Bangladesh / Cambodia / India / Indonesia

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The Sixteenth 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 fourteen reports submitted by international correspondents in the Asia-Pacific region.

The Sixteenth Regular Report

Contents

Bangladesh

Architectural Style and Ornamentations of Chhota Sona Mosque

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Chhota Sona Mosque (Small Golden Mosque) is one of the ancient mosques among the oldest mosques in Bangladesh. The mosque was built on the outskirts of the capital of Gauda in ancient Bengal. However, at present this mosque is situated on the north-west border of Bangladesh, in the village Firojpur, Upazila Shibganj in the Chapai Nawabganj district.

History of Gauda: The ruins of the ancient city of Lakhsmanavati, which is known as Gauda, is located in the Maldaha district of West Bengal in India. This ruined city is located 40 km from Rajmahal (India) on the west bank of the river Ganga. Presently the major part of this ruined city is in the Maldaha district of the province of West Bengal in India. Some parts of these ruins are in the Chapai Nawabganj district of Bangladesh. The ancient text *Artha Shastra* (Economics) of Kautillys (approximately 350-280 BC) mentioned the name of Gauda as Banga, Pundra and the Kamrup Kingdom. In the ancient text *Brihat Shambita*, written by Baraha Mihir in the 5th century, it is stated that Gauda was one of the six human habitations. It is also stated in the very ancient text *Vavishya Purana* of Panini that Gaudac and other six provinces together formed Pundradesh (Mazumdar 1998:110). In the 7th century AD, Karnasvurna was the capital of Gauda close to Murshidabad.

Map of Bangladesh

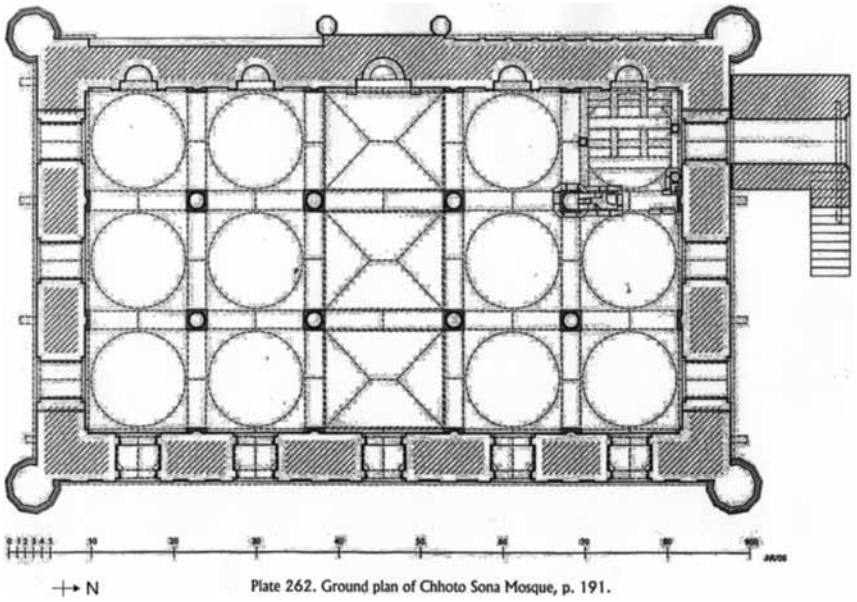
The district Chapai Nawabganj

The Muslim general Ikhtiar Uddin Muhammad -Bin-Bakhtiar Khilji conquered the Navadeep by defeating the last Hindu king, Lakshman Sen of the Sen dynasty, in 1204. He (Bakhtiar Khilji) established Muslim rule in Bengal and founded his capital in Bangarh (West Bengal in India). Afterwards, in the independent sultanate era, Sultan Jalaluddin Mahamud Shah (1415-1433) again replaced the capital in Gauda. The Golden Era began during the reign of Sultan Nasir Uddin Mahmud Shah of the Elias Shahi dynasty, and Gauda was considered to be the capital of Bengal. Enumerable mosques, palaces, fortified cities, madrasas and tanks were built in the capital Gauda from that time. In 1554, De Barosh mentioned the city of Gauda having spacious roads, adorned with many green trees, and with innumerable buildings and inhabitants.

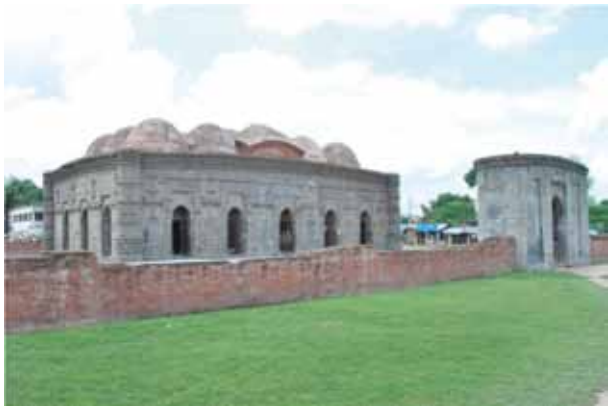
Nomenclature of the mosque: During the independent sultanate period of Bengal and during the reign of Alauddin Hussain Shah, Wali Muhammad built *Chhota Sona* Mosque (1493-1519). This exceptional monument to Muslim architecture was built in Hussain Shahi 'architectural style'. In ancient times, this mosque was called the 'Jewel of Gauda'. At that time the domes were a golden colour and looked even brighter in the sunlight. Consequently, the mosque was named '*Sona Mosque*' or Golden Mosque. At the same time (in the present-day Maldaha district, West Bengal, India) another comparatively large mosque was built in Gauda in the same architectural style. Sultan Nusrat Shah, the son of Sultan Hussain Shah, built this mosque in 1526. As a result, the biggest of the oldest mosques was called '*Bara Sona* Mosque' (Large Golden Mosque) and the smaller one '*Chhota Sona* Mosque' (Small Golden Mosque).

Architectural style of the mosque: At present, *Chhota Sona* Mosque is situated in an area bordering the village Firojpur in Shabajpur Union of Upazila Shibganj. The main road to Chapai Nawabganj-Sona Mosque land port passes by the western wall of this mosque. The mosque used to be surrounded by walls. The open courtyard (42 m x 43.5 m) was decorated with very splendid tile ornamentations. To enter the mosque one has to pass through an ornamented gateway and open courtyard. The mosque was built with fired bricks and black stone and the stone face is richly decorated. The mosque therefore seems to have been built with stone at first sight.

The measurements of the exterior portion of the mosque



Ground plan of Chhota Sona Mosque



General view of Chhota Sona Mosque

Stone pillars showing part of the arches

Stone pillars showing part of the domes

Chauchala roof and semicircular dome

Tile ornamentation in the open courtyard

are 25 m x 15.10 m and the interior walls are 21 m x 12 m. The height of the mosque is about 6.40 m and the walls are 2.10 m in breadth. Though the pillars are made of black stone, the domes and arches were formed from the capital of the stone pillars and both are made of brick. Outside the mosque, there are four corner turrets. These turrets are raised high up to the roof from ground level. The cornice is gently curved towards the north and south.

The three-aisled mosque has five bays created by decorated pillars of black basalt. The roof is divided by a five-lined dome. In the middle line, there is a three-hut-shaped roof or *chauchala* roof (typical Bangla hut style) and its sides are covered by 12 semicircular domes (6 on each side).

The exterior surface of the western wall of the mosque is covered with stone, except for the southern part. Most probably this part was damaged by a natural disaster. The entire mosque (exterior and interior wall) is covered by ornamented black basalt. Five multi-cusped arched doorways in the east and five *mihrabs* are on the western wall facing the same direction. Three more doors are on the north and three are on the south. The doors are immaculate and every door enclosed within the rectangular frame is richly decorated. Gargoyles are used on the cornice for draining water.

In the north corner of the mosque, there is a high platform named Badshah *-Ka- Taktht* (seat for king) or *'Jenana* Gallery' (praying place for women) and this is built on stone pillars. Some historians think that the platform was built for the security of the king or administrator. On the other hand, other historians think it was built as a prayer place for women. Outside, on the north-western corner, there is a staircase and doorway for entering the high platform.

Ornamentation: The ornamentation of *Chhota Sona* Mosque is not unique or incomparable but it is significant in terms of the various types of workmanship that have been used. There are three kinds of ornamentation displayed in the work of this mosque.

Terracotta ornamentation: The terracotta ornamentations mainly appear in the *Bangla chauchala* roof and arches of the domes. Various kinds of creepers, flowers, hanging lamps, small roses and geometrical designs are seen in the roofs. There are special rosette ornamentations in the square panels of the *chauchala* roof. The interior of the mosque was highly decorated with terracotta ornamentations. In the ancient period, the interior of the mosque would have been very beautiful and rich to look at.

Ornamentations in the stone: In the beautification of this mosque, engraved ornamentations are found to be much more prevalent in the stone than in the terracotta. The engraved ornamentations in the stone were made by experts and experienced artists. The mihrabs inside the mosque are beautifully ornamented on all sides, as are the five doors in the eastern wall, with beautiful creepers, rosettes, scrolls and geometrical designs. Having made bands of stones all around the mosque, dots and leaf designs have been engraved on them. Besides these, the outer walls of the mosque have been ornamented by rosette designs and regular designs. The octagonal turrets are decorated by creepers and flower designs.

Gild ornamentation: The other type of ornamentation is a golden colour slip or golden gild. Sir Alexander Cunningham saw this gild ornamentation on the dome and the walls when he visited this mosque in 1880. At that time, the mosque was very decayed, although he was still able to see the gilded domes. According to Cunningham: "It received its present name of the Little Golden Mosque from the quantity of gilding employed in the ornamentation of which some still remains to justify the popular appellation" (Cunningham 1994:74). "It received its popular name of Golden mosque from the fact of gilding employed in its ornamentation of which some traces were seen by the archaeologists of the 19th century" (Haque 2007:191).

Conclusion: *Chhota Sona* Mosque, the 'Jewel of Gauda', is the brightest instance of the Muslim architectural art of

Western wall of the mosque

Staircase for using *Jenana* Gallery

Terracotta ornamentation in the *chaughala* roof

Terracotta ornamentation (close view)

Bengal. The architectural designs and styles, ornamentations and the use of terracotta and stone side by side added a new degree of excellence to the sphere of building construction. The stone band on the corner turrets of the mosque, chain and bell motif, rosettes, creepers and geometrical designs, etc. bear testimony to the high taste of art and culture. As a result, this mosque, constructed by the artists and craftsmen of Bengal, has been able to uphold the art and culture of the Muslim reign in the world of largely. According to Haque, "With all its establishment and scheme of decorations, the *Chhota Sona* Mosque is regarded as one of the finest examples of the stone cutters art of the Muslim period of Bangladesh" (Haque 2007:191).

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Inscription with ornamentations on stone

Ornamentations all around a *mihrab*

Ornamentation on stone

Ornamentation on stone

Multi-cusped doorway

Decorated corner turret

Cambodia

Restoration Work at Prasat Srei Krup Leak-Phnom Baset

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Introduction

Prasat Srei Krup Leak (Temple) was built on the southern terrace of Phnom (Mount) Baset, approximately 25 km northwest of the capital, Phnom Penh. It was built of brick and measures 14 m (length) and 10 m (width) and faces the west (Fig. 1). There is a functioning door on the western side decorated with collonettes and lintel made of sandstone, and three false doors on each of the other three sides with 'flying palace' decorations of.

This temple was built over natural rock, worshipped as Linga (Shiva), with both blocks of rock forming a cave and represented as Yoni (Uma). The tradition of belief of worshipping Linga represented by the natural mountain and having a temple built over the mountain here is a unique case; nevertheless, not many examples like this can be found in other parts of Cambodia. This architectural concept comes from the harmony between the original animism of the Khmers with the adapted practices of Hinduism from India.

According to the artistic decoration of lintels, this temple can be dated to the late 7th century or early 8th century CE, which belongs to the late Prei Khmeng style (east false door) and early Kampong Preah style (western door). An inscription appearing on the black schist stone was found at Baset Mountain and dates from 668 to 677 CE.

Remarkably, some laterite and sandstone architectural construction elements, and fragment of lintels were found in the western part of the temple, which can help date the temple back to the 11th century in the Angkorian period. In the post-Angkorian period (from the 15th to 19th centuries CE), this place and the nearby area became a place of worship for Theravada Buddhism. To the present day, Srei Krup Leak temple as well as the area of Phnom Baset have been considered to be sacred places (Fig. 2).

Due to aging of the temple construction, war, and the impact from trees, and according to old photographs (from the 1960s), the top part of the temple roof has collapsed and remains what we can see today. Moreover, the northern and southern false doors have also been seriously damaged.

From the end of 2014, in order to prevent any more serious damage to this temple, the Ministry of Culture and Fine Arts has carried out emergency work to preserve this temple.

Conservation Activities

On site conservation activities have been carried out from the end of June to the end of September 2015. The work can be divided into five main parts:

1. Weeding: Photographs from the 1960s are able to tell us information about the surrounding temples in that there were already many trees at that time. Due to a lack of proper conservation work over many years, trees and wild vines have been able to grow on the structure of the temple and the rock (Fig. 3). Moreover, due to the location of Cambodia in the tropical region, regular weeding around the temple is required, and the branches of the trees growing around the temple, which can harm the temple structure, must be cut.

2. Clearance and Excavation:

- The accumulated soil and brick chips on top of the rock within the temple were excavated to a height of 1.8 m (Fig. 4).
- Excavation for confirming and preserving the moulding of the lower base of the wall was done. Remarkably, a covered pot was found in the trench on the edge of the north wall moulding.
- The accumulated soil in the gaps between the bricks on the walls was removed carefully to confirm the existing form of the structure to be able to preserve it.

3. Architectural survey: After the weeding and clearance work, the architectural survey term started to reconfirm the plan of the temple. A systematic survey of the temple was conducted in order to record the information and to assess the current condition. The main goal of doing this was to prepare for conservation work. Detailed measurement of each existing elevation was done (Fig. 5).

4. Restoration work: after the monitoring process, the structural evaluation and the result of clearance and excavation, the restoration was begun. The tree roots caused the water to be absorbed into holes between the brick elements. However, other problems might have been caused by the age of the structure and the construction technique, and this is probably another cause of the collapse of the building last time. The restoration project was divided into four parts:

- Emergency support of doorway: Sandstone elements contributed to weakness of the door frame, with the decorated lintel and collonettes needing to be supported (Fig. 6).
- Structural strengthening: With the aim of preserving the existing structure and decorative elements, part restoration support was provided for the following parts (Figs. 7~11).
  - New elements of fallen brick was used to support existing structures.
  - On the top of the wall, bricks were used to protect the original surface from rainwater. The bonded joints were treated and consolidated with improved mortar.
  - Application of injection filling to delaminated surfaces and joints was examined: they are probably

the best to re-fill these areas with adhesive materials, as necessary. The joints in bonded or cracked areas were treated and consolidated with improved mortar.

5. Roof sheltering: As mentioned above, the interior serves as a place of worship. As the temple has no roof remaining, a roof shelter was built within the structure to prevent rainwater. The roof is an independent structural element from the temple.

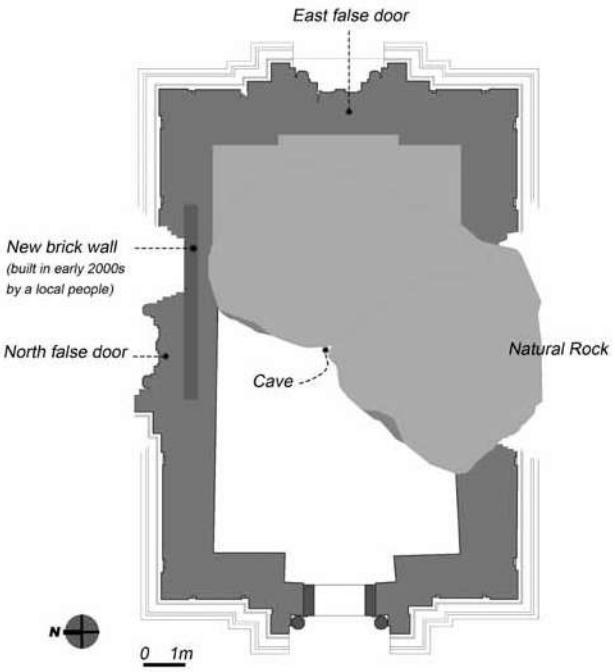

Fig. 1: Plan (conjunctional) of Prasat Srei Krup Leak

Fig. 2: Belief practice by worshippers

Fig. 3: East façade before and during weeding work

Fig. 4: Accumulated soil on the rock next to the east wall

Fig. 5: East façade (before restoration work) created by PhotoScan

Fig. 6: Emergency support installation for the doorway

Fig. 7: East façade during restoration work

Fig. 8: East façade after restoration work

Fig. 9: The front pediment before and after restoration work

Fig. 10: The interior wall before and after restoration work

Fig. 11: The east corner of the north wall before and after restoration work

India

Fading Agricultural Heritage Systems of Vernacular Cultural Landscapes: Bharatpur Case Study

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Introduction

The article presented here is based on extensive research carried out (by a group of young students then training in Architectural Conservation) to identify remnants of the intricate relationships existing between man and nature in the everyday living of a culturally rich region in north-central India, and thus understand the concept of Cultural Landscapes.

A cultural landscape, as defined by the World Heritage Committee, is the *"cultural properties [that] represent the combined works of nature and of man." It is primarily a landscape designed and created intentionally by man, an organically evolved landscape which may be a relict (or fossil) landscape or a continuing landscape and/or an associative cultural landscape which may be valued because of the religious, artistic or cultural associations of the natural element.*

Bharatpur district, constituting some historically noteworthy towns like Bharatpur, Bayana, Kaman, Kumher, Deeg and Weir, is situated in the midst of three significant cultural regions: the Ganga-Yamuna Doab to the east (one of the most fertile plains in the world), the Mewat region to the west and the Dholpur-Karauli region to the south. A detailed study of the regional physiographical features, historic evolution, tangible & intangible cultural resources classifies the Bharatpur region as a transition zone between the Ganga Yamuna Doab and the Mewat regions, entitling it to be a unique vernacular cultural landscape. This cultural landscape is the result of an integral and continuous interaction between a single dominant community of agriculturists known as the Jats, their agricultural activities and their natural environment, for 500-600 years from about the 15th century AD. Several towns and villages in the regions have enjoyed centuries of uninterrupted historic significance as important trade routes and trade centers, strategic military outposts, indigo production centers, state mints, multiple power centers and agricultural hubs. This paper will discuss (only) **the agricultural based heritage systems** that evolved in the Bharatpur region as an important influencing factor of the vernacular architecture and practices.

Methodology of the Study

The Bharatpur district and its surrounding settlements were surveyed and studied using the following parameters. These were laid down as the criteria for the delineation of the Bharatpur cultural region. Similarities and differences across different geographical boundaries within the district and in the surrounding environs were understood to delineate the homogenous and heterogeneous zones.

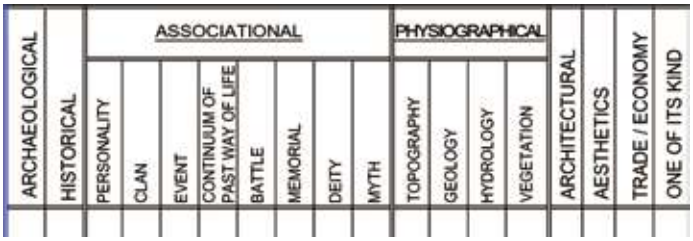
Physiographical Factors – Topography, Geology, Soils, Hydrology, Vegetation
Evolution – Military and Defense, Administrative, Settlement Patterns, Occupation, Trade and Economy
Intangible Features – Community, Linguistics, Fairs and Festivals, Parikrama (circumambulation of sacred places such as religious deities in a temple, sacred water bodies, sacred hills, and close clusters of temples, as a part of religious worship)
Built Resources – Built Heritage Components, Typology and Character

The Bharatpur cultural region thus delineated is surrounded by the Braj cultural region to the north-east, Ganga Yamuna Doab region to the east (of which the Braj region is a part), Dholpur region to the south, Dhundhar region to the west and Mewat region to the north. The physiographic features within the homogenous and heterogeneous regions clearly indicated that the Bharatpur region itself is a transition zone between the fertile Ganga Yamuna Doab plains and

the Aravalli hill ranges. It was important to first understand the concepts of a cultural region so as to identify the unique cultural landscape of Bharatpur and establish its existence followed by an evaluation of its significance. A comprehensive study of the mutual interaction of the above parameters against the context of nature and culture over several centuries in the past was carried out.

A sample study was undertaken of several historically important towns such as Bharatpur, Weir, Bayana, Kumher and Deeg, and villages such as Sinsini, Au, Koh, Gunsara, Sonkh and Awaar. Factors determining the cultural significance of each of these towns and villages were evaluated against the following criteria:

Against each factor determining the cultural significance of these settlements, an understanding of how nature and culture interacted in that context with one another was also listed to identify the unique cultural landscape of the Bharatpur cultural region.



Brief history of Bharatpur Cultural Region

Bharatpur district is the eastern gateway to Rajasthan state in western India. It has ten tehsils: Bharatpur, Bayana, Deeg, Kaman, Kumher, Nadbai, Nagar, Pahari, Rupwas and Weir. Bayana was an important administrative centre for the Yaudeya community, who were feudatories to the Gupta and Gurjara rulers from the 4th to 7th centuries AD. It continued to be an important administrative centre and a strong military outpost due its strategic location, and controlled eastern Rajasthan and Gwalior though the 8th to 10th centuries AD. From the 11th century onwards, Bayana's status as a military outpost was exemplified and it emerged as an important trading and cultural centre as it was invaded and controlled by the Muslim rulers of different dynasties up until the 16th to 17th centuries AD, after which it started losing its importance as a military outpost. It was around this period that the indigo vats of Bayana gained popularity and found a world market. The brackish water, soil conditions and suitable weather boosted indigo production tremendously. While Bayana and its environs were gaining significance as an important military base, other areas of Bharatpur district were gaining popularity from other perspectives. Stone Age, early historical, grey, ochre and redware sites have been excavated in the central Bharatpur region, as well as evidence of a dense population from the 2nd century BC onwards.

The Yaudeyas, Chauhans and Gurjaras continued to rule the entire Bharatpur region till they were defeated by the invading Muslims, and what followed was uninterrupted control of the entire region by the Slave, Khalji, Tughlaq, Lodhi, Sur and Mughal dynasties till it was won over by the Jats – the local peasant community. Between the 7th and 10th centuries AD the agricultural communities of Jats and Gujjars started occupying the Bharatpur district, driving the original inhabitants, the Meos, further north to Alwar. Over the next few hundred years this region became a rich agricultural belt producing top quality indigo, wheat, sugarcane, henna, and other crops.

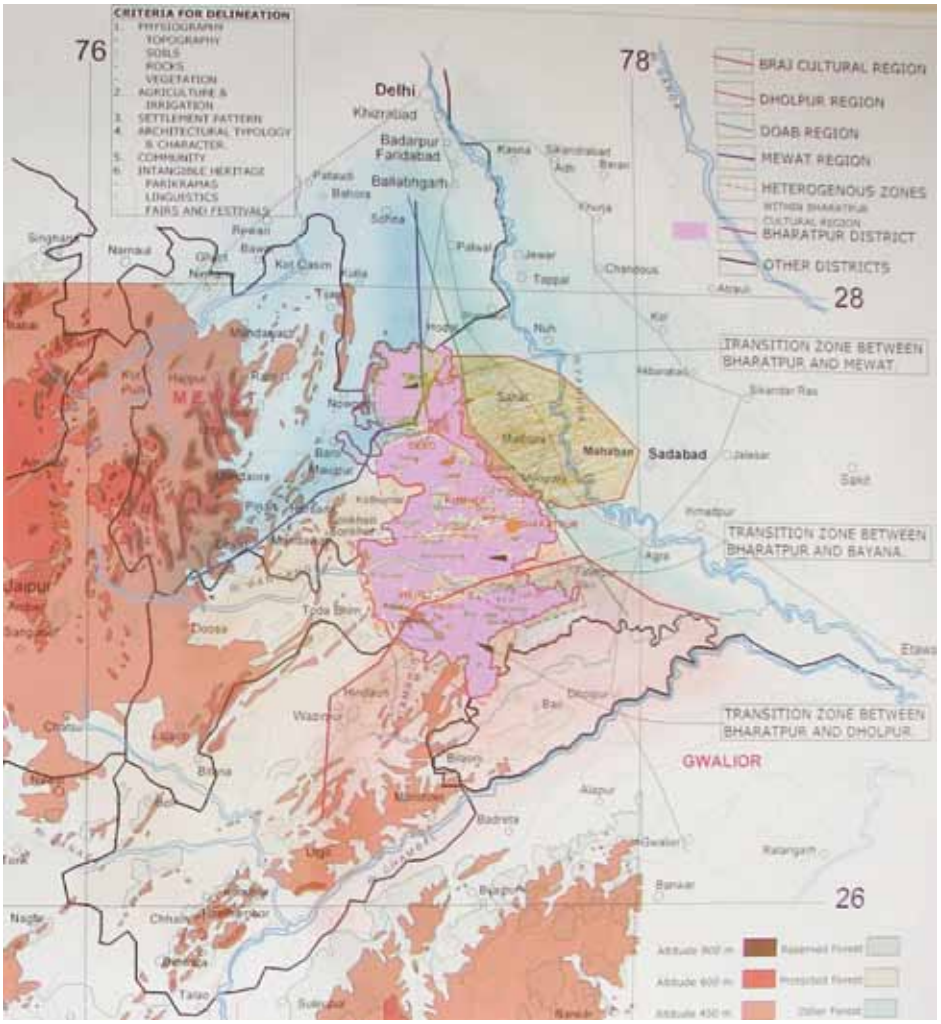
The Jats are commonly considered to be of Indo-Scythian, Indo-European, Indo-Iranian or Indo-Aryan stock in view of their similar physical features and common practices. There are no clear written records about their origin and anthropologists are still working on several theories. However, they are found in most states of North India and in many parts of Pakistan, and the Jats of the Bharatpur region are well known for having fought the Mughals and carved out a kingdom for themselves, rising from a simple peasant community to Zamindars to finally rulers of their land till the Matsya Union was formed in 1948 after India attained its independence from the British.

The Jats were very unhappy with the tax system and enhanced revenue collection that was introduced for Hindu peasants by the Mughal dynasty, and there was also growing discontentment over religious discrimination by Emperor Aurangzeb. These oppressive factors culminated in a rebellion due to their deep attachment to personal freedom, resentment towards external control and martial character. The first rebellion was in 1669 AD, followed by more organised and united attempts by Rajaram and Churaman in the late 17th century AD, and the Jat kingdom was finally founded by Thakur Badan Singh in the early 18th century AD. There were about 17 Jat rulers in Bharatpur State from 1670 to 1947. Multiple power centres such as Kumher, Weir, Bharatpur and Deeg were developed by dividing several jagirs (the smaller subdivisions within their kingdom) within the present Bharatpur district. The entire Jat kingdom of Bharatpur saw major development during this period. The natural landscape was greatly altered by the construction of:

- mud fortresses in the villages
- mud fortifications around the villages
- capitals with moats and gateways
- palaces and forts
- tanks and *kunds* (manmade lakes)
- *havelis* (courtyard mansions)
- religious structures
- walled gardens and orchards
- recreational structures

The Cultural Landscape Elements

The Jats knew their terrain and jungles only too well and stuck to their traditional mode of guerrilla warfare. They hovered on the highways and plundered the caravans and travellers in the countryside, and grabbed rich booty to show their rage towards the Mughal system of administration and to meet their warfare needs. They built their early forts



Demarcation of the heterogeneous, homogenous and adjoining cultural regions of the Bharatpur Cultural Region

in the deep jungle and surrounded them with mud ramparts that served as bases for operations and refuge, and also places for dumping the booty. Garhis (mud fortresses) were built in villages. These were prototypes based on which strategic-military systems of protection against the enemy in battles were developed in palaces and settlements by later rulers. These consisted of the following:

1. Unique defence systems were incorporated with a deep understanding of the elements of nature to strengthen the four major power centres of Kumher, Deeg, Bharatpur and Weir. Moats of the settlement acted as a water reservoir to recharge the soil. When a moat was dug, all the earth from it was used to raise mounds and mud forts that acted as defence outposts. The mud was rammed hard and vegetation grown on the mounds so that the enemy could not make out the hideouts of the soldiers. Mud was also used extensively to make ramparts around the fort and fortifications around the villages. These were early strategic systems of protection of the village against enemie. Today we can still find many villages on these mounds and recent expansion on the fringes too. Some of these fortified settlements had such a strong defence system that it took the Mughals around 10 months to break the various tiers of the security net.

2. Forts were built within forests, and villages and mounds were surrounded by babul trees. The babul is a tree 5-20 m high that prefers sandy or sterile regions with a dry climate during the greater part of the year, and can withstand both extremely dry environments and floods. These babul trees with thorns were planted extensively and can be still found in abundance. The wood is strong, durable, hard, very shock resistant, and is used for construction, mine props, tool handles and carts, and makes excellent fuel wood and quality charcoal.

3. The soil of the Bharatpur region is alkaline and saline in many places. This led to the development of an indigenous system of irrigation which reduces the soil of its extra-injurious salts and prevents it from becoming a saline and alkaline wasteland. This system has been practiced in the region for generations and is an example of a traditional knowledge system having evolved due to the interaction of humans with nature. Embankments on the agricultural fields known as bandhs are constructed to harvest rainwater effectively. The fields are extensively inundated for irrigation to control the salinity. This is considered to be a very simple, inexpensive, yet effective method. The Ajan Bandh or dam is one of the largest among several such irrigation channels to the south-west of the capital city of Bharatpur and was constructed by Maharaja Ranjit Singh (ruled 1776-1805 AD). It fed into the Atal Bund adjoining the city, which in turn supplied water to the moat around the city's fort and

its wells and also supplied water to 77 villages. It also played an important role in establishing the royal hunting ground. A UNESCO World Heritage Site and one of the richest bird areas in the world, the Keoladeo National Park is a good example of how well the farmers who turned into a ruling class understood the natural geological conditions and terrain and how they used these to create a hunting ground for their recreation. The park covers an area of 2873 hectares and is a flat patchwork of marshes, artificially created in the 1850s and maintained by a system of canals, dykes, and sluices. Normally water is fed into the marshes twice a year from inundations of the Gambira and Banganga rivers, which are impounded on arable land by this artificial dam – the Ajan Bandh. Only one third of the park is a wetland. Situated in an area characterised by very sparse vegetation, the park is the only spot with dense vegetation and trees. Dykes divide the wetland into ten units and each unit has a system of sluice gates to control its water flow.

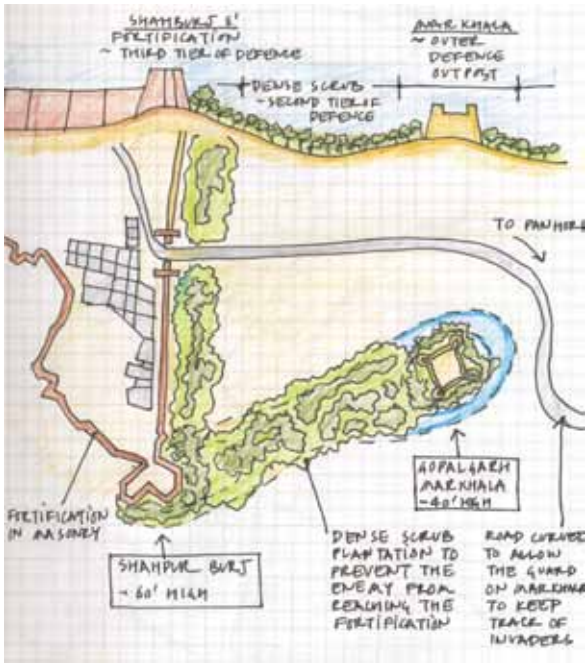
4. Manmade Ponds/*Taals* were an important source of water for irrigation and domestic purposes such as bathing, cattle rearing, washing clothes and socialising. There were two types:

   - Kacha Tal (Go Taal) built for cattle
   - Pacca Tal (Kunds) built for the use of humans and usually constructed with steps

   Both these ponds sometimes had wells projecting into them and they were recharged with rainwater from the pond very efficiently. They served as an important source of soft potable water for drinking and cooking purposes and could be used even after the water in the pond was finished.

5. With power came all other desires and the Jat rulers built several beautiful gardens in their forts and palaces, which they did so with a deep knowledge of their terrain, and climatic and soil conditions. Walled gardens along with tanks were located and built in such a manner that they served as efficient water catchment and harvesting bodies. Hand pumps and wells were all located in the vicinity because of the availability of soft water. When mud forts, ramparts and mounds were built for military reasons they were dug in a such a manner that they could serve as ponds, water tanks or moats, and beautiful gardens were created around them for easy availability of water.

6. Every agricultural community has a deep understanding of how best to utilise its produce so as to ensure maximum benefit and zero wastage, and the Jats were no exception. The main crops that were cultivated were wheat, bajra, groundnuts, mustard, pulses, rapeseed and henna. Indigo found a world market in the 17th century AD but a major slump was seen in the 18th century. Salt began to be manufactured extensively as a result of control of the soil salinity. The indigo vats and salt mines also greatly altered the natural landscape.



An illustration of the unique defence systems devised by the Jats based on their agricultural knowledge

Moat and earthen mounds (garhis) with babul plantations surrounding the Lohagarh Fort of Deeg

Moat, babul plantations and mud mounds of villages act as both a DEFENCE SYSTEM and a WATER RESERVOIR.

Embankments called BANDHS are constructed in the agricultural field forming a network.
These bandhs are carefully placed against the natural gradient to collect the rain water.

An outlet is created in the embankments in accordance with the drainage direction.

The field is FLOODED for 7-10 days.

The injurious salts in the soil rises through capillary action and gets saturated in the water.

Water is allowed to drain through the outlet.

Leguminous crops like
- PULSES
- WHEAT
- SERBENIA (dhaincha)

fixes nitrogen in the soils and reduces the salt concentration are practised in rotation.

Photograph of the Ajan Bund at Bharatpur, Rajasthan, taken by in 1900 AD

The swampy marshes of the Keoladeo Park

The wetlands with migratory birds in the Keoladeo National Park

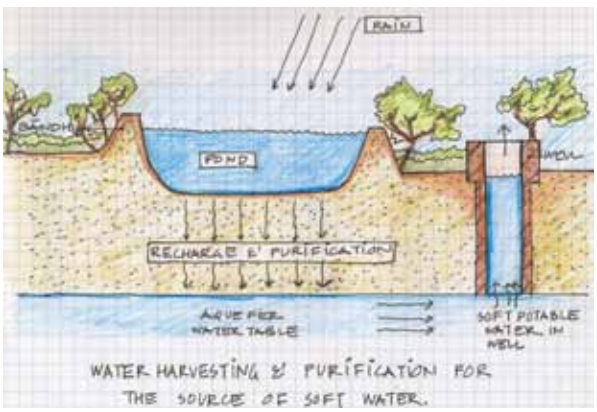
Babul trees – usually planted in clusters to form thorny, impenetrable dense vegetation

SETTLEMENT											INTERFACES						SURROUNDINGS														APPROACH			WATER	
MOUND				BUILDINGS				KUND Pucca Tal		TAL Kacha	FORTIFICATION				GATEWAYS	BRIDGE	AGRICULTURAL FIELDS	ORCHARDS	FORESTS			IRRIGATION					HILLS/ OUTCROPS	FLOODING PLANES	State High way	Link Road	Village roads	Brackish	Non-Brackish
On Mound	Around Mound	Both	Scrub Plantation	Mud (predominantly)	Masonry (predominantly)	Both	Ghats	Penetrating wells	Go Tal(cattle)		Mud	Masonry	Moat	Scrub Plantation					Open	Protected	Reserved	Wells/ Tubewells	Tals	Bunds	Canals	River							

A sample inventory to explain how data was collected and settlements were studied

Conclusion

All the villages that were studied revealed several historic structures either in a reasonably good condition or in a dilapidated state strewn among the fields, babul forests, on plain land, adjoining water bodies, etc. Some of them were found in a collapsed or demolished condition. These remnants, along with wet scrublands and dense babul forests, are spread across the entire cultural region along the urban and rural areas. These clearly speak volumes about the splendour created by the peasants, both while trying to capture political power and after having turned their jungles and wetlands into a royal kingdom. They ensured that their vernacular knowledge system was fully utilised both in their tangible and intangible expressions. The grand and brilliant expression of their courage, religious/social beliefs and customs, traditional construction knowledge, desire for luxury and military strategies through rural and urban architecture is beyond the scope of this report. However, these factors, along with the above vernacular representations, clearly showcase how important and unrecognised a cultural landscape the Bharatpur Cultural Region represents.

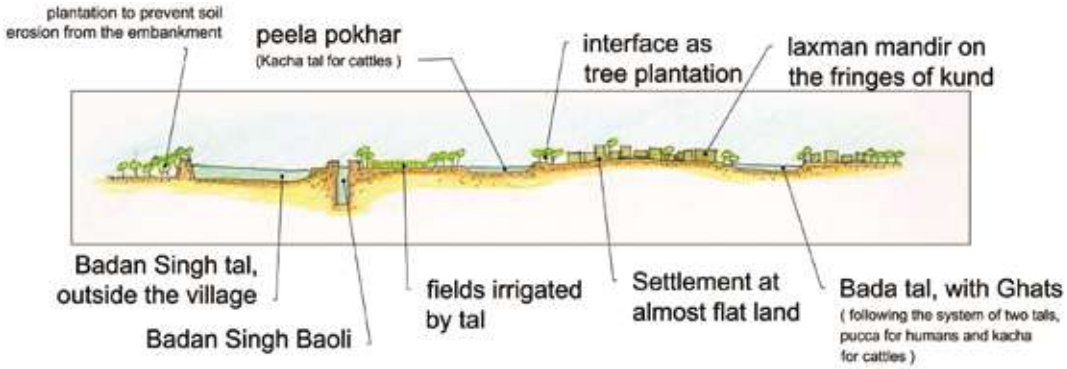


An illustration of an artificial pond and adjoining well system

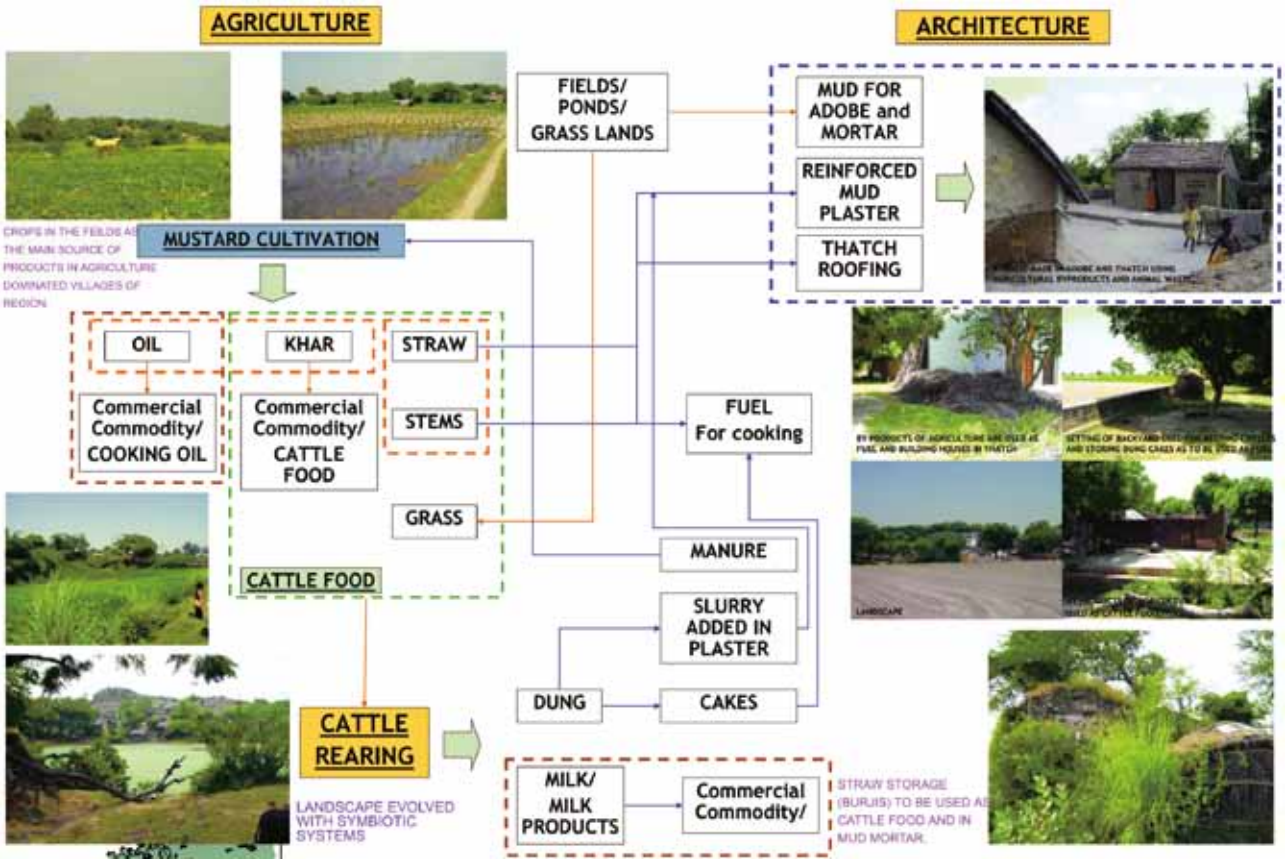
The cattle pond in the village of Awaar

The Pacca Taal 'Lalawala Kund' with projecting wells and ghats

The walled garden of RAMBAGH at the foothills of the earthen mound and a manmade pond



Cross section through the village of Sinsini illustrating the ponds and wells



Prevalent systems showing inter-dependency of agriculture with the lifestyle of the region, resulting in the evolution of the landscape

Indonesia

Conservation of Palas Pasemah Inscription Using Pulpwood

Dewi Puspito Rini, *Archaeologist,*
Heritage Conservation Office of Serang, Ministry of Education and Culture

The past is always interesting to learn. A lot of valuable information can be obtained by studying the past through its heritages. One source that is accurate enough to uncover the past is inscription. By reading and analyzing inscriptions, significant events that happened in the past can be seen.

One inscription that is contributing to unmasking the secrets of the past of a region in Indonesia is the Palas Pasemah inscription, which was found in Lampung province. Lampung province is located at the southern tip of the island of Sumatra. Lampung borders South Sumatra province and Bengkulu province to the north, the Java Sea to the east, the Sunda Strait to the south, and the Indian Ocean to the west. Lampung lies between longitude 103°40' to 105°50' E and latitude 3°45' S. Temperatures in this region are constant and homogenous, and the mean annual temperature ranges from 30°C - 37°C.

The Palas Pasemah site is located in the administrative area of Palas Pasemah village, Palas sub-district, South Lampung regency. The location of this site is strategic and fairly easy to reach by public transport. The road conditions are fairly good. The distance between the Palas Pasemah site to the capital regency, namely Kalianda, is about 30 km.

The Palas Pasemah inscription measures 0.64 meters high, 0.75 meters wide and 0.20 meters thick. The inscription consists of 13 lines. It was written using Pallawa letters and the Sanskrit language on a flat stone surface. The stone material of the inscription is andesite. The stone base material of the Palas Pasemah inscription can be categorized as acid igneous stone.

In 2014, a team from the Heritage Conservation Office of Serang intended to conserve the Palas Pasemah inscription. Before carrying out conservation work, the team made some observations about the condition and damage to the inscription. Based on the observations that were made, the stone of the Palas Pasemah inscription had deteriorated. A reduction in the quality of the inscription material was seen over almost the entire surface of the stone. The stone surface was covered by black stains that were suspected of being an adhesive. The stains had come from the adhesive material when a duplication of the inscription was made in 2004. The duplication impacted the surface of the stone inscriptions, and partly covered the stone surface with black remnants, so that the inscription is difficult to read. Another impact is the stone surface become fragile, so that weathering can easily occur.

Referring to the results of the observation, it was decided to conserve the inscription using traditional treatment. Because the surface of the stone was fragile, it would be very risky if conservation were conducted using chemicals. The team decided to conserve the Palas Pasemah inscription using traditional treatment in order to minimize any further impact.

The Palas Pasemah inscription before being cleaned

Traditional conservation is one way that can be used to inhibit the growth of microorganisms or weathering on the surface of the heritage. This method is considered to have the most minimal risk. There were several stages in the Palas Pasemah inscription conservation, which were:

1. Dry Cleaning
   The first step was dry cleaning. Various equipment are used in dry cleaning, such as nylon brushes, spatulas, needle sacks, and cleaning tools such as cleaning cloths or chamois. The technique of dry cleaning is brushing the stone surface carefully using a brush. To clean some parts that are difficult to reach, such as small holes on the surface of the object, the team used spatulas or needle sacks to pry away the remaining stains. Cleaning was done slowly so that the stone surface was not damage.

Brushing the stone

After that, the stone surface was cleaned with a clean cloth or chamois, so that the stains that covered the inscription could be cleaned, as well as to make it easier

to determine the extent of cleaning that had already been achieved.

2. Wet Cleaning
   Wet cleaning was also used because the damage was not caused by biological factors, but due to negligence in the use of chemicals. It was feared that this would have more impact on the inscription.

   The technique of wet cleaning is to sprinkle water on the surface of the item, then brush it, so that the stains can be detached. Unfortunately, maintenance using wet cleaning does not provide maximum results. The aim of cleaning using cold water was to open the pores of the stone and also weaken the adhesion stains on the surface of the inscriptions. After the inscription was cleaned using water and brush, then dried using a cleaning cloth or chamois. However, the results were not satisfactory, because some of the inscription was still obscured.

3. Cleaning using paper pulp and hot water
   Actually, cleaning using paper pulp is known as one of the methods or techniques for removing salt from stone surfaces. The conservation team decided to try this method to remove the remnants of the stain on the Palas Pasemah inscription. The tools that used for cleaning using paper pulp are a set of scales, rubber gloves, a mask, a nylon brush and a bucket, whereas the ingredients consist of clean cold water, hot water, and paper. The steps to make paper pulp are as follows:

   a. Prepare a container (bucket)
   b. Prepare hot water (10 liter) at a temperature of around 85° Celcius
   c. Prepare as much paper / newspaper as needed
   d. Pour the water into the container (bucket)
   e. Soak the paper in the container
   f. Leave the paper soaking for some time (about an hour)
   g. After the paper is wet evenly, turn it into pulp by tearing it into strips
   h. Then stick the paper pulp onto the stone surface evenly
   i. After that, pour hot water over the pulp that has been stuck onto the stone, so that the heat can last longer. The remnants of the stain can be lifted from the surface of the stone. Repeat up to three times, then allow to stand for 24 hours
   j. After 24 hours, clean the paper pulp from the stone
   k. Rinse the stone with water and dry using a clean cloth or chamois.

Making paper pulp – sticking the paper pulp – pouring hot water onto the stone

After cleaning the stone using paper pulp and hot water, the inscription can be seen more clearly. Some letters that were previously unreadable can be read now.

Recently, conservation in Indonesia has tended to use materials that are environmentally friendly and not to damage heritages. This trend has a positive impact as a spur to carrying out research on the right materials that do not adversely affect to heritages or the environment. In further, conservation experts in Indonesia also learn about traditional conservation techniques that were used by their ancestors, in order to preserve heritages, so they can last longer.

Cleaning off paper pulp - rinsing the stone – Palas Pasemah inscription after treatment

Kazakhstan

Preliminary results of the study of the ancient city of Taraz

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In 2015, a detachment from Taraz LLP "Kazarchaeology" continued research on the archaeological site of Ancient Taraz. The purpose of this research project is the transformation of the city in the historical and cultural archaeological park "Ancient Taraz". That is, after a full scientific study of the structures and the ruins of the ancient city, the works on conservation and restoration of the monument. The archaeological park "Ancient Taraz" will be presented during the World EXPO in 2017 and will become one of the most recognizable brands in Kazakhstan, creating considerable interest among tourists. At the moment, scientific research has only partially been completed, and the park was introduced at the 550th anniversary celebrations of the Kazakh Khanate, with the participation of the President of the Kazakhstan, N.A. Nazarbayev.

The ancient city of Taraz consists of a citadel (fortified part of the city), *shakhristan* (trade, or industrial part of the city), *rabad* (suburbs or craft villages located outside the *shakhristan*) and fortifications.

The high level of accomplishment of ancient Taraz indicates a water supply system, public and religious buildings, urban development with cobbled streets quarterly, and fortifications.

Archaeological studies this year have covered a significant part of the *shakhristan* and fortifications. Excavations covered an area of 1.1 hectares, which revealed the central part of the city in terms of the Karakhanid period (10th to 12th centuries). Excavations in 2015 revealed the following objects of the ancient city:

Main water system. Water was distributed through ceramic pipes, one end of which featured a cone-shaped funnel. Water pipes were laid on a "cushion" of stones, gravel and clay, and the top covered with flat stones and cobbled pavements. Water from the Talas dam was fed into the pool. Gravity acted to feed water in the reservoir through the ceramic tubes to all parts of the city. Naturally, the presence of the aqueduct required a certain amount of technical knowledge and a relatively high degree of engineering.

There is a madrasah, comprising a closed rectangular building with a courtyard, oriented along the long side of a north-south line. Login to madrasah oriented to the north. Opposite the entrance is a rectangular room, and on the east and west sides of the madrasah are a total of 14 *hudzhra* (dwellings for madrasah students and teachers) arranged in two rows parallel to each other. In the hudzhra are ovens with ceramic caps, 25 x 25 cm, with a depth of 5-7 cm. Furnaces are located in the center of each room facing towards the door. These furnaces have the function of heating the room. The floors are covered with clay. Such facilities are common in buildings in many countries of the Muslim East, particularly in Central Asia.

At the madrasah in the *shahristan* there were two groups of buildings, comprising social and religious buildings. In terms of the architectural and compositional techniques of combining two or three separate buildings into one group, the Central Asian architects did this in several different ways, on the basis of mutual arrangement of the buildings. There is one building adjacent to the madrasah, the function of which has not yet been determined. The function of the building was not clear from the general principle of architectural expression; they are all designed for the leading role of a separate building.

The research revealed the remains of a bath, which by its monumentality and architectural design is a rare example of civil architecture of Central Asia and Kazakhstan.

Also undetermined was the system of town planning, which may have been either a regular rectilinear or radial system. Urban sprawl with cobbled streets quarterly, whose length is 112 meters, with a width of 4.5 meters. This street leads to the east gate, and is the main avenue of the *shakhristan*.

A unique find was a basement for the storage of products, containing preserved voluminous bronze vessels, pottery, an iron cauldron, pitchers and bronze dishes. Also found here were a stone millstone and fragments of ceramic pots.

During the excavation of fortifications on the east and south sides, *shakhristan* were identified near the eastern and southern gates and fragmentary preserved sections of the fortress walls of the ancient city.

The results of archaeological research of cultural layers from the Karakhanid period illustrate that Taraz, which was at one time the capital of Karakhanid in its heyday, had a well-planned system of urban development.

The rich archaeological material obtained during excavations also points to the former wealth of the city. Uniquely, the excavations this year found two treasures. The first consisted of gold and bronze bracelets, earrings, fragments of ornate engraved silver plate and coins stacked in a ceramic vessel. Second, was a hoard of 184 copper coins.

In the area of the excavation there were numerous finds of ceramics, metal, bone and stone. Among these was a unique three-dimensional image of a female head made from rock crystal, and numerous articles of silver and gold, and a jade belt lining a silver cage. Of particular interest were items of bone showing the high bone carving art of the medieval masters.

At this time, excavations continue. The purpose of this period is the identification of more ancient cultural layers of the city to determine the age of ancient Taraz, but at this

stage, we can say that in the course of research and restoration work, we have gotten a unique facility for the development of the tourism industry and the object of the cultural heritage of our country - a country of great steppes.

General view

East Gate

Northeast view of the excavation

View from the south

Southeast view of the excavation

Water supply

Ceramic kettle

Jewels found in a vessel

East Tower

The eastern wall

Bricked area

Artifacts found in storage basement warehouse

Visit of the President of Kazakhstan, NA Nazarbayev

Jewelry and coin hoards

Figurines (rock crystal, bronze, terra cotta)

Beads

The Making of Singgora Roof Clay Tiles, Bachok, Kelantan, Malaysia

Professor Dr. A Ghafar Bin Ahmad, *Professor*
School of Housing, Building and Planning, Universiti Sains Malaysia

Introduction

Locally known as *bata atap*, Singgora roof clay tiles are a predominant roofing material seen on buildings on the east coast of Peninsular Malaysia, particularly in the states of Kelantan and Terengganu. The roof tiles, which are made of clay available from the local swampy salt-water areas, are turned into terracotta colour after undergoing a high-temperature baking process in a traditional earthen kiln. Singgora is a Malay word which literally means City of Lions. It refers to the lion-shaped mountain located near the town of Songkhla in southern Thailand where the roof tiles were believed to have their origins. The Singgora roof clay tiles and gable ends (Malay refers to them as *ekor itik*) are of Thai and Cambodian influence since the states of Kelantan, Terengganu and Pattani (in southern Thailand) were once part of the Langkasuka Kingdom, dating from the 2nd to 16th centuries. Singgora roof clay tiles are primarily used in Malay houses, old palaces, pavilions, gazebos, gateways, mausoleums, Siamese temples and mosques. Today, Singgora roof clay tiles are produced manually by several family-owned roof clay tile-making enterprises in the district of Bachok, Kelantan, which supply these hand-crafted tiles not only to Malay house owners but also to hotels and resorts. One of the Singgora roof clay tile makers is Ms. Che Jah Abdul Rahman, 62 years old, from Kampung Pengkalan Baru, Beris Kubur Besar, Bachok, Kelantan, who has decades of experience in this cottage industry.

Specifications

Singgora roof clay tiles are thin, flat tiles. An average roof clay tile measures 275 mm x 145 mm x 5 mm. With a rhomboid shape at one end and a small right angle of 28 mm at the straight end, each roof tile is laid carefully on roof battens without the use of any nails to form a tiered roof. Visually, this presents a unique design feature of an overlapping arrangement and a repeated pattern of roof clay tiles resembling fish scales. Today, Singgora roof tile makers are still in operation on the east coast of Peninsular Malaysia and Southern Thailand. However, there is a slight physical difference between Singgora roof clay tiles produced in Malaysia and the ones made in Thailand. The former have a more pointed edge and are relatively thinner, while the latter have a more rounded edge and are much thicker.

Production Process

While modern contemporary roof tiles are manufactured in large quantities in factories, Singgora roof clay tiles are crafted manually by roof clay tile makers using their hands and feet as per the following five stages:

i. Clay preparation

Natural clay is readily available in the swampy salt-water areas located along the river banks at Bachok, Kelantan, Malaysia. Tonnes of clay are collected and stored temporarily in sheds. The clay is cleaned of any debris, weeds, leaves and twigs and left to dry for several days before it is ready for wedging and kneading. Good quality clay with high contents of silicon dioxide (SiO_2) and aluminium oxide (Al_2O_3) is more resilient during the kiln baking process, which allows the roof clay to harden and become sturdy more easily.

ii. Clay wedging and kneading

Prior to the wedging and kneading process, some water is added to soften the hard, cleaned clay stored in the shed. Clay wedging and kneading are done manually in the shed. Roof clay makers use their bare feet to wedge and knead the clay bundle until the different shades of the clay are well blended and turn into a distinctive dark grey colour. The kneading method using the feet has been a tradition among the local roof clay tile makers for decades. It is a unique method done mostly by the womenfolk. Once the clay is well mixed, the roof tile makers prepare a wooden mould for mould pressing.

iii. Mould pressing

A wooden mould is used to shape the clay into its rhomboid-shaped signature design. The roof clay tile maker places a slab of clay into the mould and presses the clay downwards a few times with her right foot to smooth out the clay. Once the clay is packed in the mould, a wire cutter is used to slice away the excess clay. The roof clay tile maker then removes a 5-mm-thick rhomboid-shaped clay sheet, which is a dark grey colour. To avoid any clay sticking onto the wooden mould, paddy husk ash is spread all over the mould before the pressing process begins. On average, a roof clay tile maker can produce about 30-35 pieces of grey clay sheets per hour.

iv. Sun drying

The grey clay sheets are then laid down in rows on the ground under the hot sun of 32-35 degrees Celsius. While the clay sheets are drying, the roof clay tile maker uses a stick to make a slight right-angled bend at the straight end of each of the grey clay sheets. The clay sheets are ready to be collected after one to two hours of drying out in the hot sun. Once dried, the clay sheets become clay tiles and the colour changes to a lighter shade of grey. The clay tiles are collected and inspected for possible defects such as breakage, uneven shapes, chips or cracks. The good tiles are grouped together in packs of ten pieces and stacked horizontally in alternate order. When the number of stacked roof tiles reaches 40,000 pieces, the roof tile maker fires them in a high-temperature traditional earthen kiln.

v. Kiln baking

Kiln baking is the most challenging stage as it requires specific techniques by skilled and experienced roof tile makers. The roof clay tiles are stacked in several layers above the ground in the earthen kiln, which is also covered with bricks to retain the heat. Firewood is used as a fuel supply for the kiln. The fire is set at one side of the kiln for the ten-day baking process. The kiln is fired at a lower temperature in the first seven days followed by a high temperature in the remaining three days. The kiln fire is controlled manually and monitored 24 hours a day, particularly in the last few days of baking, to prevent the tiles from overbaking or becoming burnt due to the intense fire. After seven days of baking in the kiln, the fire is gradually extinguished and the roof clay tiles are left in the kiln to cool off for an additional ten days. The light grey clay tiles have now become terracotta colour. After removal from the kiln, each roof clay tile is inspected for possible overbaking or burning. The roof clay tiles are then stacked in small bundles of ten pieces in the shed. The roof clay tiles are treated with a water-resistant application before being transported to the clients. About 1,000 to 2,000 roof clay tiles can be produced daily by the roof clay tile makers during hot sunny weather.

Challenges

There are several challenges in the production of Singgora roof clay tiles. Firstly, since Singgora roof clay tiles are made manually using the hands and feet, the production of these tiles is very slow and the number of pieces produced per day is limited compared to mass-produced roof clay tiles using machinery in factories. This has resulted in a sluggish business and less profit for the roof clay tile makers. Secondly, production of the roof clay tiles is very much dependent on hot and sunny weather. Hence, during the six-month monsoon season lasting from October to March each year, the production of Singgora roof clay tiles is duly suspended due to heavy rainfall and less sunshine affecting the sun drying process of the clay sheets. When the production of tiles is disrupted during the monsoon cycle, the clients inevitably have to delay their construction projects, which may increase their costs. Thirdly, the roof clay tiles are lightweight, brittle and easy to break. There have been cases where tiles were practically blown away by strong winds during intervals of heavy rainfall; or broken into pieces when humans or animals stepped on rooftops. As a good measure, regular inspections, repairs and maintenance work are necessary to ensure that Singgora roof clay tiles are in kept in good condition.

Conclusions

Despite all these challenges, the art and craft of making Singgora roof clay tiles still remains strong and survives until today. Over the years it has gained much popularity and demand due to its unique environmentally friendly attributes. Many modern resorts, hotels and house owners in the country have used Singgora roof clay tiles due to their relatively lower cost, making them about three times cheaper than modern concrete tiles. Singgora roof clay tiles are also effective as they absorb less heat in tropical climates, making the building interior much cooler and more comfortable for users and inhabitants. Moreover, the distinguished rhomboid-design tile arrangement and sequence reminiscent of fish scales contributes to the aesthetic value and visual impact of the tiered roofs of Malay heritage architecture. Many researches and documentation projects have been conducted to record and archive this outstanding cottage industry for the benefit of future generations to help them understand and learn the art and science of making Singgora roof clay tiles. The Malaysian government, through its various cultural and heritage agencies such as the Department of National Heritage and the Malaysia Handicraft Development Corporation (Kraftangan Malaysia), have also recognised Singgora roof clay tiles as one of the invaluable heritage crafts of Malaysia due to its immense tangible and intangible cultural value and significance.

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Tonnes of clay are collected, cleaned and stored temporarily in a shed.

A roof clay maker uses her bare feet to wedge and knead the clay bundle.

A wooden mould is used to shape the clay into its rhomboid-shaped signature design.

The roof clay tile maker places a slab of clay in the mould and presses the clay downwards a few times with her right foot to smooth out the clay.

To prevent any clay from sticking onto the wooden mould, paddy husk ash is spread all over the wooden mould before the pressing process begins.

The grey clay sheets are laid down in rows on the ground under the hot sun of 32-35 degrees Celsius.

Once dried, the clay tiles are collected and inspected for possible defects.

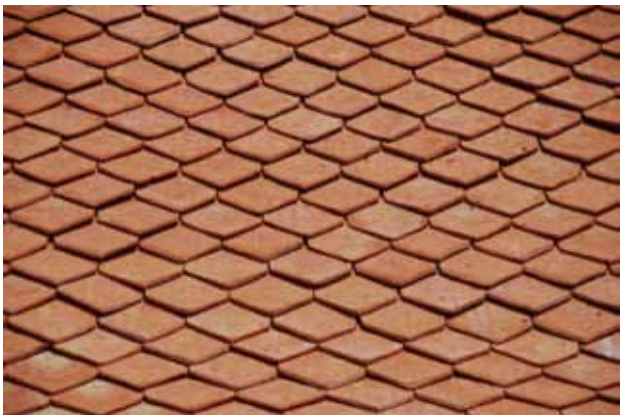
After sun drying, the good tiles are grouped together in packs of ten pieces and stacked horizontally in alternate order.

The roof clay tiles are stacked in several layers above the ground in the earthen kiln, which is also covered with bricks to retain heat.

After removal from the kiln, each roof clay tile is inspected for possible overbaking or burning.

The roof clay tiles are treated with a water-resistant application before being transported to clients.

The use of Singgora roof clay tiles during the restoration of Kedai Mulong Mosque, Kota Bharu, Kelantan.

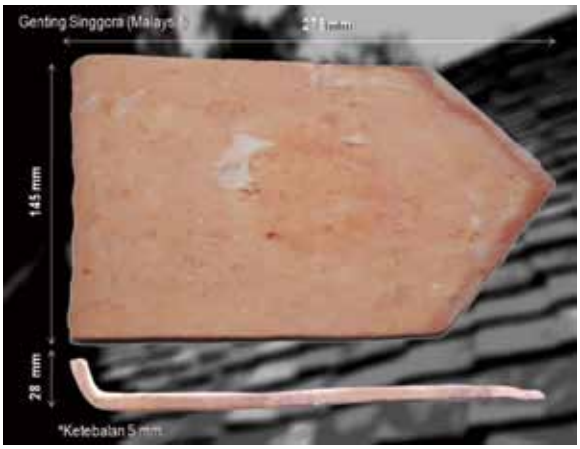


The overlapping arrangement and repeated pattern of Singgora roof clay tiles resembling fish scales.

View of old Singgora roof clay tiles at the Wat Chonprachumthat, Kampung Dalam, Tumpat, Kelantan.

Top view of the rhomboid-shaped Singgora roof clay tile.

Bottom view of the Singgora roof clay tile with a small right angle of 28mm at the straight end.



The average measurement of the Singgora roof clay tile.

Maldives

Excavation of a newly discovered ancient structure in Ha. Ihavandhoo

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

Ihavandhoo, an inhabited island of Haa Alif atoll in the north of the Maldives, is a remarkable island with much historical significance. The famous story of the Maldivian Hero Mohammed Thakurufaanu (Boduthakurufaanu), who defeated the Portuguese and ended their rule in the Maldives, reveals that the mother of Mohamed Thakurufaanu was an Ihavandhoo woman. The island has a beautifully carved coral stone mosque built by Sultan Ibrahim Muzhirudheen in 1701. In addition, the mosque compound is surrounded by an ancient cemetery consisting of tombs and shrines of important people. Their tombstones are also beautifully carved and engraved. This mosque and its cemetery are the only remaining archaeological evidence of that era in Ihavandhoo island.

Fig 1: Map of Maldives showing Ha. Ihavandhoo

Discovery of the site

The structure was first discovered in November 2014 by locals while digging a ditch for a water pipe around their health center. Upon discovering the structure they halted their work, documented what was found and informed the Department of Heritage (DoH). The site was reburied until further action by the DoH and the path of their water pipe was changed to avoid any damage to the structure.

Excavation

A team of three staff members from the DoH visited the island for four days in December 2014 to excavate the site. The team included Shiura Jaufar (Archaeologist), Zaha Ahmed (Assistant Architect) and Fathmath Malsa Maaz (Research Intern). First, the site and the surrounding area was investigated and documented and an excavation plan was created on how to complete the work and document it within the next few days. A meeting was also held with the island council to brief them about the work plan and to obtain their views about the site. The site's oral history from among the locals was also recorded, and the input of the Permanent Secretary of the island council, Mr. Mohammed Ibrahim, was very useful since he knew a lot of valuable information about the island's history and the site. He is known to be the best person in the island to obtain historical information from. He was also in charge of the site after it was first discovered; thus, his knowledge was rather useful and valuable.

Fig 2: Area before excavation

Fig 3: Excavation of Trench 1 by the locals of the island

The second day was devoted to excavating the site. Work was carried out with the help of three locals under the supervision and instructions of the DoH team and Mohammed Ibrahim. At first, excavation was carried out at the southern side of the area, and a trench of about 6.7 x 11 ft was excavated to completely expose the first structure at the site. This trench was dug about 1.5 ft deep until no further structures appeared. After excavation, the structures

were cleaned and documented with measured drawings and photographs.

On the third day the excavation was extended towards the northern side of the area, resulting in a second trench being dug measuring about 5.7 x 1.7 ft. The depth of this trench was about 1 ft. The structures exposed in this trench kept extending further towards the eastern side of the area, and due to the limited time, it was decided to stop the excavation and to record this extension without going further. The eastern side of the area needed extra work done on its thick vegetation before excavation, and since it was the last day for the team, this did not seem possible. This trench was also cleaned and documented properly. A meeting was held with the council to discuss the findings and it was decided that the site needed another season to complete the excavation. For the sake of protection of the excavated structures, the site was backfilled to be ready for the next excavation season.

Fig 4: Excavation of Trench 2

Findings

Trench 1:

This trench revealed coral stones of different shapes and sizes and some were carved (Fig 5). The first two stone structures (Fig 5: Stones 1 and 2) were badly damaged and in very bad condition. Stone 2 (Fig 6) was carved and the carvings were similar to the usual stone carvings in coral stone mosques of Maldives. A third flat stone (Fig 5: Stone 3) was placed on top of Stone 2 and this stone had a square post hole at its center (Fig 7). Among the stones recovered in this trench, the best preserved one was Stone 8 (Fig 8). This stone was circular in shape and measured 3 ft in diameter and 1 ft in height. Other remains such as

Fig 5: Intact stone structures (Nos. 1-8) and stones recovered within the soil (No. 9) from Trench 1

Fig 6: Stone 2 showing its carvings

plant roots (Fig 8), shells, and stones (coral, coral stones, sandstone) were also recovered from this trench. Some of the coral stones were also carved (Fig 9).

Trench 2:

The findings in Trench 2 were similar to that of Trench 1, and this was badly damaged as well (Fig 10). However, unlike the structures in Trench 1, the stones in this trench were arranged in a straight line and they all had a similar shape. Three stones were discovered in this trench. The stone in the middle of the structure had an arc at the top while the other two stones at either ends of the middle stone had a quadrant shape. As mentioned above, the third stone extended towards the eastern side of the area, which was rather bushy with thick vegetation, and therefore, due to restricted time, excavation was stopped there.

Similar to the first trench, this trench also yielded several coral stone fragments of different shapes and sizes, and some were carved as well (Fig 11). Unlike Trench 1, this trench had less plant root growth and furthermore, two potsherds and a bone (possibly of a bird) were also recovered from the soil (Fig 12).

Results and Conclusion

According to most of the locals' beliefs, this site was possibly used to carry out the stone work for Ha. Ihavandhoo ancient mosque in the island during its construction. They said that this site was used to cut, carve and work the coral stones to be taken to construct the ancient mosque in the island. Others believed that this was a bathing tank while others suggested this to be a shrine of an important person. However, after much investigation, research and study, no evidence was produced to support any of the above theories of the site's identity.

After investigating the structures revealed during this season, the team suggested that this could have been another ancient mosque used in the past and later abandoned, resulting in destruction and eventually complete burial. The team suggested that the structures revealed from this season's excavation looked very similar to the entrance of a mosque. This was suggested after comparing the stone arrangements with several other mosques including the mosque in this island (Fig 13).

However, it was concluded that in order to better understand the nature of the site, more work needed to be done, including a complete excavation of the site with proper dating. Hence, it is necessary to carry out another season of excavation to fully understand the site.

Fig 7: Stone 3 showing the square posthole in the center

Fig 8: Stone 8 showing the extent of root growth within the soil

Fig 9: Loose stones recovered within the soil from Trench 1

Fig 10: Stones recovered from Trench 2

Fig 11: Loose stones recovered from Trench 2

Fig 12: Bone and potsherds recovered from Trench 2

Fig 13: A comparison between the stone arrangements in R. Meedhoo Ancient Mosque and the stone structures recovered from Trench 1

Mongolia

A Newly Found Runic Inscription from Southwestern Mongolia

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On June 7, 2015, B. Ariyajav, who is a researcher in linguistics, accidentally found a Runic inscription at a site named Khulsana Am, in the territory of Erdene soum, Gobi-Altai aimag [Munkhtulga 2015: 45] (Fig. 1).

Here, the inscription is published for the first time.

The inscription is written on a rectangular rock, situated near a road from the Gobi desert to a bordering low rocky mountain area, east of the Mongolian Altai Range (Figs. 2 and 3).

On the surface of the southern side of the rock, a total of five characters of the Ancient Turkic Runic alphabet have been written from right to left, according to the tradition of Runic orthography (Figs. 3 and 4). The characters are clearly seen because the inscription is carved with wide strokes (Fig. 4).

Text: ARBvT
Transliteration: TWBRa
Transcription: tobïra
Translation: Go around!

Although tobïra, the only word in the inscription, does not occur in Ancient Turkic written sources, it can be translated into English as "to go around."

It seems likely that *tobïq*, a word that means 'rounded protuberant bone,' 'ankle-bone' and 'knee-cap' [Clauson 1972: 437] is derived from the root tob, as in *tobïra*. The earliest evidence of *tobïq* appear in materials of the Turkic languages of the 8th century [Clauson 1972: 437-438]. Its root tob (sometimes top) means 'ball' in the Middle and Modern Turkic languages [Clauson 1972: 434]. Also, Mongolian *toyiγ* 'knee-cap' is most likely a variant of the Ancient Turkic *tobïq* because its Ancient Mongolian shape can be restored as *togiγ<*toγïq/*toγïq.

The paleographic features of the inscription indicate that it can be dated to the second half of the 8th c. AD. – first half of the 9th c. AD.

There are rare Runic inscriptions to the east of the Mongolian Altai range, particularly in the territory of Gobi-Altai aimag [Battulga 2005: 61], but it should be mentioned that monuments such as the inscription of Khulsana Am have still not been found in the northern edge of the Gobi area, to the south of the Altai Mountains.

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Fig. 1. Location of the Khulsana Am inscription

Fig. 2. A view of the Khulsana Am inscription

Fig. 3. The Khulsana Am Inscription

Fig. 4. Characters of the inscription

The 2015 Earthquake in Nepal and Rescue of Cultural Heritage

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Background

It was a normal day, a Saturday and public holiday as usual. People were in the midst of the work that they have on Saturday. Most of people might have been busy with their holiday activities. Around midday, at 11:56 am, there was a great earthquake with a magnitude of 7.6 on the Richter scale on 25th April 2015 in Nepal. The epicenter of the quake was at Barpak in the Gorkha district, Central Development Region. This earthquake badly affected 14 districts with huge physical destruction as well as human casualties, and impacted a total of 35 districts. As per the latest information from the Ministry of Home Affairs, Government of Nepal, 8,600 people died, more than 21,850 people were injured, 500,223 private buildings and 980 government buildings completely collapsed, and 270,000 private buildings and 3,000 government office buildings were partially damaged. Similarly, more than 13,300 school classrooms were completely destroyed and more than 5,000 classrooms were partially damaged. The movement of the Earth was beyond one's imagination. I thought that the Earth including everything had collapsed and nothing remained; it lasted for 56 seconds, but felt as if it were several minutes, or even hours.

Another shock occurred on 12th May 2015 and aftershocks happened continuously for three months, which was terrible for the general public and frightened many people. Anyway, things have been settling down and have been returning to normal over the past four months.

Earthquake and Emergency Rescue Operation for Cultural Heritage

It is standard practice worldwide that human beings should be the first priority for rescue in any kind of disaster. Accordingly, almost immediately there were rescue teams everywhere from different agencies either from the government of Nepal or non-government agencies, 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, in order to find and identify collapsed or damaged monuments 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 situation, as everyone would be focused on finding human casualties and rescuing them wherever possible. This should rightly be our basic priority as human beings, but someone should be there taking 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 consisted mainly of 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; everyone was forced to leave the site, and more vulnerable private buildings collapsed. Luckily, we didn't receive any reports of monuments collapsing due to the second earthquake in the Kathmandu Valley; however some had been damaged or collapsed outside the valley.

At the beginning, right after the earthquake, we were yet to identify the condition of the staff and the situation they were in, but for staff who contacted 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 contacted us and we could therefore do it systematically, or at least whatever we could do in that situation.

The Department of Archaeology showed its enthusiastic dedication to protecting cultural heritage immediately after the earthquake. The activities it engaged in are as follows:

1. Immediate Response

- Data Collection and Preliminary Assessment
- Mobilization of Rescue Team

Immediately after the first quake, when it was informed that the most significant cultural heritages of the Kathmandu Valley World Heritage Properties had collapsed and were badly damaged, the Department of Archaeology tried to contact all the staff and the Director General as well, with the Director General advising that he would come and visit the sites. From the second day, most of the contacted staff were present in the office and went to the heritage sites to assess and collect data of collapsed and damaged structures. Within a week most of the preliminary assessments had been done and data collected as well, except for some of the affected districts in the Kathmandu Valley.

After the preliminary assessments had been done, the Department 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.

2. Evacuation, Salvage and Immediate Protection of the Sites

- Discussion and Interaction with Experts and Contractors
- Documentation of the Sites

As the Department of Archaeology had formed the rescue

teams immediately and deployed them as necessary to the sites, the rescue teams worked jointly with units of the Nepal Army and Armed Force Police as well as the Nepal Police. These units were deployed specially for post-disaster activities, as they were skilled through their many years of training in rescue in disaster and post-disaster situations. All the teams were very closely coordinated by the Department of Archaeology regarding the whole post-earthquake activities for cultural heritage during the time. The main objective of this joint team was to salvage the art objects and other elements scattered around the collapsed and damaged structures at the sites; therefore, the team salvaged all elements and stored them in a proper place where possible, along 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 did their best in this regard 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 that the conditions under which they were working 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 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. The 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. Stabilization and Temporary Protection of the Sites

- Rainy Season
- Formation of Expert Groups
- Detailed Damage Assessment

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 rainy season, it was very important to protect the sites where many of the monuments were still in vulnerable condition and open to the elements and may be very badly affected by rain. 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 still been continuing at the sites, due to the several large monuments affected by the earthquake.

The Department of Archaeology has formulated NATIONAL EXPERT TEAMS during this phase, which consist mostly of structural engineers, architects, archaeologists, earthquake engineers, legal experts and other necessary experts. The expert teams have been visiting sites as and when necessary, and are in the process of making detailed assessments of the whole of each site as well as preparation of amended Conservation Guidelines for renovation, conservation and reconstruction of cultural heritage/ monuments in Nepal. 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 a proper planning would be came out.

As per the invitation of 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, traditional carpenters who works for 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.

4. Preparation of drawings, designs and cost estimates

As the Department of Archaeology has limited manpower, it is not possible to conduct all activities; however, it has managed to appoint more than 30 architects and engineers 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.

First of all, the Department of Archaeology requested the public and related experts to provide documents on the collapsed, partially damaged or partly collapsed monuments for which drawings are not available in the Department. Some of the sketches and photographs were provided by the different stakeholders, but nothing was found for most of the monuments. Therefore, detailed drawings have been prepared through the newly appointed architects and engineers searching for either photographs or other reliable sketches, or documents or other related materials. They have also been preparing cost estimates; however, it is usually not possible to provide accurate estimates for these kinds of archaeological structures.

5. Long Term Conservation, Renovation and Reconstruction Planning - Conservation guidelines, amendment of related legislation, guidelines for international and domestic donors, etc.

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 government 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.

In a natural disaster situation, no one thinks about cultural/natural heritage or indeed anything else, except human beings and their rescue. Therefore, someone should think about it and respond to it; in support of its own staff, the Department of Archaeology has responded to the issue of protecting cultural heritage in a disaster situation and many of the national and international experts, agencies and individuals also showed their concern immediately after the earthquake. Humanitarian considerations are very important in such a situation; however, cultural heritage, which actually is the creation of human beings, should also be important and someone should respond to it: *"If hundreds of people are involved in rescuing people, one would be enough for rescuing heritage in such a situation."* In the last earthquake in 2015, the following monuments were affected as per the preliminary assessment of the monuments by the Department of Archaeology.

PRELIMINARY LIST OF COLLAPSED AND PARTIALLY DAMAGED MONUMENTS
Updated on 07 July 2015

KATHMANDU VALLEY WORLD HERITAGE PROPERTY

SN	PMZ/District	Collapsed	Partially Damaged	Total
1	Hanuman Dhoka Durbar Protected Monument Zone	12	27	39
2	Patan Durbar Protected Monument Zone	6	15	21
3	Bhaktapur Durbar Protected Monument Zone	5	14	19
4	Pashupati Protected Monument Zone	5	57	6
	Pashupati (Monument Groups)	2	35	37
5	Swayambhu Protected Monument Zone	4	9	13
6	Bauddha Protected Monument Zone	0	1	1
7	Bauddha (Monument Groups)	0	2	2
	Changunarayan Protected Monument Zone	3	2	5
	Sub Total	**37**	**162**	**199**

DISTRICTWISE

SN	PMZ/District	Collapsed	Partially Damaged	Total
1	Kathmandu	26	96	122
	Kathmandu (Monument Groups)	2	3	5
2	Lalitpur	20	88	108
3	Bhaktapur	10	38	48
4	Kavrepalanchowk	7	46	53
5	Dolakha	7	20	27
6	Ramechhap	3	10	13
7	Lamjung	16	14	30
8	Gorkha	27	9	36
9	Nuwakot	5	26	31
10	Dhanusa	0	4	4
11	Kaski	3	1	4
12	Tanahun	0	29	29
13	Dhading	5	35	40
14	Makwanpur	0	4	4
15	Sindhupalchowk	19	4	23
16	Sindhuli	0	1	1
17	Rasuwa	0	7	7
18	Mustang	1	31	32
19	Bara	0	3	3
20	Parsa	0	1	1
	Sub Total	**151**	**470**	**621**

RANA PERIOD BUILDINGS

SN	PMZ/District	Collapsed	Partially Damaged	Total
1	Kathmandu	1	32	33
	Sub Total	**1**	**32**	**33**

Source: ERCO: 2015(Updated on 07 July 2015)

The following are some photographs taken immediately after the earthquake on 25th April 2015 within Kathmandu Valley World Heritage Property and in the valley:

Hanumandhoka Palace and square complex before earthquake

The buildings of Hanumandhoka Palace Complex after earthquake

Kasthamandapa before Earthquake

Completely collapsed Kasthamandapa due to the earthquake—hanumandhoka PMZ

Maju Dega before earthquake—Hanumandhoka PMZ

Completely collapsed Maju Dega due to the earthquake—
Hanumandhoka PMZ

Chyasing Dega (Krishna Mandir) before earthquake—Hanumandhoka PMZ

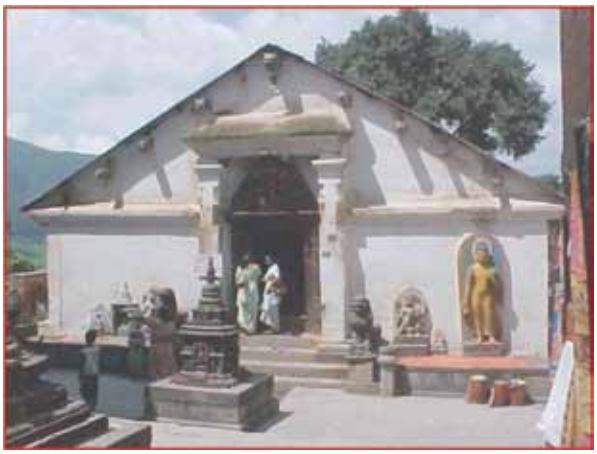
Completely collapsed Chyasing Dega (Krishna Mandir) due to the earthquake—Hanumandhoka PMZ

Narayan Temple before earthquake—Hanumandhoka PMZ

Completely collapsed Narayan Temple due to the earthquake—Hanumandhoka PMZ

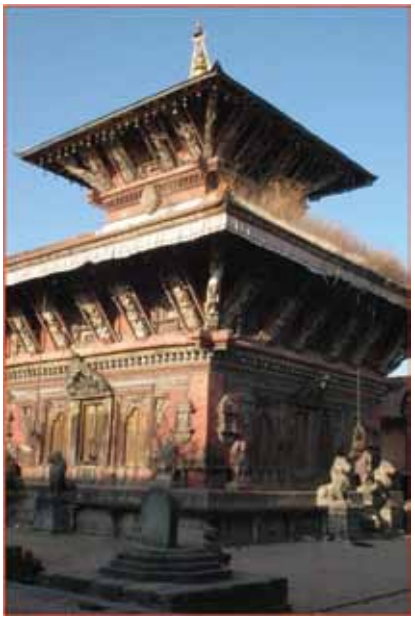
Anantapur Temple at Swayambhu PMZ before earthquake

Partially collapsed Anantapur Temple due to earthquake—Swayambhu PMZ



Shantipur Temple at Swayambhu PMZ before earthquake

Partially damaged Shantipur Temple due to the earthquake—Swayambhu PMZ



Changunarayan Temple before earthquake—Changunarayan PMZ

Changunarayan Temple still surviving during and after the earthquake—immediate protection was needed—Chanagunarayan PMZ

Kileshwor Temple before earthquake—Changunarayan PMZ

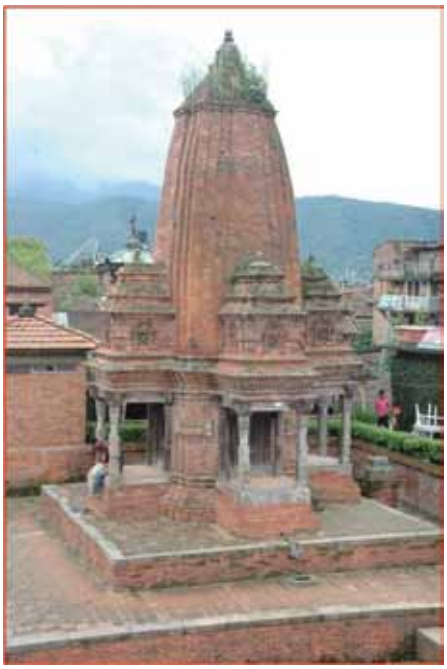
Kileshwor Temple survived the earthquake but needed strong supports for further strengthening—Changeunarayan PMZ

Vatsala Temple before earthquake—Bhaktapur PMZ

Vatsala Temple after earthquake—collapsed due to earthquake

Fasidega before earthquake—Bhatkapur PMZ

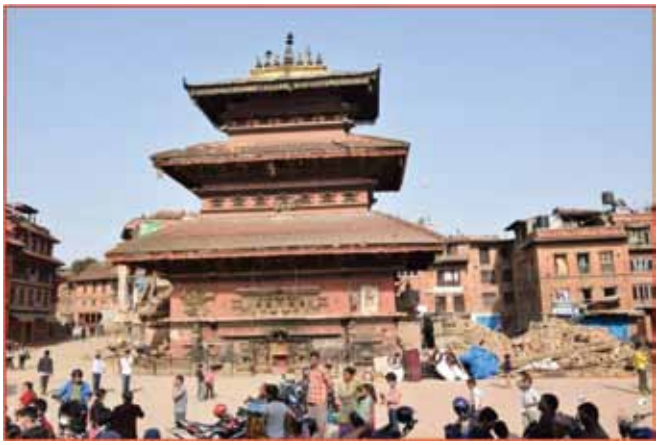
Fasidega collapsed due to earthquake—Bhaktapur PMZ



Radhakrishna (Kedarnath) Temple before earthquake

Radhakrishna (Kedarnath) Temple—
partially collapsed due to earthquake

Some cracks developed in the dome of Swayambhu Mahachaitya due to the earthquake—Swyambhu PMZ



Bhaktapur—Bahirav Temple—not affected by earthquake

Hari Shankar Temple at Patan Durbar PMZ—before earthquake

Completely collapsed Hari Shankar Temple due to earthquake at Patan Durbar PMZ

Char Narayan Temple before earthquake—Patan Durbar PMZ

Char Narayan Temple completely collapsed in the earthquake —Patan Durbar PMZ

Narasingha Temple at Patan Durbar PMZ before earthquake

Completely collapsed Narasingha Temple due to earthquake, close to Krishna Mandir—Patan Durbar PMZ

Taleju Temple at Patan durbar before earthquake—Patan Durbar PMZ

Broken pinnacle of Taleju Temple at Patan Durbar during earthquake

Dharahara—A significant structure with sentimental and historical value in Nepalese society—before earthquake

Collapsed Dharahara during the first earthquake on 25th april 2015—outside the boundary of a World Heritage Property in the Kathmandu Valley

New Zealand

Beattie's Cottage: Preservation of a 19th Century Gold Miners Home

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Heritage New Zealand Pouhere Taonga

Introduction

In the mid to late 19th century the riches of the Otago goldfields provided a massive income for the Government of New Zealand and a wage for the thousands of migrates who came to the New Zealand gold fields to make their fortune (Figures 1 & 2). This aspect of Otago and New Zealand's history is highly significant as the goldfields were vital in the formation and establishment of the 'colony' of New Zealand when Pakeha (Europeans) arrived in large numbers from the 1840s onwards. The first people in New Zealand were the Maori who arrived ca. 1300 AD. They knew of gold, but it had no value to them and hence with the arrival of Pakeha the landscape began to change dramatically due to goldmining. Tangible evidence of the Otago's gold mining history used to be found almost everywhere where gold was discovered especially along major rivers and feeder streams. However, much of this heritage has been lost due to changes in land use particularly as a result of hydroelectric power schemes along the Clutha River which is the largest river in the South Island.

This article describes a project to preserve the remains of a gold miners hut known as Beattie's Cottage and the related gardens as an example of how 19th century gold miners lived on their claims along the Clutha River in Central Otago (Figures 2 & 3).

Gold, Hydroelectric Power and Wine

Gold is considered to have been first discovered in Otago in 1857 by Edward Peters (known as 'Black Peter') who was from Mumbai, India. Peters came via the California gold fields in 1857 and made his discovery while working as a shepherd in Tuapeka. He used his gold to pay for provisions. However, Peter's discovery was paid little attention and it was not until Gabriel Read announced his gold discovery at Lawrence in 1861 that the Otago gold rush commenced. The 1861 announcement saw thousands of gold miners from Australia, North America, Europe and then China converge rivers and stream all over Otago to make their riches from gold. The big rivers such as the Clutha, Kawarau and Shotover were headed for first with their long and easily accessible banks where gold was initially literally scooped off the surface of the river sands. The early miners used simple and cheap methods to recover gold, such as gold panning, paddocking and cradling at the river's edge. After the easy gold was won, larger sluicing operations evolved using miles of water races, reservoirs, and dams to control water to mine the river banks and terraces.

By the end of the 19th century, the Shotover River near Queenstown in the Lakes District (Wakatipu) was considered the richest gold river in the world (Figure 1). Also by 1900, New Zealand was a world leader in hydraulic elevating and gold dredge technology exporting its inventions and expertise all over the world. New Zealand had the world's first electric dredge and today the hard rock mining site of Bullendale is the most complete early example of an electrically powered gold mining operation left in the world, this site using electricity as early as 1882. Between 1861 and 1900 gold mining remains consisting of tailings, water races, dams, sludge channels, huts, gardens pack tracks etc. were distributed throughout the region mainly near water sources. Goldfields towns, which are still working towns today mostly dependent on tourism, were also a legacy of the mining.

After 1900, many miners had left the Otago goldfields with the easily won gold was long gone. Only a handful of sluicing and dredging operations survived being large operations still capable of producing a profitable amount of gold by their sheer size of turnover of gold bearing material. By the 1920s most gold mining was minimal with the Depression drawing some groups back to previously mined areas up until the 1930s.

In the 1940s a major hydroelectric dam was planned for the Roxburgh Gorge on the Clutha River which contained hundreds of archaeological sites related mostly to 19th century gold mining but also containing Maori sites dating back to ca. 1300AD (Figures 4 to 6). The opening of the Roxburgh Dam in 1956 and the flooding of the gorge destroyed hundreds of archaeological sites with none being recorded before the inundation of the gorge. Today, many sites do survive above the current lake level but often these are only parts of sites and not the whole complex.

Forty kilometres up river of the Roxburgh Dam, the Clyde Dam was built and closed its gates for filling in 1992 forming Lake Dunstan which stretches 26km up stream (Figures 7 to 11). This again not only affected large areas of horticultural and farm land but buried numerous archaeological sites. However, this time the New Zealand Government had been proactive in recording heritage not only within the inundation area but upstream to the source of the Clutha, surrounding Rivers and Creeks, nearby Lakes and land within the Clutha catchment. This meant that even with extensive loss, at least this loss could be put in context to illustrate what effects the dam would have on Pakeha and Maori heritage sites. The loss was to be clearly significant in terms of the goldfields history for the Clutha catchment and so to mitigate for this, hundreds of archaeological sites were recorded in detail and major exactions were undertaken.

After the creation of Lake Dunstan, gold mining sites were then faced with another risk due to significant change in land use. Areas which were once farm land running sheep which had little effect on archaeological sites, were converted into vineyards (Figure 12 & 13). This affected

many of those remaining heritage gold mining sites above the new lake level. Sites higher up slopes above the lake were bulldozed flat for the vineyards and their related infrastructure.

What remains of gold mining heritage sites along the Clutha is therefore significantly less than what was present before the Roxburgh and Clyde Dams. Excellent examples of 19th century gold mining sites do survive along water ways feeding into the Clutha River and in the Upper Clutha itself, though these sites a less accessible than those which lay along the river prior to the dams. The presence of gold miner's huts along Lake Dunstan is now rare and any good examples have very high cultural heritage value.

History of Beattie's Cottage

Alexander Beattie was granted a lease by the Crown in 1916 to 10 acres of land on which his schist stone cottage was built (Figure 14; Winter 2013:5). The land was surveyed in 1915 (Figure 15) with this survey showing the location of the cottage and it's boundary at that time (Added to this figure is a blue line which shows approximately how much of this property was flooded by the creation Lake Dunstan in 1992). Beattie, however, occupied and built his cottage here ca. 25 years before he was granted a lease.

Research by archaeologist Andrew Winter showed that Beattie was recorded in electoral roles as a miner in 1882 at Pembroke a town by Lake Wanaka now called Wanaka. He is recorded in an 1887 newspaper as mining at the Criffle Diggings which was a gold field ca. 10km from Pembroke township (Winter 2013:5). This site is today famous for the preservation of its workings. Beattie then appears at Quartz Reef Point in the electoral roll of 1893 and is recorded as a resident with his wife Jessie. Miners in the 19th century often did not own freehold land and leased land for mining and/or living near their claim. It is likely that he moved here after gold was discovered by Tillman and Bethune who are noted in the Otago Daily Times (June 1891) as striking large amounts of gold at the main creek at Quartz Reef Point in 1891 (Winter 2013:5). A later edition of the Otago Daily Times (September 1891) then notes 'Beattie and Logan' recovering a "considerable amount of gold out of the creek at Quartz-reef" (Winter 2013:5).

Beattie, therefore, had moved to Quartz Reef Point as a miner in ca. 1891 and built his cottage there but it appears at some years later he applied for a permanent lease to leave his life as a miner (though his occupation has not yet been determined). It is possible with 10 acres he ran a farmlet and orchard. He retired in 1925 and died in 1940 (Winter 2013:6).

The lease land passed from his family to the Willson family in 1967 then the Crown cancelled the lease in 1979 for hydroelectric generation purposes but the cottage was still used as a holiday batch by the Willson family until 2013. In 2013, the Crown through its agency called Land Information New Zealand ("LINZ") found the stone cottage to be unsafe and closed it for private use. The original intention was to demolish the whole cottage, but after discussions between LINZ (represented by Rose Quirk) and Heritage New Zealand, an opportunity to preserve part of the historic cottage, the garden feature and trees was recognised. Heritage New Zealand therefore developed a preservation project to turn the property into a public picnic area by Lake Dunstan.

The cottage prior to partial demolition

In Figures 16 to 26 are shown what the cottage and gardens looked like prior to the partial demolition. Figure 16 shows a plan of the cottage by Winter (2013:23). It can be seen from the photographs and the plan by Winter (2013:23) that the cottage was made of local schist stone (the dominant geology of this district) and probably had a corrugated iron roof as was common to use at the time of its construction. It appears that the main cottage complex originally had two structures with three others added later. The first structures were the main two roomed cottage (Bedrooms 2 & 3) and the schist 'store', though only remnants of the front stone wall of the 'store' remain (Figure 16-27). A schist stone 'living room' and lean-to was then added (used for Bedroom 1 and Living room) to the main cottage, these notable for the very different and less professional stonework, and at some stage the timber framing for the back section 'store' was built (possibly after removal of the original stone walls(?)). The connecting bathroom/vestibule/kitchen were 20th century add-ons connecting the whole complex together. In the 20th century another corrugated iron and timber framed outbuilding was built behind the schist lean-to. A mud mortar was used for all the stonework.

It can also be seen from the photos that in the 20th century shuttered concrete was used to support various stone walls and a concrete stacked chimney replaced the original schist stone chimney (Figure 20). The windows are not the original 19th century windows which would have been square or rectangular small glass pane windows (see Figure 25 for 19th century style window on the right of the picture). These have been replaced with early to mid-20th century style wooden framed windows. The doors are also a mix of 20th century periods. The interiors of the structures have 20th century linings over 19th century stonework or 20th century timber framing and the 20th century concrete floors probably hide original flat schist pavers beneath.

The garden area was very overgrown but stone faced garden terracing could be seen. Concrete fencepost which pre-date the filling of the lake in 1992 can be seen in the water just off from the property. Orchard trees, some which appear to be of some age, consist of apricot, plum, cherry and quince with a grape vine as well. The cottage and gardens are sheltered by exotic Poplars which were a common tree type in the 19th century to provide wind breaks around houses and occupation areas in Central Otago.

The Preservation Project

As noted above, the original size of the property was 10 acres and this was designated for hydroelectric lake operations in 1979. Not all of this acreage was flooded in 1992, perhaps 40%, leaving the land where the cottage resides never to be flooded but where it also cannot be used for occupation or building on. It can only be used for

recreational purposes. LINZ and Heritage New Zealand therefore agreed that an opportunity existed for a heritage/recreation/teaching project for the site. This project would preserve, through partial demolition, a footprint of the cottage to illustrate to the public visiting the site what the home of a gold miner from the late 19th century looked like. In addition, the gardens would be cleared to reveal hidden features and heritage orchard plantings to complete this picture. The project would also provide a teaching opportunity for stone masonry students from the local Otago Polytechnic Stone Masonry course, taught by expert stone mason Steve Holmes, to work on a genuine 19th century schist cottage. Such an opportunity is rare due to the uncommon nature of these buildings along the lake. The outcome would be a Heritage Recreation Reserve for the public to enjoy.

The project saw a number of contractors and local heritage advocates donate their time including Bruce Lauder, Kevin Blanch and Steve O'Kane from Fulton Hogan (a large construction company), Ben Teele from Jackie Gillies & Associates (a heritage consultancy recording the site on behalf of LINZ), Historic Places Aotearoa Central Otago (a voluntary heritage advocacy group) and consultant archaeologist Matthew Sole (Figure 28). LINZ (through Rose Quirk) also donated funds to pay for the materials required for the stonework.

Partial demolition of the cottage and revealing site features

In Figures 29 to 38 can be seen the partial demolition, vegetation clearance and stonework preparation underway. Prior to this, the height of the walls to be retained during the demotion was marked in white paint on the walls to guide the digger driver (Figure 29). Some walls were in a very unstable state and so were reduced in height again during demolition to create a more stable structure. The demolition revealed more of the history of the cottage showing how walls were or were not tied together and the support timbers used during the original build. A 20th century concrete dish drain was also revealed along the back wall of the cottage to take water away from this side of the building which lay against a steep bank (Figure 36). A small section of stonework on the outside of the dish drain implied that a stone retaining wall may have once been present behind the cottage providing enough of a gap for access and to stop water flowing off the slope and down its back wall. This gap probably filled up over time with soil and leaf litter brought in by rain and wind etc. from the slope and so rather than digging this fill out, the dish drain was installed in the 20th century to take the water run-off away.

The stone mason students began scrapping out loose mortar as soon as partial demolition in a location had been completed (Figures 32 to 34). Wall features, such as sockets in the stonework where timbers had once been, were prepared for preservation so as the full history of the construction technique could be seen.

Figures 31, 37 & 38 show the vegetation clearance being undertaken and features being revealed through the removal of turf and thick grass. Figures 39 to 43 show the complex after vegetation removal and partial demolition was completed. The gardens had been planned carefully on the property and were a mix of both 19th and 20th century garden features. Some terracing was dry stacked as per 19th century style while others were the result of using a modern cement mortar. One nice feature revealed under turf was a schist stone path leading down to the lake which originally may have led down to the Clutha River (Figure 43). A cluster of broken artefacts from the late 19th and early 20th century indicated that a rubbish pit probably once lay in the location of a 20th century concrete pad or very close to it now under the trees bounding it (Figure 37).

Sycamores were required to be removed from the site due to their proximity to the walls to be retained and also because of their invasive effects they were having on the site. Sycamores are considered a weed tree species and damage many heritage sites in Central Otago. The vegetation clearance also ensured that the fruit trees would not have to compete with invasive weed species.

Current and ongoing works

Presently, the Otago Polytechnic Stone Masonry course is still undertaking stonework of the preserved walls (Figures 44 to 48). The original mud mortar is too soft and friable to preserve the walls now they are open to the environment, so expert stone mason Steve Holmes is using a combination of traditional 19th century recipes as used on other schist huts of this time. For the pointing, he is using a sand-lime pointing mix with the sand coming directly from across the lake (Fulton Hogan Parkburn Quarry). A yellow sand for the pointing mix is being used because it has a better colour and grain-size distribution for this application. The lime is Taylors/Graymont Stabilime product (Calcium Oxide / burnt lime in chip format) which is slacked in the sand ('hot-mix' method), then combined with the sand and lime thoroughly by hand before wetting to obtain a workable mix. The render for the inside of the main building is a 2:1:1 (sand: earth: lime putty) mix. The earth component is recycled mortar from the demolition-to-height of the original upper walls. Deteriorated earth mortar and plaster from the lower walls are not being reused because they are salt-affected and the introduction of excess ground salts into the replacement mortar mix must be avoided.

For the wall capping pointing mix Steve is using an NHL 3.5 bagged lime (manufacturer Singleton Birch Ltd) mixed with the same yellow sand. He is hoping this hydraulic lime will a more durable mortar for the exposed wall tops to better resist rain, frost and people clambering on up on them.

The stonework will take about another two weeks to complete for the main cottage and early next year the remainder of the walls in the complex will be finished by more students. Then the site will be revisited and any further management advised on and undertaken. The final stage will be producing a site management guide long term preservation and the installation of an Interpretation Panel.

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Figure 1. Locations of two important Otago goldfields and major gold bearing rivers (Map sourced from Info Map 266. Crown Copyright Reserved).

Figure 2. Location of Beattie's Cottage near Cromwell as well as Lakes Roxburgh and Dunstan which are the result of hydroelectric schemes on the Clutha River (Map sourced from Info Map 266. Crown Copyright Reserved).

Figure 3. Location of Beattie's Cottage near Cromwell on the shores of Lake Dunstan (Map sourced from Info Map 266. Crown Copyright Reserved).

Figure 4. The Roxburgh Dam under construction in 1955. All areas along the river margins were gold mined and gold miners hut sites were present in the rocky landscape. Otago. Whites Aviation Ltd (Photo source: Alexander Turnbull Library Wellington, New Zealand. ref WA-39231-F).

Figure 5. The Roxburgh Gorge in the late 19th century showing mined banks/ terraces, a miners water race on the hillside and gold mining dredges. All these remanats were buried under Lake Roxburgh (Photo source: Museum of New Zealand Te Papa Tongarewa Collection ref C016254).

Figure 6. Chinese gold miners in the 19th century in the Roxburgh Gorge. Settlements such as this were buried under Lake Roxburgh. (. Alexander Turnbull Library, Wellington, New Zealand Lib ref1-4-009945-G).

Figure 7. The Clyde Dam under construction, 17/01/1983 (RW Murray Collection held by Matthew Schmidt).

Figure 8. Wagons between Crommwell & Clyde in 1908. The desert like landscpae is from gold mining activties which incldued soucing trees for fuel and structres. This area later became rich with orchards then flooded by Lake Dunstan (RW Murray Collection held by Matthew Schmidt).

Figure 9. Cromwell Gorge typical minersr shelter flooded by Lake Dunstan (RW Murray Collection held by Matthew Schmidt).

Figure 10. Before the filling of Lake Dunstan, taken 04/04/1992 (RW Murray Collection held by Matthew Schmidt).

Figure 11. After filling of lake Dunstan from the same location as Figure 10, taken on 16/10/1993 (RW Murray Collection held by Matthew Schmidt).

Figure 12. Lowburn looking towards Northburn Station, taken April 1977 before Lake Dunstan. Beatties Cottage is indicated. Gold mining hertiage extends from the river (dredging remains) to up on the hills and slopes (RW Murray Collection held by Matthew Schmidt).

Figure 13. Effects of Lake Dunstan and vineyards on Lowburn and gold mining hertiage using Google Earth (10 April 2015) looking in the same direction as Figure 12. Much of the different mining activties from differing hsitoric periods have been lost. Beatties Cottage indicated.

Figure 14. Beatties Cottage, Northburn showing the main cottage structre first built in ca. 1891. The cottage is made of schist stone and probably had a corrugated iron roof as it does today (Photo: Matthew Schmidt).

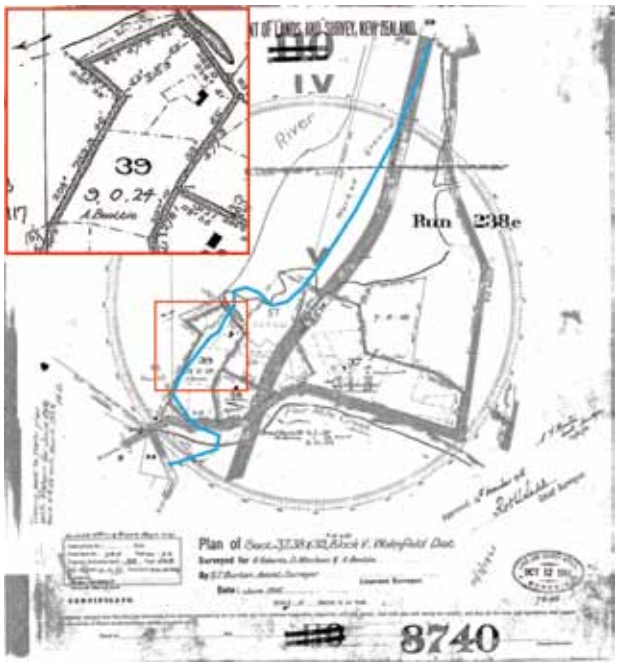

Figure 15. Survey plan SO8740 from 1915 showing Alexander Beatties property on Section 39. The current shoeline of Lake Dunstan has been marked (Survey Plan copyright Land Information New Zealand).

Figure 16. Plan of Beattie's Cottage by Andrew Winter/Jackie Gillies & Associates 2013.

Figure 17. Beattie's cottage before partial demolition. View to main cottage centre and Living room/kitchen to the left (Photo: Matthew Schmidt).

Figure 18. Centre of photo later addition made of timber, far left outbuilding same age as main cottage (Photo: Matthew Schmidt).

Figure 19. The back wall of the main cottage (Bedroom 2 & 3) before partial demolition.

Figure 20. Left side of main cottage showing modern concrete stacked chimney, later stone lean to (right) and 20th century concrete shuttering to support walls.

Figure 21. Back of later stone lean to and corrugated iron 'store' (Photo: Matthew Schmidt).

Figure 22. Later corrugated iron framing added to original 19th century schist stone 'store' room (Photo: Matthew Schmidt).

Figure 23. Front of 'store' and 20th century wooden and rendered living room/kitchen (Photo: Andrew Winter, Jackie Gillies & Assoc's).

Figure 24. Interior later stone lean-to bedroom 1.

Figure 25. Interior of main cottage bedroom 1 and 2 showing modern fire but 19th century style window on the right wall (Photo: Matthew Schmidt).

Figure 26. Interior of later wooden living area and kitchen showing earlier schist stone wall in background (Photo: Matthew Schmidt).

Figure 27. Interior 'store' looking at original stone work right of photo (Photo: Matthew Schmidt).

Figure 28. Contractors/Volunteers who worked on the preservation project (Photo: Matthew Sole).

Figure 29. Partial demolition underway (Photo: Matthew Schmidt).

Figure 30. Partial demolition underway (Photo: Matthew Schmidt).

Figure 31. Stonework being prepared and vegetation being cleared during partial demolition (Photo: Matthew Schmidt).

Figure 32. The stone mason class and expert stonemason Steve Holmes preparing the stonework (Photo: Matthew Schmidt).

Figure 33. Stonemasons preparing the walls (Photo: Matthew Schmidt).

Figure 34. Stonemasons preparing the walls (Photo: Matthew Schmidt).

Figure 35. Clearing debris from behind the back wall of the main cottage (Photo: Matthew Schmidt).

Figure 36. Archaeologist Ben Teele investigating a 20th century concrete dish drain found behind the back wall of the main cottage (Photo: Matthew Schmidt).

Figure 37. Archaeologist Matt Sole investigating some remnants of a late 19th/early 20th century rubbish pit found during vegetation clearance (Photo: Matthew Schmidt).

Figure 38. Clearing vegetation and excavating the stone path which once led to the Clutha River and now Lake Dunstan (Photo: Matthew Schmidt). View from lake edge.

Figure 39. View over site from behind Main cottage and Bedroom 1 & Living room after partial demolition and vegetation clearance completed. Ready for stonework. (Photo: Matthew Schmidt).

Figure 40. View over site from lake edge showing stonework revealed in the gardens (Photo: Matthew Schmidt).

Figure 41. The main cottage (Bedroom 1 and 2) ready for stonework (Photo: Matthew Schmidt).

Figure 42. Remains of 'store' ready for stonework and garden features revealed through vegetation clearance. (Photo: Matthew Schmidt).

Figure 43. Schist stone path leading from the cottage and once probably to the Clutha River revealed during vegetation clearance (Photo: Matthew Schmidt).

Figure 44. Main cottage walls being prepared for pointing by the stonemasonry class (Photo: Steve Holmes).

Figure 45. Repointing underway on one of the back walls of the main cottage (Photo: Steve Holmes).

Figure 46. Repointing underway on the main cottage (Photo: Steve Holmes).

Figure 47. Capping of the stone walls using a hard mortar and pieces of schist (Photo: Steve Holmes).

Figure 48. Rendering of the inner walls of the main cottage as they would originally have been. A tougher mortar is used as these walls will now be exposed to the weather (Photo: Steve Holmes).

Pakistan

Conservation Problems and Recent Safeguarding Practices for Archaeological Sites and Monuments in Pakistan

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Introduction:
Management is the function that co-ordinates the efforts of the people to accomplish goals and objectives using available resources. Management science helps us in planning, organizing, staffing, leading or directing, and controlling an organization or initiative to accomplish a goal.

When we talk about the conservation or management of archaeological sites/monuments, therefore, we have to conserve their cultural significance by safeguarding them from a vulnerable state. This encompasses a broad range of issues related to protection and preservation, including terrorism and natural disasters, such as earthquakes, volcanic eruptions, hurricanes and tsunamis. The potentially catastrophic effect of natural disasters on cultural property is sometimes fatal. Forecasting through risk management means that the damaging effects can be minimized up to a reasonable level. Large scale cultural losses resulting either directly or indirectly from human intervention is considerable and regrettable, and these can be prevented to some extent through a risk management plan.

Archaeological management for proper conservation of archaeological sites/monuments in Pakistan has developed in response to the many threats to archaeological resources and the means and methods of mitigating their impact by, for instance, the development and implementation of policy and legislation, surveys, collection of management data, etc.

Cautious Approach:
The fundamental objective of conservation is to prolong the life of the cultural heritage without destroying its physical or other evidence. The minimum effective action is always best while carrying out conservation work. If possible, the action should be revisable, otherwise it can be damaging for the existing original elements of the site. Sometimes we have to go for re-construction of historic buildings; for example, the recent reconstruction of Ziarat Residency, which was completely damaged in a terrorist attack in June, 2013. Even then, restoration and re-construction has been based upon accurate documentation and evidence and not merely conjecture.

Complete documentation before, during and after conservation is a vital tool which helps the conservators discover traces of additions, alterations and earlier treatment of the fabric of the place, as evidence of its history. As such, our approach is based on precise documentation in the form of analytical and critical reports, otherwise it is feared that the site/monument will lose its architectural, aesthetic, historic, documentary and archaeological value.

Techniques:
A number of key conservation principles relating to minimum intervention, or reversibility retreat ability, have been identified and are being implied by a team of researchers/archaeologists from the Department of Archaeology and Museums. The first key principle is to preserve as much of the original material as possible, keeping any intervention to a minimum, and doing no more than is strictly necessary to guarantee the proper use for the life of the original fabric. Thus our aim is to protect the original elements of a structure. In buildings, conservation reversibility is harder to achieve.

The material used for the conservation of archaeological monuments can be naturally occurring or manmade, and behaves differently within different parameters depending on its quality. We can say that depending on these conditions, materials are often substituted with another material that may be harder, less porous or durable.

Mud brick is an excellent example of a "soft" material which is substituted for any material of less porosity, greater strength, a lower hydrophilic nature or indeed any hydrophilic qualities. For instance if we re-point or cap a mud wall with cementitious material, the mud brick scarifies, or dissolves, in favour of the repair medium. In Menjodaro (Indus Valley Civilization World Heritage Site in Pakistan), for recharging the joints of the brick wall, mud capping on the walls is applied. The bricks dissolve in rainwater and fill the joints of the brick masonry with mud slurry. This technique is revisable and successful for the recharging of joints.

Since 1950, we have looked at modern materials to provide a "magic" solution to the problems of materiality, such as concrete and cementitious products, soluble nylon and whole range of organic polymers, but one by one these have shown weaknesses in performance and compatibility.

In the world of restoration and reconstruction, modern materials have found favour, often because construction companies have no skill or expertise in conservation principles, aims or even science to carry out the work. It is regrettable that untold damage is probably being done to the heritage monuments of places where simple material facts are ignored or unknown. Repairing "like with like" therefore, becomes a basic principle of the conservation of archaeological and architectural structures.

Values:
It is self evident that no society makes an effort to conserve what it does not value. These values help to systematically set overall priorities in deciding proposed interventions, as well as to establish the extent and nature of the individual treatment. The assignment of priority values inevitably reflects the cultural contents of each historic building in Pakistan.

Historical Values:
Historical values are at the root of the very notion of heritage. The capacity of a site conveys, embodies, or stimulates a relation or reaction to the past of the fundamental nature and meaning of a heritage object. Historical values occur in several ways, from the heritage material's age, its association with people or events, its rarity and/or uniqueness, its technological qualities, or from archival documentary potential.

Cultural values:
History and heritage are core elements of all cultures. Ideas, materials, and habits are passed through time, so cultural values are, like historical values, a part of the very notion of heritage. There is no heritage without cultural value. Cultural values are used to build cultural affiliation in the present and can be historical, political and ethnic.

Political Values:
The use of heritage to build or sustain civil relations, governmental legitimacy, protests, or ideological causes is a particular type of cultural symbolic value. These values stem from the connection between civic/social life and the physical environment, and from the capacity of heritage sites in particular to stimulate the kind of positive behavior that builds civil society.

Socio-cultural Values:
Socio-cultural values are the traditional concern of conservation—values attached to an object, building, or place because it holds meaning for people or social groups due to its age, beauty, artistry, or association with a significant person or event, or (otherwise) contributes to the process of cultural affiliation.

Religious Values:
Heritage sites are sometimes imbued with religious or other sacred meanings. These spiritual values can emanate from beliefs and teachings of organized religion.

Aesthetic Values:
Aesthetic value is widely agreed to be category of socio-cultural value, although it refers to a wide range of qualities. In the main, aesthetic refers to the visual qualities of heritage.

Participation:
Local communities are important stakeholders of heritage and can play a critical role in conservation and management. This is particularly seen in monuments that are "living". It is necessary now to engage local communities in the decision making process such as in aspects of conservation and management of the monument. This enables communities to establish inextricable linkages with the monument and also leads to the generation of employment opportunities, the sustenance of local crafts and an increase in tourism-related activities. In Pakistan, conservation and restoration works have been carried out at a number of archaeological monuments with the local participation of educated and skilled people, for instance at Lahore Fort, Monuments at Multan, Mosques at Thatta in Sindh, etc.

It has been learnt, after long experience, that communities traditionally associated with the monuments or living in their vicinity may be encouraged to continue this intrinsic relationship with the monument and its setting, provided this does not disturb its authenticity and integrity.

Use:
Any effort to restore and conserve historic cities, monuments and sites must include renewal of the economic and financial structure to both fund and maintain the restoration. Adaptive reuse is a flexible approach. It demands a unique framework for a new type of private public partnership in order to overcome the interlocking regulations, the jurisdiction of multiple competent authorities, fragmented ownership and various laws and practices that can impede conservation and revitalization. Historic public spaces are not only a witness of our past; they are also part of a living organism which involves the dynamics of rapid urbanization, shifting economic activities, and the rising cost of urban land.

Conclusion:
The recent safeguarding practices being applied in Pakistan have provided a great helping hand to prolonging the existence of historical monuments/sites. The best practices are being appreciated by the experts as they also provide onsite training facilities to young students of archaeology.

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Aerial view of historical monuments at Thatta

Close view of facade of the tomb of Jam Nizamuddin, Thatta

Tomb of Issa Khan Tarkhan, Thatta

Aerial view of Moenjodaro

Old fort, Lahore

Old fort, Lahore

Shalamar garden, Lahore

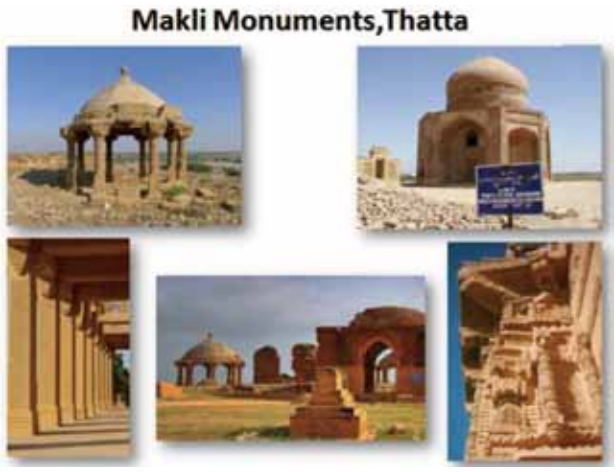
Sirkap site, Taxila

Main Gate at historical monument, Thatta

Wild growth problem at Rohtas fort, Jehlum

Dharmarajika stupa after conservation work

Buddhist remains at Takht-e-Bahi



View of Rohtas fort

Aerial view of Shalamar Garden, Lahore

Shalamar Garden

Structural remains at Moenjodaro

Aerial view of Moenjodaro

Base of a Wall showing the horizontal damp-proof course at Moenjodaro

Leaning walls being protected with steel supports at Moenjoaro

Rainwater penetration into the structure at Moenjodaro

Befor Conservation SD Area, College building, B.1, R.61, pointing underpinning

Philippines

Reconstruction of the Second San Ignacio Church in Intramuros, Manila

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Intramuros or the Walled City is a historical landmark in the Philippines where the most significant cultural properties are located. Miguel Lopez de Legazpi founded Manila in 1571. The Philippines was under Spanish rule for 400 years. During this period, strong fortifications or stone walls, bulwarks, and moats were built to protect it from invasions. As the walls were constructed so were government offices, residences, and educational and religious institutions. The first religious order to arrive in Manila was the Augustinians in 1571 together with the Legazpi Expedition. The next religious orders to come were the Franciscans (1578), the Jesuits (1581), the Dominicans (1587), the Augustinian Recollects (1606), the Hospitallers of God (1641), and the Franciscan Capuchins (1886). Within the walled city are magnificent churches built by these different orders that were all destroyed during World War II except for the San Agustin Church, the lone survivor, which was declared a UNESCO World Heritage Site in 1993. Intramuros was left in ruins and deteriorated. The author will focus on the reconstruction of one of the significant sites in Intramuros, the Second San Ignacio Church built by the Jesuits, and the revival of the church and its mission house from its ruins.

The Republic Act 597 was signed in 1951, declaring the fort a national shrine and Intramuros a historical monument. The law specified the use of Spanish architectural designs for buildings that were to be built in the area. Presidential Decrees 1277 and 1537 were enacted to preserve the streets and walls of Intramuros from destruction, and institute penalties and violations. In 1979, by virtue of Presidential Decree No. 1616, the Intramuros Administration was created to administer the preservation, restoration, protection, and development of the Intramuros walls. Since the agency is now under the Department of Tourism, it has an additional task to promote the Walled City as a tourist destination. The Intramuros Administration was able to acquire priceless 18th-19th century ecclesiastical art pieces from different parts of the country since its inception. The enlargement of the collection made it necessary for the agency to think of an area spacious enough to accommodate it. Through the years, some of the buildings destroyed during World War II were reconstructed. Some were rebuilt for adaptive reuse. One example of a building for adaptive reuse is the ongoing project of the Intramuros Administration: the Reconstruction of the Second San Ignacio Church. The building is being reconstructed based on the original design while the remnants of the old building are being preserved in the process. The reconstructed building of the Second San Ignacio Church will house the Ecclesiastical Collection of the Intramuros Administration. The site is envisioned to become another tourist attraction.

Archaeological Excavation

Prior to preparation of the plan for the reconstruction of the Second San Ignacio Church, the Intramuros Administration requested the National Museum to provide assistance regarding the archaeological excavation of the site. There had also been previous excavations done by the Intramuros Administration. Based on the archaeological assessment presented by the National Museum to the Intramuros Administration, the archaeological excavation resulted in "the recovery of significant features and archaeological materials that can provide insights on the way of life of early occupants and the history of construction of the church, Jesuit Mission House and other structures. The presence of architectural research will assist in the design conceptualization of the proposed structure so as not to deviate from the architectural origins of the San Ignacio Church and Intramuros." These were the findings of the National Museum: The archaeological excavations in the Second San Ignacio Church and the former Jesuit Mission House revealed features that represented structures that could be dated back to the 18th century. At the second San Ignacio site, significant archaeological features were exposed, including a small cistern, adobe granite flooring, the massive foundation of a wall, church flooring made of brick tiles, an underground crypt and a well enclosed with adobe blocks. These features represent structures that were portions of the residential buildings constructed in the 18th century based on the Antonio Rojas ca. 1713 and Pedro y Murillo ca. 1734 maps. These structures were built prior to the construction of the Second San Ignacio Church and the Jesuit Mission House. With regard to artifacts and ecofacts retrieved, the most significant material recovered was an earthenware shard with an ancient inscription recovered in the upper field soil and among artifacts associated with Ming Dynasty ceramic ware trade. The different archaeological discoveries at the San Ignacio site are beneficial for the proposed ecclesiastical museum's architectural and structural features, so as to maintain the architectural origins of the Second San Ignacio Church. After the excavation, the National Museum also recommended the incorporation and exposure of the archaeological features at the proposed ecclesiastical museum site, such as the discovered cisterns, adobe well, underground crypt and artifacts. Preservation of the structures will provide visitors with an awareness of the history of the area and contribute to the study of Intramuros.

Historical Background

The third religious order to arrive in the Philippines was the Society of Jesus, or the Jesuits, in 1581. The first Jesuit compound in Intramuros is situated along Calles Victoria and Palacio. Between 1590 and 1596, a second church made of rock was built and dedicated to St. Anne. The church was modeled after the IL GESU, the Jesuits' mother church in Rome by Fr. Antonio Sedeño, a Jesuit priest. The church of St. Anne did not survive after various earthquakes and attempted reconstructions and restorations. The Jesuits decided to build on the same site a church in honor of San Ignacio, the first San Ignacio Church made of rock and wood designed by the Italian Jesuit Gianantonio Campioni,

which survived several earthquakes. It became the center of Jesuit activities and was considered to be one of the prominent churches in Intramuros. The first San Ignacio Church was turned over to the Spanish government when King Carlos III decreed the expulsion of the Jesuits from Spain's dominions. Their properties were confiscated and placed for public auction. The church was neglected and transformed into a stable by the Spanish government, and was called Cuartel de España. The earthquake of 1863 destroyed the first San Ignacio Church.

The Jesuits returned to the Philippines in 1845 as missionaries in Mindanao. They were able to buy a house at the corner of Calles Anda and Arzobispo in Intramuros, the site of the Jesuit Mission House. They ran the Escuela Municipal which later became Ateneo Municipal (now Ateneo de Manila). The government gave permission to build a bridge over the street that would connect the school house to the mission house. In 1878, the Jesuits were given permission by Archbishop Pedro Payo to construct a chapel, the Second San Ignacio Church. A prominent architect by the name of Felix Roxas Sr. designed the church in the Classical and Renaissance style, although he died before seeing its completion. The construction of the church was continued by a brother of the Society, Francisco Rivera, with the help of Isabelo Tampingco, Crispulo Hocson and Manuel Flores. The interior of the church boasts majestic wood carvings. The church was strengthened by the builders to endure the impact of earthquakes and calamities.

The differences between the first and second churches were apparent: the first church's façade boasted massive stones while the second church's façade was made of bricks, piedra de Visayas (coral or limestone) and white Carrara marble pillars. The first church had a patio, while the second was directly constructed alongside the street, making it looked cramped. Nevertheless, what the second church lacked in exterior design, it made up for in its interiors. It was considered to be the Jesuits' sueño durado or "golden dream" because it acted as a bastion of glory representing their return.

The Ateneo and the Second San Ignacio rose to fame and the Ateneo was even considered to be the school esteemed by the distinguished families. In a great fire in 1932 the Ateneo was burned to the ground. The church and the mission were fortunately spared, but it could no longer function as a college church. In 1945, the church and the mission house were burned during World War II. After the war, the church was converted into a storage area by the Allied Storage Brokerage Building. Eventually, the site was turned over to the government under the care of the Intramuros Administration.

Ongoing Reconstruction of the Second San Ignacio Church, Intramuros, Manila

Phase I, the building of the shell of the church, is already complete. The reconstruction of the Mission House and the refurbishment of the interior of the church as a museum will be the next step as part of Phase II and Phase III of the project. About 5,000 pieces from the Ecclesiastical Collection of the Intramuros Administration are intended to be preserved and displayed here. The archaeological features and artifacts will be integrated to allow visitors insights into the history of the site. The reconstruction of the San Ignacio Church will have a great impact on Philippine conservation of built heritage. It will serve as an example of adaptive re-use in conserving structures. Furthermore, the showcase of the religious art pieces will show the rich cultural heritage of the Filipinos.

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The Intramuros Administration headed by Atty. Marco Antonio Luisito Villanueva Sardillo III-IA Administrator, Mr. Edgardo Baysic, Architect Augusto Rustia, Architect Flonel Winda Asuncion, Staff of Fr. Luis Merino, OSA Library, and the Archdiocesan Archives of Manila.

An old map showing the site of the first and second San Ignacio Churches

Pedro Murillo y Velarde Map ca. 1734

Architectural plan of the first San Ignacio Church

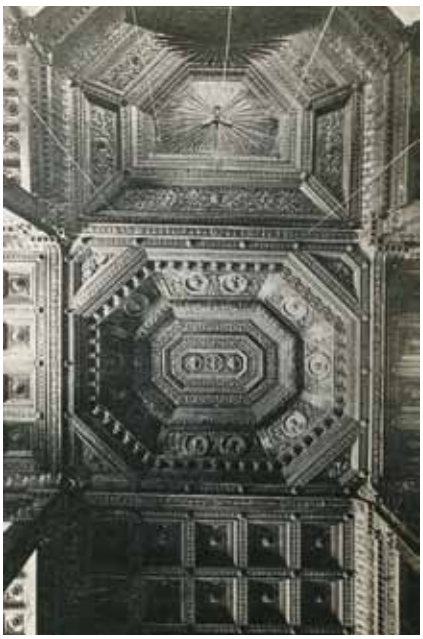
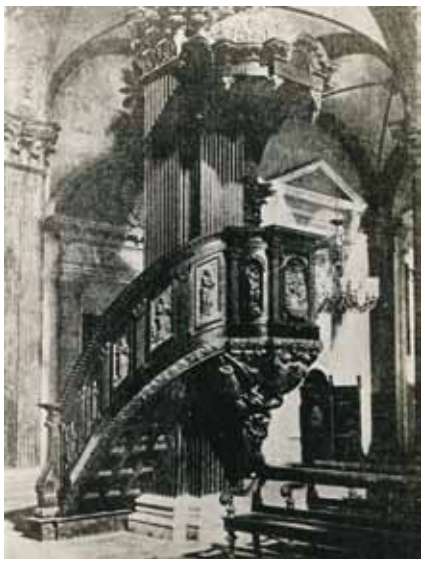
Plans of the first San Ignacio Church. Completed in 1632. It is the site where the *Pamantasan ng Lungsod ng Maynila* now stands

Pre-war photos of the Second San Ignacio Church

Façade (The Sunday Tribune, 1939. IA photos) and back view of the Second San Ignacio Church

The interior of the church boasts intricate carvings and designs. The main altar was carved by Isabelo Tampingco. The Statue of San Ignatius of Loyola and the altar of the Sacred Heart of Jesus were carved by Manuel Flores. An 1890 photo shows the side door entrance of the church sculptured from narra and baticuling wood.



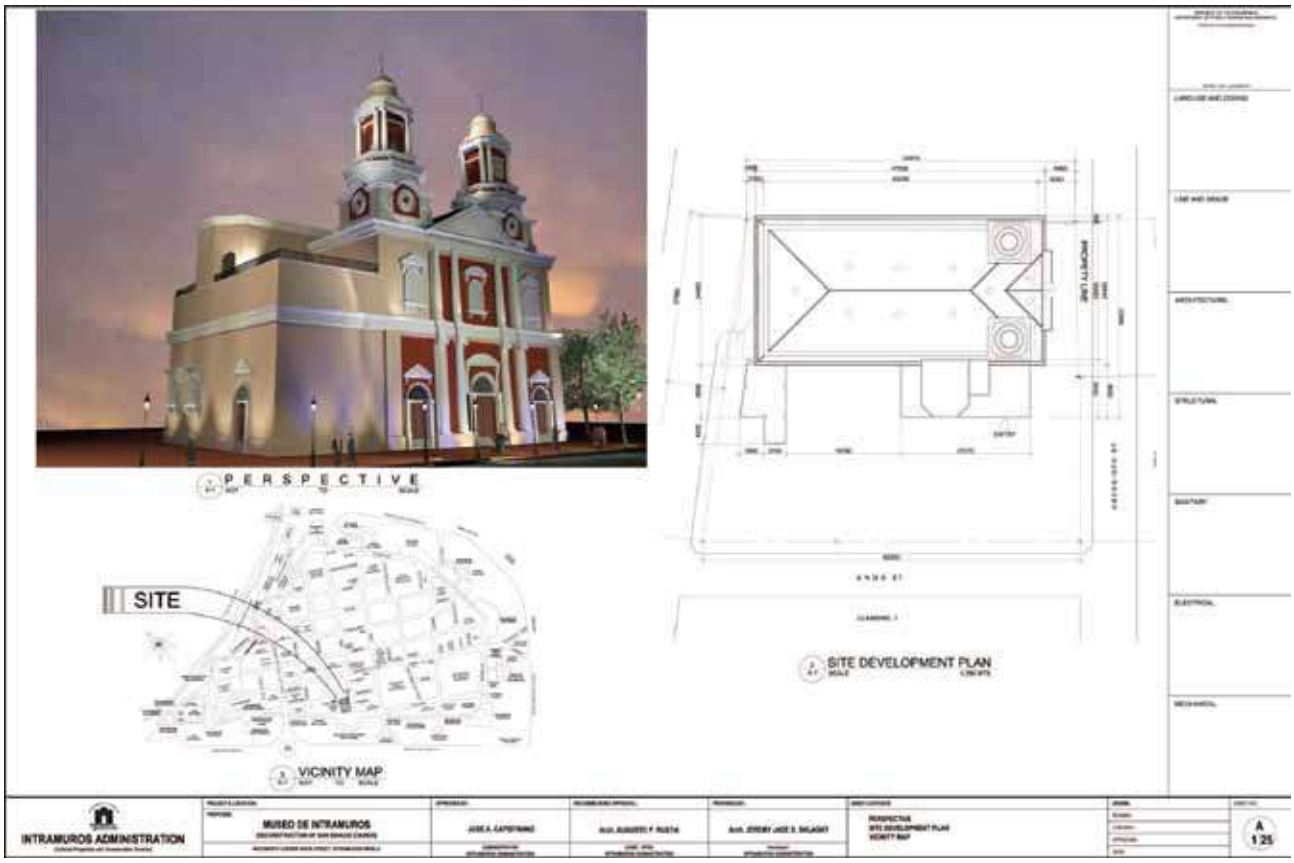



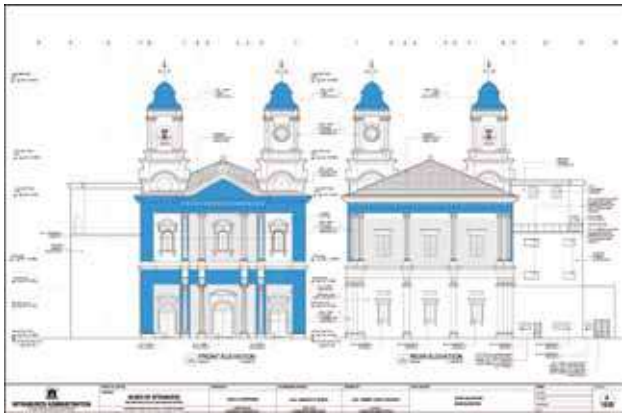

Old photos (1890) showing the majestic interior of the church with its intricate carvings. The beautiful pulpit was carved by both Flores and Hocson.



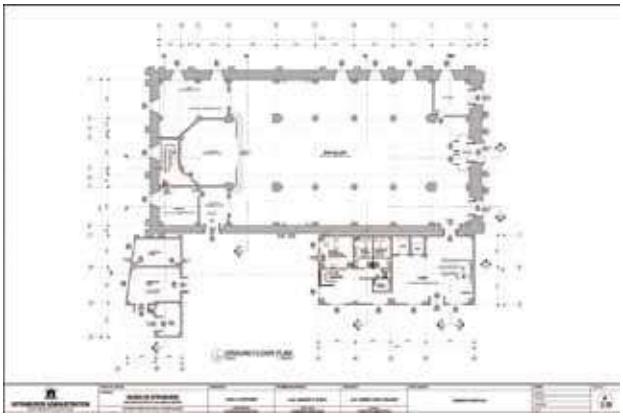

Ruins of the San Ignacio Church: Structure at the back of the church, possibly placed as an addition when the area was used as a warehouse after WWII (left photo, IA). Columns and bricks can be seen in the exterior wall (middle photo, IA). There is also a vacant crypt (middle right photo, IA) and a well at the site (right photo).

Site Development Plan: The Second San Ignacio Church

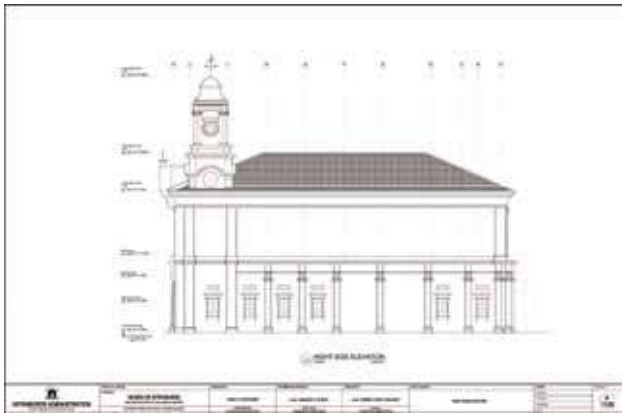




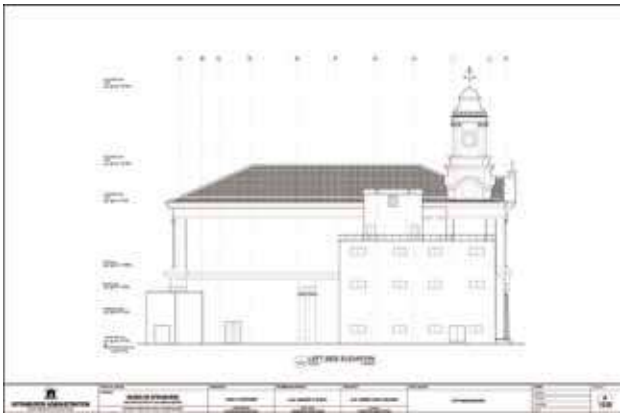
Front/Rear elevation



Ground floor plan



Right side elevation



Left side elevation

Reconstruction of The Second San Ignacio Church

The photo (upper left) shows two passages, the original side entrance with bricks, and another arched opening created after WWII by the Americans.
The remaining parts of the original structure of the church consisted of bricks about 1 x 1 in size and volcanic tuff. The church façade was made of bricks, adobe, and marble (upper right photo). (2014, IA photos)

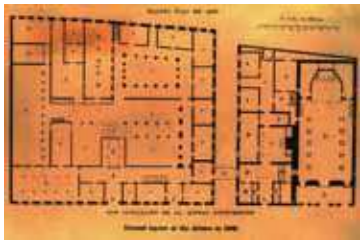
Reconstruction of the façade, exterior, and interior walls of the church (2014, IA Photos)

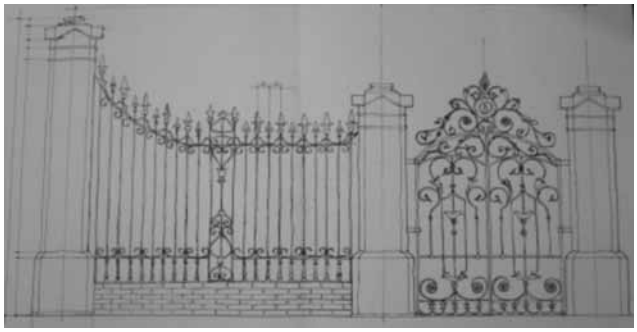
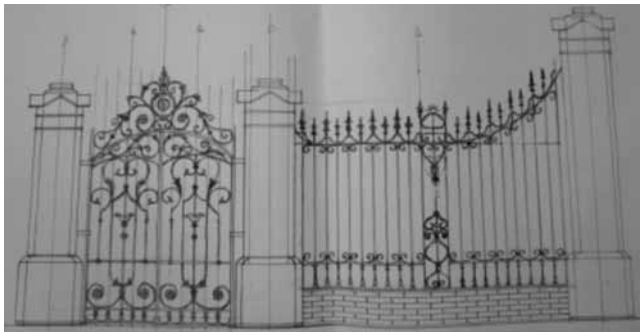
These are recent exterior photos of the church taken by the author (2015). The original columns have been preserved.




Recent visit of the author to the reconstructed site of the Second San Ignacio Church (2015).

Below are photos of the architect showing the plans of San Ignacio Church and the ground layout of the Ateneo in 1909 (note the bridge that connects Ateneo to San Ignacio) and the prepared design of the wrought iron gates as depicted in the old photo.



Sri Lanka

Construction of Ancient Houses in Sri Lanka

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Abstract
This report will discuss the methodology of construction of houses in ancient Sri Lanka in respect to technical and intangible aspects. It will describe the methods and materials used for construction of ancient earthen houses and the rituals relating to various stages of construction. Not only that here were so many auspicious times but also the auspicious materials used will be discussed.

However, traditional building technology is currently facing numerous challenges and it appears that their disappearance from society is unavoidable. The important thing is to document the traditional knowledge systems and to try and safeguard at least some samples of architecture. Attention will be drawn to this aspect in the second part of the report.

In the face of technical development education, even earlier generations have been unable to pass such features on to subsequent generations, and neither is the present generation so concerned about these features.

1. Introduction
Sri Lanka's recorded history goes back more than 2500 years. Prehistoric man in Sri Lanka was interested in living in rock caves. Our architectural heritage was transformed drastically from the 3rd century BC after the arrival of Arahat Mahinda, who introduced Buddhism. Until then, ordinary village houses were built with clay and wattle and roofed with grass.

The construction method of ancient dwellings in Sri Lanka is significant in terms of its sustainability and was related to environmental conditions, financial affordability and aesthetics.

Since the ancient period, earth and timber, which were freely available and costless, were used for construction purposes. The main structure consisted of a foundation, walls and roof. The foundation was also made of earth with rock boulders, which hindered damp entering the house. Earth and sticks were used in the superstructure for dwellings as well as for religious and royal buildings. The roof was thatched with tree leaves etc.

People in ancient Sri Lanka built their own dwellings by using natural resources and materials in a very simple manner. These houses were well maintained as the people had a simple lifestyle and were free to maintain the buildings. These ancient houses, which were mainly built for protection from the elements such as the rain, wind and sun, depicts the economic, social, environmental, religious and cultural background of a past society.

Through the rituals, beliefs and faiths used in building construction, research can be carried out on intangible heritage and its social impact.

2. Construction
2.1 Methods and types
According to the plan of a typical house, it was one rectangular unit with one or two rooms. Nails were not used in these houses. The wood in the roof was bonded using cane or other wild creepers.

Houses of nobleman differed from the above mentioned houses in the number of rooms, the internal garden and rarely tiled roof.

According to the writings of Robert Knox (17th century) details of the traditional rural housing system has been described.

"Their houses are small, low, thatched cottages, built with sticks daubed with clay, the walls made very smooth; for they are not permitted to build their houses above one story high, neither may they cover with tiles, nor whiten their walls with lime; but there is a clay which is as white, and that they use sometimes. They employ no carpenters or house builders, unless some few noblemen, but each one buildeth his own dwelling; in building whereof there is not so much as a nail used; but, instead of them, every thing which might be nailed, is tied with rattans and other strings, which grow in the woods in abundance—whence the builder hath his timber for cutting… The poorest sort have not above one room in their houses, few above two, unless they be great men…" Robert Knox (1981:235).

It was expressly forbidden under feudal laws laid down by the King for ordinary people to build a two story house or tiled roof as a dwelling in ancient Sri Lankan society. They built their houses themselves with mutual cooperation. As these buildings were made of temporary materials, they do not exist now.

Anyone who wanted to build a house or repair one got help from the other villagers voluntarily. And this person would in turn help others according to their requirements. As an example, in the event of roof thatching, they would work with their neighbors. In this exercise the mutual cooperation of villagers was built up.

Ancient Sri Lankan society had a totally community-based system. Community participation (called "shramadana" – literally, the donation of self labour) is a very popular concept in Sri Lankan society. Ancient people supported each other in their special activities as well as day-to-day work without any compensation. This community-based system was also used in the repair and restoration of houses. Cadjan, straw and palmyrah thatching were used in the vast majority of ancient rural houses. The main problem of this kind of roof is less durability of the roofing

materials and because of that, they had been replaced in certain time periods. In this occasion of thatching, the whole village participated with the house owner without any compensation.

Fig. 1: Community participation

Ancient buildings are small in scale compared to those from later periods. The main structural elements of ancient buildings are described as the foundation, superstructure (walls) and roof. As using earth in different methods, there are five types of earthen construction as per the following construction techniques.

i. Wattle and daub
ii. Rammed earth
iii. Adobe
iv. Stone walling in mud mortar
v. Laterite blocks

Only the wattle and daub and rammed earth methods will be discussed in this report.

Fig. 2: Rural house

2.1.1. Foundation

The foundation platform was usually built to a height of about 600 mm using selected clayey soil and stones. The walls were constructed on this ground. After completing the house the floor was finished with the application of cow dung for a neat and smooth appearance as well as for antiseptic purposes.

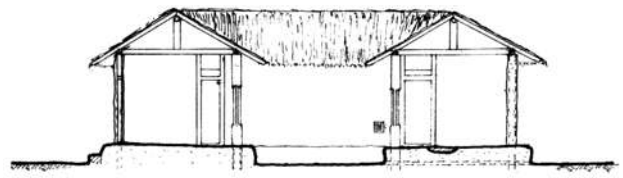
2.1.2. Superstructure

Wattle and Daub

In this type, corner posts and taller gable posts were sunk to above the described platform. In between these were

Fig. 3: Ancient house in Meemure village in Central Province – 9th century. An inability to find traditional roofing materials and in the interests of easy maintenance and durability, galvanized sheets were added during a later period.

Fig. 4: Inside the house



Sectional Elevation

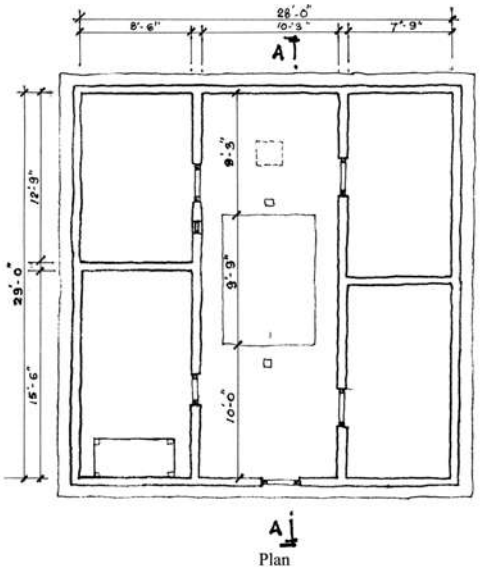


Fig. 5: Plan and elevation of ancient house

roof-supporting posts and thin stakes driven into the ground. Other thin sticks were tied horizontally to the vertical posts and stakes. No nails were used in the entire construction. Everything was tied with rattan and other

strings. Two rows of this kind of lattice framework were erected in parallel and clay balls were placed in between these frames.

Fig. 6: Wattle and daub construction

Rammed earth

In rammed earth construction, clay balls were placed on top of each other on the foundation platform with the support of shuttering. This kind of construction took a little more time because the whole height of the wall could not be constructed continuously due to bulging from its own weight.

Finishes

After three days, the kinds of walls mentioned above were plastered using clayey earth mixed with fine sand. Due to the resulting shrinkage cracks, clay plaster was applied several times. No equipment was used to apply the clay on the walls.

Fig. 7: Roof construction

2.1.3 Roof

The roof frame consisted of a timber structure including crossbeams, ridge plates and rafters etc. The covering was usually thatched coconut palm leaves (cadjan) or rice straw on the frame.

2.1.4 Main Causes of Decay

White ants and the monsoonal rains are the main reasons for the decay of walls, and therefore, repair is needed once a year. As a matter of habit, ancient house owners repair their houses before the new year festival (April).

2.2. Materials and Techniques

They used freely available building materials that were eco-friendly, and could be recycled, reused and renewed. In these constructions the main building materials used are earth and timber. Desirable qualities for earth construction material include:

- Strength
- Low moisture absorption
- Limited shrink/swell
- Availability
- High resistance to erosion, insect and chemical attack

Earth was used for constructing walls and plastering. Suitable clayey earth was selected from pits. Foreign matter was removed before it was pounded. Then water was added and the mixture was trampled by foot and allowed to dry for 24 hours to remove excess water.

Timber was used in log form for all kinds of roof elements. But they selected appropriate timber species for longevity and resistance to climatic factors and insect attacks. In normal practice timber logs were seasoned by being submersed in mud for 3 to 4 weeks.

3. Local Knowledge Systems and Intangible Aspects

3.1. Local knowledge

This architectural heritage contains local knowledge, and many of the norms, heritage values and construction methods that existed in the past and have been transmitted through the generations by practice and also through oral traditions. So many aspirations, conceptions and methods were used for construction procedures that were believed to contribute to comfortable living.

Examples:

- Earthen construction is very comfortable due to its high thermal insulation. Therefore the inside of the building is cool by day and warm by night.
- A high earthen plinth acts as a thermal and damp barrier because earth has low capillary action. The walls and floors do not get wet or warm and therefore no cracking occurs.
- The floor was finished with cow dung because they believed it to be antiseptic.

Unfortunately this knowledge is slowly disappearing due to changing socio-cultural and economic patterns and ways of thinking.

3.2. Intangible Aspects

Usually these houses were constructed by family members with the help of an astrologer and the head craftsman. Before constructing a building, many customs were followed. The horoscope of the householder and the planetary positions were considered by an astrologer. There were so many steps that needed to be carried out at auspicious times, from selecting land to finishing and house warming; i.e., for starting, cutting trees, erecting the first posts and placing doors, etc. They believed that

cutting mature trees on new moon days would not be subjected to insect attack as the sugar content in timber was low during those days. Not only that, there were so many auspicious building materials which were only used for house construction. Offerings were made to guardian deities before starting.

In the rituals relating to the various important stages as discussed above in the construction, the head craftsman or house owner would dress suitably in white clothes while facing the east. They believed that if the ritual were incorrectly carried out or held at a non-auspicious time, the house owner and family's life and health would be affected.

3.3. Knowledge Transfer

The memory of older generations is important to transfer the knowledge to the younger generations. They are rich in invaluable information about auspicious times, material techniques, designs and ideas, etc. Due to the introduction of technology, traditional houses are disappearing, so that this knowledge is hardly passed on to the next generation. Acceptance of new construction methods cannot be avoided because of changing attitudes, changes in society and new approaches to construction.

4. Social and Other Impacts

Nowadays, earthen buildings in Sri Lanka face numerous challenges.

These are categorized as follows:

i. Influence of social transformation
ii. Scarcity of materials
iii. Economic development
iv. Natural causes

i. Influence of social transformation

Social transformation cannot be avoided with the new technological trends. It is natural that people prefer a comfortable, long lasting and elegant environment and facilities. As a result, the younger generation tends not to continue with the traditional knowledge systems describe here. As elders spend the last stages of their life in the modern houses of their children, old houses are being abandoned. The new generation tends to build houses using cement, sand and stone and they do not like to use traditional or natural materials because of the high cost of maintenance.

ii. Scarcity of materials

In the past, the materials used for construction could be easily found in nature. Clay from lake beds and timber from the jungle could be supplied freely. Nowadays, it has become a difficult task to find building materials such as earth and timber logs, as the relevant authorities have banned the digging of lakes and cutting down trees in jungles.

iii. Economic Development

As a result of the rapid economic development of Sri Lanka, the materials and designs used in construction are converted to easily bought materials and elegant designs. In this situation people reduce the usage of traditional materials, though they may be eco-friendly or comfortable to use.

Today most old and traditional buildings have been abandoned because people would like to live in modern houses requiring less maintenance.

iv. Natural Causes

- Climate conditions
- Structural failures
- Destruction due to use
- Insect attacks

5. Conclusion

Ancient earthen building technology made housing more affordable for people, provided comfortable living and helped conserve the environment. However, ancient houses made of earth in Sri Lanka will deteriorate and disappear soon due to lack of attention to maintaining them and the reasons mentioned above. The earthen building tradition will also disappear, be modified or evolve due to the social and cultural needs of the time. In lieu of traditional buildings, the cement building style has become prominent.

While the expectation of people for modern things cannot be eliminated, the process of getting old traditional things eliminated is also inevitable. What we can do is to preserve and maintain some of the remaining buildings and document the knowledge systems associated with traditional housing, and where possible, use them for present-day activities.

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Some Features of Buddhist Stupas of Central Asia and Korea

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Acknowledgements
This article is presented as a summary of a report prepared in the framework of the Asia Cultural Program on Conservation Science (ACPCS) of NRICH Daejeoun in 2015. In this program were participated young specialists from several Asian countries, which working on the cultural heritage preservation. During the program, participants listened lectures by professionals from the Scientific and Conservation Center, Department of Artistic Heritage, Architecture and Archeology. Lectures comprised theoretical and practical on conservation of different materials such as metal, stone, ceramics, wood, paper and others. Also, there were interesting presentation on the artistic heritage and archaeological sites of Korea. As part of the program, we visited to museums and familiar cultural monuments located in different cities and areas. The main objective of the course was to provide an opportunity to carry out personal studies on specific topics selected by each participant. My topic was devoted to the study of the Buddhist stupas of Central Asia and Korea. The main focus was to identify the characteristics and conduct a comparative analysis of architectural decoration of the Buddhist stupas, revealing elicit their similarities and differences.

Introduction
According to experience of the experts, Buddhism was introduced to Korea in the 6th century AD from China, and Buddhist missionaries from Sogd, Bactria, Parthia and Tokharistan played an important role in its formation. Contacts on the issue of Central Asian-Korean, we cannot say certain, but there was probably an indirect influence on the formation of the Central Asian Buddhism to this religion in Korea, Koguryo and Silla[1].

Most stupas in Bactria date from the Kushan time. The first stupas with a square base appeared in the second half of the 1st century AD in north-western India, and these spread throughout Bactria in the 2nd to 3rd centuries AD. This type is represented by the stupas of Airtam (separately standing), Ushtur-mullo and the Tower of Zurmala. As excavations have revealed, Bactrian stupas of that period, traditionally built from pakhsa and adobe brick, were faced by stone plates. This facing treated a profile of the structure and was decorated by architectural and sculptural decor.

Monastery stupas with square bases had ladders going to the platform of the base, where prayers and rituals were undertaken. Stupas from Merv Buddhist complexes could be related to this type. Stupas were located either inside cultic and monastery complexes (Airtam, Kara-tepa, Dalverzintepa, Adjinatepa, Hishttepa), nearby (Fayaztepa, Ushtur-mullo, Gyaur-qala in Merv), or were separately standing (Zurmala, Zartepa, suburbs of Gyaur-qala in Merv).

Comparison of stupas: similarities, differences, identity and characteristics
At first glance, the similarities between the stupas of Central Asia and Korea are far apart. But if you examine them deeply, you can find parallels between them. In my cursory examination of stupas in Korea, I tried to find similarities in the form and the individual elements and the decor. When comparing Buddhist stupas and pagodas in Central Asia and East Asia, the particular reasons why Korea's stupas are different are as follows:

1) Ideological aspect
Stupas and pagodas are regarded as architectural structures associated with Buddhist doctrine, and both were used for the same function; i.e., for storing relics and as a place of worship. And, in ideological terms, the majority of stupa in Central Asia and Korea were strictly oriented to the east.

2) Etymological aspect
One possible origin of the term "pagoda" is reportedly the Persian *butkada*, from *boot* (idols) and *kada* (church, home).

3) Architectural aspect
The plans for stupas and temples in Central Asia and Korea are similar. Some experts have formed the view that the scheme of a Buddhist temple in Ayrtam was used later in Ak-Beshim and East Turkestan. It can be assumed that this scheme spread into the far eastern territories and including Korea also. The similarities with Buddhist temples can be seen in the arrangement of the two stupas. This scheme can be seen at the Karatepa Buddhist site and stone pagodas at Gameunsa Temple Site in Gyeongju (Fig. 1).

There is the opinion that the prototype of the pagoda is the wooden church, subsequently constructed of brick and stone. But I expect that the architecture of stupas in India and Gandhara, stupas from Central Asia, also contributed to the development of Buddhist pagodas in the East and in Korea.

According to my research, the Buddhist stupa was eventually modified, becoming more decorative. In architectural terms, the hemispherical stupa lost its original value over a long stretch of time. The platform became several layers. But, over time, increasing the platform floors to two, then three then resulted in a multi-story structure stupa. The reason for the increase was apparently to depict on each platform the sculptural images of Buddhist mythology or scenes from the life of Gautama Buddha. Because, of the increasing number of stupas, masters received a lot of experience.

However, in turn, Buddhist philosophy developed and to some extent influenced the change in the shape and composition of the stupa. Here the chatra varies greatly

and, as it decreases. From this process, we can observe the formation and evolution of the stupa (Fig. 2).

We can give an example of a technique used in the construction of the stupa. It is known that the stupas of Central Asia and early Korean stupas were built with a mixed technique of brick and stone blocks. It's still possible to see that the shape of the base of the stupa and pagoda are identical; for example, in Central Asia early stupas had a square base, and after further development the form of the stupa appears with circular bases. We can also see these platforms in Korean pagodas and stupas (Fig. 3).

I think the shape of stupas in Central Asia is more like that of small Korean stupas. The hemispherical body of Fayaztepa stupa and small stupa in the walls of the main stupa at the Karatepa Buddhist complex find a direct analogy in the bell-shaped stupa at the Tongdosa temple behind Daeungjeon (main Dharma Hall). This ball-shaped stupa is decorated with lotus patterns, lotus blossoms, lotus petals, the Four Virtues and gods on the base and upper parts (Fig. 4).

It is remarkable to research similarities have not in the form of the stupa, but also in the platform of the Diamond Precepts Altar with the Gate behind the Main Hall. The monumental platform surrounded by a stone barrier and arched gate reminds me of a stupa at Sanchi. We know that this stupa contains a relic of the Buddha, and stupas in Central Asia are usually used for such a function. But here we can see another similarity; that is, a broad platform and a round fence, which served a Buddhist ritual called "pradakshina-patha" (Fig. 5).

4) Artistic aspect

In the course of the study I have read articles by Lee Hee-bong, where he cites similarities between the profile base of the stupa and figures donators and apsara reliefs on the stupa. I would add here, too, like elements such as clearance stupa stone blocks with reliefs. For example, the large stupas in Central Asia facing stone slabs covered with Buddha images and pilasters. This tradition appears in Korean pagodas too (Fig. 6).

On the four corners of the stone brick pagoda of Bunhwangsa Temple are statues of seated lions. We can see such kind of designs in other pagodas as well (e.g., Dabotap). This view at first reminded me of the same statue at Stambha of Ashoka in India, farther its continued used in Central Asia too. For example, in Old Termez I found the sculpture of a lion decorating a capital column. The arrangement may have been in a different place, but the ideological function was identical (Fig. 7).

For other similarities, we can look to the design of platform stupas with a decorative ornament lotus, for example the square platform on Karatepa stupas and the stupa of the Beopcheonsa Temple or the Hexagonal Multi-story Stone Pagoda of Geumsansa Temple, which has the same ornament decorated with three layers of lotus (Fig. 8).

The final part of the stupa at Beopcheonsa Temple resembles another decorative item from Central Asia; i.e., a round stone block decorated with two tiers of lotus. The center of the block is hollow, which indicates that it could have used as a harmika of a stupa (Fig. 9).

There are other similar elements, such as at the top of the Seokgatap pagoda of Bulguksa Temple, the final part of the chatra, and floral ornaments such as growing curls reminiscent of antefixes from the Khalchayan settlement in the south of Uzbekistan (Fig. 10).

Conclusion

We can continue comparing in detail, but the above examples suffice for us to draw conclusions about the features and parallels of Central Asian stupas and Korean pagodas. Once again, here is a total list of similarities between the stupas of Central Asia and Korea:

- Ideological and philosophical meaning is identical; that is, both were used for storage (in Central Asian stupas, reliquaries; and in Korean pagodas, sarira caskets) and places of worship;
- Planning structure is similar: composition of the Buddhist complex with two stages;
- Construction technique: mixed technique of brick and stone blocks;
- The form of small stupas of Central Asia and the stupa monks in Korea are similar;
- Structural parts: platform, plinth, cornice, harmika, chatra and others;
- Decoration of the stupa with zoomorphic (lion) and anthropomorphic (Buddha) images, as well as floral (lotus, spiral) ornaments.

In conclusion, we can say that the stupa in Central Asia affects, albeit indirectly, the formation of the stupa and pagoda in the East, including Korea. The stupa evolved over a long time; as a result they developed a special form and features. In every historical and cultural region they represent local characteristics and traits. At the same time they retain their original ideological and philosophical significance. This shows the stability and duration of the traditions and culture of the peoples of the East.

This research makes it possible to identify the features of the architecture and artistic features of Buddhist stupas of Central Asia and Korea. And based on this, materials from stupas found by archaeological excavations in Central Asia can be reconstructed. Also, the studied materials can be used for research to identify the mutual culture and traditions of the ancient peoples of the Silk Road.

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Fig.1 Plan of Stupas in Monastery Complex of Karatepa Buddhist site (Central Asia) & Stone Pagodas at Gameunsa Temple Site in Gyeongju (Korea).

Fig.2 Increasing the platform floors to two, then three, and then a multi-story stupa.

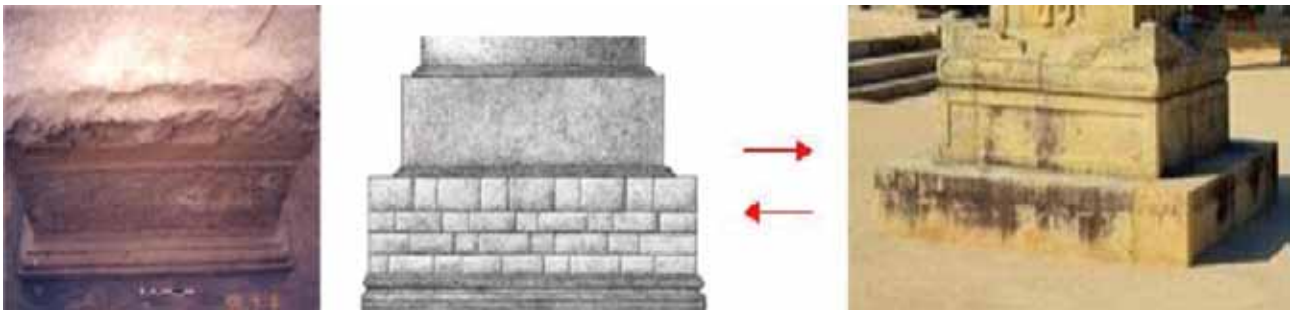

Fig.3 Comparison by shape: Stupas of Karatepa Buddhist site & Base of Pagoda of Tongdosa Temple (Korea).

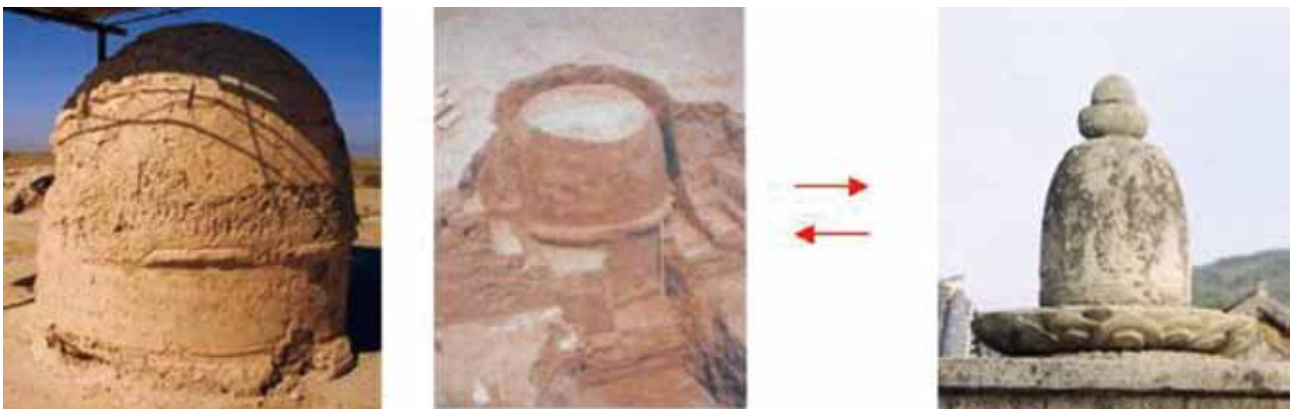

Fig.4. Comparison by shape: Fayaztepa stupa, Small stupa of Karatepa & bell-shape stupa of Tongdosa Temple.

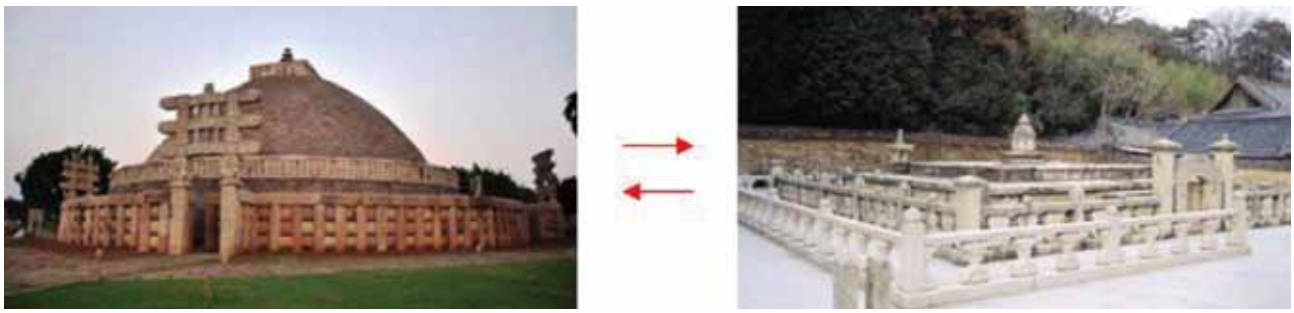

Fig.5. Stupa at Sanchi (India) & gate and platform of Diamond Precepts Altar behind the Main Hall of Tongdosa Temple.

Fig.6 Pilasters and friezes with Buddha images (Old Termez. South Uzbekistan. Kushan period) &
Three-story Pagoda of Jinjeonsa Temple. Stone brick pagoda of Bunhwangsa Temple (Korea).

Fig.7 Stone statue of the Lion from Old Termez, Lions on Ashoka's Stambha (India) & pagoda at Bunhwangsa Temple and Dabotap (Korea).

Fig.8 Similarities in the design of the platform: A square platform at Karatepa stupa & stupa of the Beopcheonsa Temple;
A round-shaped stupa in Karatepa & multi-story stone pagoda of Geumsansa Temple.

Fig.9 Similarities in design with lotus ornaments: Harmika from Old Termez & stupa of the Beopcheonsa Temple;
city of Old Termez & pagoda of Geumsansa Temple.

Fig.10 Comparison of floral ornaments: Antefixes from Khalchayan (South Uzbekistan) & top of the Seokgotap Pagoda from Bulguksa Temple (Korea).

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