt's Hotel stands on the spot of Rees

original hotel). Rees became a very successful businessman and society man very quickly helping to establish the hospital, government buildings, the Masonic lodge, acclimatisation society, jockey club etc.

With his move to the Kawarau Falls Station in 1863, Rees quickly built his new homestead and a number of ancillary buildings, most of which survived into the late 20th century. His partnership with Grant and Gammie finished in 1865 and Rees sold the Kawarau Falls lease to the Boyes Brothers in late 1866. When Rees left Queenstown in 1867, his contribution to the founding of the town was greatly celebrated.

Rees Kawarau Falls Station, the Meat Shed & the Dairy

In the figures and photographs below can be seen Rees Kawarau Falls Station at various times since 1863, as researched by archaeologists Andrew Winter and Ben Teele (Figures 3 to 10). In Figure 3 is shown the earliest pictorial of the Station painted by Sir William Fox in ca.1864. The ancillary buildings can be clearly seen and also what are possibly the Meat Shed and Dairy. Figure 4 is a survey plan from 1865 showing the main house at the Station. Ancillary buildings known to be present are not shown in the survey. Figure 5 is a cropped section of an 1866 painting by Nicholas Chevalier again possibly showing the Meat Shed and Dairy alongside the other original Rees buildings. These early paintings of the Station appear to support the age of the Meat Shed and Dairy to have been built between 1863 and 1865 (Teele 2016). This age is quite likely as such buildings were a crucial element for the functioning of a large sheep station.

The first known photograph of the Kawarau falls Station is from ca. 1872 (Figure 6). It can be clearly seen from this cropped version of the original larger image where the Meat Shed and Dairy reside and details of their construction. In Figure 7 is shown another image of the Station this time taken in 1874 which illustrates the complex of buildings. Figure 8 is an aerial photograph of the station taken in 1949. The completeness of the 19th century farmstead is still apparent with the original buildings still having a function in the running of the property.

It can be seen from Figure 3 to 8, that over the decades from 1863, when Rees built his first house at Kawarau Falls Station, until 1949, all the original buildings survived the changes in ownership of the property and this continued until 1960 (see Winter's 2014:7-10 research on the history of the Rees/Boyes Brothers station). From 1960 onwards, the farm buildings were gradually demolished as part of a campsite development with Rees homestead torn down in 1987 leaving only the Meat Shed and Dairy and the flat area where the homestead stood and its associated laurel hedge believed to have been planted in the 1920s. This change to the Kawarau Falls Station cultural landscape is effectively illustrated by a Google Earth image from 2004 (Figure 9) showing the terracing created for the camp site. The Meat Shed and Dairy only survived the camp site earthworks as they had a use with the Dairy utilised as a small cabin and the Meat Shed as a storage facility. By 2009, the camp site terracing had also been destroyed during site works for new apartments prior to the current

owner's project (Figure 10).

The demolitions over the years meant that the only above ground tangible evidence left of Rees life in Queenstown would be these two small schist stone buildings, the Dairy measuring 3m/4m and the Meat Shed 2.5m/3m (Figures 11 to 17). These buildings are simple in design being made of lime mortared schist stone and having a timber roof structure with wooden shingles. In later years, both the Meat Shed and Dairy building had corrugated iron placed over the original shingles and as such these are still preserved beneath this iron. The Meat Shed still has most of its later brick floor but the Dairy has a 20th century concrete floor. Both structures therefore have high authenticity (see Winter 2014:12-13 for a more detailed description).

Lake's Edge Developments Ltd bought the abandoned earlier apartments development in 2014 to undertake their own residential development project. Extensive earthworks were still required for this new project but one of the aims of their development was to preserve both the Meat Shed and Dairy and as such these final tangible pieces of Rees Kawarau Falls Station. This would be done by creating a public reserve around the Dairy and then moving the Meat Shed from its current location 50m to the new reserve.

The Meat Shed Moving Project

Lake's Edge Developments Ltd engaged Civil Construction Ltd and Helluva Build Ltd to project manage and undertake the moving of the shed to its new location. Heritage Engineer Lou Robinson of Hadley & Robinson Ltd designed the moving technique (Figure 18) to ensure the building could be moved in one piece and a heritage architect (Jackie Gillies) and archaeologist (Ben Teele) were responsible for recording the building and any associated archaeology before and after the move. Jonathan Howard (Built heritage specialist) and myself of Heritage New Zealand reviewed plans and the methodology of the move and provided input where required. Heritage Engineer Win Clark, working for Heritage New Zealand, also reviewed the engineering plans before approval of these was given by Heritage New Zealand to undertake the move.

The project required the walls of the Meat Shed to be supported by a steel and concrete beam foundation installed around the base of the walls (Figures 19 & 20). The building was then braced on the inside and outside and the walls sandwiched using polystyrene, wood ply panels and studs (Figures 18 & 21). This resulted in a solid 'box' within which the schist stone Meat Shed sat with a new foundation. The final weight of the structure to be moved was 59 tons. After some months of preparing the area around the Meat Shed for the move as well as a road to its final resting place and the final position, on 1 July 2016 two 100 ton cranes lifted the shed in tandem and placed it onto a house moving truck (Figures 22 & 24). The truck then slowly moved the shed away from the original site, the cranes moved to the new position, and from there it was lifted off the truck to its final location (Figures 25 to 28). The concrete strip foundation became the shed's new permanent foundation. The shed was then left to 'settle' for a few weeks before the boxing and bracing were removed.

After removal of the boxing and bracing, the shed was checked for cracks and other issues and initial repairs were made (Figure 29). Work was also begun on reinstalling the original brick floor (Figures 30). By October 2016, the area around the Meat Shed and Dairy was landscaped. Plants lining the path down to the Meat Shed and Dairy from the new development were sourced from cuttings of the laurel hedge which used to grow along the path leading to the old homestead from the lake (Figures 31).

Conclusions

This project is a good illustration of co-operation between a private developer, its contractors, heritage specialists and a heritage agency to achieve a positive outcome for a highly significant heritage site. The ca. 1864 Meat Shed could not remain in its original position, so rather than demolishing the structure or dismantling it to rebuild somewhere else, which would both destroy the fabric and original workmanship of the building, a solution to move the shed in one piece was found and as such the authenticity of the building was preserved. In addition, the land the Meat Shed and Dairy sit on are to become a public reserve so the public can interact with an original piece of Rees history, this would not have been possible if the Meat Shed had remained marooned on a small piece of land

amongst the new residential development.

Acknowledgements

Lake's Edge Developments Ltd, Civil Construction Ltd, Scott Sutherland, Helluva Build Ltd, Dean Kirk, Lou Robinson, Jackie Gillies, Andrew Winter, Ben Teele, Jonathan Howard and Wyn Clark.

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Figure 1. Current South Island pastoral leases (source: LINZ 2016).



Figure 2. Location of Rees first homestead established in Queenstown in 1860 and his 1863 Kawarau Falls Station.



Figure 3. Painting of Rees Kawarau Falls Station by Sir William Fox, c.1864 (source: Alexander Turnbull Library. Image sourced and Meat Shed & Dairy indicated by Ben Teele of Origin Consultants).

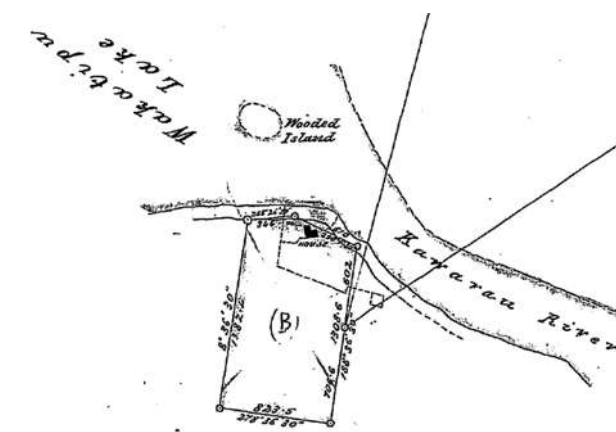


Figure 4. 1865 survey map of Rees Kawarau Falls Station (source: LINZ. Image sourced by Andrew Winter).



Figure 5. Crop of 1866 painting of Kawarau Falls and Rees Station by Nicholas Chevalier (source: Te Papa. Image sourced and Meat Shed & Dairy indicated by Ben Teele of Origin Consultants Ltd).



Figure 6. Crop of first known photograph of Rees Kawarau Falls Station probably from 1872. The Meat Shed & Dairy can be clearly seen. (source: Te Papa. Image sourced and Meat Shed & Dairy indicated by Andrew Winter).



Figure 7. Photograph taken of the Station in 1874 (source: Lakes District Museum. Meat Shed & Dairy indicated by Matthew Schmidt HNZPT).



Figure 8. Aerial photograph of Kawarau Falls Station taken in 1949. Note that the 19th century buildings are still present (source: VC Browne & Son. Photo marked up by Andrew Winter and Matthew Schmidt, HNZPT).



Figure 9. Google Earth image of the Kawarau Falls Station from 2004 showing the campsite terracing and the two remaining Rees buildings, the Meat Shed and the Dairy and the laurel hedge.



Figure 11. The Meat Shed in 2015 showing its isolation within the residential development (photo: Ben Teele, Origin Consultants Ltd).



Figure 10. Google Earth image of the Kawarau Falls Station from 2009 showing the extensive earthworks undertaken by the owner of the property at that time.



Figure 12. The front of the Meat Shed showing the Dairy in the background (photo: Andrew Winter, 2014).



Figure 13. The interior of the Meat Shed showing the schist walls (parts rendered), timber roof, meat hanging bars and hooks and the doorway (photo: Ben Teele, Origin Consultants Ltd, 2015).



Figure 14. The interior of the Meat Shed showing the brick floor (photo: Ben Teele, Origin Consultants Ltd, 2015).



Figure 15. The Dairy building showing the entrance doorway. The schist is hidden by a cement render (photo: Matthew Schmidt, HNZPT, 2016).



Figure 16. The back and side of the Dairy building (photo: Matthew Schmidt, HNZPT, 2016).



Figure 17. The interior of the Dairy building (photo: Matthew Schmidt, HNZPT, 2016).

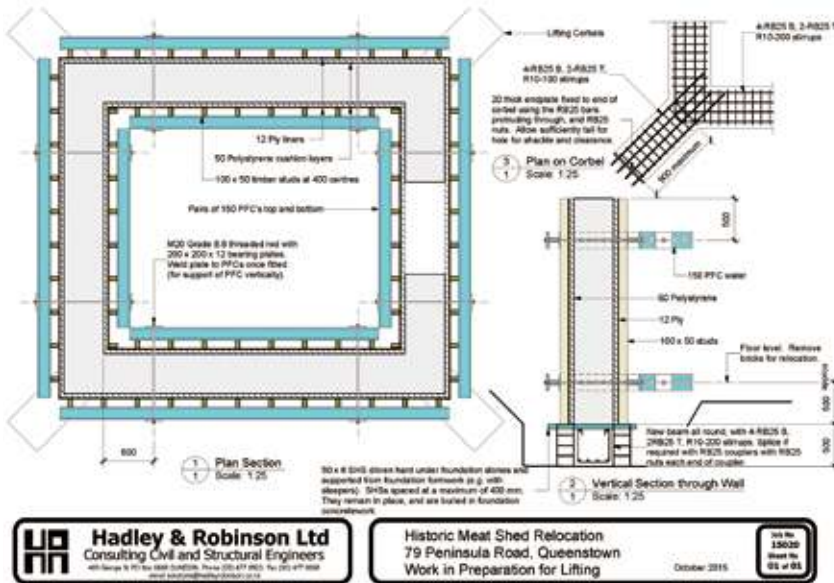


Figure 18. The moving technique for the Meat Shed designed by Lou Robinson of Hadley & Robinson Ltd.



Figure 19. The Meat Shed prior to preparation for moving (photo: Ben Teele, Origin Consultants Ltd, 2016).



Figure 20. Close view of the concrete beam strip foundation and other bracing prior to the move (photo: Matthew Schmidt, HNZPT, 2016).



Figure 21. The Meat Shed all braced with crane straps connected to the lifting corbels (photo: Matthew Schmidt, HNZPT, 2016).



Figure 22. The cranes ready to lift the 59 ton Meat Shed (photo: Matthew Schmidt, HNZPT, 2016).



Figure 23. The Meat Shed successfully lifted and the beginning of the slow move over to the moving truck (photo: Jackie Gillies, Origin Consultants Ltd, 2016).



Figure 24. The Meat Shed on the house moving truck on its way to the new location 50m from its original location (photo: Matthew Schmidt, HNZPT, 2016).



Figure 25. The Meat Shed being backed into place next to its new location (photo: Matthew Schmidt, HNZPT, 2016).



Figure 26. Some of the moving team, from left: Lou Robinson of Hadley & Robinson, Scott Sutherland of Civil Construction Ltd, Matthew Schmidt of Heritage New Zealand Pouhere Taonga and Jackie Gillies of Origin Consultants Ltd (photo: Matthew Schmidt, HNZPT, 2016).



Figure 27. The carcass hanging hooks in place (photo: Matthew Schmidt, HNZPT, 2016).



Figure 28. Plan showing the new location of the Meat Shed next to the Dairy in the public reserve (plan supplied by Lake's Edge Developments Ltd).



Figure 29. Landscaping works underway around the Meat Shed as well as initial repairs to the building. Pictured from left are Scott Sutherland of Civil Construction Ltd and Dean Kirk who undertook the repairs (photo: Matthew Schmidt, HNZPT, 2016).



Figure 30. The brick floor of the Meat Shed being reinstated (photo: Matthew Schmidt, HNZPT, 2016).



Figure 31. The entranceway to the new reserve, the Meat Shed is on the right and the Dairy is on the left. The plantings are cuttings from the laurel hedge which led from the lake to the homestead (photo: Matthew Schmidt, HNZPT, 2016).



A Recent Study of the Individual Buddha Stone Sculptures from Gandhara, Pakistan

Tahir Saeed, *Ph.D. scholar / Deputy Director*

Federal Department of Archaeology and Museums, Islamabad, Pakistan

Introduction:

Pakistan, situated in South Asia, is one of the fortunate countries in the world which has been home to a number of civilizations. It is gifted with a great number of archaeological sites and historical monuments on its soil. These historic assets are our link with our past and, as the custodians, it is incumbent upon all of us to preserve them for posterity. Pakistan is the land that beckoned Alexander the Great to sail down the river Jhelum, and Pakistan's historic assets include the spectacular Gandharan civilization as the seat of Buddhism; the devotional carvings of the Hindu Shahi temples of the Salt Range and Tharparkar; the funerary clusters of Historical Monuments at Makli, Thatta; Multan and Uch Sharif, representing successive Sultanate dynasties; the Sikh architectural heritage following the Great Mughal's contribution to the art and culture of this region, and the legacy of the British, who colonised this land before the independence of Pakistan on 14th August, 1947.

Gandhāra and Buddhism:

The Gandhāra region is situated in the north-western part

of the Indian sub-continent, with the steep mountain ranges of the Karakoram, the Pamirs and the Hindu Kush bordering it. It comprises present-day Peshāwar Valley, Bajaur, Buner, and Swāt. Swāt, once called *Uddiyana*, is one of the most important regions in the northern part of Pakistan and a centre of great archaeological interest, rich in cultural remains of the past. Alexander the Great came to Swāt, Ora in 327 BCE. Arrian, the historian of Alexander, distinctly mentioned three flourishing towns in Swāt, one of them being Ora, modern-day Udegram.

The spread of Buddhism in ancient times followed the path of the Silk Road. One of the main routes of the Great Silk Route passed through Karakorum, linking Kashgar with Kashmir and Gandhāra. Countless people travelled along this Silk Route over the span of one thousand years. Their evidence is depicted on the rocky cliffs on the waysides and on rough boulders, strewn in the upper valley of the Indus River and its tributaries. Due to its prime position, the region of Gandhāra served as a gateway to the Silk Route, giving access to Central Asia and to the countries of the East and West.



Map 1 Location map of Pakistan



Map 2 Gandhāra region

Buddhist Stūpas and Monasteries in Gandhāra:

During the lifetime of Buddha two types of Buddhist establishments were constructed: viharas and sangharama. The former were erected for meditation purposes. However, later on, venerated objects were also kept inside the viharas for the sake of worship; they were later built as living quarters for the monks. The concept of stūpa as a worshipping entity was adopted by followers after the

death of Buddha. Thus stūpa became the third important component of Buddhist establishments alongside the viharas and sangharama. These were not only built in the Indian territories, but were also adopted by the patrons of the Gandhāra Valley. In the Gandhāra region and particularly in Taxila Valley, many Buddhist shrines from the 3rd century BCE to the 5th century CE have been exposed and uncovered by the spades of archaeologists.



Map 3: Location of the most important archaeological sites in the Gandhāra region, namely: Ali Masjid, Shah-ji-ki Dheri, Shaikhan Dheri, Bala Hisar, Mohmmad Nari, Takht-i-Bahi, Sehr-i-Bahlol, Chanaka Dheri, Mekha Sanda, Sikri, Jamalgarhi, Shahbazgarhi, Thareli, Palai, Chat Pat, Kashmir Smast, Sanghao, Loriyan Tangai, Gumbat, Barikot, Andan Dheri, Nimogram, Gumbatuna, Udegram, Panr, Butkara, Shaidu Sharif, Shanisha, Zaro Dheri, Bhamala, Taxila, Mankiyala, etc.

A large number of Buddhist settlements, stūpas and monasteries were erected by Buddhists in the present-day Malakand area, Totakan in Zulamkot Valley, Loriyan Tangai, Allah Dand Dheri and over the hill of Shahkot. There are also remains of Dabar Tangai and Guniar at Thana. Then in the sub-valley of Barikot: the ancient Indo-Greek city of Bazira and other noteworthy Buddhist sanctuaries including Udegram, the Ora of Greek Historians, Kanjar Kote, Nat Maira, Tokardara, Amluk Dara, Najigram, Abba Sahib China, Nawagai, Abu Tangai, Shingardar and rock carvings near the village of Tindodag. In Swāt Valley, other imposing Buddhist establishments are at Saidu, Butkara-I, Butkara-III, Loebanr Stūpa, Arab Khan China, Dangram, Jorjorai, Topdara, Panr, Baligram and Shanasha, including a large number of rock carvings. Then to the north of Mingora Swāt, an important Buddha rock image is on a high rock near Jahanabad. Another all-embracing Buddhist site is located on the Malamjaba plains next to Manglawar.

Gandhāra Art:

Gandhāra Art has been a focus of attention for both eastern and western scholars since its discovery in the early 19th century CE. The Indus-Oxus region covers the Indus Valley and Oxus Valley and the territory between them. This area comprised a number of ancient states including *Uḍḍiyāna* (Malakand Division), and Gandhāra (Peshāwar Valley), which are now situated in Pakistan and Kapisa (Panjshir-Ghorband Valley) and Bactria in Afghanistan. The sculptural or regional styles of these states differed slightly and therefore may be referred to as *Uḍḍiyāna*, Gandhāra, Kapisa and Bactrian. However, due to large-

scale interaction among these states, the regional styles share some broad characteristics and collectively could be called the “Indus-Oxus School of Buddhist Art”.

The Patronage of Gandhāra Art and the Artists:

Buddhist artists began very early to represent with chisel and brush not only figures of Buddha, Bodhisattvas and other Buddhist teachers and saints, but also episodes from the last earthly existence of the master, and from the series of his former incarnations. The caves, stūpas and temples are covered with numerous representations of this kind, but only some of these treasures are accessible to us in trustworthy reproductions and of these, only a small number have been satisfactorily explained.

Subject Matter of Gandhāra Art:

The subject of Gandhāra Art was propagation of Buddhism with the help of different types of sculptures carved in different mediums, such as schist stone, stucco, terracotta, bronze, metal, iron, wood and artworks or paintings. It is generally believed that art plays a great role in most religions as it serves to educate and to bring the practitioner close to a religious goal. In Buddhism too the work of art acted as a focus for meditation, which is a key element to practicing the religion. In Buddhist art, Buddha himself is one of the most important sculptural subjects.

Anthropomorphic Representation of Buddha:

The Buddha image is distinguishable by appropriate attributes; one of these, an enlargement or bump on the head (*uṣṇīṣa* or “turban”) may have originated in Gandhāra for the practice of gathering the hair into a topknot beneath

a turban and only subsequently taken as a protruding skullbone, which was worshiped (Ca. 400 CE) at Hadda as a relic. The Buddha's hair in Gandhāra is usually carved in undulating lines drawn back from the forehead with the *uṣṇīṣa* often circled by a band. Another attribute is the *ūrṇā*, a tuft of hair between the eyebrows, shown on the sculptures as a small raised circle or a depression where a gemstone had marked it.

In Gandhāra, thousands of Buddha images were carved after the earliest Buddha image appeared on coins of Kanishka. The individual images were enshrined for worship in the chapels of the monasteries and sometimes in the niches of the stūpas. The flat rectangular friezes were fixed against the bases of the stūpas and as stairrisers with iron nails and hooks. The curved panels were fixed at the tiered drums of the stūpas, which form a complete circle after being joined together.

Subject Matter of the Collection:

The subject matter of the S.R.O Peshāwar Collection is mainly Buddhist cult images which were carved in the Gandhāra region during the 2nd to 6th centuries CE by the zealous Buddhist artisans of Gandhāra. The Buddhist collection comprises: the life of the Buddha depicted in reliefs, individual images of Buddha and Bodhisattva, architectural elements such as Stūpa pegs, harmika, brackets, capitals, pilasters, stūpa models, and panels showing Buddha or Bodhisattva, as well as different scenes from the life of Buddha.

The Buddhist sculptures were fixed to the bases, drums and stairs of the Buddhist stūpas, around which worshipers circumambulated. The individual Buddha images were used to fill the niches around the stūpas and monasteries. The "harmika" (solid box in a square) above the dome of the stūpa was carved on all sides with stories from Buddha's life, which were chiseled on stone tablets and fixed to the stūpas, inside which the "relics" of Buddha were kept in a casket for worship. Some major iconographical features of the Buddha image is observed as follows:

- i) The image of Buddha is offered as "motionless", which gives a sense of strength.
- ii) His image is always drawn on a straight line, whether seated or in a standing position.
- iii) Buddha is always shown as the "focal point" in every image.
- iv) The Buddha image is represented as a "versatile personality".
- v) When Buddha is seated on a lotus flower, (or lotus throne), it gives the sense of a circle.
- vi) Buddha is depicted always in the "Central Position".
- vii) The composition of Buddha images shows "rhythm" as they are always very mathematical in their finish.

The S.R.O Peshāwar Collection comprises one of the most extensive collections of Gandhāra Art in Pakistan, coming mostly from the Gandhāran sites. Some of the most important sites in the Gandhāra region excavated and worth mentioning are: Shah-ji-ki Dheri, Peshāwar, Palatu Dheri, Ghaz Dheri, Mamane Dheri, Akhun Dheri,

Ibrahimzai, Utmanai, Hamid Garhi, Turangzai, Bala Hisar and Sheikhan Dheri in Charsada, Takht-i-Bahi, Jamal Garhi, and Sehr-i-Behlol in Mardan, Aziz Dheri in Swabi, Butkara-I & II, Saidu Sharif sites in Swāt, Andan Dheri, Chatpat, in Dir, Munkar Dheri, Shahbazgarhi, Mansehra, Chanaka Dheri, Mekha Sanda, Thareli, Sirkap, Sirsukh, Mohra Moradu, and Jaulian in Taxila, along with many other sites in the Gandhāra region.

Significance of Sub-Regional Office, Peshāwar Collection:

The Sub-Regional Office (SRO) Peshāwar Collection is the storage of the former Sub-Regional Office of the Federal Department of Archaeology and Museums, which is presently under the administrative control of the Directorate of Archaeology & Museums, Government of Khyber Pakhtunkhwa as a consequence of the 18th constitutional amendment in 2011. This storage was developed from the collection of the Archaeological Survey of India, Frontier Circle during the first half of the 20th century throughout the colonial period and after the independence of Pakistan.

The collection came from the archaeological excavations mainly conducted by the Archaeological Survey of India during the 20th century and later on after the independence of Pakistan by the Federal Department of Archaeology & Museums at the different sites of Gandhāra such as Munkar Dheri, Jamal Garhi, Shahbaz Garhi, and Takht-i-Bahi, including Japanese excavations at Chanaka Dheri, Mekha Sanda, Thareli, and District Mardan. The antiquities included those which came through acquisitions, donations or gifts as well as confiscated material received through the Customs authorities, police departments and staff of the Federal Department of Archaeology & Museums from time to time. The collection comprises 2, 891 registered antiquities in the Accession Register of S.R.O Peshāwar mainly pertaining to the Gandhāra region.

The whole collection comprises stone and stucco sculptures, architectural elements, panels, terracotta figurines, ivory/bone objects, coins, manuscripts, and ethnological material. The S.R.O Peshāwar Collection contains 130 individual Buddha images in schist stone. As far as the material of the collection is concerned, the main medium of these objects is schist, whereas stucco material is also present. Besides these, there are also antiquities in bronze and terracotta. Of 2, 891 antiquities in the collection, 2, 253 are in schist, 454 in stucco, 109 in bronze, 70 in terracotta, and 5 in ivory/bone material.

Material Analysis of Buddha Images in the Collection:

The prime material of the individual Buddha stone images in the S.R.O Peshāwar Collection is schist, which can be further divided into three types: black schist, grey or greenish schist and green schist. Out of 130 Buddha images, four are in black schist, 67 in grey schist and 59 in green schist, comprising 3%, 49% and 47%, respectively, of the material. During examination of these sculptures, two Buddha heads in black schist, 32 Buddha heads in grey schist and 15 Buddha heads in green schist were identified. Similarly in the collection, out of 81 Buddha images, two were found in black schist, while 32 in grey and 47 Buddha images in green schist were identified.

During the research study, 32 Buddha images in *abbayamudrā* were found in the collection, which included one image in black schist, 10 in grey schist and 21 in green schist. The 28 sculptures of Buddha in *dhyānamudrā* included 15 images in grey schist and 13 images in green schist, with no images of the Buddha in black schist. The nine Buddha images in *dharmacakramudrā* included one image in black schist, three in grey schist and five in green schist. Similarly, out of 12 images of Buddha's bust, fragments, etc., four images were in grey schist and eight in green schist, with no images in black schist found in this category of the collection.

Dimensional Size of Buddha Images:

Three types of stone sculptures are predominant in the collection: relief panels, individual carved images, and stelae. The relief panels were used to face the walls of stūpas, chapels and monasteries. These were sculptured with subjects selected from the life of Sakyamuni and presented in a serried manner. The individual carved images were designed to be placed against a wall. In the S.R.O Collection 51 miniature stelae, 10 small stelae, 43 Stelae, and 26 life-sized Buddha images were recorded, comprising 39%, 8%, 33% and 20%, respectively, of the kind of sculptures.

Chronology of Buddha Images:

The Buddha images mentioned below pertain to four periods:

The first period, about the 1st century CE, represents the formative period of the Buddhist art of Gandhāra. During this period, the figure modeling followed the Hellenistic style in the rendering of postures and drapery. Buddha images were produced with the height and physical appearance of a human being but with the addition of a halo and *uṣṇīṣa*. However, the oversize *uṣṇīṣa*, the wide open eyes and delicate mustache and stiff drapery folds of the robe display Greek artistic influence.

The second period corresponds to Kanishka's rule, about the end of the 1st century CE or the beginning of the 2nd century CE to the mid 2nd century CE. During this time, Buddha images are rendered with a flat *uṣṇīṣa*, a prominent *ūrṇā* mark, half-closed eyes and delicate moustache. The Buddha wears a monastic robe covering both his shoulders, akin to the himation of ancient Greece, and the drapery folds are cut in convex form as in the Greek style.

The third period, from the mid 2nd century CE to the first half of the 3rd century CE, is chiefly during the rules of Huvishka and Vasudeva. Buddha images during this time show them at their height of their perfection. In this period the images present Buddha as a typical Apollo Greek god, with oval face and well elaborated facial features. The forehead is somewhat higher, the central hair line is pushed back, the hair brushed backward with wavy locks, eyebrows fine and curved with the *ūrṇā* carved in between, the canthus are thus deep and the eyes half-closed, suggesting the spiritual state of meditation. The nose is high and the bridge of the nose is connected to the forehead in a straight line, the lips are thinner, the corners of the mouth sink more deeply, and most of these images are without moustaches. The Buddha is shown in a

monastic robe covering both his shoulders with massive drapery folds. The round halo is depicted in plain.

The fourth period, from the second half of the 4th century CE to the end of the 5th – 6th centuries CE, took place under the rule of the Kidara Kushanas. In this period, Buddha images not only followed the model of the previous three periods, but also immersed some features from the Gupta art of India, notably a round face, spirited expressions, thin drapery and a realistic rendering of the body of Buddha.

Provenance of Buddha Images in the Collection:

The study of Buddhist archaeology in Gandhāra since the beginning of the 18th century started first with an antiquarian interest without applying any scientific methods or excavation techniques. At the beginning of the 20th century, however, when the subject attracted the attention of the scholarly world, a more systematic and scientific approach was developed. A large number of Buddhist sites in Gandhāra were thoroughly investigated, but it is very unfortunate that the materials, particularly the schist sculptures, recovered from these sites were studied according to their style or analogy rather than their contextual, stratigraphic and historical background. The sculptures found during the course of the archaeological excavations are generally associated with the very long period of the Kushans, who ruled over Gandhāra from about the 1st to 3rd centuries CE.

As regards the possible provenance of Buddha images in the collection, we can declare without any doubt that most of these images belong to the different sites of Gandhārā, except a small number of Buddha images which we have declared as being ascribed to early artistic productions of Swāt and Buner. For example we have five Buddha heads from this early period, most probably from the Swāt and Buner areas. Under the present study, however, the provenance of 11 images is known, having been excavated from the Mohmmand Nari, Thareli, Mekha Sanda and Takht-i-Bahi sites.

The Buddha images from the Mohmmand Nari site constitute one Buddha head, one Buddha in *abbayamudrā* posture and one Buddha image in *dhyānamudrā*. There are five Buddha images reported from the Thareli site, plus three Buddha heads, one Buddha in *abbayamudrā* and one Buddha in *dhyānamudrā*. Another site from where Buddha images are reported is Mekha Sanda. Two Buddha heads are mentioned from this site. There is one Buddha head which is reported from the site of Takht-i-Bahi, District Mardan.

During the comparative analysis of Buddha images under the present research study, it was found that the Buddha images from the sites of Mohmmand Nari, Thareli, Mekha Sanda and Takht-i-Bahi have a very close affinity and resemblance to the Buddha images reported from the different Gandhāran sites such as Butkara-I, Swāt valley, Sikri, Sheikhan Dheri, Aziz Dheri, Sehre-i-Behlol, Takht-i-Bahi, Peshāwar Valley and other Gandhāran sites. For instance, one Buddha head from the Mohmmand Nari site has a close affinity and resemblance to a Buddha head

from Sikri. Another Buddha head which is reported to be from the Takht-i-Bahi site has similar iconographic features and style comparable with a Buddha image from Sehr-i-Behlol and now preserved in Islamabad Museum. A Buddha head from an unknown site is comparable with a Buddha head discovered at Butkara-I and now preserved in Swāt Museum. We also have a Buddha head which came from Thareli site and is comparable with another Buddha head from Sehr-i-Behlol, now in Peshāwar Museum.

A Buddha in *abbayamudrā* is from Mekha Sanda and well comparable due its iconographical features and affinity with a Buddha reported from Sheikhan Dheri, and another Buddha in *abbayamudrā* from the Thareli site is comparable with the same Buddha image from Sheikhan Dheri. A Buddha image in *dbyānamudrā* posture from an unknown site is comparable with a Buddha image from Aziz Dheri.

The above discussion proves and provides sufficient food for thought that the Buddha images of unknown provenance in the S.R.O Peshāwar Collection are well comparable with the Buddha images which have been reported from the different sites of Gandhāra such as: Butkara-I, Swāt Valley and Sikri, Sheikhan Dheri, Aziz Dheri, Sehr-i-Behlol, Takht-i-Bahi, in Peshāwar Valley and other sites from the Gandhāra region.

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Fig. 1 Buddha head from MekhaSanda



Fig. 2 Buddha head from Thareli



Fig. 3 Buddha head from Takht-i-Bahi



Fig. 4 Buddha in *abhayamudrā* pose from Mohammad Nari



Fig. 5 Buddha in *abhayamudrā* pose from Thareli

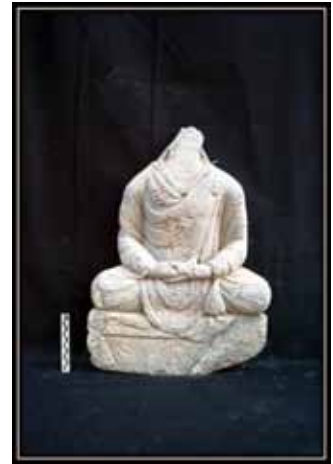


Fig. 6 Buddha in *dhyanamudrā* pose from Mohammed Nari



Fig. 7 Buddha in *dhyanamudrā* pose from Thareli

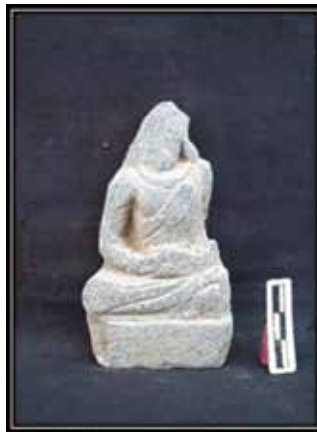


Fig. 8 Buddha in *dhyanamudrā* pose from Palatu Dheri, near Charsada.



Restoration of the Roman Catholic Manila Metropolitan Cathedral-Basilica

Louella Solmerano Revilla, *Head-Conservation Laboratory*
San Agustin Museum, Intramuros, Manila

Introduction

The Manila Metropolitan Cathedral-Basilica is located at Plaza Roma in the Intramuros district of the City of Manila. This paper will highlight its prominence in the religious life of the Filipino people. The Cathedral has stood witness to many historic events in the country. It evolved from a simple *Parish*, into a *Cathedral*, and was eventually declared a *Basilica*. From 1571-1945, it experienced devastation and damages caused by fire, a series of calamities and war, each time rising from its ruins. The present cathedral remains a magnificent structure since its last reconstruction in 1958, although sustainability and durability must entail to ensure that the building will last for a long period of time. The Cathedral must have a sound structure to endure modest earthquakes, if not all. The manifestations of damages and deterioration to the building

led to retrofitting works from 2013 up to the present (2016), a preventive measure seriously taken after the result of the earthquake in October 2013 that ravaged historic churches in the southern part of the Philippines.

The Manila Cathedral is the only church in the Philippines to be declared a *Minor Basilica* in 1981 upon the late Holy Father, Pope John Paul II's, own motion which earned it the title of the Basilica of the Immaculate Conception. His Holiness Pope Francis has called the year, from December 8, 2015 to November 20, 2016, the Jubilee celebration of Mercy. He encourages compassion and mercy to be practiced in the daily lives of the faithful. H.E. Cardinal Luis Antonio Tagle has declared in the Holy Year of Mercy 2016, five Jubilee churches including the Manila Cathedral as a pilgrimage destination.



Exterior of the Cathedral, 2016

Completion of the major restoration works was done in time for the awaited visit of Pope Francis in the Philippines last January 2015. The Holy Father officiated the mass at the Manila Cathedral and Luneta attended by millions of people. He also went to Palo, Tacloban and Leyte afterwards to show his support for the victims of typhoon Yolanda.

Historical Background

Before the church became a Cathedral, it was established as a *Parish Church* in 1571. It was constructed upon the initiation of the Spanish Conquistador Don Miguel López de Legazpi. The church was made of light material, of *nipa* and bamboo. Manila became a Diocese of Mexico in 1578. On December 21, 1581, it was elevated into a Cathedral under the title of the Immaculate Conception of the Blessed Virgin Mary. This happened two years after Pope Gregory established the Diocese of Manila, which was placed under the supervision of the Archbishop of Mexico. It was destroyed by fire in 1583 and reconstructed from wood, nipa, and bamboo. A typhoon hit Manila and destroyed the Cathedral again on June 15, 1583.



Interior of the Cathedral, 2016



Pilgrims inside the Cathedral, 2016

In 1591, Bishop Domingo Salazar initiated the building of the *2nd Cathedral*, wherein a sturdier material made of stone and mortar was used. This was destroyed by a series of powerful earthquakes in 1599 and 1600.

Efforts were made to rebuild the *3rd Cathedral* during the time of Archbishop Benavides and Archbishop Mercado between 1621-1645. An earthquake partially damaged the Cathedral in 1621. It was completely destroyed during the December 5, 1645 earthquake. The Cathedral services were transferred to the Misericordia Church.

The building of the *4th Cathedral* was started by Archbishop Poblete in 1654 and completed in 1681. It was damaged by typhoons and earthquakes and repaired in 1706 by

Archbishop Camacho. Repairs continued in 1736 under Archbishop Rodriguez. The Cathedral was in a dilapidated state in 1747. It was declared unsafe and demolished in 1751.

The *5th Cathedral* was rebuilt on the same site starting in 1751 under Archbishop Pedro de la Santisima Trinidad and was inaugurated on December 8, 1760. It was designed by Fray Juan de Ugucconi. Later on it was repaired and renovated in 1850 by Ojeda. Another earthquake destroyed the Cathedral on September 16, 1852, leaving only the façade standing.

The building of the *6th Cathedral* started in 1854 and was completed in March 31, 1858, designed by Nicolas Valdes. It was known to be a magnificent structure. It was destroyed by the January 3, 1863 earthquake. However, the belltower survived the tremor.

The *7th Cathedral* to be built was designed by Don Vicente Serrano who employed the Romanesque-Byzantine style. Construction started in 1870 and was completed in 1879. Three prominent architects worked on the Cathedral, namely Luciano Oliver, Vicente Serrano Salaverria and Eduardo Lopez Navarro. It was blessed by Archbishop Pedro Payo. The church's external appearance was characterized by round arches, thick walls and large towers. The interior was richly decorated, the arches

beautifully ornamented. The 1880 earthquake crumbled the bell tower to the ground. It housed wounded American soldiers during the Philippine–American War of 1899-1902. The *7th Cathedral* was fully destroyed in 1945 during the Liberation of the Philippines in World War II.

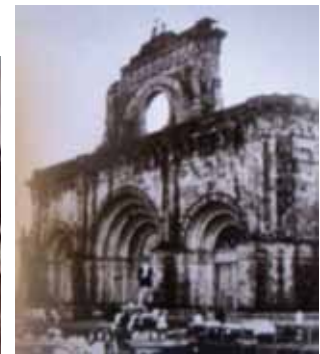
The reconstruction of the *8th and present Cathedral* started in May 1954 and was completed in December 1958 under the direction of Archbishop Rufino Cardinal Santos, designed by Architect Fernando Ocampo. The stained glass windows were by Galo Ocampo. The Cathedral received donations from Japan, Spain, and the United States among others. Inspired by Serrano's design, he added to its previous appearance. He made use of marbled floors, mosaic panels, arcaded colonnades, lovely columns, and an Immaculate Conception themed Cathedral. His Neo-Romanesque design is a combination of Revival, Renaissance and Modern styles. The present Cathedral is a product of the old Cathedral's great design mixed with Ocampo's architectural touch. The cathedral adopted the Neo-Byzantine and Neo-Romanesque styles. The ceilings, arches, pineapple finials, stained glass depicting the life of the Virgin Mary, the belltower, large dome, bronze door portraying the history of the Cathedral, and images of saints on the doorways contribute to the harmonious aesthetic appearance of the structure.



1880



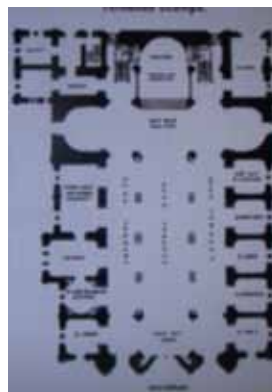
1937



Ruins after WWII



Restoration after 1945



Floor plan by Arch. Ocampo



1958 Reconstruction

It was in February 1981 when Pope John Paul II came to Manila and expressed his desire for the Manila Cathedral to become a Basilica to H.E. Jaime L. Cardinal Sin, the then Archbishop of Manila. On April 27, 1981, just a few months later, the Manila Metropolitan Cathedral was elevated to the rank of a Minor Basilica of the Immaculate Conception by virtue of a Papal Bull (decree) issued by Pope John Paul II as an enduring witness to the faith of millions of Filipinos and as the venue of many important religious

activities. A historic moment in the Catholic Church happened when Popes John Paul II & John XXIII were canonized and declared Saints by Pope Francis with the presence of Pope Benedict XVI on April 27, 2014 at the Vatican City. Special church liturgical masses in the Philippines were celebrated during this period.

Initial assessment of the Manila Cathedral

His Eminence Cardinal Luis Antonio G. Tagle III ordered



Plaque placed on the wall of the Cathedral on April 18, 1965 in recognition of the generous donations, for the reconstruction of the church, from the people of the Philippines and Japan, the latter through the intervention of H.E. Iwataro Uchiyama, Governor of the Prefecture of Kanagawa, alongside two other plaques for the USA and Spain.

the closure of the Manila Cathedral Basilica for a certain period due to concerns over the structural integrity of the Basilica. According to the contractor's report by SP Castro Inc., various cracks had appeared in its interior walls, fragments were falling from adobe walls due to exposure to the elements over the years, and there were perennial leaks in different parts of the Cathedral, and sometimes flooding literally inside the Cathedral during heavy rain due to clogging of the interior storm drainage system of the Cathedral. A structural retrofitting consultant was engaged by the Cathedral to look into the present state of the structure. The initial findings were alarming as the conclusion points to major retrofitting works which are necessary to ensure that the Cathedral is structurally safe for the end users.

Summary of the restoration and retrofitting works

1. Planning for retrofitting works: The Manila Metropolitan Cathedral-Basilica Foundation, Inc. engaged a structural consultant in 2010 to do a thorough investigation and prepare retrofitting plans. There was likewise a need to look into the electrical systems of the Cathedral, as usage over the past 50 years had taken its toll on most of its electrical components such as power, the lighting system and audio/video systems. To gain a holistic view of the retrofitting and enhancement, the scope of the structural consultant was expanded to include electrical works, plumbing and drainage works. Due to lack of as-built plans, the entire structure was mapped using available sophisticated digital technology to come up with images which were then converted into floor plans and elevation drawings. These were further enhanced using old plans and visual observations becoming the base upon which the consultants prepared the structural retrofitting plans.
2. Engagement of a project manager and other design consultants and specialty suppliers: Once the plans were completed and ready for execution, MMCBFI (Manila Metropolitan Cathedral Basilica Foundation, Inc.) decided to engage a project manager and after evaluation of various proposals, SP Castro Inc. was engaged on January 10, 2013. They immediately conducted an inventory of the available documents and information and site inspection to obtain an overall perspective of the challenges and constraints

regarding the retrofitting and restoration works. To address other concerns in the restoration, other consultants were also recommended.

3. Design review and revalidation of the retrofitting plans: After a due diligence review and validation of MCB (Manila Cathedral-Basilica), there were some revisions and modifications in the structural retrofitting designs due to actual site condition.
4. Construction phase: A six month timetable to complete the restoration works was agreed to be accomplished from June 2013 to November 2013. The restoration works of the Manila Cathedral-Basilica was divided into three phases namely: 4.1) Engineering Restoration, 4.2) Special Systems Enhancement, and 4.3) Architectural.

4.1) The Engineering Restoration was further subdivided into: 4.1.1) Structural Restoration which involved strengthening the foundation consisting of main pillars and twin columns supporting the nave, selected beams of the Cathedral, and columns of the bell tower; 4.2.2.) Electrical systems restoration and upgrade; 4.2.3) Storm drainage system restoration involving the de-clogging of the vertical cast iron downspouts and replacement of the old and clogged concrete and drainage pipe; 4.2.4) Water and sanitary lines involving the replacement of corroded galvanized iron and PVC waterlines with more durable pipes which are resistant to corrosion; and 4.2.5) restoration works of areas affected by the engineering restoration works such as restoration of chipped concrete or adobe surfaces.

4.2) Special Systems Enhancement consists of improvements to the exterior and interior lighting using LED lights, and also enhancing the architectural façade of the Cathedral by defining its width and breadth through the play of lights, and exterior accent and uplights along the perimeter of the Cathedral; audio/video systems (speakers were placed in strategic areas of the church), high definition monitors and interactive touch screen monitors for the general public to touch to know more about the history of the church; installation of a CCTV system as part of security measure; and a bell tower clock system (to complement the newly retrofitted bell tower, the old

and defective clock system was finally replaced with a new set). For over 50 years, the old face of the Bell Tower clock stood as silent witness to the fast changing environment within the Intramuros area. The existing cathedral was rebuilt sometime in 1954 and completed in 1958. It has exceeded the usual 50 year lifespan of buildings and its present condition is no longer compliant with the most recent structural code in terms of safety factor. This safety factor has evolved over the years by incorporating the most recent structural code influenced by strong earthquakes experienced in the past to better enhance the structural integrity and performance of buildings in such a situation. The structural and non-structural cracks inside the walls of the Cathedral were rectified using a different approach.

4.3) Architectural Restoration: Interior restoration works followed after the completion of structural retrofitting. This involved the restoration of the floor, wall and ceiling finishes as close as possible to their originals. The biggest challenge in the interior restoration works was the reinstallation of the chipped/dismantled mouldings of the capitals and arches, became necessary to allow for the installation of carbon fiber during the structural retrofitting works. The intricate decorative design of capitals and arches were replicated by precast moulding. The restored parts were finished with manual retouching by skilled artisans. All pews made of solid narra were refurbished to complement the retrofitted restored and interior finishes. The exterior restoration works cover the replacement of the chipped/dismantled adobe walls using the same adobe materials. The adobe wall restoration was only limited to the Bell Tower, the front façade of the Cathedral and portions of the side walls at General Luna and Cabildo Streets where the downspouts were diverted to the newly constructed storm drainage lines along the exterior side walls of the chapel naves. External landscape restoration included the provision of elevated sidewalks at General Luna St., and the front side of the Cathedral with stamp-crete finish and steel bollards.

5. Restoration Schedule: The retrofitting and restoration works were originally envisaged to be completed within six months. However, the following unforeseen developments have contributed to the overall delay of the restoration works because of its domino effect on the succeeding works: inclusion of the retrofitting of columns, which was included when the master retrofitting schedule was being finalized; the poor condition of the belltower columns, discovered after the adobe walls were dismantled, which necessitate additional preparatory works; difficulties encountered in the retrofitting of beams inside the domed ceiling due to the cramped space inside the decorative precast mouldings; delays in the arrival of imported lighting fixtures and audio/video equipment. The restoration works as originally envisaged from July to November 2013 were understandably not completed as scheduled:

the extensive use of scaffolding systems in the restoration works to reach the elevated areas inside and outside the Cathedral, where works are required, particularly the time taken regarding its erection and dismantling and due consideration being paid to the safety of workers and installers, the chipping of thick adobe concrete walls to imbed conduits or gain access to the ceilings, and the discovery of other works which were not considered in the planning stage, but needed to be done. Despite the foregoing constraints, the historic restoration works of Manila Cathedral-Basilica were substantially completed by December 2013 in time for the “soft opening on December 8, 2014 while the balance of the major physical works were completed on March 25, 2014 in time for the Grand re-opening on April 9, 2014, with mass celebrated by H.E. Luis Antonio Cardinal G. Tagle III. The Cathedral had been closed to the public since February 7, 2012. There were other improvement works that continued from April 2014 to 31 March 2015, such as the repair of copper roofing, repair of the wooden framing of the dome, installation of additional air-conditioning systems, the upgrading of Meralco facilities to cater to the needs of the Cathedral, restoration of stained glass, installation of exterior lighting along the perimeter of the dome, and the addition of carillon bells.

On-going works (September 2016) and future proposed

improvements: Restoration of exterior adobe walls which have deteriorated over years of exposure to the elements; landscape enhancement to complement the Neo-Romanesque architectural ambience of the Cathedral; waterproofing of roof deck; conversion of the belfry tower into a museum; make-up water tank; and the upgrading of the emergency power back-up to ensure an uninterrupted power supply.

Acknowledgements:

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Restoration of the Manila Cathedral Basilica (June 2013-December 2014)



Cathedral during restoration works on August 2013 (photos by SPCastro, Inc.)



Retrofitting and plastering of the belltower



Installation of Carillon Bells, 2014



On-going restoration works: Plastering of exterior adobe walls and waterproofing of roof deck (Photos of the author, September 2016).



The impressive exterior architecture of the Cathedral can be viewed at night with its monumental lighting effects (September, 2016).



The lower pictures show the interior of the Cathedral with its lighting enhancement.





Vee bissa and Atuwa: Earthen Structures for Storing Grain in Ancient Sri Lanka

D.A. Rasika Dissanayaka, Assistant Director (Promotions)
Department of Archaeology Sri Lanka

Abstract

Many Sri Lankan settlements were agricultural based and these settlements were located in areas where water was easily available. Our forebears in ancient Sri Lanka constructed both medium-sized and colossal irrigation tanks. Not only that, they also had the ability even to divert rivers to feed the rice fields, as once upon a time old Lanka named herself as the great granary of the East. In those days, paddies were exported by the Great King Parakramabahu the 1st.

In this situation, the farmers of ancient Sri Lanka wanted paddy or other grain storage houses (granaries). Vee bissa or atuwa were used for this purpose. In terms of construction, the material used for building these vee bissa and atuwa are similar although the technology and architecture are different. Not only the size of the granaries, but the use of materials, architectural design and style give an attractive appearance.

This building type has been abandoned for some decades but it still embodies many heritage values. In this paper I will demonstrate different types of granaries and their architectural features and technologies.

1. Introduction

Ancient dwelling houses were built with other, subordinate buildings, activity areas, tools and auxiliary utensils. Paddy farming was the main livelihood of ancient people so they were required to store their paddy or other grain for the next harvest. For this purpose, storage bins called vee bissa and atuwa were used although their structure and form were different from dwellings.

In constructing these storage bins, special attention was paid to protecting them from insect attacks and climatic conditions as well.

2. Types and Construction Methods

According to the shape, use and technique, there were two types of granaries.

- i. Vee bissa
- ii. Atuwa

Both of these types followed the popular concept of ancient Sri Lankan architecture called *tampita* (on pillars) structure, with the floor bed elevated from the ground by using rock boulders, stone columns or wooden posts.

2.1. Vee bissa

Vee bissa, which were constructed near the house, was the traditional structure for storage of paddy or other grain harvest in ancient Sri Lanka. They were constructed with wattle and daub or woven cane, which was plastered with clay/earth, and the roof was thatched with either paddy straw or *iluk* grass. It stood on an elevated wooden or rock

platform for protection against insect attacks, erecting the farmer's own house premises.

For the construction, four timber logs are placed horizontally on a minimum of four rock boulders or stone columns. Timber planks are fixed on it as a floor. The superstructure consists of woven cane, finished with mud/clay and cow dung plaster on both sides (Figure 1). Sometimes these structures are lime washed. The paddy bins are cylindrical in shape with an independent roof structure. The roof is made of palm leaves or paddy straw. According to the roof style, one can enter the bin with the help of the pole by raising the roof or simply by entering the gable side.



Figure 1: Vee bissa at Thotupala Walawwa

2.2. Atuwa

The atuwa, which is another traditional ancient contraption to store paddy and other grain, was constructed inside or outside the house.

In some villages, a different style of granary called an atuwa was constructed. It is also constructed on a platform raised on wooden post above ground level. The superstructure consists of wattle and daub construction, timber planks, and sometimes palm leaf walls. As in the

above case, the roof of the atuwa is an independent structure with a palm leaf or paddy straw roof. Normally the shape is rectangular (Figure 2a & 2b).



Figure 2a: Atuwa at Lankatilaka Temple, Kandy



Figure 2b: Atuwa at Embekka Devala (Temple)

3. Materials

For the two structures, freely available and easily found materials were used for construction, with the help of traditional technology. The foundations of these structures comprise stone boulders, short stone columns or timber posts, with the platform built of wooden planks.

The roof consists of a timber structure including independent timber posts with palm leaves or paddy straw thatched on it. In the past, these building materials could be obtained easily and freely from the surrounding environment.

Four different construction methods were found to complete the body of these granaries.

- i. Wattle and daub
- ii. Bundles of paddy straw coated with a mixture of clay and cow dung
- iii. Wooden planks or palm leaves
- iv. Woven cane

i. Wattle and daub

Thin sticks are placed and another stick is fixed horizontally to vertical posts. Two rows of this kind of framework are erected and clay balls are placed in between this frame. After a few days the walls are plastered using clayey earth mixed with fine sand on both sides (Figure 3).



11 An Atuwa
(Drawing by Malinga Amarasinghe)

Figure 3: Line drawing of an atuwa by Malinga Amarasinghe. Further Studies in the Settlement Archaeology of the Sigiriya-Dambulla Region, Colombo: PGIAR, Myrdal-Runebjerg, E. Gunawardane, D. Fernando, S. (1994)

ii. Bundles of paddy straw coated with a mixture of clay and cow dung

Bundles of paddy straw are placed on each other horizontally in the shape of a circle and fixed together. When the required height is reached, plaster containing clay and cow dung is applied to both sides (Figure 4).



10 A Vi-bissa
(Drawing by Malinga Amarasinghe)

Figure 4: Line drawing of a vee bissa by Malinga Amarasinghe. Further Studies in the Settlement Archaeology of the Sigiriya-Dambulla Region, Colombo: PGIAR, Myrdal-Runebjerg, E. Gunawardane, D. Fernando, S. (1994)

iii. Wooden planks or palm leaves

In some cases walls are made of wooden planks or palm leaves with a frame of sticks (Figure 5).



Figure 5: Atuwa with wooden planks at Pusulpitiya Temple

iii. Woven cane

According to the availability and knowledge of technology, woven cane was used in the construction of granaries. Clay, mud or cow dung plaster was applied to this surface externally and internally as desired (Figure 6a & 6b).



Figure 6a: Vee bisssa



Figure 6b: Vee bisssa

4. Technology

As a protection measure, the granaries were built in an elevated position for preventing insect attacks. Moreover, this provided the best protection from damp as the *atuwa* and *vee bisssa* walls were not connected to the ground.

As another method of preventing insect attack, ash and *kobomba* (*Margosa*) [*Azadirachta indica*] leaves were spread around the wooden post foundations or on the paddy. The smell of these leaves made white ants flee the area.

When storing the paddy in the above types of bins the excessive heat generated inside the bin could be

minimized. This helped to maintain the proper climatic conditions to prevent the grain from becoming rotten. At the same time, the earthen walls were protected from damp due to the generated heat.

The granary confirmed the availability of food as well as showing a measure of the wealth of the villager. The number of granaries within a compound showed the prosperity, assets and wealth of the dweller. When it was a house belonging to a nobleman or temple or king, the granary was a separate building. Although this building type has been abandoned for a number of decades, it still embodies many heritage values.

5. Heritage Values

Granaries like *vee bisssa* and *atuwa* included in ancient dwellings played a vital role in the day-to-day life of the inhabitants. Therefore, these granaries contain various heritage values associated with their construction, materials used and functions.

Architectural Value

These structures represent the traditional Sinhalese architecture of the 18th to 19th centuries. The shape, construction techniques and material used are examples of the most impressive architectural features from that period. Some of these buildings are still used today.

Historical value

These structures played a vital role in the history of ancient farmers. Therefore they provide a historical testimony for the future.

Material value

All the walls of these structures have been made out of mud/clay and wattle and daub which are still in their original state. In Sri Lanka, wattle and daub technology was used widely in the ancient period.



Figure 7: Abandoned vee bisssa

6. Conclusion

The ancient granaries of Sri Lanka may vanish in the near future because of the state of deterioration and abandonment many of them are in, if conservation

procedures are not taken. The main natural causes of deterioration are dampness, rainwater and the effect of wind. More than all of these, however, deterioration caused by abandonment is more critical (Figure 6). The decayed parts of these structures can be conserved with suitable materials and some of the natural causes can be overcome by using certain control measures.

Finally, preservation of these endangered heritage structures needs the understanding and education of the local communities.

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Preliminary Results of Archaeological Researches in the Karatepa Buddhist Center (in 2014-2015)

Akmal Ulmasov, *Leader specialist*

Fine Arts Institute, Academy of Sciences of Uzbekistan

Karatepa¹—a Buddhist monument dating from the time of the Kushan in Old Termez city—is located on the right bank of the Amu Darya. In 2014, a joint team from the Fine Art Institute under the Academy of Sciences of Uzbekistan and Risho University (Japan) started archaeological excavations in Karatepa. The archeological works continued, and in 2015² and on the results of biennial excavations unearthed several rooms. They are of different sizes and spread out almost in one axis in a northerly direction (Fig. 1).

Room No 54. This room is completely revealed and the layout is square-shaped (2.80 x 2.90 m). The floor is pise. The walls are plastered with clay with the addition of straw and preserved to a height of 2.50 m to 3.05 m. The thickness of the walls has not yet been revealed. The room on the perimeter (at the level of 1.14 m from the floor) is colored red and white above a whitewashed section. In the background of this whitewash visible horizontal and vertical lines are painted in red and black. This is apparently ornamental painting that decorated this room (Fig. 2).

There are two arched passageways in the room: one of them is in the west wall (height - 2.05 m, width - 0.86 m) and the other is in the south wall (width - 1.06 m). The latter passage has not yet been fully excavated. The west passage has a low (height - 0.05 m) threshold, with coated plaster. At the end of the wall at 1.00 m from the floor is a deep semicircular niche (0.40 x 0.40 x 0.38 m). The inside of the niche is painted black. A copper coin was found on the floor, presumably Kushan-Sassanian.

Room No 55. This is located four meters to the south of Room No 54. The layout of the room is rectangular-shaped (6.20 x 2.25 m) and elongated from east to west. The room was excavated to the floor during the second construction period. On the surface of the floor of the second building floor is a thick (0.05 m) layer of ash, probably from fire. There are human bones at both ends of the floor, but no skulls. Radiocarbon analysis³ of the bones dates them to the period between the second half of the 6th and the first half of the 7th centuries AD. It can be assumed that the room on the second stage of the operation was used as a crypt (Fig. 3).

In this stage, the main passage (width - 0.90 m) in the middle of the east wall was laid raw. The right side of the passage has a high semicircular niche (0.37 x 0.35 x 0.22 m) and there is another high niche at the end of the south wall (0.55 x 0.40 x 0.35 m). The end of the north wall has an archway (width - 0.90 m) from the first construction period. The arch's aperture is laid across from the raw (0.32 x 0.32 x 0.12 m). On the southern wall at a distance about two meters from the main passage of a major groove, the top was destroyed, apparently because of the skylight. At a level of 1.90 m above the floor there is a massive

decorative cornice, made of plaster. The cornice is decorated with a wide shelf, with a rectangular cross-section and heel, and a convex arch at the top. Judging by the traces on the surface of the fragments of the cornice, it was painted red.

On the upper surface of the middle south wall are preserved several remains of sloping bricks. The presence of bricks laid like this suggests that it was the fifth arched ceilings. This technique had been widely used in the Bactrian construction traditions of the Kushan period. For example, many of the early opened rooms of Karatepa, as well as in the neighboring temple-monastery complex, Fayaztepa, the rooms are the enfilade type and hallways have arched ceilings⁴.

Archaeological finds

Excavations of these objects presented numerous diverse archaeological materials. Most of them are fragments of various ceramic vessels, such as jugs, bowls, cups, plates, "chirag" (oil lamps) and others. Among the ceramic fragments it is rarely found ornamental vessels, roof tiles and ancient Bactrian inscriptions, applied in black ink (Fig. 4).

In the layer of rubble in the uncovered areas many fragments of stone sculptures were found. One of the stone fragments shows the head of an elderly man, apparently an ascetic. The character demonstrated expressive. The statue is small (8.7 x 6.2 x 7.6 cm) sculpted by scabbing of white limestone. Other fragments, a head (10.5 x 11.3 x 12.7 cm), and part of a pair of legs (12 x 9, 4 x 5.05 cm) were probably a bird of prey - Garuda (Figure 5 a, b).

Architectural details. Among the new discoveries are finds that occupy a special place in terms of stone architectural detail. Like the sculptures, they are made of white limestone from the last cultivation. Standing out among them (12.2 x 9.7 x 22.8 cm) is a miniature column with an unusual shape. It is decorated with two rows of lush and large lotus leaves and one line of leaf shape ornaments. Above the leaves is a round abacus with three massive horizontal shelves. At the edge of the upper surface are two small protrusions (apparently for supporting a wooden column). Echinus totally sales, abaca and projections partly departure. The upper bed of the abaca displays deep gouging (Fig. 6 a).

Typically, these columns were fitted with stone base Attic profiling. In the rubble, part of such kind of base (5.4 x 15 x 8.2 cm) was found. As usual, the trunk of the column was wooden, which has not been preserved. Another stone fragment makes up part of the profile of the Corinthian capitals (6.7 x 6.0 x 5.4 cm). It is in the form of stylized acanthus leaves with the central part streaked and the upper part extended and bent forward in the beam (Fig. 6b).

The archaeological excavations in this area are ongoing, so it is too early to draw conclusions in terms of both architecture and the historical and cultural aspects of the room. Further studies will try to find out many of the issues associated with this facility in particular, and with the Buddhist Karatepa center as a whole.

Conservation works

Parallel with the excavations in the author's report, conservation work at another monument site has been carried out. This involves fragments of wall paintings preserved only in the lower parts (5 cm by 30 cm) of niches in the yard of complex B at West Hill Karatepa (Fig. 7a-c). The polychrome paintings are poorly preserved because first, loess plaster was placed on them, and second, the niches were located in a semi-open place where the paintings were exposed to rapid destruction

caused by dust and bright lighting. The opinion was that, judging by the condition of the paintings, after opening, they were left open and not preserved. On the preserved parts of these paintings can be seen the lower part of human figures, painted bright red on a black background. And on this background are freely transferred irregular shaped circles, painted pink, the inside of which depicts a lotus flower.

At first, the paintings were cleaned of dust with distilled water, using a brush. After the surface has been cleaned, the painting is strengthened with 5% solution of Paraloid B72 acrylic adhesive on acetone. In some areas, fixing the synthetic resin with aqueous dispersion solution meant first applying the brand Betek Lateks, which is resistant to alkaline attack.

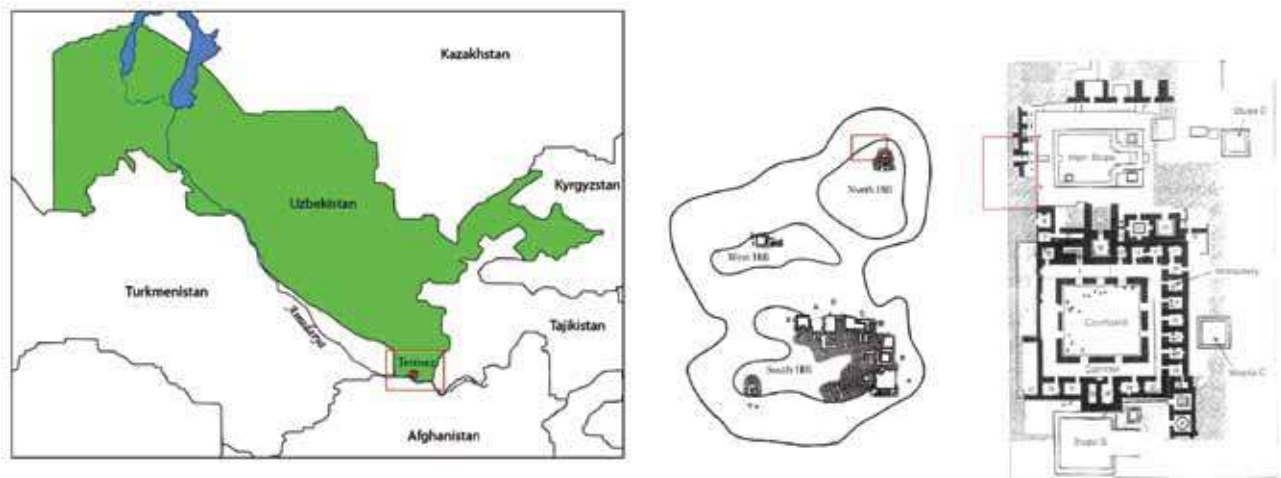


Fig. 1. Location map, schematic plan of Karatepa and excavation site.

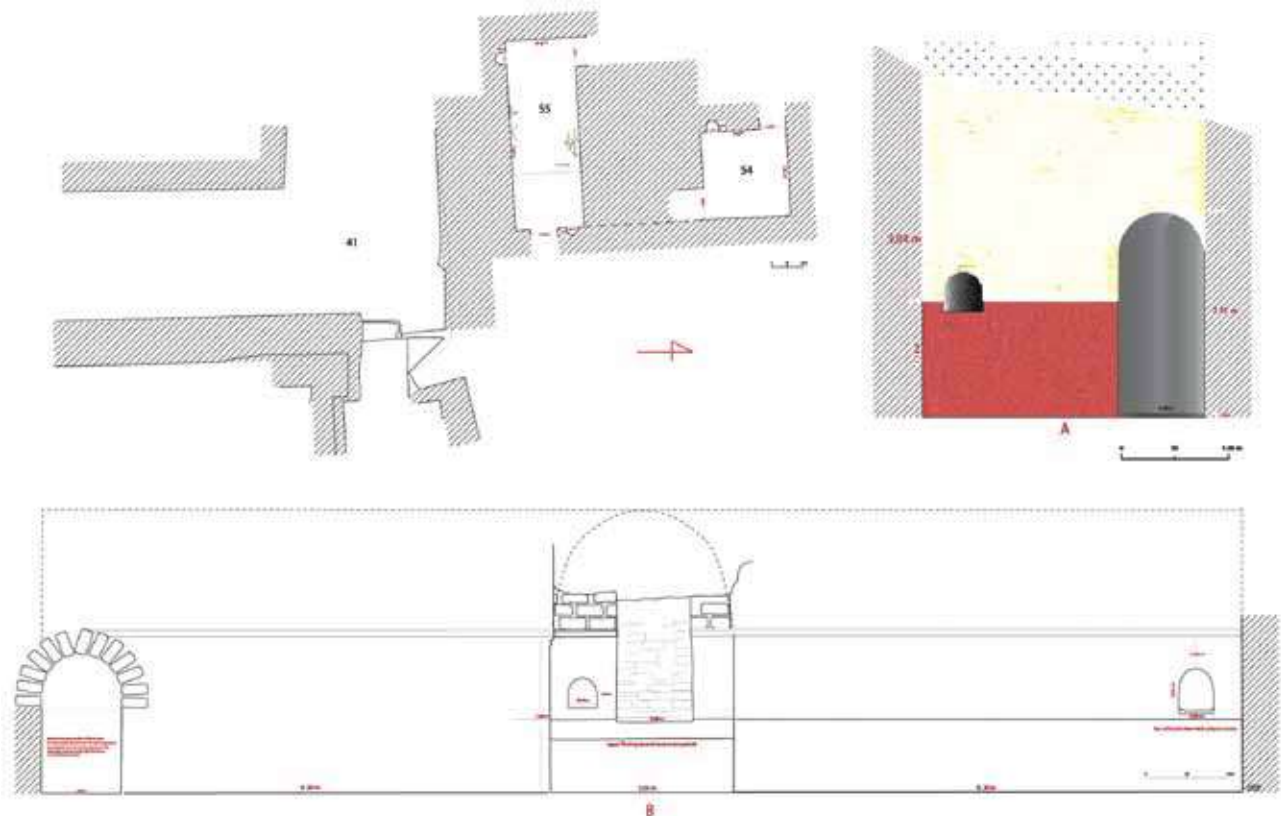


Fig. 2-3. Plan of Excavation rooms:
A) Section (of the southwest wall) of room No 54
B) Reamer of Room No 55. North Hill of Karatepa.

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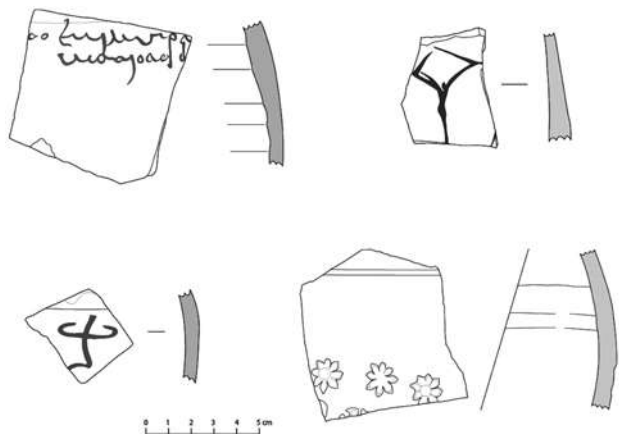


Fig. 4. Ceramic objects (some examples) with manuscripts and ornaments.

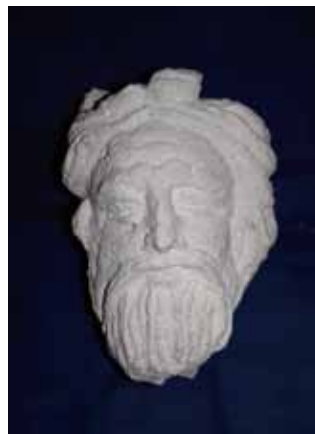
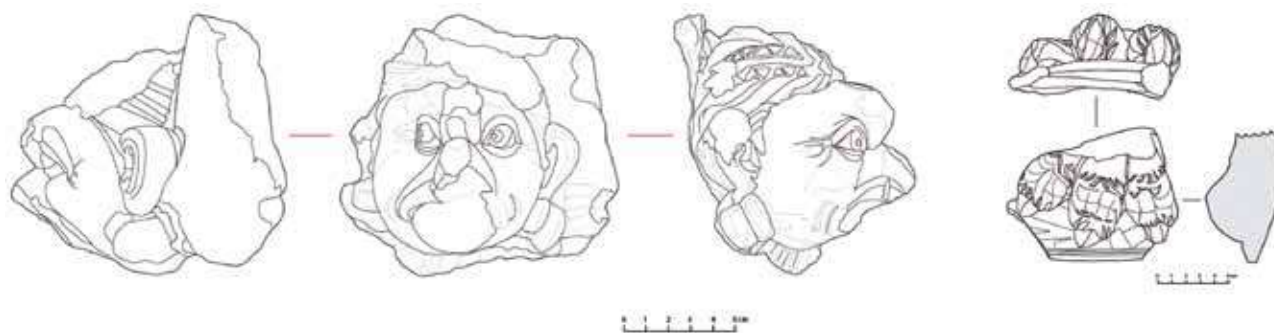
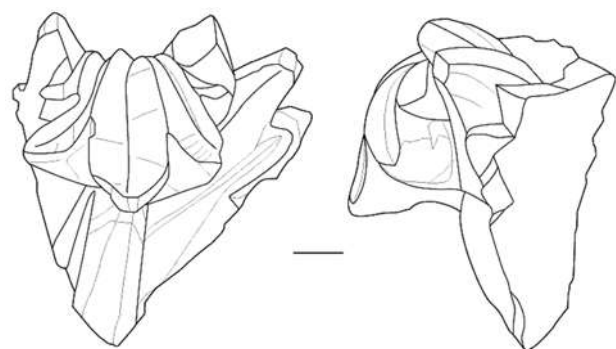


Fig. 5. Sculptured objects (some examples):
A) Status of an old man (Ascet - ?)



B) Fragments of the statue Garuda and its leg.



B) Fragment of the Acanthus.

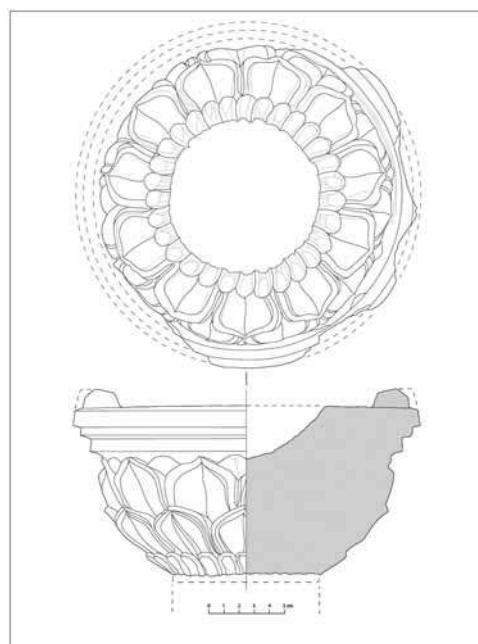


Fig. 6. Architectural objects:
A) Stone capital of a column



Fig. 7 a-c. Conservation of the wall paintings.



Identifying Potential Archaeological Sites on a Polynesian Outlier – Preliminary Archaeological Survey on Futuna

Richard Shing, *Manager*

Vanuatu National Heritage Register, Vanuatu Cultural Centre

As part of our continuous survey work for the purposes of documenting and preserving our cultural sites, the Archaeology Unit / Vanuatu National Heritage Register, with funding from the Australian Research Council, completed a week of scoping the islands of Futuna from 30th June to 7th July for potential areas to conduct further archaeological excavations and surveys of cultural sites, and also to follow up on previous archaeological work conducted on the island by the late Richard Shutler and Mary Shutler in 1964. The Southern Vanuatu Archaeological Survey (2016–2019) is being coordinated by Dr. Stuart Bedford (Australian National University), Dr. James Flexner (Sydney University) and Dr. Frederic Valentin (Université de Paris) and is a four-year project which aims to identify, survey and conduct archaeological excavations on the islands of Futuna, Aniwa, Tanna and Aneityum.



View of Futuna from Nokorwai Hill

The timeframe being examined by the project is from the initial arrival of the Lapita culture, around 3,000 years ago, to the period of initial European contact in the late 18th century and early 19th century, and covering everything in between. It endeavours to research, document and analyse all aspects of human existence and activity within the given timeframe. Additional members of this initial expedition were Jimmy Kuautonga (Tafea Cultural Centre official), Richard Shing (Vanuatu Cultural Centre archaeologist) and Wanda Zinger (student).

Community meetings were conducted to make local communities aware of the importance of archaeology in the interpretation and preservation of their past, and about the possibility of further archaeological work that will be taking place in their areas in the next three years. All communities have showed enthusiasm in working with the project in the years to come.

Futuna

Futuna is a small, volcanic island with an uplifted reef and a surface area of 13 km². It rises sharply from sea level to the mountainous flat-topped plateau of Tatafu, 666 metres above sea level. The steepness of the terrain, the lack of running water and safe sea passage on most parts of the island made

it a harsh island on which to live compared to other neighbouring islands. The fact that people have lived on this rocky island and have adapted to suit the environment around them gives much cause to conduct further archaeological research to determine how this has eventuated.

The people living on Futuna have oral traditions that say they came from the east, and their language and culture is similar to Samoa and Tonga. There are oral traditions associated with the arrival of and trading with Tongans. The back migration of Polynesians to Futuna, and other Polynesian outliers in Vanuatu, is estimated to have occurred around 1,000 BP.

There has been very little archaeological research done on the island of Futuna. In 1964, Richard and Mary Shutler visited Futuna, where they excavated some rock shelters and found some human skeletons, among other artifacts. These skeletons and artifacts were returned to the Vanuatu Cultural Centre in 1999 and are currently being sorted in order for Dr. Frederick Valentin to begin an analysis of them. Since then, no archaeological work had been conducted on the island until the time of our arrival.



Visiting rock shelter excavated by the Shutlers

On arrival, visits were made to the rock shelters that the Shutlers had excavated, to register GPS coordinates and to identify if further investigation was needed. The method the Shutlers used nearly 60 years ago is somewhat outdated, so it was decided that other excavations had to be conducted beside some of the Shutler's excavations. Further expeditions over the top of the island and around it provided more opportunities to identify other sites of archaeological interest, and the following sites and activities of cultural heritage were identified for future archaeological investigations:

1. Mission history and cemetery - In 1841 two Samoan teachers were stationed on Futuna by John Williams on the request of chief Koitiana, but they were murdered after people blamed them for introducing disease. In 1852 Aneityumese evangelists landed on the island but returned after not being able to make

any converts. In 1881 Reverend Joseph Copeland settled on the island and began converting the people to Christianity. What remains from these past activities are the foundations of their buildings and churches and the cemetery they created. There is potential for further excavations to be made around these early houses to find out more about these early missionaries and also to survey the cemetery to find out the extent of this burial site. Coordinators of the project have already amassed many documents and photographs of that period (through journals, letters, collections and books from missionaries and early Europeans in archives and universities around the world) and further research overseas will be made to find more materials about the history of Futuna.

2. Rock shelters - Rock shelters surround the island of Futuna, primarily formed as the island massively uplifted over thousands of years, creating what looks from a distance to be a massive chunk of limestone jutting out of the ocean. Rock shelters have always been used as temporary dwellings, and the rock shelters on Futuna show signs of human habitation, such as fireplaces and rudimentary abodes. The Shutlers excavated some of these rock shelters and human burials were uncovered in nine different places. On Futuna, the bones of the dead were placed in crevices in the limestone cliffs and some were still visible during the trip.

There is potential for further surveys to be conducted on these rock shelters and for further excavations to be conducted adjacent to the Shutler's excavations in order to further document the burial methods of the period.

3. Stone walls - The island of Futuna is littered with stone walls. Both basalt and limestone rocks are used depending on the availability of the resource within the vicinity. Stone walls are built to:
 - i. Mark land boundaries – these normally run in a vertical pattern up a slope.
 - ii. Prevent soil erosion – these garden terraces normally run in a horizontal pattern along a slope to prevent soil runoff and to create a gentler gradient to cultivate crops.

There is a need to further survey and excavate all



Stone basalt walls along a track

the stone walls on Futuna, and plans are in place for this activity to take place next year with the available funding.

4. Sites associated with oral traditions - The island of Futuna is rich in folklore and there is a need to further document and record these sites that have oral traditions attached to them.



Mapping of taro garden terraces

5. Sites of early settlement - Two test pits were excavated at Sinou, on the north-eastern tip of the island, where we believe there may be signs of initial settlement (i.e., the Lapita people). There was not much uncovered but further excavations will be made in the future to see if pottery or Lapita shards can be found.

The proposed study will be conducted mainly on three major periods in the settlement history of the island, all which had major impacts on the island. The focus will be on the Lapita period, when people began inhabiting the islands around 3,000 BP; the period of Polynesian back migrations, around 1,000 to 1,500 BP; and the missionary period, when early European missionaries began converting the islands in the late 18th century.

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