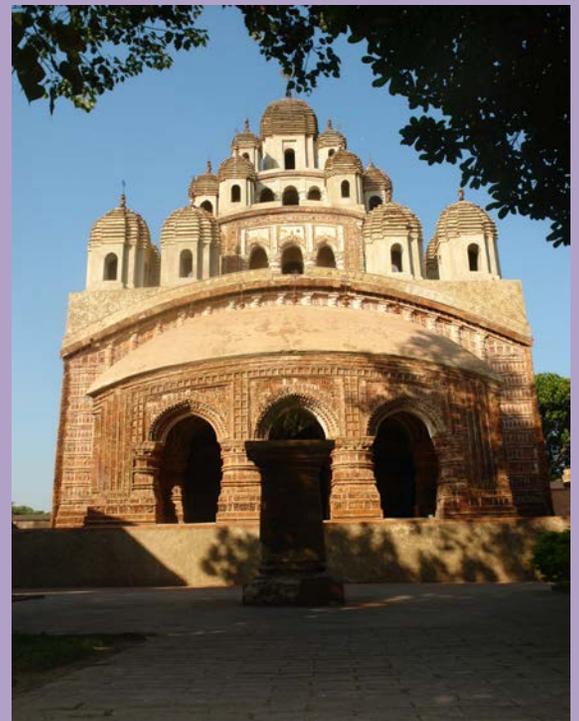
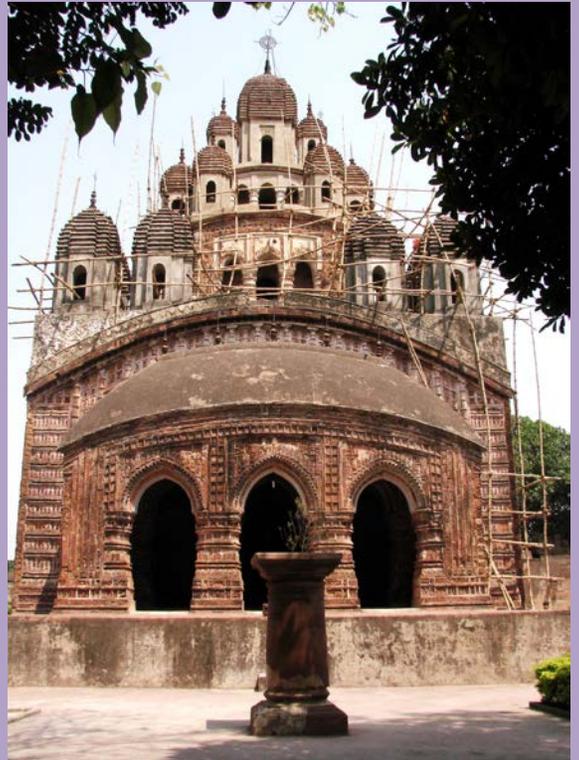


# INDIAN ARCHAEOLOGY

2011-12 – A REVIEW



# INDIAN ARCHAEOLOGY 2011-12 - A REVIEW

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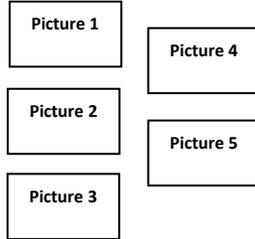
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## *Illustrations*

### **Front**



### **Back**



**Front Cover:** *1 and 2, General view of the Citadel along with a well, Khirsara, Gujarat, 3, Inscribed stone slab, Bayana Fort, Rajasthan, 4 and 5, Krishna chandraji Temple, Kalna, West Bengal, during and after chemical preservation*

**Back Cover:** *Bust of the Buddha (obverse and reverse sides) from Excavation at Uppugundururu, Prakasam, Andhra Pradesh.*

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## PREFACE

I am delighted to present the current issue of the **Indian Archaeology 2011-12 - A Review** which affords ready references about archaeological investigations of the country carried out during the year by different organizations.

This particular volume contains information on archaeological activities like explorations and excavations, epigraphy, palaeo-botanical and pollen analytical investigations, other important discoveries, museums, architectural survey, preservation of monuments, archaeological chemistry, archaeological gardens and publications undertaken by the Archaeological Survey of India as well as other allied institutions. In this regard, I extend my sincere gratitude to all the Heads of the Archaeological Organizations in States, Universities, Museums and Research Institutes including our colleagues in the Survey who had contributed in bringing out this review for the researchers and scholars in its existing form. Here, I must congratulate Dr. D. N. Dimri, Director (Publications) and his team in the Publication Section for bringing out this academic journal so rapidly which incidentally missed a deadline.

I appreciate the cooperation of Shri Ashok Kumar Patel, Superintending Archaeologist, Kolkata Circle of the Survey, to complete the work. Shri Shantanu Maiti, Superintending Archaeologist, of the Survey, is credited with initial editing of manuscript.

Further, I would like to thank Dr. Sangeeta Chakraborty, Assistant Superintending Archaeologist, Kolkata Circle of the Survey, who steadily compiled, edited and made press-ready this Review who was helped by Shri Atindra Kumar Dey of the Hazarduari Palace Museum, Murshidabad in formatting, designing and layout.

Finally, Shri C. Dorje, Former Joint Director General, Archaeological Survey of India, deserves special acknowledgement for meticulously going through the manuscript and suggesting necessary corrections.

In editing this volume, little inaccuracy might have existed for which I must be apologetic. Conversely, prime responsibility lies on the contributors who have furnished the data.

Date...../...../2016  
New Delhi



(Rakesh Tewari)  
Director General  
Archaeological Survey of India

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# INDIAN ARCHAEOLOGY 2011-12 – A REVIEW

## 1. EXPLORATIONS AND EXCAVATIONS

### ANDHRA PRADESH

#### 1. EXCAVATION AT UPPUGUNDURU, DISTRICT PRAKASAM

The Hyderabad Circle, of the Archaeological Survey of India<sup>1</sup>, under the direction of R.Krishnaiah, assisted by D.Kannababu, Ch. Babji Rao, T. Chenchu Ratnam, A.Suresh, V.Kanaka Raju, N.Subba Rao, Ch. Vijayanand, P.Srinivas, Gopala Rao, carried out scientific clearance-cum-excavation work at the disturbed ancient mound Uppugunduru (15<sup>o</sup>40'48";80<sup>o</sup>12'25") in the revenue limits of Chinaganjam, with a view to expose the Buddhist Establishment, which was thoroughly damaged due to agricultural activities and vandalism, as the mound is under private ownership.

The exposition work started after the removal of rank vegetation, uncovered the remains of a large monastic complex, mainly concentrated in the northern part of the mound. Traces of two parallel walls, running in east-west orientation, having approximately 2m thickness on the northern side and connected by 2m x 1m wall, at irregular intervals, which are mostly missing or robbed, evidently suggest that these remains were part of a northern row of monastic cells, constructed of lime stone rubble. The irregular evidences of exposed structural remains revealed that the east-west oriented wall had about 22m length (could be an enclosure wall) and further supported by

one inner and another outer walls. The thickness of the extant outer wall measures about 16m, while the inner one is 8m thick, with floor space, measuring between 1.8 to 2.1m.

The western end of this structure is highly disturbed and brought to light a brick wall belonging to the Early Historic times. A row of three *in situ* fragmented storage vessels were encountered here.

To its south, lime plastered dual brick tanks, measuring approximately 1.25m x 1.05m and 0.7m x 0.94m with 0.30m wall thickness, have been unearthed. The former tank has 1.18m depth, whereas the latter shows 0.75m depth. Its south-western portion is damaged, hitherto, it is the most intact structure exposed at the site.

Segment of a lime plastered brick drain, measuring about 2.4m in length and 0.28m in base thickness, has also been exposed. Its total length could not be ascertained, as its, western extent is lost.

The probe has also traced out a rectangular structure; approximately measuring 10m x 8m, having 2m thick wall on the southern side and nearly 0.50m thick on the northern side, within it, a pair of two walls in the north- south orientation, has also been exposed. It is lined parallel to the main walls on the east and the western sides. The north- eastern and south-western part of the wall got either missing or damaged.

1. Archaeological Survey of India is referred to in the following pages as the 'Survey' only.

In addition, important structural remnants of rubble stone votive stupa with six courses measuring about 3.6m in height have also been unfolded in course of the clearance work.

Thus, the exposed and available structural remains that came up through the exposition work are partial and devoid of any complete shape, and as a result, the nature of construction could not be established.

However, the ceramic assemblage surfaced from the site is predominantly red ware and the shapes met with include vase, storage jar, *handi*, basin, bowl, lid, sprinkler, *lota*, finial and earthen lamp of the Early Historic period in medium to coarse fabric. Apart from plain variety, incised and appliqué decorated pottery has also been found during the exposition work.

The other important finds include fragmentary limestone bust of the Buddha, few sculptural fragments, beads and coins. Altogether, five coins (four lead and one copper) are reported from the surface collection and single lead coin is retrieved from the clearance work. Besides, one stone celt, a stone disc and shell fragments were collected from the surface as well as from the exposition work. Couples of tiny limestone fragments, containing Brahmi scripts of Satavahana and Ikshvaku Periods, akin to Nagarjunakonda palaeography, remained the added significant discoveries.

### ARUNACHAL PRADESH

#### 2. EXPLORATION IN DISTRICTS TAWANG AND WEST KAMENG

A team from the Guwahati Circle, of the Survey, in collaboration with the Directorate of Research, Government of Arunachal Pradesh under the guidance of S.S Gupta of the Survey,

assisted by Kh. Menaka, Jitumani Das and Nabajit Deori, conducted archaeological explorations in the Tawang and West Kameng Districts and brought to light the following archaeological sites:

The site **Zemithang**, District Tawang (27°41'.894"; 91°42'.929") is located about 94 km north of the Tawang District Headquarters, where a Buddhist Stupa of larger dimension, locally known as Gorsam Chorten was noticed, which is believed to have been constructed by a local Monpa Monk, named Lama Pardar, imitating the model of thirteenth century Bodhinath Stupa of Nepal.

The Gorsam or Gorcham Chorten remained the largest among all the stupas of north eastern India and attained a height of 27m from the ground level. It is constructed of dressed stone with a lime plaster and consisted of a large cylindrical dome (measuring about 16m in diameter and 49.5m circumferences), standing on a four terraced drum or *medhi*. On the lower most terraces, four miniature stupas are raised on the four corners. The base of the *medhi* is square on plan and each side measures 43.2m in length, the lower circumambulatory path is enclosed by a holy wheel *vedika*. The stupa can be entered from the four cardinal directions.

A numbers of images of various Buddhist deities have been placed around the lower part of the *anda* (dome) in the niches. The dome can be reached through a flight of steps having ornamental railing in all directions. There is a circumambulation path, paved around the giant Chorten. The dome is surmounted by a square *harmika* with a spire of thirteen tiers in a pyramidal order, and topped by a chamber which is covered with glass panes, making a *chhatravali*.



A



B



C

*A, Zemithang: rock engraving of the Buddha; B-C, Tak Tsang: cupmarks and rock engraving.*

On the outskirts of Zemithang, along the road leading to Lumla, a Buddha figure engraved within a circle, on a fallen rock, is noticed (Pl.1A). He is shown seated on a lotus pedestal, wearing a drapery. His right hand is in *bhumisparsamudra*, whereas the left one is kept on the lap, probably holding a bowl and two male devotees are carved on either side of the central image, near the pedestal. His head is marked with elongated ear lobes, curly hairs and *usanisa* on top and a halo is carved behind the head. Below the figure, an inscription of one line (in Bhoti script) is found which appears to be in veneration of Lord Buddha.

About 50km west of Tawang District Headquarters, another site named **Tak Tsang**, in the same district, is noticed at an altitude of nearly 3657m above the mean sea level (MSL). It is well-known for the seventh century built monastery called Tak Tsang Gompha or Tiger Cave, where Guru Padmasambhava is believed to have performed meditation. The area around Tak Tsang Cave yielded archaeological remains. At Tak Tsang Gompha, an outcrop, appears to be an elephant's head, is exposed on the slope of the hill, leading to Tak Tsang Chu and depicts fifty numbers of cupmarks or cupules (Pl.1B) in eleven rows, running from left to right, measuring about 5.20m in length, 0.5m to 0.15m in width and 0.3m to 0.15m in depth. Each row has three to seven cupmarks. There are no corroborative evidences in assigning their age, but these cupmarks or cupules are believed to be an ancient sign of human activities.

On a cliff of rock, at Tak Tsang, a Buddha figure is carved seated on a lotus pedestal, in meditation posture, with a *halo* behind the head (Pl.1C). The whole figure is engraved within a circle and measures nearly 0.50m in length, 0.30m and 0.30m in width.

Below the figure, an inscription is carved in Bhoti script, adoring Lord Buddha. Few patches in blue and green colours are noticed around the Buddha figure, which appears to be of later addition.

**Shergaon**, lies at an altitude of nearly 1828m above the MSL, is a small township of West Kameng District, located around 60km west of Bomdila, near the River Valley of Dibblo. On the bank of the river, twelve numbers of well-dressed limestone menhirs have been reported placed at a distance of 1m to 5m from each other. These menhirs measure from 1.65m to 0.47m in length, 0.53m to 0.18m in width and 0.17m to 0.2m in thickness. All the menhirs are rectangular with truncated top and raised upright; sometimes they are noticed inclining towards the left.

In the same cluster, a *Mane*, (a miniature religious hut) closed from outside, is raised over a platform, the podium measures about 0.62m in height, 1.52m in width and 4.13m in length. Made of limestone slab, the *Mane*, having a wagon vaulted roof, is rectangular in plan and measures about 3.5 m in length, 1.64 m in height and 1.3m in width. The walls of the hut (*Mane*) are found veneered with inscribed stone slabs in Bhoti scripts.

## BIHAR

### 3. EXPLORATION IN PATNA, DISTRICT PATNA

The Excavation Branch III, Patna, of the Survey, under the direction of Arvin Manjul, assisted by J.K.Tiwari, Ashish Kumar, Neetesh Saxena, D.Kumar, O. P. Pandey discovered the following antiquarian remains at different locations:

<i>District</i>	<i>Village/Site</i>	<i>Latitude/ Longitude</i>	<i>Name of the block</i>	<i>Nature of Remains</i>
Patna	Hebaspur	25°24'N; 84°48'E	Vikram	Potsherds of black and red ware, black slipped ware and red ware, fragments of glass bangles, terracotta beads and hop-scotches.
do	Kandap	25°30'N; 85°01'E	Sampatchak	Potsherds of black slipped ware, grey ware, northern black polished ware and stone sculpture of Pala period.
do	Kuranavada	25°30'N; 85°09'E	Sampatchak	Potsherds of red ware

## GUJARAT

### 4. EXCAVATION AT CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

In continuation of previous year's (*IAR 2010-11<sup>1</sup> pp. 29-31*) excavation, the Vadodara Circle, of the Survey, in association with the Department of Archaeology and Ancient History, M.S. University, Vadodara, and the Directorate of Archaeology, Government of Gujarat, Gandhinagar, conducted further small scale excavation, at an open area of the Champaner-Pavagadh Archaeological Park, inside the citadel walls, making royal enclosure of 15<sup>th</sup> century, with an objective to reveal buried structures and occupational history of the site under reference.

Accordingly, a trial trench was laid out in the front portion of the centrally protected monument of Three Cells, in order to check whether any octagonal shaped structure is extending towards this monument or not. Consequently, the excavation revealed a lime plastered brick wall. Remains of two steps were found connected to the side wall. The

probe also exposed more walls and floors of structures, which are lime plastered and each one of these octagonal structures are surrounded by four pillar bases. All these structures are connected with each other with the help of brick walls.

Debris exposed within the excavated areas, comprise fragments of bricks, roof tiles and few architectural members, such as, pillar bases. Fifteen numbers of broken cylindrical measuring jars, all are of same shape and size (0.40m long), found lying on one of these structures. Besides, surface clearance carried out around the Maratha *Mahal* indicates that it was actually a large building complex.

The prominent pottery assemblage gleaned from the digging includes red ware, black ware and grey wares. A few potsherds were coated with green glaze. Surface of some sherds of grey ware vessels were treated with fine slip and the shoulder portion of the vessels were decorated with incised, geometrical and non-geometrical designs. Large numbers of porcelain sherds were also recovered from the octagonal structures.

1. This publication is referred to in the following pages by the year only.

Noteworthy antiquities are two copper coins, silver ring, a striking copper image of Lord Ganesha and few spearheads. Among the terracotta figurines, few fragments of animal figurines and one human figurine deserve mention.

**5. EXCAVATIONS AT KHIRSARA, DISTRICT KACHCHH**

In continuation of the previous year's (2010-11, pp. 23-28) work, Excavation Branch V, Vadodara, of the Survey, under the direction of Jitendra Nath, assisted by R.N.Kumaran, Bipin Chandra, N.B.Soni, J.B.Makwana, Partha Dhara, Rajesh S. Shambharkar, Bipin M.Rohit, D.P.Modi, H.R.Tadvi, K.P.Parmar, N.M.Raval, G.B.Varia, Ramraj Meena, Ms. Priyanka Randive, Hitesh Patel and Nirav Darji, resumed excavations at Khirsara, in order to study the architecture of the citadel, the gateways and other allied structures within.

Likewise, the excavation was taken up in the trenches AF 32, AF 33, AF 34, AF 35, AF 36, AF 37, AF 38, AF 39, AF 40, AG 33, AG 34 and AG 35 on the southern side of the fortification wall. It revealed a 10m wide citadel wall with periodical reinforcements. This fortification wall of nearly 90m on the southern side, acted as the outer fortification wall. In the early stage, well-dressed, square shaped sandstone was used to raise the wall, where mud mortar was applied as binding medium. In the next stage, the height of the wall was raised along with the width and merged with the main inner wall of the citadel. The space in-between the actual outer wall and the above-mentioned wall were filled with stones and soil, while the upper surface is plastered with mud-brick materials and probably used as a pathway. Otherwise, it

might be used to strengthen the whole citadel, which in-turn, acts as the bolster against the flash flood. In the later stages, this area was filled with mud brick materials, when the height of the wall was raised. Similarly, the inner core of the second wall and the inner wall of the citadel was filled with multi-coloured mud bricks and brick bats with thin mud mortar, as binding medium. The ratio conforms to the usual Harappan brick sizes.

The foundation of the fortification wall was raised by levelling the surface with mud brick materials and the strengthening wall was also raised like the former and was built of 'rough faced random coarse masonry'. The section in the deep trench (AG 34 / qdts 3 and 4) along the outer fortification wall reveals, flood deposit against the wall for nearly one meter, followed by mud filling and rammed mud brick materials in ramp, which was dug up to 3.85m from the Reduced Level.

The excavation in the trench AF 33/qdts 3 and 4, has also revealed the inner corner of the citadel on the south-western side, in which, it runs along the northsouth axis and turns towards the east. Then, it runs up to 70m and again turns towards the north, making the southeast corner (AF 39) with a flight of steps. The evidence shows the random additions of inferior quality sandstones with the multi-coloured mud bricks and brick bats filled inner core, without any alignments.

The fortification wall of the citadel, running in the northsouth direction on the east, has exposed corner of the outer wall of the citadel. Built of well dressed, polished angular sandstones in tapering position, this wall

bisects the outer general fortification wall. Nearly thirteen such stones were exposed and still continuing. It is worthy to mention here that such stones are used only in the corners and the remaining stones are of huge size, dressed to face in Quoins (corner) stressed masonry (Pl.2A). Top courses show the evidence of later additions and most probably rose during the late phase.

The steps (Pl. 2B), exposed in the trenches AE 39 and AF 39, provided to give access to 5 to 6m wide pathway on the eastern side and to have a look over the 'Ware House'. These steps coincide with the entrance, noticed in the index trench AE 39. The distance between the two is 4.10m and it leads to a 2m pathway with a huge door sill on the northern side. The length and the width of the steps are 2.75m x 0.38m x 0.25m, 2.78m x 0.30m x 0.25m, 2.80m x 0.30m x 0.25m and 2.75m x 0.26m x 0.25m. The section shows flood deposit and subsequent mud brick filling. Coeval with this, the early steps are buried inside the earth and new steps were provided on the top, with stones of various sizes, which betrays the finishing of steps of the early phase. Though, the alignment and length was maintained but the width and the height were not maintained. These steps measure 2.80m x 0.32m x 0.50m, 2.78m x 0.30m, x 0.15m, 2.80m x 0.20m x 0.28m and 2.80m x 0.40m x 0.20m. During the last phase, new steps are provided with reduced sizes. Only two steps of this phase have been survived measuring 2.32m x 0.60m x 0.20m and 2.30m x 0.40m x 0.18m.

Further excavations in the citadel area have exposed two huge complexes with interconnected rooms. These complexes are

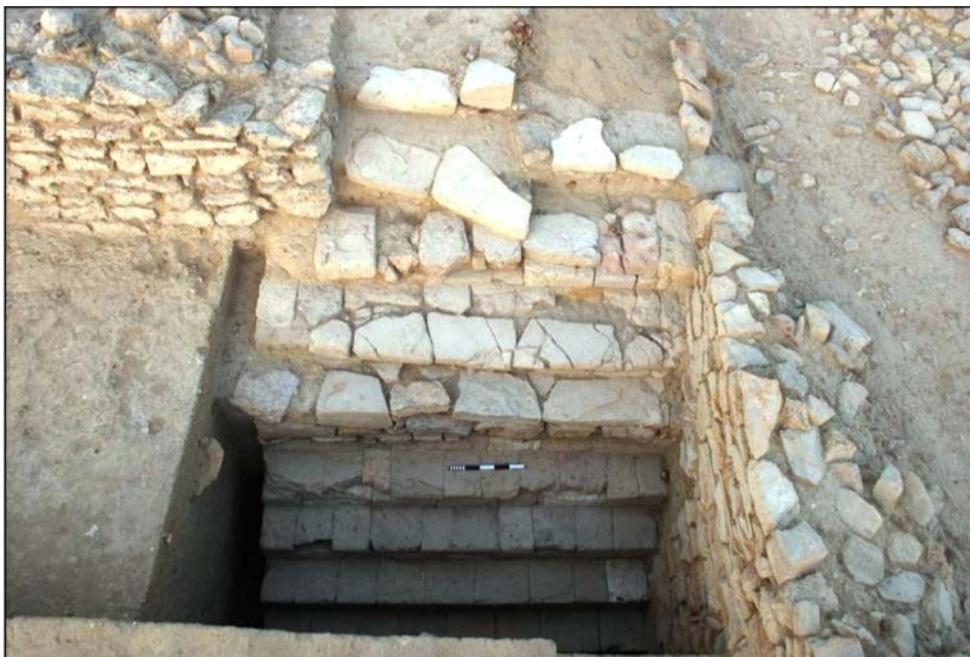
identified and numbered as Complex A and B. The digging operations in the trenches AC 37 (qdt 3), AC 38 (qds 2, 3 and 4), AC 39 (qds 3 and 4), AC 40 (qds 3 and 4), AD 38 (qds 1,2,3 and 4), AD 39 (qds 1,2,3 and 4), AD 40 (qds 1 and 2), AF 39 (qds 1,2 and 3) and AF 40 (qdt 3) have unfolded Complex A (Pl. 3A), while the excavations in AC 34 (qds 3 and 4), AC 35 (qds 3 and 4), AC 36 (qds 3 and 4), AC 37 (qds 1,2 and 4), AD 34 (qdt 2), AD 35 (qds 1,2 and 3), AD 36 (qds 1 and 2) and AD 37 (qds 1 and 2), situated western side of the citadel, have uncovered Complex B (Pl.3B). These complexes were more or less intact exposing interconnected rooms, steps, door-sills, off-sets, drains, hearths or *chullahs*, post holes and entrances.

The index trench AE 39 (qds 3 and 4), lay just near the complex A and the inner fortification wall has revealed evidence of closed entrances of the complex, during all the five stages, due to periodical floods.

A well, with an inner diameter of 3.40m was noticed at the heart of the citadel, covering the trenches AE 34 (qds 3 and 4), AE 35 (qdt 4), AD 34 (qdt 2) and AD 35 (qdt 1). Based on the evidence, it is assumed that the well was dug during the early phase and was continuously in use up to the last phase and was dug up to a depth of 5.65m, exposing 25 regular courses of well polished sandstone masonry, directly resting on the bed rock. A rectangular trough has been provided to the western side of the well. It measures 1.60m x 2.20m. A few rope marks were also observed on them. The section inside the well shows the evidence of flood deposits of nearly 1.10m thickness.



A



B

*Khirsara: A, southern fortification wall of the citadel and B, steps leading to the pathway.*



A



B

*Khirsara: A, Complex A, within the Citadel and B, Complex B, along with a well in the Citadel*

The remarkable ceramic assemblages are red ware, red slipped ware, coarse red ware, black ware, grey ware, buff ware, black and red ware, reserved slipped ware of various shades, black on red ware, mostly painted with geometric and naturalistic designs and few demonstrate graffiti marks.

The recovered Harappan artifacts include terracotta beads, bangles, dice, toy carts, wheels, animal figurines, beads of various semiprecious stones and steatite, shell objects like bangles, beads and inlays, copper chisels, bangles, ingots, slags, nails and beads, stone objects like quern, pestles, mortar, drill bits, chert blades, microlithic tools, sling balls, weights of various shapes and sizes and so on and so forth.

### 6. EXCAVATION AT KOTADA BHADLI, DISTRICT KACHCHH

The Gujarat State Department of Archaeology, in collaboration with the Department of Archaeology, Deccan College, Pune, under the directions of Y.S. Rawat and Prabodh Shirvalkar, assisted by Bharat Dighe, Devadatta Phule, Krishna Malap, S. Udaya Kumar, Kalyan Chakraborty, Sutapa Lahiri, Tejal Ruikar and Jagriti Hazra, continued excavations at Kotada-Bhadli (23°20'; 69°25'), Taluk Nakhatrana, and confirmed Late Mature Harappan settlement (**Fig.1**) at the site. The site was first discovered by J.P. Joshi, of the Survey in 1965-66 (1965-66, pp. 14-16). A unique trait of this site is that it does not represent a mound in the classic sense; rather it is a "flat" terrain, surrounded by fortification walls and pottery fragments are exposed on the surface in minimal numbers.

Situated on a confluence zone of two unnamed rivers (emptied in the Banni Plains of Rann of Kachchh), one on the western or left side and the other on the eastern or right side, the site approximately measures about 3.11 acres area and is completely intact. In the first season, the excavations divulged a section of Residential Complex and Fortification Wall of the very site, but this year's excavation almost revealed the same.

The Residential Complex (**Pl.4**), partially exposed in the trenches XC2, XC3, XC4, XD2, XD3 and XD4, is mainly concentrated in the central part of the site. This complex has unfolded a number of walls and rooms within, figured as nos. 1 to 11 and 1 to 10 respectively (**Fig.2**).

The exposed central main wall or first east-west oriented wall of this complex is having a total length of 11.16m and the surviving height of 0.54m which was exposed in the Trench XC4. There were total 5 courses of sandstones. The big and medium sized sandstone blocks were used for the construction of the wall and sandy material has been used as a filling between two stones. The wall was resting directly on the whitish coarse river sand. There was no foundation or foundation pit for the wall. The inner face of the same was comparatively well dressed, though the stones used were of various shapes. The top of the wall had three flat courses of sandstones. However, it was oriented east-west and had bulges at some places, making the wall a little bit disoriented. The thickness varies from 0.65 to 0.71m. This wall formed the southern closing of rooms 2, 4 and 6 and the northern closing of rooms 1, 3 and 5.

The excavations have also unfolded second eastwest running wall, going parallel to the first eastwest orientated wall, exposed in the trenches XD2, XD3 and XD4, which was attached to the main western closing wall or north-south wall. After the joining point, the main western wall shifted 0.84m inside, making combined area square in shape. The total length of the wall exposed was 8.90m across the trenches XD2, XD3 and XD4. The width of the wall in trenches XD2 and XD3 remained 0.70m. The wall entered into the section or baulk of trenches XC3 and XD3 and after crossing trench XD3, only 0.49m width was visible as it entered into the baulk of trenches XC4 and XD4.

The height of the wall in trenches XD2 and XD3 was 0.42m, having four courses of sandstones. This wall created the southern closing of rooms 1, 3 and 5 and the northern closing of rooms 7 and 8.

At a distance of 3.75m from the second east-west running wall, the third east-west running wall originated and was exposed in the trench XD4. This wall was attached to the wall no.8 and running parallel to the second east-west oriented wall. The total exposed length of the wall is 4.30m and the exposed height is 0.42m, having four courses of sandstones. The width of the wall varies from 0.52m to 0.59m, having three flat stones on the top. The gap between second east-west wall and third east-west wall is 3.10m. This wall forms the southern closing of room 9 and the northern closing of room 10.

Another wall marked as the main western wall or northsouth wall was located at a distance of 11.16m from eastern section of trench XC4. It

forms the western closing wall of rooms 5 and 6. The wall was exposed in the trenches XC2 and XD2. The exposed total length remained 4.60m, till it entered into the southern section of trench XC2. From the northern section of trench XC2, till 2.70m distance, where it connects with the main central wall or first eastwest running wall, the wall was in alignment and running parallel to the wall no. 6. The height of the wall measures about 0.35m, having three courses of sandstones and the width of the wall, till it joins, measures 0.86m. After crossing the main central wall or first east-west wall, the width and alignment of the wall changed. The width becomes 0.75m, due to which in room no. 5, there was a gap between platform and the wall, whereas in room no. 6, the platform was attached to the wall. The height of the wall reduces to 0.25m, with three courses of sandstones. In trench XD2, the length of the wall remained 1.93m showing 0.84m width. At a distance of 1.22m from the northern section of trench XD2, the wall joins with the second east-west running wall. After joining, the main western closing wall changed its direction and shifted 0.84m inside, making a square at the joining. The wall forms the western closing of rooms 5, 6 and 7.

The above-mentioned walls formed a number of living rooms and small walls. Room 1, exposed in the corner of trench XC4, was located on the southern side of the central main wall or first eastwest running wall. The wall 1 runs here north-south. The small portion of the wall was exposed in the eastern section, facing west, in trench XC4. After that, it went inside the eastern section completely. The total length of the wall was 3.67m with four courses of sandstone

blocks. The exposed height and width measure about 0.43m x 0.43m; the inner face of the wall is quite well dressed. The visible width of the wall measures 0.43m. At 2.71m from eastern section, wall 2 originated. It runs in north-south direction and closes room 1 on the western side. The exposed length of the wall measures 3.60 m. The height remained 0.65m with five courses of sandstones. The width of the wall varies from 0.57m to 0.60m with three flat courses on the top. This wall entered into the southern section of the trench and in the baulk met with the second eastwest running wall. This second eastwest running wall is the closing wall on the southern side of the room whereas the central main wall or first eastwest running wall forms the northern closing of the room.

Room 2 is located on the northern side of the central main wall or first eastwest running wall. Wall 3 runs in northsouth direction with a measurement of about 0.43m x 0.79m x 0.13m (H) and forms the eastern closing wall of room 2. At 3.72m from the eastern section of XC4, wall 4 begins in northsouth direction. This is the western closing wall of room 2. The total length and width exposed in trench XC4 measures 1.05m x 0.69m. Only two courses of the wall have been exposed up to the height of 0.29m.

Room 3 is located on the southern side of the central main wall or first eastwest running wall. The wall 2 or the western closing wall of room 1 remained the eastern closing wall of the room 3. At 6.05m distance from eastern section of XC4, the wall 5 originates in northsouth direction in trench XC3. The distance between wall 2 and wall 5 is 2.75m.

The total length of the wall 5 is 3.05m. The total height exposed is 0.41m, having four courses of sandstones. The width of the wall is 0.64m with three flat stones on the top. This wall is the western closing of the room. The wall enters into the southern section of the trench XC3 and in the baulk meets with second eastwest running wall. This second east-west running wall forms the southern closing of the room.

Room 4 is located on the northern side of the central main wall or first east-west running wall. The wall 4 or the eastern closing wall of the room 2 is the eastern closing of room 4. At 7.65m distance from the eastern section of trench XC4, the wall 6 starts in the north-south direction in trench XC3. This is the western closing wall of room 4. The length of the wall is 0.95m. The height of the wall exposed in trench XC3 is 0.47m with four courses of stones. The width varies from 0.59 to 0.61m, with three flat stones on the top. The face of the wall is quite well dressed. The central main wall or first eastwest running wall forms the southern closing of the room. Digging between the room 4 and 6 has exposed Inter Communicating Door within the complex.

The wall 6 is only 0.98m in length and then a big flat single stone is kept which measures 0.40m in size and has entered into the northern section of trench XC3. This gap with the flat stone is identified as inter communicating door between room 4 and 6.

Room 5 is located on the southern side of main central wall or first eastwest running

wall. This wall forms the northern closing of the room. The wall 5 or western closing wall of room 3 is the eastern closing wall of room 5. At a distance of 4.70m, from wall 5, the main western closing wall or northsouth wall forms the western closing of the room. Within the room 5, near the western closing main wall, a sandstone platform has been exposed, measuring about 1.50mx 0.63mx 0.12m which is attached to the central main wall or first east-west running wall. Near the platform, concentration of pottery was quite high. The second eastwest running wall forms the southern closing of the room.

Room 6 is located on the northern side of the main central wall or first east-west running wall. The wall 6 or the western closing wall of room 4 is the eastern closing wall of room 6. At distance of 2.90m from wall 6, the main western closing wall or northsouth wall 7 closes the room 6. This room is the largest one in the complex so far excavated. The platform which is there in the room 5, actually created in the room 6. Two courses of sandstones were exposed making the height of the platform 0.24m. The width is 0.61m having three flat stones on the top. The platform joins with the main central wall or first east-west running wall on the south. From this wall on the northern side it entered into room 5. In front of the platform; close to main central wall or first eastwest running wall, a big flat stone is found, which must have been used for sitting purpose. At the corner of wall 6 and main central wall or first eastwest running wall, a storage jar was found embedded in the ground. Even from the room 5, large amount of pottery and small complete pots were unearthed. The evidences indicate that these

rooms most probably have been used as storage rooms, perhaps as granaries.

Room 7 is located on the southern side of second eastwest running wall. The main western closing wall remained the western closing of the room. From the junction of western closing wall and second eastwest wall, at a distance of 5.65m, wall 8 originates in the northsouth direction exposed in the trenches XD3 and XD4. The wall is attached to the second eastwest running wall and is in straight line of wall 5, parallel to main western closing wall or wall 7. The distance between wall 7 and 8 is 2.80m. The total length of the wall exposed is 4.30m. The width of the wall varies from 0.64 to 0.70m. The total height exposed is 0.42m having three courses of sandstones. The wall forms the eastern closing of the room.

The platform which has been found in rooms 5 and 6 continues in room 7. The total length of the platform exposed in trench XD3 or in room 7 is 3.05m. The exposed height measures 0.19m, having two courses of sandstone. The width of the platform is 0.58m. Further, the main western closing wall stops at a distance of 1.93m from the northern section of trench XD2 and XD3. The platform continues to run in alignment of the western closing wall and the same platform gets converted into the main entrance of the complex on the western side. The total exposed width of the entrance is 1.68m. The entrance is not completely exposed; the portion of the entrance is in the unexcavated area. The room 8 is located on the southern side of the second eastwest running wall. This wall forms the northern closing of the room.

The wall 8 or eastern closing wall of room 8 is the western closing of the room. The third eastwest running wall forms the southern closing of the room. Within the room a big storage jar has been found embedded in the ground.

Room 9 is located on the southern side of the third eastwest running wall. The third eastwest running wall forms the northern closing of the room. The wall 8 or eastern closing wall of the room 8 is the western closing wall of the room. On the western side, outside the structural complex, a small construction has been found in trenches XD2 and XE2. The wall 9 originates in trench XE2 in northsouth direction. The total length exposed in the trench is 2.10m. The height is 0.3m, having three courses of sandstones. The width of the wall measures 0.56m. The wall enters into the baulk area between XD2 and XE2 and penetrates into trench XD2. The total length of the wall exposed in the trench XD2 is 2.44m and the height is 0.9m having two courses of sandstones. The width of the wall varies from 0.52 to 0.57m. The wall stops abruptly at a distance of 2.47m from the southern section of the trench. The distance between entrance and wall 9 is 1.80m. At 2.10m distance from the northern section of the trench XE2 another single coursed wall, numbered as 11, originates, running eastwest. The wall joins wall 9. The total length exposed in the trench is 2.00m. The height of the wall is 0.20m having single course of sandstone. The width of the wall varies from 0.41 to 0.75m. The wall 11 is visible in the western and southern section of trench XD2. The wall runs eastwest parallel to the wall 10. The total length exposed is 1.26m. The exposed height of the

wall is 0.29m having three courses of sandstones. The width of the wall varies from 0.23 to 0.29m. The wall stops abruptly and does not join with the wall 9.

The excavation was continued in the rampart or fortification wall in the trenches XL2, XL3, XM2, XM3, XN2, XN3, XO2 and XO3 and exposed both sides of the wall. Out of all these trenches, XO2 and XO3 were partly opened. Only NW and NE quadrants of both the trenches were opened, where as in XN2, as it is a part of bastion, only small digging was done. These trenches were put in order to find out the inner face of the fortification wall and the bastion. The major excavation was carried out in trenches XL2, XM2, XM3 and XN3. The inner fortification (Pl.5) wall was exposed in trenches XL2 and XM2.

In XM2 only the upper portion of the wall was traced, whereas in XL2, the excavations were carried out till the foundation level of the wall. The total length of the wall exposed is 10.15m in trenches XL2 and XL3. The trench XL2 was excavated up to foundation levels of the fortification wall. At 7.65m from western section of trench XL2, the wall slopes down. The total height of the wall is 2.11m. There are total fourteen courses of sandstones. In the construction of wall various types of sandstones have been used. Some of these are very hard and compact, whereas some are soft and fragile. Most of the stones used in the construction are big, flat squarish or longish in shape, mostly arranged horizontally in the construction. In between big horizontal stones, some small vertical stones are kept, but these are less in numbers. The size of the stone varies, they are not uniform, but the open face

of the wall has quite well dressed stones. The sizes of some of the stones in the last courses are 0.62m × 0.19m, 0.54m × 0.18m, 0.38m × 0.20m and 0.25m × 0.16m. The big stones are kept at the base level, few found in the upper courses. Some of the stones measure 0.46m × 0.21m, 0.47m × 0.18m, 0.38m × 0.12m and 0.33m × 0.4m. The quantity of the smaller stones increases in the constructions, particularly in the upper courses and few stones measure 0.26m × 0.10m, 0.14m × 0.8m, 0.16m × 0.8m and 0.18m × 0.6m. Again, towards the top, big stones are arranged in the construction, measuring about 0.49m × 0.15m, 0.35m × 0.14m and 0.30m × 0.20m. The sizes and shapes of the vertically placed stones show varied measurements, such as, 0.19m × 0.7m, 0.12m × 0.6m, 0.19m × 0.10m and 0.9m × 0.7m. At the base or in the foundation level, hard river sand has been put. It is whitish-reddish in colour and is very compact in nature. The thickness of this foundation soil varies from place to place. The most important feature of this soil is that it does not extend into the trench, only found below the fortification wall. In trench XL3 inner face of the fortification was exposed, but once reaching the dump i.e. layer 3 the excavation was stopped. In this trench, the total height exposed is 1.45m, having eight courses of stones. The top of the inner face was cleaned to check the extension or thickness of the wall. While cleaning, another small wall was found joining to inner face on the back side. It is traceable only to a certain length and then it merges with the buttress wall. This wall is 0.47m inside from the outer edge of the inner face. Total length exposed is 4.30m and the height is 0.32m, maintaining four courses of flat stones. Further, on the back side in trench XM3, the

edge of the wall is not found. Wall 1 or the topmost wall was exposed in the trenches XM2 and XM3. The exposed total length is 10m. In the trench XM2, the excavations were carried out on the inner face of this wall in an area between the wall 1 and 2, which revealed that the inner face has only four courses of sandstones and then the area between two walls, is filled with stone debris.

In order to find out the nature of debris and constructional style, excavations were continued, surprisingly, apart from debris no other construction activity was noticed. The outer face of this wall was opened in XM2. The total height exposed is 1.20m, having eleven courses of sandstones. This shows that the outer face of the wall is constructed accurately in typical Harappan style and the wall started becoming broader towards the base.

This structural method was noticed completely in the trench XM3. In this trench, the outer face of the topmost wall or wall 1 was exposed. The total height remained 2.37m, containing fifteen courses of sandstones. Stones of various sizes and shapes have been used in the wall. Mostly the big stones have been used for the construction. The sizes of few stones are 0.35m × 0.15m, 0.31m × 0.19m, 0.29m × 0.25m, 0.30m × 0.22m, 0.44m × 0.23m, 0.35m × 0.27m, 0.41m × 0.27m, 0.37m × 0.5m, 0.59m × 0.18m. The small stones were kept in between the big stones. The sizes of which are 0.3m × 0.6m, 0.11m × 0.11m, 0.8m × 0.7m, 0.11m × 0.8m, 0.10m × 0.8m, 0.9m × 0.9m. At 8.70m, from the western starting point of wall, in trenches XM2 and XM3, there, a little bit diversion on the inner side was noticed, probably due to shifting or tilting of the same.

This tilting appears only in the upper nine courses near eastern section of XM3. Then again from 10th course the wall gets its original level. In the excavation, against this wall in the upper levels, the fallen debris of the wall was found. Below the debris, the ashy material came across. This material is similar to the layer 3 of the inner face of the fortification wall which shows that the dumping activity was carried out at the same time, on the inner as well as on the outer side of the fortification wall. This ashy material at some places has yellow silt in patches. This silt is very hard and compact that has not been found in any other constructional activity or dump.

A part of bastion **(Pl.6)** was exposed in the trenches XM3, XN2 and XN3. At 7.50m, from the western section of the trench XM2, the bastion originates from the top most wall or wall 1. The joining of the bastion with the wall 1 is at 90° or right angle. The height of the bastion exposed up to eleven courses of sandstone, is 2.40m and still it is continuing. Various types and sizes of stones have been used in the constructions. Some of the stones are completely in weathered state. The face of the bastion is well dressed. At some places, yellow silt was used as packing material, but most of the times fine brownish sand is used. At a distance of 3.57m from its starting point, the bastion tilts little inside, making it disoriented. But again it regains its 90° angle and comes in the proper alignment. At 5.70m from the starting point of bastion, it turns towards western side and exposed in trenches XN3 and XN2. At the turning point, big square sandstone block is kept, which gives support to the wall. The total breadth of the

wall exposed after its turning is 8.90m. The height exposed is 1.35m, having seven courses of big stones, kept horizontally. At a distance of 5.40m from the turning point, the wall budes out and then again moves inside in the alignment of the wall. On top of the bastion probably big platform was constructed, which is completely destroyed due to which top of the bastion contained only debris of stone and sand. Most probably as seen in the case of top most wall or wall 1 of the fortification wall where Harappans filled the in-between area with the stone debris, here in bastion also, the inhabitants packed stone debris inside the platform, as a filling material.

This Harappan Community manufactured basic wares like red ware, grey ware, pink ware and kaolinite ware, among which red and grey wares have been further sub-divided on the basis of treatment and paintings and classified as varieties. Hence, the ceramic assemblage of Kotada Bhadli has been divided into wares and varieties. Red Ware is divisible into black-on-red variety or painted red variety, red slipped unpainted variety and red untreated variety, whereas the grey wares are dividable into grey variety and red slipped grey variety.

The black-on-red variety is dominated by fine fabric, though; medium to fine fabric is also in hand. It is well fired, fashioned on fast-wheel, following lutting technique and treated with brownish red colour. The slip is applied on exterior as well as interior of the open vessels. The painted motifs done in black or brown colour on the pottery are geometrical, such as, wavy vertical lines in panel, jail pattern, horizontal bands etc. The main shapes in this

category are globular pots, bowls, basins (Fig.3), dish, dish-on-stand and bases (Fig.4). The red slipped unpainted variety varies from fine to coarse fabric. A large number of potteries in this category are made on fast wheel and in some cases the lutting marks are there which confirms that slab or coiled technique was used for the production. Most of the pottery is well fired, except few ill fired globular pots. The pottery is treated with dull red colour. The slip is applied on the exterior in case of closed vessels, such as globular pots and storage vessels. The main shapes in this variety are globular pots, storage jars and bases (Fig.5).

The red untreated variety has coarse and gritty fabric. It is ill-fired and manufactured by using both hand-made and fast wheel technique. The firing of this variety is uneven as the red and black colour blotches are visible on the body of the pottery. The main shapes in this variety are globular pots, bowls and bases (Fig.6). The grey variety ware has been found in less quantity at the site. It has fine fabric and is smoky grey in section. It is manufactured on the fast wheel and is treated with the red color slip on the exterior. The main shapes are globular pots and bases (Fig.7). Treatment wise, red slipped grey variety is same as of Grey variety the only difference is that it has red colour slip applied on the body. The main shapes identified in this variety are globular pots and dishes (Fig.8).

The pink ware has fine to medium fine fabric, made on fast wheel. The overall colour of the ware is pink and sometimes it is treated with red slip. Over the pink surface or red slip surface, the geometrical paintings are done in black colour, such as, horizontal bands on the

exterior and circular bands on the interior. The dominant shape in the category is globular pots (Fig.9).

The kaolinite ware has fine fabric and well fired, also made on fast-wheel technique. The colour of the fabric varies from white to pink. It is treated with the red colour slip. Over the slip the paintings are done in black colour such as, horizontal bands and vertical bands. The dominant shape in this category is globular pot (Fig.10).

The antiquities obtained from the excavations include perforated and non-perforated pottery discs, hopscotch (Pl.7A), shell and terracotta net-sinkers, terracotta inlay, beads (Pl.7B), grinding and hammer stones, shell bangles, microliths and stone weights (Pl.7C). Besides, bone tools were also found from the site.

The most important discovery is a large number of broken crucibles. This evidence proves that copper smelting activity was carried out at the site. Though the smelting area has not yet been found. Besides, a unique object of copper (Pl.7D) has been discovered. It is a 5.5cm copper rod, having a golden tip. The tip is in the form of foiling on the copper rod. The use of this copper rod is still a question mark.

#### 7. EXPLORATION AT SOMNATH, DISTRICT JUNAGAD

Explorations were undertaken at Somnath by Arati Deshpande-Mukherjee, Sushama Deo, Soumi Sengupta from the Department of Archaeology, Deccan College, Pune, and Savita Ghate from Dr.Ambedkar College, Pune, which recovered pottery, faunal



A



B

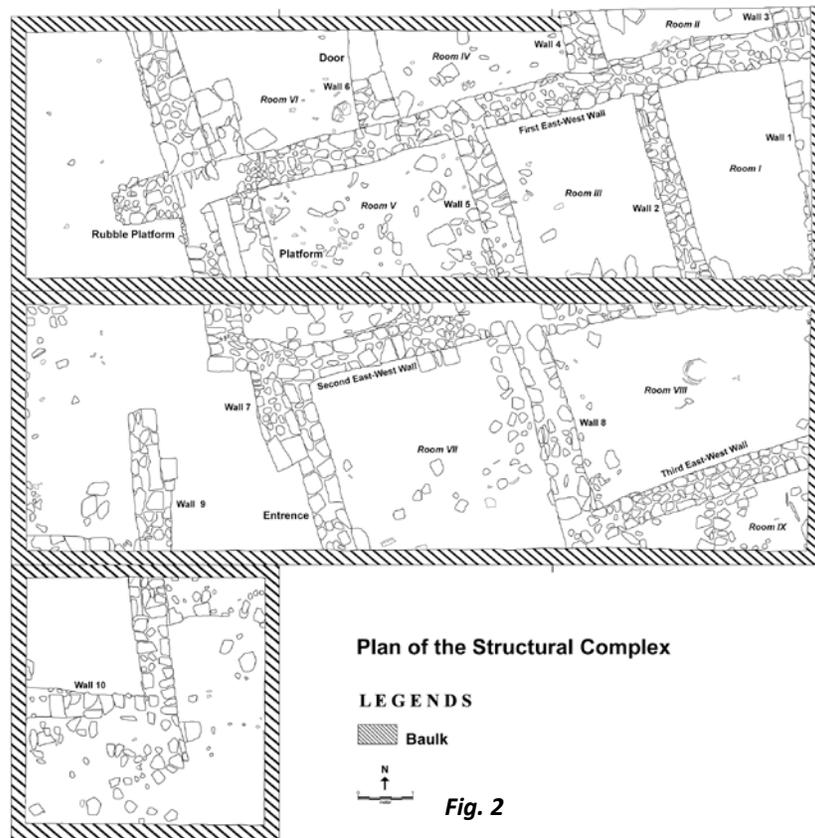


C

*Kotada Bhadli: view of residential complex from, A, west, B, east and C, south*



**Fig. 1**



**Fig. 2**

**Kotada Bhadi: 1, location of the site and 2, plan of the structural complex**



*Kotada Bhadli: inner fortification wall*



A



B

*Kotada Bhadli: view of bastion from, A, east and B, south*

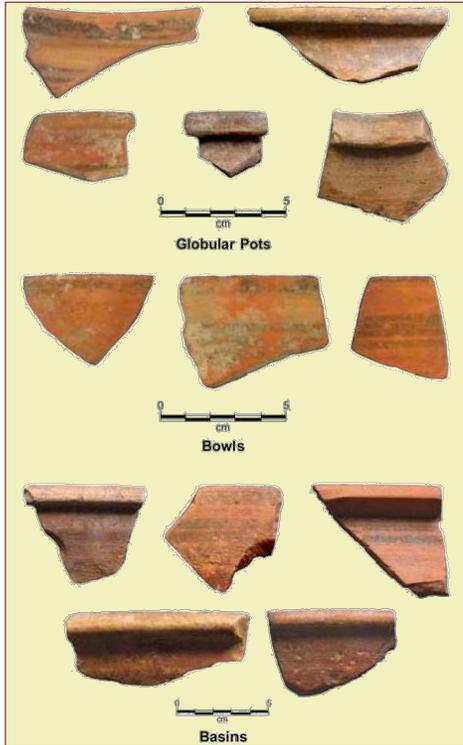


Fig. 3

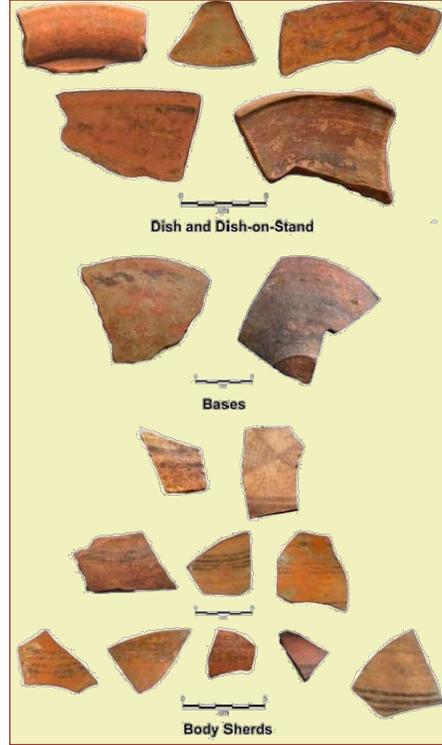


Fig. 4

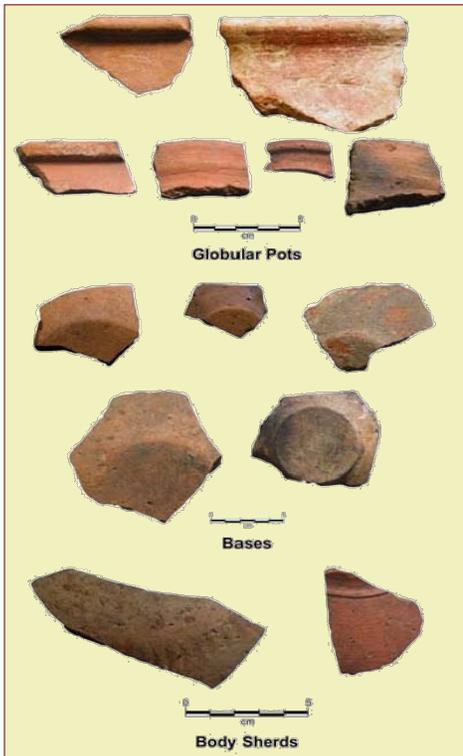


Fig. 5

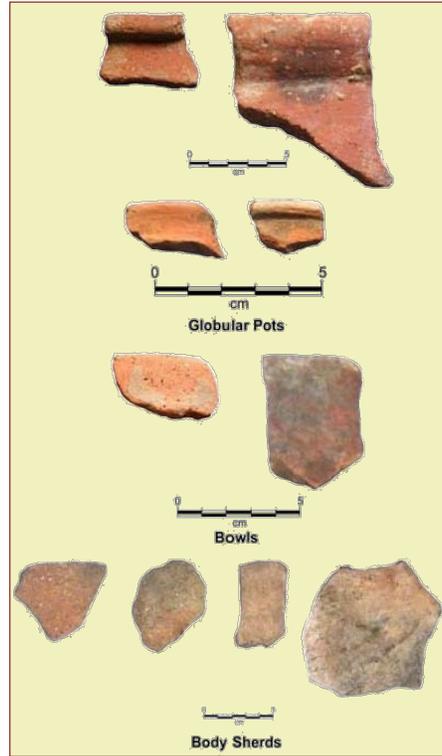


Fig. 6

Kotada Bhadli: 3 and 4, black-on-red varieties, 5, red slipped unpainted varieties, 6, red untreated varieties

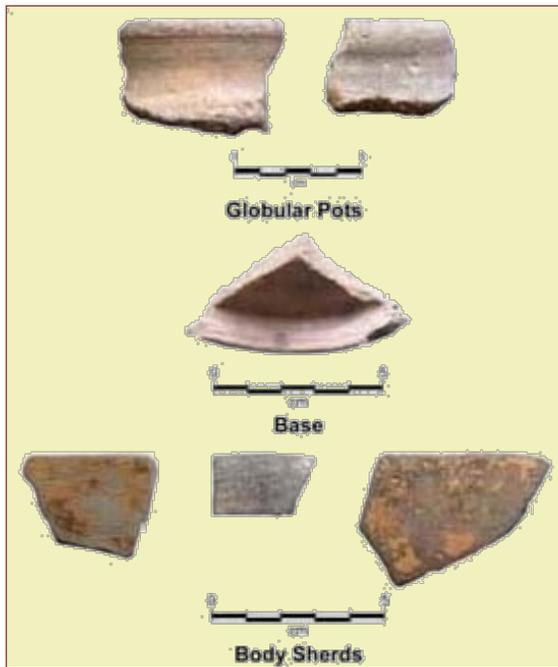


Fig. 7

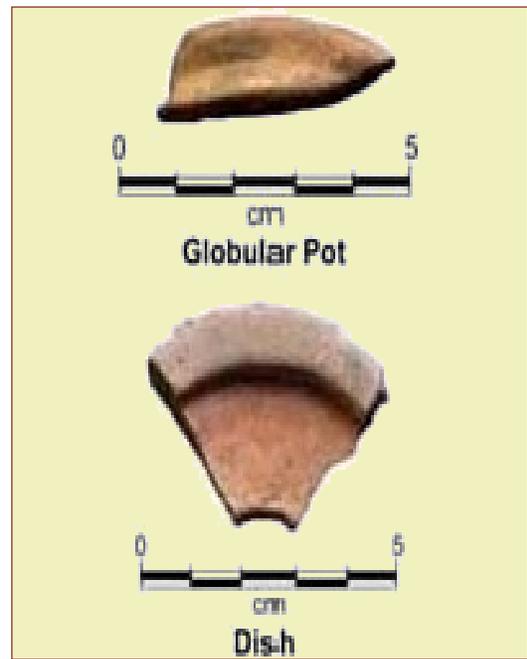


Fig. 8



Fig. 9

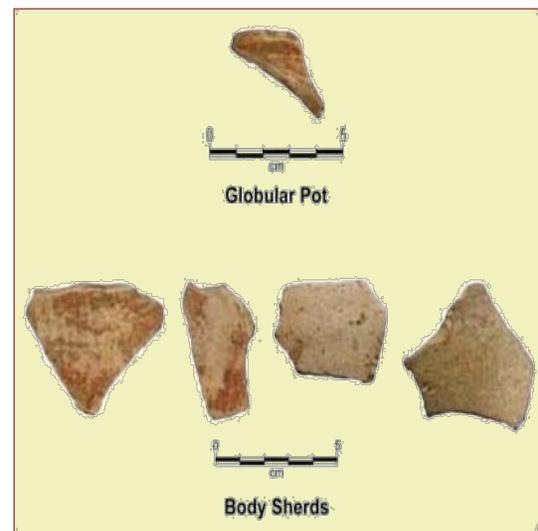
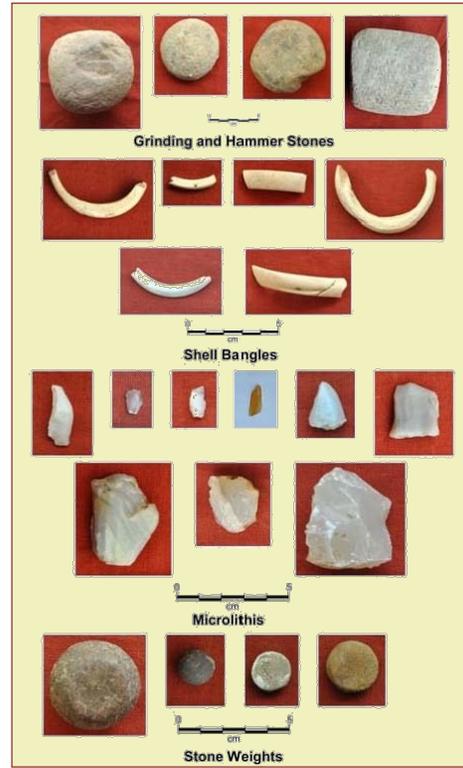


Fig. 10

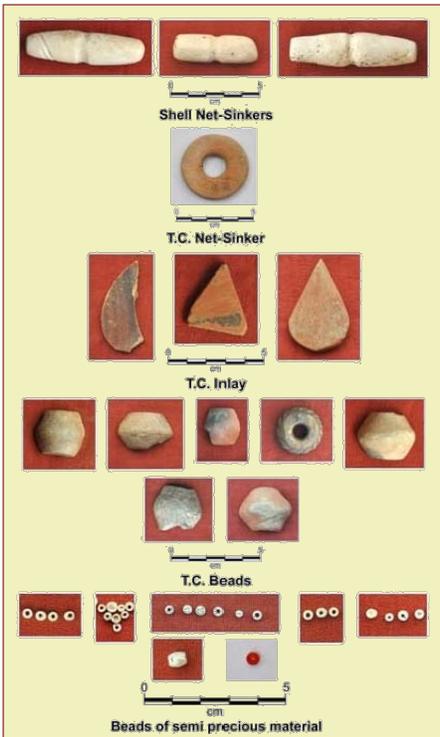
*Kotada Bhadli: 7, grey varieties, 8, red slipped grey varieties, 9, pink ware and 10, kaolinite ware*



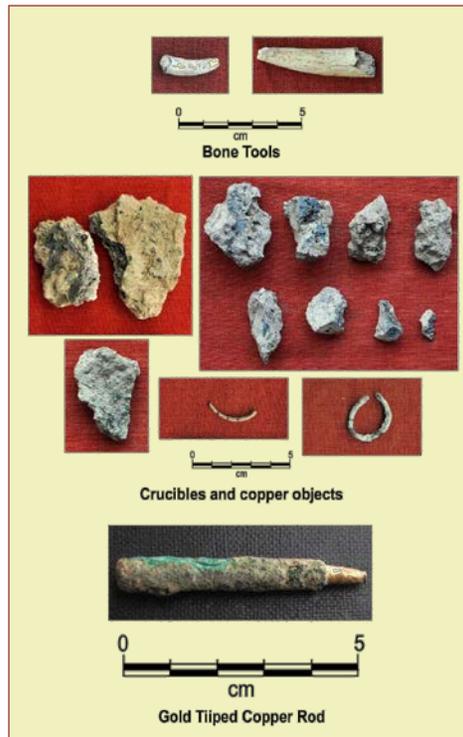
A



B



C



D

Kotada Bhadli: antiquities

remains, soil and sand samples, shells etc from the exposed section of a sand dune deposit on Somnath beach, close to the Somnath Temple.

In addition, investigations were carried out in and around the Prabhas Patan town, particularly at the mouth of River Hiran. Here, dead oyster shells were observed. A circular stone net sinker was found in the sand of the older dune. On the road to the Triveni *Sangam*, close to the Nav Durga Temple, digging of a ditch for laying pipe line has yielded pottery and few animal bones. The pottery closely resembles with the remains found in the dune section of Somnath beach. A broken terracotta figurine of a horse rider was encountered. Both the head of the rider and horse are missing.

To the south-east of Somnath, behind the Somnath Trust Guest House and parking area, huge dumps of soil are visible. On close examination these were found to contain pottery, bones and a large columella of *Turbinella pyrum*. These appear to have been brought from somewhere and dumped in the vacant land.

Further close to this area, small mounds rising approximately to a height of 3m to 4.5m are located, surrounded by broken wall like structures, made by using the bedrock miliolite limestone.

A surface survey on these mounds revealed small fragments of pottery, shell bangles and some parts of *Turbinella pyrum* shells such as apex, columella etc.

## HARYANA

### 8. EXPLORATION AT RAKHIGARHI, DISTRICT HISSAR

In order to establishing a positive working relationship with the people of Rakhigarhi, creating an extensive and detailed map of the site, conducting systematic surface collections and a subsurface survey by using Ground-Penetrating Radar (GPR), Electrical Resistivity and also to assessing the excavated and unexcavated areas of the site, Vasant Shinde of the Deccan College, Pune, assisted by Adam Greens, Narender Parmar, and a team of research scholars had undertaken exploratory work under 'Rakhigarhi Project' during the period under review.

Rakhigarhi is considered to be one of the largest urban centres belonged to the Harappan Period and perhaps remained the first early state society in South Asia. It is located in the centre of the Ghaggar-Hakra River Basin, now in the Narnaund Tehsil of Haryana. Previously, limited excavations were conducted by the Survey.

It has been observed during current explorations that the people of Rakhigarhi reside at the site year round, potentially providing protection for sensitive exposed materials as well as a point of contact for interested visitors who arrive there during field seasons. Keeping this view in mind, the residents of the village made understood the importance of the site in respect of South Asian history and approaching development of their place. Along side, the work of gathering

data on the spatial attributes of the site has also been done.

This includes the creation of a Digital Elevation Model (DEM) that could be used to understand the precise topography of the site and the creation of a plan of the modern structures that now cover the site. By using the Total Station (TopCom7500), three-dimensional coordinates were recorded in relation to a site benchmark located at the top of RGR-3, close to a modern *Dargah*. All the dimensions taken from the Total Station were measured from this point.

The DEM reconstructs the topography encountered in the field; however, the areas where it was impossible or impractical to collect readings appear somewhat distorted. As such, it is necessary to include a layer of the modern buildings that cover the site. These buildings were added to the site GIS using satellite imagery provided by the Global Heritage Fund, in combination with measurements of building corners taken in the field.

The preliminary results presented here are highlighting both the vertical extent of the core of the site and the relationship between the site and the modern occupation. All the features identified by previous excavations in the core area of the site are present in the DEM. There are clearly five distinct raised areas (RGR 1-5), three of which are fairly unobstructed by the modern village (RGR 1-3). The two large areas are beneath the village (RGR 4 and 5). RGR 4 is the most obstructed by the modern village, though there are still large areas that are

relatively unobstructed by modern village (Fig.11).

The total size of the core area of the site, which includes RGR 1 to 5 is 60 hectares. It became clear after the completion of the DEM that the raised areas that were previously identified as mounds are not necessarily discrete topographic features sharing the same history of site formation. In particular, it appears that RGR 2 and 3 may have been connected throughout most of their formation period, having been cut only sometime within the past 100 years to provide a pond for water buffalo. Additionally, it is clear that RGR 2, 3, and 4 have continuous boundaries on their east and west flanks, which probably indicates that they were part of the same period of settlement and development. Further archaeological operations were carried out at Locality 1 (RGR 2, 3), Locality 2 (RGR 1), and Locality 3 (RGR 5).

Another important result of the mapping efforts is the true size and character of Rakhigarhi, which suggests that it extends at least 2.5 km away from the core area, covered by approximately 4 m of alluvial sediments. This figure is tentative and subject to change till analysis of well sediments is completed. Thus, the work makes it clear that at its height Rakhigarhi was an urban centre on the same scale as Harappa or Mohenjo-Daro in Pakistan. The size of Locality 2 is comparable to Mound AB at Harappa. While much of Rakhigarhi may lie beneath the modern village, it is clear that during the Third Millennium BC, the site developed along the same parameters and on the same scale as the large Harappan centres in Pakistan.

Further investigations at the areas of Locality 1-3 indicate that they were not heavily obstructed by modern occupation were divided into 5x5m squares. Five percent (5%) of these squares were randomly selected for surface collection. This methodology was developed based on the ones applied by the Beas Regional Survey Project in Pakistan. All the artifacts in each of the selected squares were collected, counted, and then entered into site database.

One example is as follows: majority of non-pottery artifacts are clustered in Locality 1, RGR 2 (Fig.12) highlights a concentration of carnelian on the northwest slope of the mound (Fig.13).

This pattern indicates that there was probably carnelian working activity on the northwest slope of RGR 2 (Fig.14). Many other artifact-types were clustered in other parts of RGR 2 as well, including copper, faience, and shell. This may indicate that RGR 2 was a centre of production during the Harappan Period, or at the very least that there were concentrations of these artifacts just below the surface of the mound.

The artifact- distributions have not yet been fully analyzed, but systematic collection of artifacts from the exposed surface of the mound clearly sheds light into many aspects of Rakhigarhi's site formation.

The last phase of this year's project was directed towards the collection of subsurface data from areas of the site that were exposed and areas that were covered by the modern village. To collect these data, a team of experts from Pune (Pune's Center Water and Power

Research Station (CWPS), Government of India) created digital profiles of subsurface features by using Ground-Penetrating Radar, Electrical Resistivity, and Seismic Techniques. Over 60 profiles, varying in length from 5 meters to 50 meters, were collected.

These surveys were non-destructive and were collected in every major area of the site. GPR was used to assess every bit of the mound, and resistivity profiles were collected on RGR 1-3. The results from these surveys are still being processed, but the team's initial impression was that prominent archaeological features, such as, mud and baked brick walls and previous excavations, were clear in the profiles produced on RGR 1 and 2. Additionally, a number of anomalies were identified beneath the village on RGR 4 which are yet to be analyzed.

Therefore; the effort of this season has established the groundwork for future investigations of the site.

## JHARKHAND

### 9. EXPLORATIONS IN DISTRICTS PALAMAU AND DEOGARH

A team of the Ranchi Circle of the Survey, under the guidance of N.G. Nikoshey, assisted by Abdul Arif and K.K. Jha carried out exploration in the Districts of Palamau and Deogarh and the following sites of archaeological importance with their cultural assemblages were brought to light:

The site **Kabra-kala** (24° 21'82"; 83° 54'14"), situated on the confluence of the Rivers Son and Koel, at a distance of about 251 km north

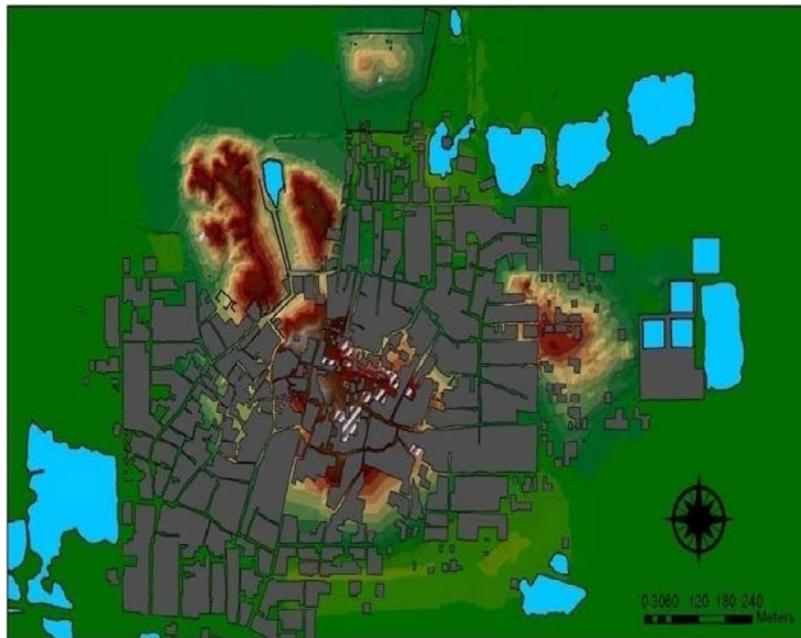


Fig 11

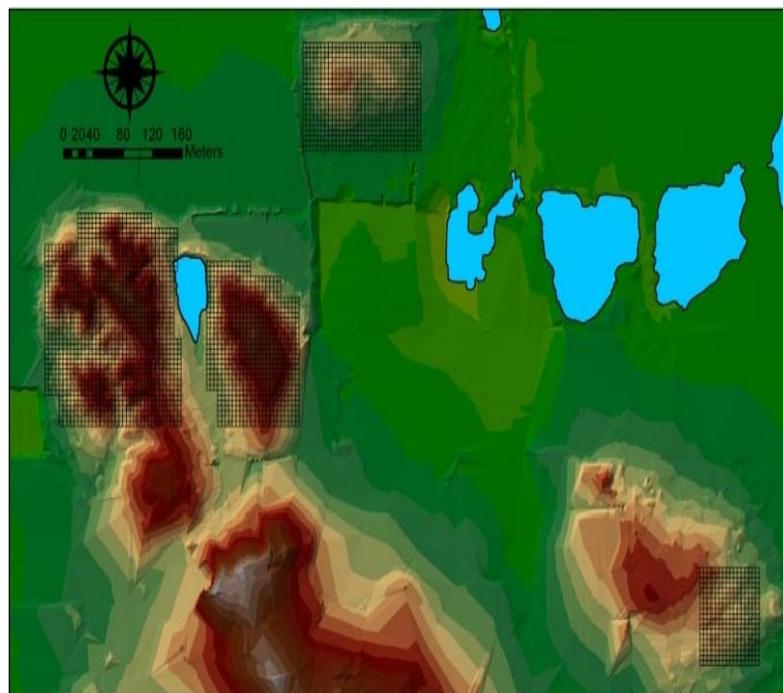


Fig. 12

*Rakhigarhii: 11, DEM and site plan, four distinct raised areas and 12, gridded area for surface collection*

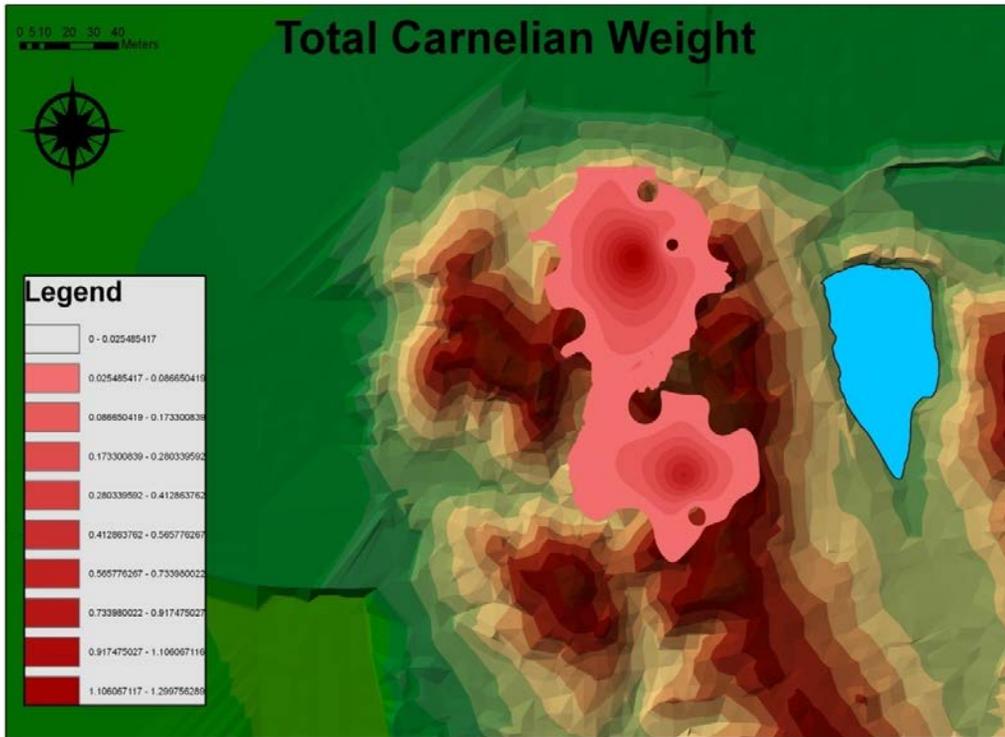


Fig.13

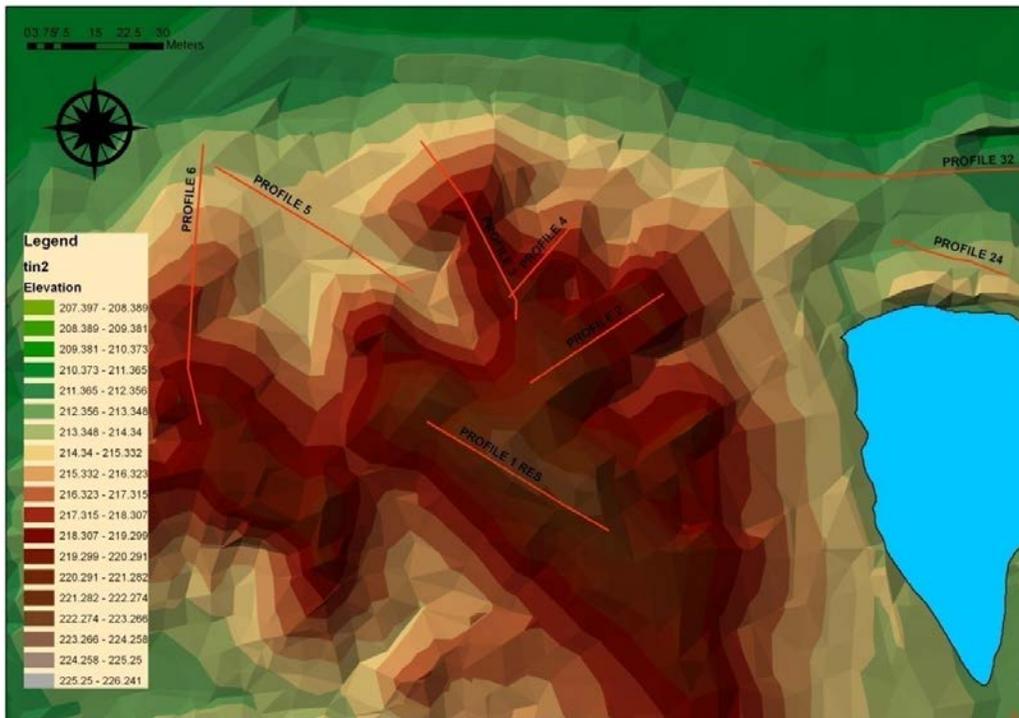


Fig.14

Rakhigarhi: 13, distribution of carnelian on RGR 2 and 14, location of profiles on RGR2

of Ranchi and 18 km from the Japla Railway Station, comes under Haidarnagar Police Station in Japla Block of Palamu district. In course of investigation, a number of pot-sherds comprise red ware, black and red ware, black ware, black slipped ware, northern black polished ware and glazed ware found scattered on the mound, which may be dated from the Chalcolithic to the Medieval Periods. Besides, numerous terracotta ring-wells of different diameters varying between 0.68m, 0.74m, 1.26m and 1.30m were also traced. A large number of antiquities and art objects (Pl.8) probably datable from Neolithic to Late Medieval Periods have been collected which suggest that once Kabra-Kala site was very prosperous and had a trade link through water route which connects the site to the ancient Pataliputra and other parts of ancient India.

Another site **Karon** (24° 07'45"; 86° 44' 82") is located 220km away from Ranchi and 21km north of Jamtada. In course of exploratory work, few ancient tanks have been noticed around the village, among which Kanshasar and Chapu-sar tanks are noteworthy. In the centre of Chapu-sar tank, there is a circular sandstone pillar, engraved with a sculpture, shown in seated posture. Within the village, Kareshawar Temple, probably belongs to Late Medieval Period exists and a good number of loose sculptures as well as architectural fragments have been recovered in and around the temple.

About 4km from the Kabra-Kala site, one more village, namely **Pansa** (24° 30'33"; 83° 52'47"), situated on the right bank of the River Koel, nearly 261 km north of Ranchi, 22 km from the Block Headquarters of Japla has been

explored. After thorough investigation, one mound seems to be an ancient mud stupa, roughly circular in shape, having 8m height and 15m diameter (Pl.9A) had come across during the survey.

**Sahar-vira** (24° 28'58"; 83° 51' 77") is placed on the right bank of the Koel River, about 22km north of Japla and 5km north of the Pansa village. The total height of the mound measures about 3m and its diameter is nearly 8m. The mound is covered with burnt bricks, looks like a stupa. In the centre of the mound, there is a sandstone pillar engraved with a sculpture and iconographic ally, it can be dated to sixth to seventh century CE. (Pl. 9B).

#### 10. EXCAVATION AT ITKHORI, DISTRICT CHATRA

Ranchi Circle of the Survey carried out excavations at Itkhori (24° 17'32 ; 85° 8'27") led by N.G. Nikoshey, assisted by Abdul Arif, Jaya Shankar Naik, K.K.Jha, M.K. Brahmachari and Mukesh Ekka. The archaeological mound Itkhori is located on the right bank of the River Mohani, which is 1 km west of the village Itkhori. The site is situated at a distance of 55 km from Hazaribagh and about 35 km from the District Headquarters Chatra.

The site is dotted with archaeological remains of Brahmanical and Buddhist faith of Pala period. With a view to ascertain the cultural sequence of the site as well as the nature of material culture of the Pala period, a total number of 14 trenches were laid out (Pl. 10A), out of which, two quadrants have been dug up to the natural soil which revealed a deposit of 1.50m showing single culture, dated between

ninth and tenth century CE, on the basis of sculptures found in course of the excavations. The digging exposed ruins of a stupa, consists of a rectangular base ((*medhi*) made of two courses of sandstone blocks, over it, lies the dome which shows three courses of bricks. The extant height of the stupa is 0.17m. Interestingly, most of the sandstone blocks of the base are carved with decorative designs, mythical female figurine, *kirtimukha*, *gandharva*, amorous couple, etc. It clearly suggests that these building materials were parts of an earlier temple. The *medhi* was filled up with mud and sandstone rubbles and traces of lime concrete floor are found at the top. Another stupa was exposed at a distance of 160m south of the main stupa, with an extant height of 0.70m. Only the remains of northern parts are traced out.

The ceramic collections retrieved are red wares, black wares, red slipped wares and few grey wares. The shapes include bowl, vases, storage jar, miniature pot, lid, dish, spout, incense burner, lamp etc. in which bowl is predominated, followed by vase. The potteries are mostly of medium fabric showing fine, medium to coarse texture and both well fired and ill fired varieties are available. Painting on the pottery is conspicuous by its absence and only the incised designs (Pl. 11D) of vertical stroke, wavy line, zigzag, diamond pattern, nail impression have been noticed along with few stamp design of birds, particularly pair of swan. The shapes and many designs of the pottery can be compared to the materials of Antichak (Vikramshila Monastery) and other sites of India.

The excavation unfolded a number of sandstone sculptures (Pl. 11A), depicting

seated Buddha in various *mudras*, head of the Buddha (Maitreya?) (Pl.10B), male attendant of a deity, votive stupa, (Pl. 11B) etc. along with terracotta objects including beads, hopscotch, *chillam*, animal figurine, gamesmen; iron objects (Pl. 11C) like, nail, clamps, sickle, arrow-head, ring and stone objects comprising hopscotch, bead, skin rubber, Siva-*linga*, saddle quern, broken pestle, etc.

## KERALA

### 11. EXCAVATION AT MARYOOR, DEVIKULAM TALUK, DISTRICT IDUKKI

Small scale excavation at Maryoor was conducted by the Deccan College, Pune, under the leadership of P.P. Joglekar, assisted by R.K. Mohanty, Nihil Das, Midhun Sekhar, Cyriac Jose, Vinu Paul, K.K. Sivaprasad, and G.S. Abhayan, with substantial financial and logistic support of the *Maryoor Gram Panchayath* and Society for Archaeological Research and Cultural Heritage (SEARCH), Kerala. In the initial stage, several locations were visited and their potential for yielding archaeological data was assessed and accordingly, three locations, namely, 1) a painted rock shelter on the Muruganpara Hill that faces River Pambar, 2) Nachivayal habitation site and 3) a dolmen with enclosure wall, located above the Muruganpara Hill were excavated during the year under review.

The painted rock shelter (10° 15' 23.9"; 77° 10' 19.1") on the **Muruganpara Hill** is located approximately 150m to the north of River Pambar, at an elevation of 981m MSL.



A



B



C



D

*Kabra-Kala: A, beads, B, inscribed stone seal, C, northern black polished sherds and D, coin*



A



B

*A, Pansa: general view of the site and B, Shahar Vira: head of a sculpture*

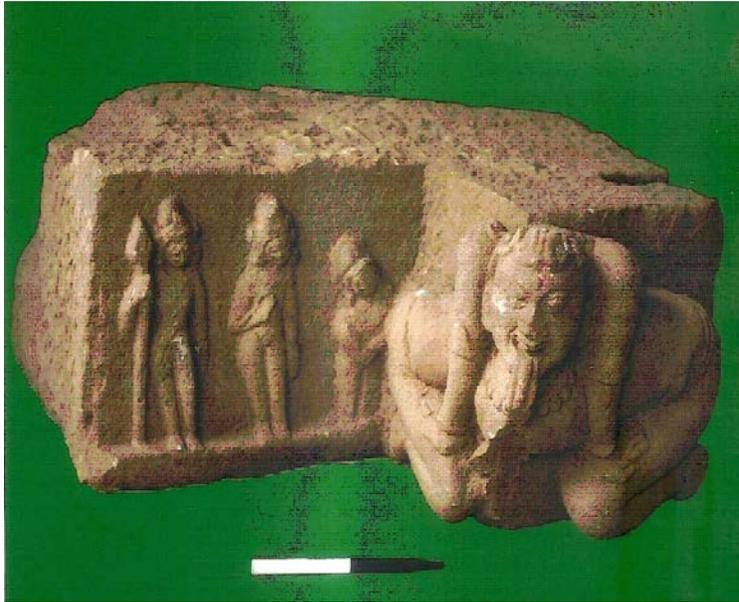


A

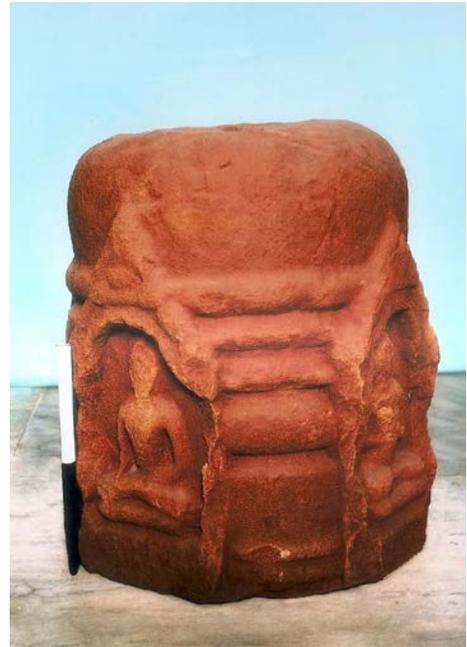


B

*Itkhor: A, general view of excavation and B, Buddha head*



A



B



C



D

*Itkhor: A, architectural members, B, votive stupa, C, iron objects and D, decorated pot sherds*

The shelter is created by two large rocks with a small gap in between them and the east-west width of the rock shelter is 12m. A highly damaged painting in red colour has been noticed on the rock, facing north. Due to weathering it was not possible to identify the content. More or less flat area of 12m x 3m inside the drip line seems to have been used by people in the past and on the available surface, four trial trenches of 1m x 1m were taken for excavation. Trench C1, D1, D2 and G1 were dug up to 0.25m, 0.27m, 0.22m and 0.32m, respectively. Chunks of raw material for making microlithic tools and a few fragmented microliths found from 11 to 16cm deposit in all the trenches. The top 11-16cm deposit consisted of fragmented pottery, most of which matches to the types recovered from the dolmens. Based on these findings it is tentatively suggested that this rock shelter was inhabited both by the microlithic making people and megalithic people in their respective times.

The small habitation site at **Nachivayal** locality, situated approximately 4m south of Maryoor village was also taken up for excavation. The site is disturbed due to modern sugarcane plantation. The site is spread over an area of 1.5 hectare, where potsherds were found scattered on the surface. Two trial trenches of 1m x 1m were laid, one each on northern periphery and the another trial trench of same size was taken up in the central area. All the three trenches were dug up to a depth of 0.92m and revealed three layers: top layer made of blackish forest loam soil, layer 2 consists of light brown compact soil and layer 3 shows brown semi-compact soil. These three layers yielded ceramics,

mainly red ware. From the second layer a few pieces of iron slags, terracotta object and one micro bead made of glass were recovered. On comparative basis, this habitation is tentatively dated to the Early Historic Period or Early Centuries of the Common Era.

There are several dozens of dolmens found on the Muruganpara hill, the place is known as **Kovilkadav** (10°15.29'34"; 77°10'8.28"). Among these dolmens, one with an enclosure wall (Dolmen-42) was selected for excavation. This dolmen is located (10° 15' 28.7" ; 77° 10' 20.1") on the rocky surface, at an elevation of 1022m MSL, oriented east-west, with a slight slope towards the west. The dolmen has two chambers. The right side chamber is constructed out of 9 stone slabs, placing both vertically and horizontally, while the left side chamber is made out of two orthostats, measuring 2.30m x 2.85m in left and right sides, respectively. A 0.50m gap was noticed in-between two chambers, where the cairns are filled up to the level of capstone. From the rubble fallen inside these two chambers, it is clear that the cap stones have got crushed in. However, a grid of 2m x 2m was laid and the two dolmens were named as Chamber 1 (southern) and 2 (northern). After the plotting of the each stone slab by giving specific numbers in numerical order, clearance of cairns packing started from the eastern side of Chamber 1. It is observed that, this cairn packing was followed by a thin loose brownish soil fill. Similar feature was obtained in the consecutive area of the chambers. Each stone piece removed from the Chamber 1 was counted and measured, especially to know, are they following any pattern or just as irregular rubbles. Subsequently on the basis of size,

these rubbles were divided as small medium and large. After taking out the cairns, there was a thin layer of rubbles along with loose soil was noticed. Below this, about 0.17m deep the floor slab was found broken into two pieces. Each slab measures 0.85m x 0.77m x 0.80m x 0.72m in length and width, respectively. Besides, flat rubbles were kept in the space, where floor slab and orthostat were not touched. This was done to maintain the level of floor slab and keep slab as tight as possible.

About 1.30m distance from the eastern side, where the floor slab is ended, vertically erected two slabs were noticed. Apparently this was found exactly in the middle of the chamber. Initially it looked like capstone crushed inside, but actually the slabs were deliberately kept in order to bifurcate the chamber. After removing the floor slabs, a thin layer of loose brownish soil appeared. It was noticed that deposit on either sides of orthostats was compact, whereas the central portion was very loose in texture. It means considerable time was taken to fill the central portion, after the filling of the marginal area. After taking out floor slabs, three layers of fillings were observed: a thin layer of loose brownish soil became visible; an alignment of four square-shaped rubbles, measuring 0.45m x 0.40m x 0.45m x 0.75m; and again a thin layer of semi-compact brownish soil mixed with rubble over the bedrock noticed, where few potsherds were found scattered.

Excavation was extended to the second chamber, after completion of the first chamber. This chamber was made of three

slabs - northern and southern slabs measure 2.85m x 2.30m x 0.83m x 0.70m, respectively. The eastern and western orthostats and the capstones were missing. Inside chamber was 0.55m in width which contained rubble filling. These were removed as the first step of the excavation. Below this packing of 0.5m thin loose brownish deposit was noticed along with few sherds of black and red ware and red ware.

Underneath, the floor, a slab was found constructed out of a single massive stone (2.65m x 0.65m x 0.20m), got tightly packed in-between two orthostats. In the northwestern corner, two broken miniature black ware pots were recovered, which were kept on the floor slab. Below this slab, a 0.10m loose brownish soil deposit was observed. This contained few charcoal pieces and the deposit ended on the bedrock.

## MADHYA PRADESH

### 12. EXPLORATION IN TAPTI-PURNA VALLEY, DISTRICT BETUL

A team from the Prehistory Branch, of the Survey, conducted explorations in Tapti-Purna Valley, led by Nandini Bhattacharya-Sahu, assisted by Gajanan Katade, K.M. Girhe, P.L. Janbandhu, R. D. Deshpande, Ekta Dharkar, Vijay Gedam, M. S. Kadhao along with Prabash Sahu, M.R. Kambe, of the Excavation Branch I, Nagpur, and discovered ten prehistoric rock shelters, covering an area of 20 sq.km in the Gawilgad Hill Segment of the Satpura Range, near the village Dharul (PI.12A) in Tehsil Atner.

These rock shelters are housing petroglyphs in

the form of an engraving, bruising and pecking, pictographs or paintings, which comprise the shapes of stick figures, outlines, solid and X-ray figures etc. For convenience of study, the survey team has grouped and numbered the shelters in accordance to their distribution, as per the local names. The groups have been identified as Mungsa Dev Group ((MSD), Kosumb *Gufa* Group (KMG), Kukadsadev Group (KSD), Ambādevi Group (ABD), Telkan Group (TKN) and Gaimukh Group (GMK).

The shelters vary in sizes the largest being 26m x 8m x 9.5m while the smallest one measures 8.5m x 2m x 4.25m. The shelters generally face south, south-east and south-west (Pls.12B, 12D).

Petroglyphs including engravings, pecking and bruising have been noticed in three groups of the shelters, viz. MSD, KSD and ABD. A rarity, in terms of the Indian Rock Art Studies, noticed in these shelters is the depiction of a larger variety of subjects other than the commonly seen cupules (Pl.14B) in most instances. Petroglyphs comprise cupules, engravings, deeply incised into the rock surface, most commonly depicting groups of bovid, in various moods and activities, like grazing (Pl.13A), running, climbing a slope and indulging in playful pranks. All these have been very astutely and sharply depicted by the artist on the hard rock surface. The various stages of their locomotion are clearly discernible by the diverse positions of their tails and limbs. Petroglyphs in the form of pecking show common herbivores like herds of deer (Pl.13B) and *chausingha* in various

positions and the bruising comprise of simple faunal and geometric motifs.

The paintings, found largely on the walls and sometimes on the ceilings, mostly executed in burnt sienna and occasionally in white, depict a good range of faunal and geometric motifs. Depictions of stylized tortoise, deer (Pl.14C), dog, wild boar, vulture/bat, rabbit, ox, monitor lizard, donkey, *chital*, *nilgai* (Pl.13D), *sambar* etc. are found commonly in the shelters. Geometric designs, (Pl.12C) which also comprise natural elements like the honey comb (Pl.13C), are depicted in almost all the groups. Paintings in burnt sienna are found to be superimposed on the engravings in PRS Kukadsadev-VI (Pl.14A).

However, more such shelters are yet to be explored and final documentation of the shelters is to be done. The team, in its initial stages of work, has collected Middle Palaeolithic tools like side scraper, end scraper, convex scraper, triangular scraper and Upper Palaeolithic tools, like, blades, blade lets, borer-cum-scraper and fluted cores, made on chert, agate and quartz, from the surface of the rock shelters and their immediate vicinity. Subsequent trial excavation, if any, within the floor of the shelters, may throw more light on the antiquity of the Petroglyphs and Pictographs.

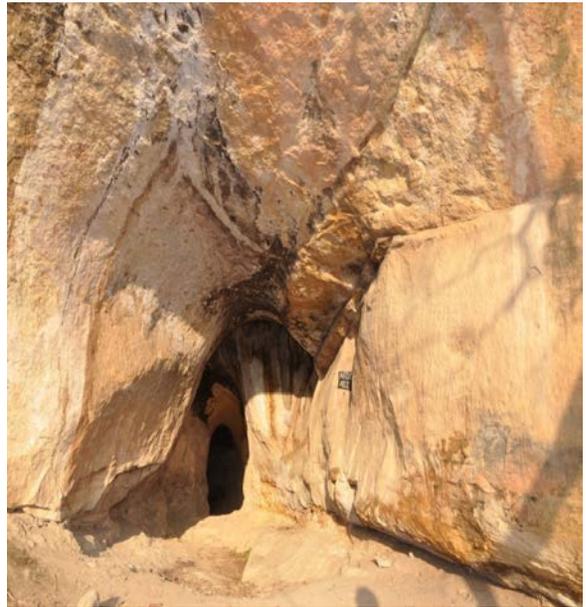
The description of the said rock shelters discovered by the team as well as those already reported and revisited by the team is as under:

**EXPLORATIONS AND EXCAVATIONS**

<i>Shelters</i>	<i>Geo-coordinates</i>	<i>Nature of Remains</i>
Ambadevi I	21° 24' 33.84"N; 77° 56' 58.08"E	Engravings and paintings of bull, deer, honeycomb
Gaimukh I	21°24'11.40"N; 77° 54' 28.20"E	Traces of painted animals
Gaimukh II	21° 24' 11.40"N; 77° 54' 28.20"E	Paintings of boar, <i>nilgai</i> ,honeycomb etc.
Kosumb Gufa I	21° 24' 7.78"N; 77° 55' 37.74"E	Paintings of boar, tortoise, bull, elephant and stylized human figure
Kosumb Gufa II	21° 24' 7.68"N; 77° 55' 30.36"E	Paintings of stylized tort and geometric designs
Kosumb Gufa III	21° 24' 9.72"N; 77° 55' 25.38"E	Paintings of tortoise, rabbit, monkey etc.
Kukadsadev I	21° 24' 14.46"N; 77° 56' 38.53"E	Traces of painted bull
Kukadsadev II	21° 24' 15.90"N; 77° 56' 38.88"E	Painting of grazing bovines
Kukadsadev III	21° 24' 14.34"N; 77° 56' 38.40"E	Paintings of boar, fish, elephant
Kukadsadev IIIA	21° 24' 14.76"N; 77° 56' 37.32"E	Paintings of boar, deer, tortoise and palm impression besides lithic tools
Kukadsadev IV	21° 24' 14.10"N; 77° 56' 37.62"E	Paintings of wild boar and palm impression
Kukadsadev IVA	21° 24' 14.64"N; 77° 56' 35.82"E	Painted geometric design
Kukadsadev V	21° 24' 15.90"N; 77° 56' 36.12"E	Paintings of honeycomb, doe, mythical animal with elongated body and lithic tools
Kukadsadev VI	21° 24' 11.82"N; 77° 56' 36.24"E	Engravings of bull, deer, paintings of mother and child, monitor lizard, donkey, stick human figures and cupules and lithic tools
Kukadsadev VII	21° 24' 11.46"N; 77° 56' 23.16"E	Engravings showing bovine groups and paintings.
Mungsadev I	21° 24' 9.78"N; 77° 55' 51.42"E	Paintings of bovine groups and cupules and lithic tools
Telkan I	21° 24' 17.22"N; 77° 54' 31.74"E	Paintings of honeycomb design, stylized tortoise donkey and lithic tools
Telkan II	21° 24' 6.34"N; 77° 56' 12.41"E	Paintings of rabbit, dog, vulture/bat, monitor lizard and geometric designs.



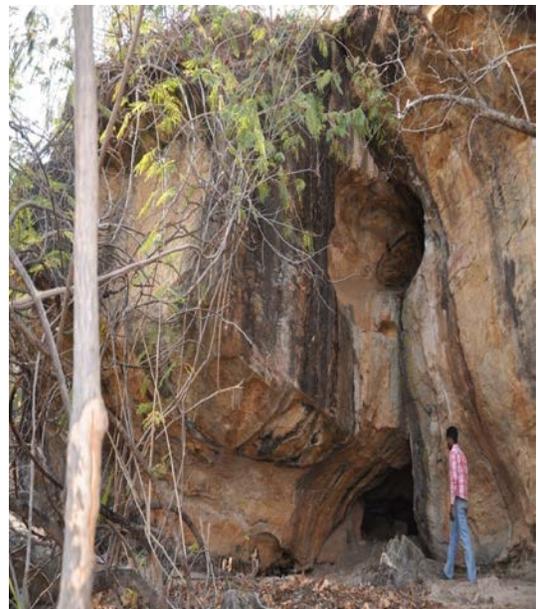
A



B



C



D

*A, Dharul: general view of Gavilgad hills, B, Ambadevi: general view of entrance PRS I, C, painted festoon of inverted triangles and Kukadsadev PRS I, D, PRS VII, entrance of rock-shelter.*



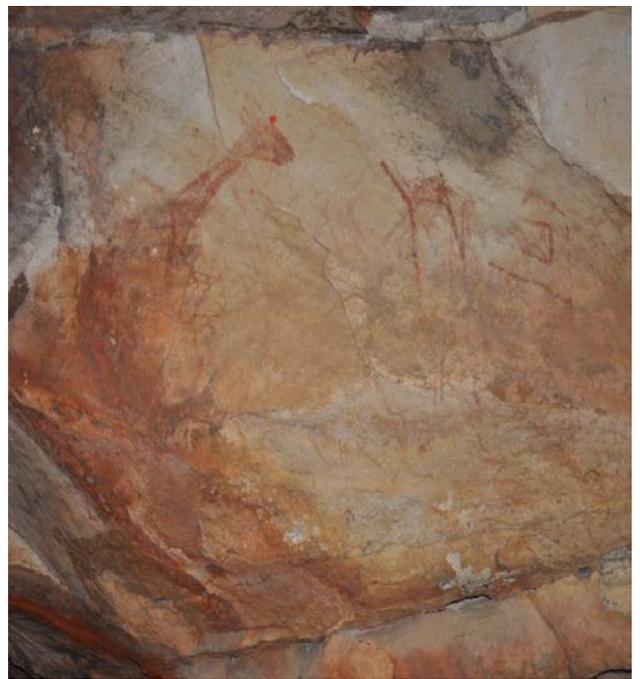
A



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C



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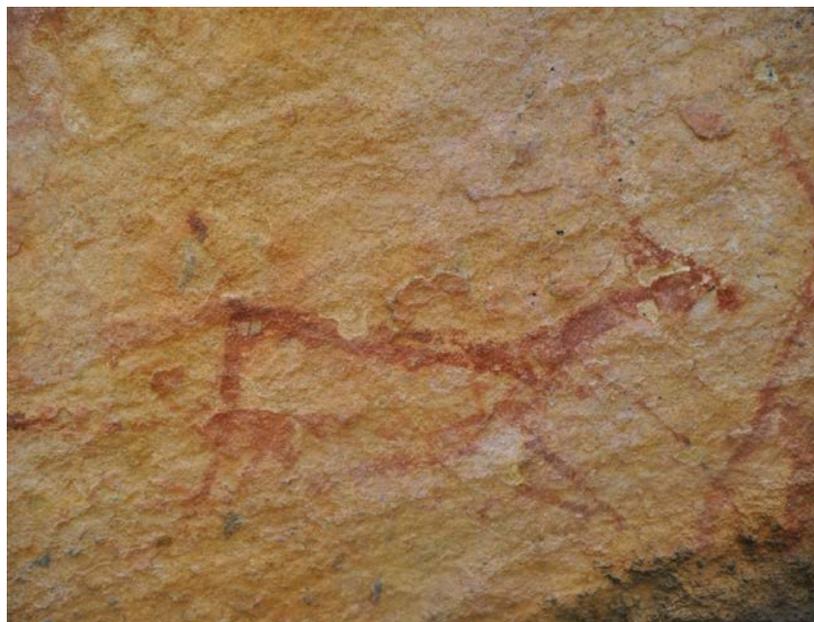
*Kukadsadev: A, PRS VI, engraved grazing bull, B, PRS VI, herd of deer by pecking, Gaimukh: C, PRS II, painted honeycomb and herd of deer showing internal organs and D, PRS II, painted nilgai.*



A



B



C

*Kukadsadev: A, PRS VI, superimposition of paintings over engravings, Mungsadev: B, PRS I, cupules and Telkan: C, PRS I, painted deer with upraised tail.*

## MAHARASHTRA

## 13. EXCAVATION AT HIRAPUR, DISTRICT CHANDRAPUR

In continuation of the previous year's work (2010-11, pp. 69-78), the Deccan College Post-Graduate and Research Institute, Pune, under the direction of Kantikumar Anant Pawar, assisted by Ismail Kellelu, Ganesh Halkare, Kim Yong Jun and Akash Srinivas, undertook an excavation of a megalithic burial site, located in the vicinity of the small village Hirapur (20° 37'30"; 79° 31'30"), of Chimur Tehsil, with a view to expose and understand about non-sepulchral categories of megalithic burial tradition and also to find out any existence of iron furnace near the dolmen. as the previous survey yielded large number of iron slags.

The excavation was resumed within the Megalithic Burial (MB) 1, which is a huge, intact dolmen, remained largest in the region. During the last year's excavations, left chamber of this dolmen was dug which revealed typical micaceous red ware, micaceous black ware, red ware, stone polisher, glass bangles, copper bangle, stone celt (?) and bricks holding the size of 8cmx16cmx 32cms.

This year, right chamber has been exposed (Pl.15A) up to the deposit of 1.85m; 60cm deposit from the top was very disturbed in nature. It is perhaps a later deposit, stored by some natural as well as human activities. The remaining deposit of 1.25m is possibly undisturbed, placed out at the time of the constructing activities.

The deposit of about 1m has a lot of small and medium size chunks of stone, rammed with

the help of lime and bel mortar, which shows a typical nature of burial deposit. From the top, at a depth of 1.05m, there are two pink coloured burnt bricks, properly placed in linear alignment in the north-south direction.

The right chamber is exposed in a section like the previous season's excavation of left chamber. This was done not to disturb the central and right supporting laterite orthostats. The distance between western and eastern orthostat is 2.20m. The thick burial deposit has been excavated up to the bottom, leaving a section of 0.92m from west to east. The right orthostat has a height of 2.40m and it is slightly tilted towards the south, with an angle of approximately 30° from the upright position. The two bricks joined with a bel and lime mortar, hold the size of 47cmx8cm x 8cm.

Very close to the right orthostat, one square dressed laterite block is placed properly, having a measurement of 40cmx 40cm x 25cm (Pl.15B).

In the above mentioned disturbed deposit, interestingly three sandstones have been found with vermilion applied on the surface that indicates during the colonial and even on later period, this burial was used for veneration. At present, the villagers of Hirapur worship this burial as 'Mandavgota' after harvesting their fields.

Another rectangular laterite block was placed towards the eastern orthostat with the measurement of 44cm x 30cm x 30cms. Two copper coins were recovered from this burial at a depth of 1.58m.

In comparison to the left chamber very few

antiquities were recovered in the right one. Interestingly, the quantity of glass bangles in this chamber are very less as those encountered in the left one.

During the previous season's excavation, on the northern side of the right orthostat of MB4, an enclosing structure was exposed (Pl.15C) towards the north, having two lines of dressed laterite blocks, with a total thickness of 1.80m. In this exposed structure, the outer line of the wall has a single course, whereas the line which is closer to MB1 exposes two courses of laterite blocks. During last season's work, the outer line was exposed up to 2.48m and the inner line was exposed up to 2.10m. In this season, this structure was further exposed (Pl.16A) to find out its exact orientation and alignment.

During the course of this year's work, the outer line, which is running towards the north has been exposed up to 8.40m, consisting of 11 dressed laterite blocks of various measurements placed in a linear alignment, with the help of a laterite soil mortar. The maximum length of a block is 1m, whereas the minimum is 0.54m. The outer line has a single course, except at the distance of 3.50m, from the right orthostat of MB4, where traces of another course, in which, two laterite blocks are visible; having a total length of 1m, one stone is comparatively smaller than the other. At the base of this outer line, black cotton soil has been used to give proper strength and support to this structure. This outer line turns towards the west, making an angle of 90°, exposed up to 15.80m, which is its end towards the west. The outer line is also made of dressed laterite blocks, but surprisingly, it

has 3 courses, visible by its traces in various places. The base course had 14 dressed stones of different measurements. The maximum length is 1.02m, whereas the minimum is 0.40m. From the point of curve to the west, at the distance of 2.30m, a second course starts, which has 23 laterite blocks of different sizes. Most of the stones are small in size having maximum length of 0.50m, except the second last stone from its curve to the south (western most point) which has a total length of 1.40m.

A third course of this wall starts from 3.10m from the point of curve towards the west. The third course of this outer line is not continuing upto the western most point. Some stones are missing, creating discontinuity in the third course. Probably there were four stones which are not visible now, either missing or robbed.

Among the fourteen stones in the course, the first three is followed by a gap and then next eleven. After the distance of 15.80m, the outer line turns towards the southern direction. Only four stones have been exposed due to time constraints. Of the four stones, the maximum length is 0.85m; where as the minimum length is 0.45m. Interestingly, this line and the stones do not look properly placed. The inner line of this enclosing structure has two courses of same laterite blocks which were exposed up to 2.10m during the last season's work, as mentioned above. The upper course of this line is very disturbed and slanting towards the main double chambered dolmen. From the eastern face of the dolmen inner line is 3.40m away. This inner line is 6.80m long towards the north and very disturbed in the middle because at some places, it has three courses of uneven dressed stones.

The third course is visible at the distance of 2.50m from its starting point near the right orthostat of MB4. The base course contains heavy laterite blocks for giving support to the upper two courses. The base course has 8 blocks in which, one very hard, is placed at a distance of 4.30m. In the second course, there are 11 stones placed above the base course. Size wise, these stones vary in dimension. Due to some disturbances, the second course is slightly slanted towards the main dolmen. In the third course, there are 7 stones visible but most of them have completely collapsed towards the dolmen.

This inner line turns towards the west and runs at a distance of 14.80m. It has rectangular laterite blocks of which only 15 are visible in the base course. This inner line which is turning towards the west lies 2m away from the northern side of the dolmen. This line might have three courses but compared to the outer line, this line is very disturbed and all the stones of the second and third course have collapsed towards the northern side of the dolmen. Some stones have collapsed in such a way that they have fallen only 30cm away from the dolmen. In the second course, there are 16 stones visible in a tilted position. The maximum length is 1m, where as the minimum is 0.75m. Blocks which are used in the second course are properly shaped and most of them show similarity in their length and breadth.

In the third course, there are thirteen stones visible in collapsed state. The maximum

length is 0.85m and the minimum is 0.15m. Surprisingly, at one place, on the backside (west face) of the dolmen, at a distance of 0.70m, a sandstone block of 65cm x 30cm x 20cm has been exposed, which is circular in shape, on one side. Sudden use of the sandstone block among these laterite blocks is much unexpected. This inner line also turns to the southern direction and is exposed upto 2.10m, in which only three stones, in a linear alignment are visible, of these, the maximum one is 1.40m in length while the minimum one measures 0.15m. There are two more stones visible in a fallen condition. It is hard to trace out whether these stones remained parts of the inner wall running E-W or N-S, or not. Alignment of this wall, which is running towards the south, will be exposed in next season's excavation.

Some traces of the wall/structure have been excavated from the left orthostat of MB4. It is very hard to say anything, whether this structure is continued to the southern direction from the left orthostat or not. In the excavated approximately 5m x 5m area, there are five laterite stones, of which, only one laterite block is properly dressed, which is lying 3.50m away from the left orthostat. An uneven sandstone block is found 90cm away from the left orthostat. Below this sandstone block, a large quantity of potsherds has been unearthed. On the eastern side of the MB4, during last season's excavation, a large laterite slab was traced and exposed up to 30 cm. This year the slab has fully been exposed. Interestingly, this is the largest laterite slab,



A



B



C

*Hirapur: A, right chamber, B, bricks inside of right chamber and C, MB4 and enclosure*



A



B

*Hirapur: A, view of enclosing structure around dolmen and B, stone slab*

placed in horizontal position (Pl.16B). This laterite slab is very close to both the orthostats of MB4. The E-W length of this slab is 3.10m and the N-S breadth is 2.50m and maximum thickness is 0.40m. This rectangular laterite slab has a curve on both the corners of its northern direction, while the southern corner points do not betray any curve. The conical shape in the northern side is purposefully made.

A large amount of pottery has been retrieved in course of excavation on the northern and southern sides of the slab. From the section, it is clearly visible that, this slab is placed above the third layer of laterite soil. On the northern side, close to the northern face of the slab, one copper coin was recovered.

#### 14. EXCAVATION AT SHIUR, DISTRICT NANDED

The excavation at Shiur was undertaken jointly by the Department of Archaeology of the Deccan College Post-graduate and Research Institute, Pune, and the Department of Archaeology, Sholapur University, under the direction of P.P.Dandwate of the Deccan College. Other participants were V.S. Shinde, B.C. Deotare, G.D. Shete, Arati Deshpande-Mukherjee, Satish Naik, B.S. Gajul and B.B. Dighe, 33 post-graduate and diploma students of the Deccan College, Pune, Maya Shahapurkar Patil of Sholapur University, 21 post-graduate and research students of the Sholapur University with a view to understand the chronology, nature and significance of the site in the regional context.

The site (19° 40' 46"; 77° 27' 39") is located on the right bank of River Painganga in Hadgaon Taluk, 75 km north-east from Nanded District Headquarters. Very close to

the mound, there are four Brahmanical (image of Vishnu) rock-cut caves (Pl.17B), dated about eighth to tenth century CE. The mound, located to the west of these caves, was selected for excavations. On the whole, nature of the mound is somehow flat, mostly cultivated land, to its north-east corner, six trenches, each measuring 5mx5m, with 0.5m baulk in between, designated as A1, A2, A3, A4, A5, and A6, from west to east, were laid out. Trench A1 and A2 were at lower level, exposing not more than 0.35m of habitation deposit. The average occupational deposit at the site is around 1.5m, capping the naturally formed black soil.

The excavation mainly resumed in three quadrants of A4 and one of A3. Total 9 layers were observed at the site, maximum of which were exposed in the eastern half of trench A3 (Pl.17A), as the western half of this trench is lying on the slope. This trench brought to light evidence of structure in the form of wattle and daub wall. The pit found was filled with white ash produced by burning of cow-dung cake. It seems to be a furnace, since no other evidence is available; it is difficult to specify its functional aspect. The added important features observed in other trenches are floors made with the substance prepared of mud, lime, small grade gravel and vitrified grains of soil. Whether it is crushed grains of bricks or specially prepared vitrified soil is not known. Some brick bats and a few broken brick fragments were also recovered during the excavations. Roof-tiles are absent at the site. Besides, half circular hearths were also exposed at various levels during digging operation.



A



B

*Shiur: A, stratigraphy of Trench A3 with prepared house floors at three different levels and B, image of Vishnu*

The pottery repertoire comprises red ware and red slipped ware. Micaceous ware, black-and-red ware and black slipped ware were recovered in meager amount. Micaceous ware was found throughout habitation deposit. Black-and-red ware is absent in upper levels, it starts occurring from mid-level and were recovered in huge quantity. The sherds are relatively thick and not as fine as megalithic black-and-red wares which suggest its occurrence in the Early Historic period. The association of this pottery and related material indicates temporary settlement at the site during this period. The black slipped ware was essentially recovered from the upper levels.

Quite a good number of animal bones and shells have also been gleaned from all the trenches, but A3 trench yielded highest quantity of animal bones, most likely of domesticated cattle, sheep, goat, cow and buffalo.

On the basis of food grains retrieved from the site, it appears that probably the inhabitants cultivated wheat, rice, gram, pea and oil seeds.

The antiquities found include glass and shell bangles, arecanut-shaped terracotta beads, beads made in several other semiprecious stones and glass, terracotta human and animal figurines, iron and copper implements and single coin that require to be cleaned for proper identification.

The cultural sequence of the settlement dated back to Late Satavahana period that continued up to seventh-eighth century CE.

#### 15. EXPLORATION IN NANDED AND YAVATMAL DISTRICTS

An archaeological exploration was resumed by a team of researcher from the Deccan College, Pune, in the Nanded and Yavatmal Districts, near the village Shiur and located the following sites of antiquarian remains;

The site **Borkhi** reveals an Early Historic and Medieval settlement which is located around 3km south of Talani, an important market place in Hatgaon Tehsil. The stretch of archaeological remains is found in 1 hectare area. Sherds of red ware, red slipped ware, black-and-red ware and black slipped ware were collected from the site. A good number of four legged querns were also noticed arranged upside down, under a tree.

The second site, **Gojegaon**, is situated around 10km south of Umardhed, in the Umardhed Tehsil, on the Umardhed - Nanded Road. The habitational deposit spread around 0.5 hectare area showing almost a flat terrace. The site yielded red wares, red slipped wares and black-and-red wares. The finding of black-and-red ware and other pottery confirm Early Historic identity of the site. Besides, temple remains (parts of pillar) of Medieval Period were traced and broken sculptural pieces like *salunkha*, *nandi* were also noticed.

Another site, named, **Old Marlegaon**, is located at around 1km east of Chincholi Sangam, Tehsil Umardhed. An assemblage of red wares, red slipped wares and black slipped wares having sandy fabric, has been traced out. Besides, a terracotta human figurine with defaced head, hands and legs was also found at the site.

Two other sites bearing architectural and sculptural relics have also been located in Nanded District. Out of these two sites, at **Unchegaon**, a temple of Maratha Period has been identified, consisting of *mandapa* and *garbhagriha*. In the *garbhagriha*, a part of *gomukha* is worshiped as the main deity. Outside the temple, under a tree, an image of *panchmukhi* Siva-linga and *nandi* is placed. The *panchmukhi* Siva-linga is a unique one because all the five faces of Siva are depicted on five sides of the *linga*. Four faces on four sides and the fifth one are shown at the top of the *linga*.

At **Talani**, a temple of Devi Jagadamba of the Maratha Period and a temple dedicated to Siva of Medieval Period have been noticed. The Siva-linga and the *Salunkha* are large in size. According to the local people, the Siva-linga was buried under the soil; it was removed and installed in the temple later. Outside the

**17. EXPLORATION IN DISTRICT THANE**

Mayur Babulal Thakare from the Competent Authority Office of the Mumbai Circle of the Survey and Research Scholars of the Deccan College Post-Graduate and Research Institute,

temple one standing image of Vishnu and few Hero-stones were also observed.

**16. EXPLORATION AT MANJARKHED, DISTRICT AMARAVATI**

In order to locate megalithic burials, explorations at Manjarkhed were conducted by Gurudas Shete of the Deccan College Post-Graduate and Research Institute, Pune.

The site **Manjarkhed** (20° 49'45"; 77° 56' 27.7") is situated on Kholad River, a tributary of Bemla River of the Wardha River System. Located around 4 km from Chandur Railway Station, on a road to Amaravati, the site was first reported by Ajit Kumar in 1987-88 and assigned it as the Early Iron Age locale. This season's exploration around 3 km radius of the site established that the archaeological remains found from the village belong to the early Iron Age and no burials were found so far.

Pune, conducted explorations and brought to light several Colonial Portuguese sites (Pls.18 - 20) in Bhaiwandi and Palghar Taluk.

The details of these sites are as under:

<i>Location of Site</i>	<i>Takuka/ Tehsil</i>	<i>Latitude/ Longitude</i>	<i>Nature of Remains</i>	<i>Probable Date</i>
Dativare(in Koliwada facing creek, near the house of Smt.Sandhya Sadashiv Raut)	Palghar	19.510715N; 72.773653E	Remains of Portuguese Fort	Between 16th to 18th century
Dehisar(on the slope of a hillock outside the village)	Palghar	19.639351N; 72.884160E	Portuguese Outpost	Between 16 <sup>th</sup> to 18 <sup>th</sup> century

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Duktan(on the hillock inside the village)	Palghar	19.683173N; 72.868651E	Portuguese Outpost	Between 16th to 18th century
Firangpada(on the top of hillock)	Bhiwandi	19.31273N; 73.00168E	Portuguese Outpost	Between 16 <sup>th</sup> to 18 <sup>th</sup> century
Gane (surrounded by brick factories)	Bhiwandi	19.32293N; 73.00584E	Foundation of Portuguese Outpost	Between 16 <sup>th</sup> to 18 <sup>th</sup> century
Girale(on the hillock, near the house of Smt.Manjula Damodar Vangad)	Palghar	19.608986N; 72.877900E	Portuguese Outpost	Between 16 <sup>th</sup> to 18 <sup>th</sup> century
Jalsar(near the house of Shri Vinayak Rajaram Parab)	Palghar	19.532187N; 72.800497E	Portuguese Church	Between 16th to 18th century
Khamloli(near the house of Shri Balram Naik)	Palghar	19.661718N; 72.868514E	Remains of Fortified Portuguese Mansion/ Outpost	Between 16 <sup>th</sup> to 18 <sup>th</sup> century
Kharbao(in the premises of Kharbao PHC)	Bhiwandi	19.295438N; 72.994891E	Remains of Kharbao Fort	Between 16 <sup>th</sup> to 18 <sup>th</sup> century
Khatali(in the village)	Palghar	19.588034N; 72.740815E	Remains of Portuguese house with intact wooden logs and medallion carvings.	Between 16th to 18th century
Kelve	Palghar	1. 19.60199N; 72.73368E 2. 19.604355N; 72.734137E	Remains of Portuguese Church and Pentagonal Bastion with gun slit.	Between 16th to 18th century
Nawaze(near the house of Shri Ramesh Atmaram Patil)	Palghar	24 Km South-East of Palghar	Portuguese Outpost	Between 16th to 18th century
Paigon(inside the village)	Bhiwandi	19.326890N; 72.975178E	Foundations of Portuguese Outpost	Between 16th to 18th century
Virathan(on the hillock at the outskirts of village)	Palghar	19.54391N; 72.79365E	Fortified Mansion/Church Complex	Between 16th to 18th century



A



B



C



D

*A, Girale: architectural members, B, Kelve: pilaster and broken vaulted roof of a church and C, entrance of church, D, Virathan: Chapel*



A



B



C



D

*A, Dativare: remains of fort, B-C, Duktan: Portuguese outpost 3, D, Khatali: Portuguese outpost 2*



A



B

*A, Khamloli: remains of Portuguese mansion, B, Virathan: interior of the Chapel*

**18. EXPLORATION IN TAPTI-PURNA VALLEY, DISTRICT JALGAON**

A team, from the Prehistory Branch, of the Survey, comprising Gajanan Katade, K.M. Girhe, P.L. Janbandhu, R. D. Deshpande, Ekta Dharkar and Vijay Gedam, under the direction of Nandini Bhattacharya-Sahu carried out exploratory works in the Tapti-Purna River

Valley and discovered Middle Palaeolithic, Mesolithic, Chalcolithic and Historical sites at Barbhaya (Pl.21A), Dolarkheda, Dui, Nandvel, Wadhave (Pl.21B).

The cultural remains gleaned from the sites are as follows;

<i>Village/Site</i>	<i>Geo-coordinates</i>	<i>Nature of Remains</i>
Barbhaya	21° 03' 8.10"; 76° 07' 46.44"	Chalcolithic
Dolarkheda	21° 04' 26.00"; 76° 09' 15.66"	Mesolithic
Dui	21° 05' 7.20"; 75° 59' 24.36"	Mesolithic
Nandvel	21° 02' 15.24"; 76° 10' 6.90"	Historical
Wadhav I	21° 02' 5.64"; 75° 59' 30.42"	Middle Palaeolithic
Wadhav II	21° 01' 31.38"; 75° 59' 43.56"	Middle Palaeolithic

**MANIPUR**

**19. EXCAVATION AT SANGGAI YUMPHAM, DISTRICT IMPHAL EAST**

The Manipur State Archaeology, under the Directorship of K. Dinamani Singh, in consultation with O.Kumar Singh, assisted by L. Ibomeha Singh, Kh. Renubala Devi and Gangthaungam Kamel undertook excavation at the site Sanggai Yumpham (24° 48' 24.50" ; 93° 56' 40.89"), located within the Kangla Fort, Imphal City, with an aim to verify and trace the foundation of erstwhile Citadel, drawn by Maxwell. He was a British Political Agent, stayed in Manipur before the pre-

occupation of Manipur by the British. The grid plan prepared for the earlier excavation in 2007 is adopted in the present excavation also, so as to understand the distribution of the excavated area within Sanggai Yumpham.

The grid of S8 E26 is selected for the present excavation (Pls.22A-B), however, the grid square is divided into 4(four) quadrants measuring 5m x 5m for the convenience of trenching. Initially, digging began in a control pit (1mx1m), in the north-western corner of the trench S8 E26D, near the newly reconstructed Citadel Wall. After digging up to a depth of 0.4m from surface some brick bats and potsherds along with complete bricks



A



B

*A, Barbhaya: general view and B, Wadhve-I: middle palaeolithic tools*

inscribed with the letters CHI, KMS and DCP have been encountered. The complete bricks measuring 23cm x 11.5cm x 6.5cm are laid in a square of 1.80m area. At a depth of 0.26m from surface, a deposition of lime *surkhi* with brick bats have come across, which continued up to 0.93m, where lies a brick structure, plastered with lime *surkhi*. Above this brick structure, there is a loose deposition of lime *surkhi* and few brickbats in the shape of a dome, having a height of 0.75m.

To ascertain the height of this brick structure, digging was extended towards eastern portion where at a depth of 2.50m from datum line, *surkhi* floor extending to the east was exposed. There are 15 layers of bricks where lime *surkhi* was used as binding material. The bricks are uniform in size, having dimensions of 29cm x 13.5cm x 8cm. The width of this structure is 0.75m, running north-south and length being 5.09m, penetrating up to the trench S8 E26 – A. There it is joined with a perpendicular brick structure leading towards west.

Another brick wall coming from east also joined this structure at a distance of 4.20m from its southern end.

The team encountered large deposition of potsherds in two layers along with charcoal and ash being separated by a layer of clay, having the thickness of 0.20m to 0.40m. The potsherd includes red and black wares. All these earthen wares are handmade and decorated with stamped designs. Burnt thin bricks of 23.5cm x 12.5cm in size are also found mixed with the potsherds. The southern part of this trench seems to be a refuse pit deposit.

During the course of excavation, the section facing north revealed nine layers. They are: Layer (1) composed of clay and brick bats; Layer (2) consists of clay; Layer (3) composed of huge deposition of ash and charcoal and its thickness is as much as 0.40m; Layer (4,5 and 6) has *surkhi*, ash, *surkhi*, with the thicknesses of 0.5m, 0.6m and 0.5m respectively; Layer (7) shows deposition of ash, having 0.30m thickness; Layer (8) composed of brickbats and a *surkhi* floor which covers a brick tunnel, inside of which is decorated with corbelled arch and has a width of 0.59m. At the bottom, there is a groove and height from this groove to top is 0.85m. This tunnel passes through the Citadel wall to drain out water beyond the Citadel.

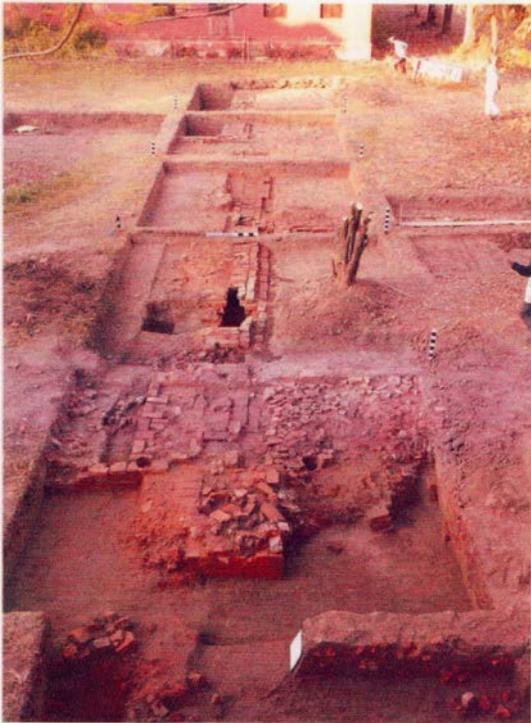
The important findings include small and large earthen jars, bones (Pl.22C), circular bell, coins and upper part of a terracotta *hukka*, inscribed with “Bengali” scripts.

In order to trace further extension of the tunnel towards north, excavation was carried out in trench no.S8 E26-A, measuring an area of 5mx5m. After digging 0.16m from the surface, brickbats, potsherds and a glazed lower portion of “*hukka*” in chocolate colour were revealed. Further digging of about 0.21m, encounters a deposition of brick bats and complete bricks randomly. Removal of these bricks exposes one hole, rectangular in shape and has a width of 0.33m. At the depth of 0.70m, rectangular sandstone found laying east-west, with the thickness of 0.26m. The length of the sandstone cannot be measured as both ends are embedded in a brick structure which is constructed vertically with a height of 2.83m.

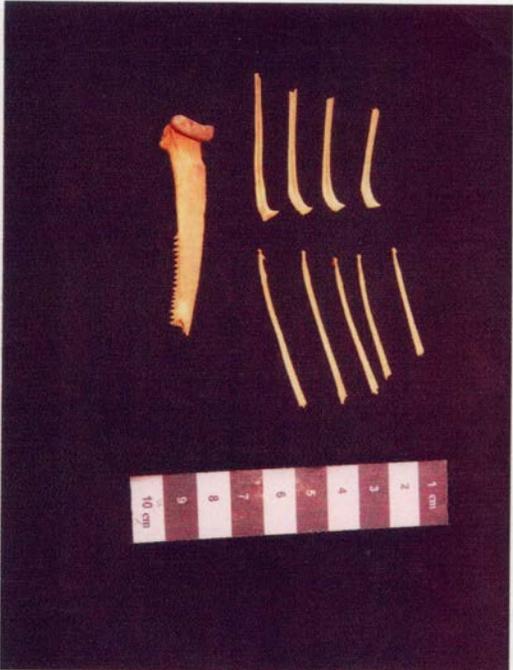
PLATE 22



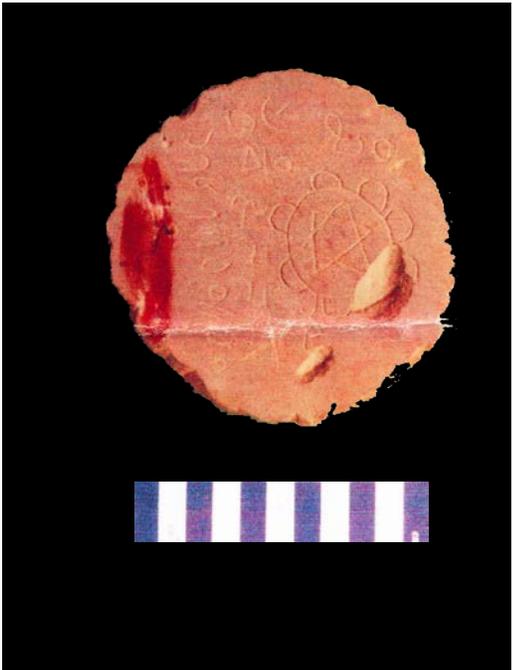
A



B



C



D

*SanggaiYumpham: A-B, view of excavated site from north and south, C, unidentified bones, D, inscribed sandstone piece*

This structure can be approached from the west through two corbelled arch entrances. The first entrance has an extant height of 1.45 m and a width of 0.76m, while the second one measures H 1.29x W 0.90m. Next to second entrance, again the tunnel appeared in the trench S8 E26-D. Here, on top of a vertical structure, the terminating point of the tunnel is found. The height from this point to ground is 2.2m and water might have fallen here then passed through lower tunnel. At this point, the tunnel is also formed like a corbelled arch, having a groove at the bottom. After excavating towards north, at the trenches of S7 E26-D, S7 E26-A, S6 E26-D, the extension of the tunnel was discovered which started from trench S6 E26-D. The total length of this tunnel is 13.95m.

In trench S7 E26-A digging was continued on the eastern side of the tunnel to examine its feature as well as its height. In course of excavation, a flat round sandstone piece inscribed in “Bengali” script (Pl.22D) as well as numerical was traced out. Besides, a number of broken red ware *hukka*, potsherds, few coins and disposed rifle bullets are also noticed.

## MIZORAM

### 20. EXPLORATION IN DISTRICT CHAMPHAI

A team from the Guwahati Circle of the Survey, led by S.S. Gupta, assisted by S. Shyam Singh, Tapas Dutta, and D.K. Majumdar, had surveyed the Champhai District, and located the following archeological sites, dotted with megalithic menhirs bearing petroglyphs and few rock shelters.

The site **Lungphunlian** (23° 45' .895"; 93° 18' .452") lies about 65km northeast of the Champhai District Headquarters. On the outskirts of the Lungphunlian village, a huge menhir, badly affected by natural chipping, measures about 3.65m (width) x 0.65m. (Thickness) x 4.03m (height) has been noticed. In addition to it, there are seven menhirs erected in this locality. One of these has shoe marks and inscribed with the year '1912'. These menhirs are erected on the hill slope of Lungphunlian tlang (hill).

Another significant finding is the rock engraving on a sandstone boulder measuring approximately 2.85m (height) x 3.90m (width), facing southeast. The forms of engraving include necklaces, *surahi* type pots, beakers, concentric circles, pendant and a stylized human figure.

Another site **Zotlang** (23°26'.810"; 93°20'.250") is located about 5km east of Champhai District Headquarters, where seven menhirs are found arrayed in a row. The largest one measures nearly 2.44m (height) x x1.87m (width) x 0.34m (thickness) and is fully carved with human and animal figures on both front and back sides (Pl.23A).

On the front side, there are 4 rows of human figures, first row consists of six figures; second one is having seven figures, third one contains four figures and fourth one shows five figures. On the backside, lies four rows of animal figurines, first row has four figures and other remaining rows have three figures each. Below them, lies a row of five human figures. On the top left corner, figure of a bird is depicted. These arrayed human figures on the front side have been carved over two spears

facing on either direction. The smallest menhir has a dimension of 1.12m (H) x 0.63m (W) x 0.23m (Thickness). Further, two menhirs bearing engravings- one with seven circles and the other showing an outline of a human figure have also been noticed. A little further east of these menhirs on the road-side lies a boulder, engraved with a standing human figure, holding a sword with his right hand and a *hukka* (?) with the left one, bedecked with an ear ring and necklace, flanked by two circles on either side.

About 54 km south-east of Champhai District Headquarters, on the top of a hill, the site **Lianpui** locates. There are 83 menhirs erected in different rows (Pl.24A). The largest one measures 1.87m (height) x 1.37m (width) x 0.20m (thickness) and the smallest one being 0.20m (height) x 0.23m (width) x 0.15m (thickness). Some of them have been brought from elsewhere and erected in this place to save them from destruction. These menhirs are also full of carvings and embossing. The main forms are rows of human figurines (Pl.23B), animals, *mithuna* heads, birds mainly hornbills, deer, fish, circles, probably gong and alike. Some menhirs depict human figures, holding a spear along with the said animals, occasionally human with and bird figures.

**Vangchhia** (23°12'.064"; 93°20'.506") is sited about 60km south-east of the Champhai District Headquarters. There are about 180 menhirs of different sizes, the dimension of the largest one (Pl.25A) is 1.5m (width) x 0.30m (thickness). Like Lianpui, these menhirs are also full of carvings and

embossing of different forms, such as, rows of human figures, heads of *mithuna*, deer, other animals, circles probably gongs, weapons and so on (Pl.24B). Besides, there is one human figure, holding spear and wearing headdress locally called *chhawndawl* and *areke-ziak* which is supposed to be put on by those persons, who have killed enemies in the war, depicted along with animals, human figures, heads of *mithuna*, deer's which might have been killed by him, circles or gongs, weapons probably used by him for killing these beasts and enemies and alike. Sometimes the said human figure is shown without headdress. As per local beliefs, these menhirs are raised as memorial stones wherein heroes have been depicted along with animals and human beings, which have been killed by them during their life time.

In addition, there is a rock shelter with five openings, noticed upside of the menhirs, overlooking the Myanmar border which was probably used as a watch tower or bunker. It is completely devoid of any depiction inside or outside. There is a hillock near the menhir site, marked with irregular post holes, probably for erection of some superstructure on a rock, where few potsherds, bearing cord impressions or basket mark on the exterior surface, have been collected. They are all handmade and fabric ranges from medium to thick, core shows rough texture due to the presence of quartz-grits in the clay. A smoking pipe or chillum applied with red slip is also found from the site. Structural remains in the form of stone paved pathways are also encountered during explorations. These structures might be related to the people who

raised these menhirs for memorial stones. These pathways, leading to the Tiau River found in Lianpui, Vangcchia and Farkawn sites, which are locally known as Mirawng Lamlian/ Mirawng Kong and might have been used for fishing, hunting, agricultural activities and other subsistence activities along the river courses of Tiau by the people of by-gone ages.

The site **Dungtlang** is situated 55km south of the Champhai Districts Headquarters. During the survey, some potsherds have been encountered. These are almost similar to those found from Vangchhia. Structural remains in the form of boulders, arrayed in an alignment are also encountered in Dungtlang (Pl.25B). These remains form various compartments, in the midst of huge boulders. Finding of these structural remains suggests the existence of a habitation site of uncertain period. Besides, two menhirs of medium height, without engravings are also noticed. Among them one is still intact, while another one is fallen. They are enclosed by boulders in a circular way. In addition, there are six memorial stones or menhirs engraved on the front side. The largest or central one measures 2.07m (length) x 0.70m (width) x 0.12m (thickness), while the smallest menhir shows 0.60m (length) x 0.70m (width) x 0.4m (thickness) dimensions. These menhirs appear to be brought from somewhere else and raised over there.

Interestingly one of the menhirs depicts an elephant, tiger and an unknown animal one above another which is conspicuously absent in other sites. Some smaller animals are also depicted in front of the tiger and the elephant. Moreover, one pendant, horn and one spiral

/concentric circle have been depicted on the upper part of the same menhir.

Another peculiar depiction is three rows of tigers and one concentric circle or gong, engraved on one of the menhirs. While going up, there is a platform made of huge stone slab and two raised upright perforated stones. There is a local legend that village chieftains' daughter Lianchhiari used to sit here for loom in the eighteenth century CE.

Further climbing up, there is a cliff and local myth says that, this place has been developed into a romantic historic place, owing to the lover's village of Lianchhiari, the chieftains' daughter. The extension of the early settlement has been noticed in the nearby hill, wherein dressed stones are found aligned horizontally, forming the wall which measures 0.50m to 1m in height. The settlement is extended up to 4km on this slope. It is worth mentioning here that Neolithic axe, hammer stone and a jar of red ware have been come across during exploration. It is quite likely that the entire settlement, made of dressed stones, is a Neolithic site that required further investigation.

About 90 km southeast of Champhai District Headquarters, the site **Farkawn** lies. Here, engravings on a vast rock, lying on the ground have been noticed. The execution is divided into three segments by drawing straight lines. *Mithuna* heads, weapons and vessels/ pots are depicted on the upper segment, necklaces, circles and geometrical patterns are engraved in the middle segment; while circles, wild boar and a scene of attacking of an animal on a human being are represented on the lowest



A



B

*A, Zotlang: menhir and B, Lianpui: human figures*



A



B

*A, Lianpui: general view and B, Vangchhia: human and animals figures*



A



B

*A, Vangchhia: general view and B, Dungtalang: general view of early settlement*

segment. Depiction of the figures is similar to carving on menhirs or memorial stones of the other sites. Another archeological place is the **Chhura's Farep** (Chhura's pig). There is a stone sculpture modelled as a mallet, related to a local faith. It is spherical in shape, having four circular holes in a row placed vertically. It measures about 1.07m in length and 1.86m to 1.37m in dia. It looks like a human bust.

The **Lamsial Puk** cave is situated 10km north of Farkawn, where few numbers of bones and skulls have been found kept inside a wooden box. It is learnt that these bones have been deposited by the village people who have shifted to other places. Earlier, they had these bones in their house only. In absence of corroborative evidences, it is very difficult to date these menhirs. However, in Mizoram these memorial stones are likely to be of three to four hundred years old. Since the surveyed areas of Champhai District lie in the border of Myanmar it is quite likely that the people who migrated to this region have practiced their custom of raising the menhirs which is still continuing.

## ODISHA

### 21. EXCAVATION AT SISUPALGARH, DISTRICT KHURDA

The excavation at Sisupalgarh was further conducted by the Excavation Branch IV of the Survey, under the direction of A. K. Patel, assisted by Milan. K. Chauley, Mahendra Pal, S K Khuntia, B. B. Badamali, R. N. Sahoo, S. K. Bhoi, S. K. Mishra, Simanchal Barik, A. K. Sasmal, S. N. Kuanar, H.K. Behera, Subash

Das, N. Pal, M. K. Sahoo, C. Mohanty, Kangali Barik and Bansidhar Behera.

As the ancient site is located within the city of Bhubaneswar, it is mercilessly destroyed by the recent urbanization. In the present situation, the gateways to the site have been turned inaccessible, due to the building activities and destruction. However, the area of second gateway of the western fortification wall, is still intact and its ownership lies with the Government of Odisha, hence the site was selected for excavation.

The main objective of the excavation was to highlight the significance of the cultural heritage of ancient Odisha and to understand the town planning of the habitational area. With this aim, a small scale horizontal excavation was taken up in the second gate of the western fortification wall during this season. The area of second gateway, designated as Sisupalgarh II, was made into a square, measuring 100mx100m, which was further divided into smaller squares of 10mx10m (**Fig.15**) and numbered as B1 to B100 (Sisupalgarh-1 was the area excavated by Prof. B B Lal). Initially, partial excavation was carried out in five trenches, namely, B37, B38, B39, B47 and B49. Owing to some technical restrains; the excavation was closed without reaching to a logical end. Among the above five trenches, B-37 (Qdt.1 and 2) was dug up to a depth of 2.98m which exposed six layers, the lowest two layers 5 and 6 composed of loose brownish soil mixed with brick- bats, overlying by the laterite pavement of the ancillary passage. Layer 4 being loose and

ashy and mixed with potsherds, indicating some kind of fire activities. Layer 3 is having compact, yellowish brown soil, while layer 2 is composed of loose, brown soil mixed with brick bats suggesting the debris of the collapsed brick revetment provided above the laterite stone wall. Layer 1 belongs to humus.

The above layers are post deposits, after disuse of the ancillary passage. On the basis of the findings of two sealings, pottery types and other objects, all layers from 1 to 6 are coincided with the Period-III of Prof. B.B Lal; the date was assigned by Prof.Lal as c.200-350 CE. It has already been mentioned that the excavation has revealed single period of occupation. Even, the nature and character of this partially exposed gateway, resembles with the structures excavated by Prof. Lal in dimension as well as in construction.

The exposed structure of the northern flank of the gateway has an ancillary passage. The fortification wall turned outward and joined with the L-shaped flank, built of laterite block of varying sizes, the largest one measures about 1.37m x 0.43m x 0.37m and the smallest one shows 0.87m x 0.43m x 0.37m measurement. The ancillary passage (Pl.26A) is a laterite stone paved floor and is approached by three stone steps (Pl.26B) from the contemporary level of the main gateway.

The ancillary passage measuring 7.50m x 1.65m has eight courses of laterite blocks, while the wall along with the gateway measures 6.05m in height, having seven courses only. The function of the ancillary passage was most probably for the pedestrians to enter inside the fortification when the doors of the main gateway were closed.

The northern flank has been partially exposed in the trenches B36, B37 and B38, measuring 19.80m in length, the width is uncertain as excavation is incomplete. The L-shaped flank (Pls.27A-B) is a solid basement, made of laterite block.

Immediately above the basement, is a super-structure of baked bricks surviving up to a height of eight courses; the brick sizes are 45cm x 30cm x 8cm, 43cm x 30cm x 10cm and 42cm x 25cm x 9cm. On the inner side of the brick revetment, offsets are seen. The area within the brick revetment is filled up with clay mixed with brick bats. The construction of the flank along with the ancillary passage revealed three phases of structures, exactly similar to Phase II, III and IV of previous excavation. Here, Phase II is represented by the laterite structures, while the Phase III is marked by baked brick revetment and Phase IV is featured by weaken and repairing stage. However, Phase I signifies the mud rampart has not been exposed during this season.

The pottery gleaned from the excavation is mainly plain. Painted wares are conspicuous by their non-appearance. Both handmade and wheel made potteries have been recovered. Red ware of fine and coarse fabric predominates.

Besides, grey ware, black and red ware, black slipped ware, red slipped wares are also found along with few sherds of yellowish, red and buff wares. There are few black and red wares which contain incised design on lower part of the bowls. In addition, small vessels, jars, lids, bowls, dishes, basins, pedestalled bowls are the main type of Period-III. The fabrics are of

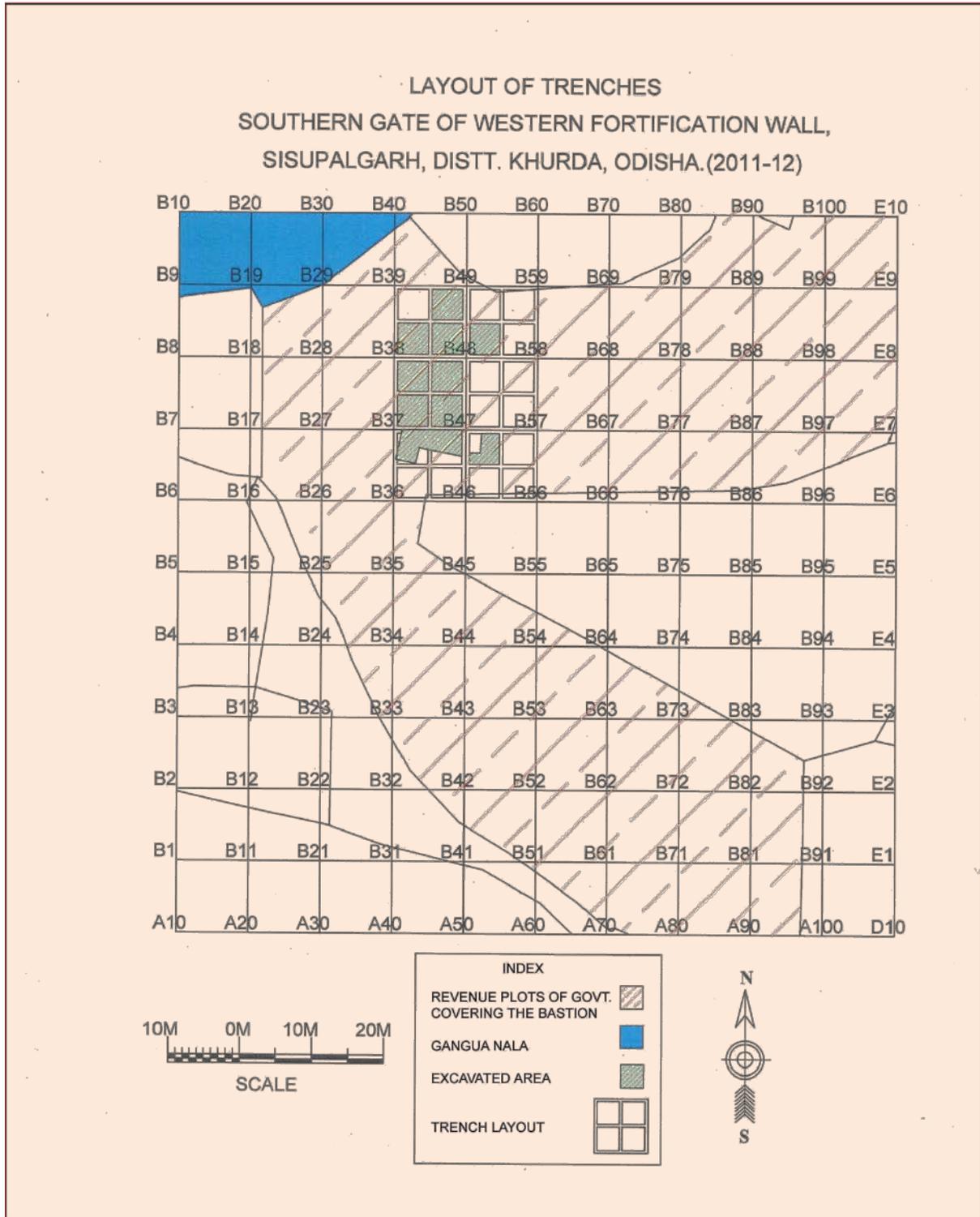


Fig. - 15



A



B

*Sisupalgarh: A, paved ancillary passage, B, steps leading to ancillary passage*

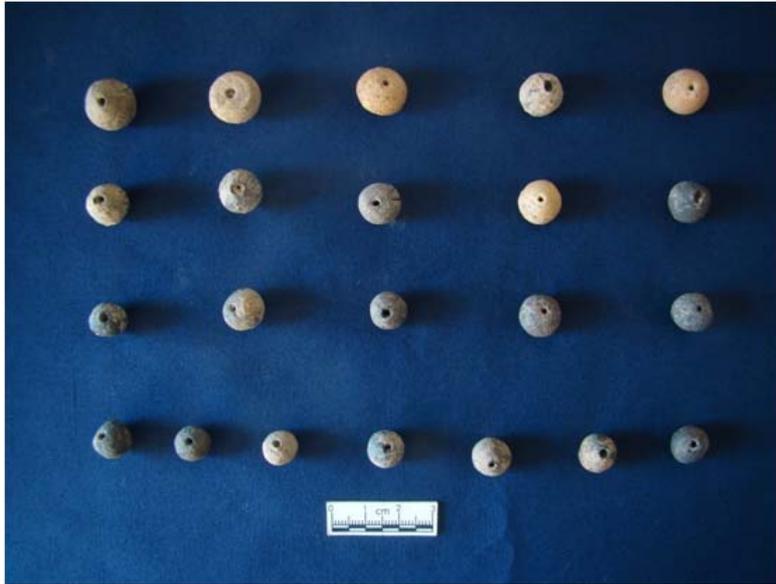


A



B

*Sisupalgarh: A, brick revertment of northern flank, B, laterite based north flank*



A



B



C

*Sisupalgarh: A, beads, B, terracotta ear studs and C, terracotta sealing*

thin to thick. The pottery has slip as well as wash and few of them are polished. The pottery of Period III marked decline, as those are crude and ill-fired.

Altogether, seventy three numbers of antiquities have been unearthed, which include terracotta beads (Pl.28A), balls, wheels, ear-studs (Pl.28B), gamesman, hop-scotches, skin rubbers and iron nails. Two terracotta sealings showing a buffalo feeding to calf, bearing a legend and the other one inscribed with two indistinct letters are worth mentioning (Pl.28C). Since the excavation was partial, further excavation of this ancient site may reveal a complete cultural sequence.

## PUNJAB

### 22. EXCAVATION AT RUPNAGAR, DISTRICT RUPNAGAR

The excavation at Rupnagar or Rugar, formerly known as Ropar ( $30^{\circ} 57' 59.04''$ ;  $76^{\circ} 31' 59.16''$ ) was resumed by the Excavation Branch II, Delhi, of the Survey, under the guidance of P.B.S.Senger and V.N. Prabhakar, of the Survey, and Shahida Ansari of the Deccan College, Pune, assisted by B.S.Fonia, Hari Om Sharan, Nidhi Gupta, V.P.Verma, Priti Shandilya, Ravinder Kumar and Subhas Kumar with the objectives; to expose the earliest occupation at the site, represented by the Harappan Culture, to understand the structural levels, house plans, origin, growth and transformation of the Harappan Culture and its association with various regional manifestations, as represented by the evidence from the site Bara; to collect the samples from the archaeological deposits of various levels

that can be subjected to different scientific as well as technological analyses and to identify the probable role of Rupnagar in the overall exploitation of mineral resources and to expose the area, west of the main mound and to reveal the presence and extent of the Harappan Cemetery.

The previous excavations carried out at different points of the Rupnagar site, namely, RPR-1, RPR-2 etc by Y.D.Sharma during 1953-54 and 1954-55 had brought to light a six fold sequence of archaeological cultures, starting from the Mature Harappan Culture followed by the Painted Grey Ware Culture, Early Historic (Mauryan, Sunga-Kushana, Gupta) period up to the Modern period i.e. seventeenth century CE), but the excavation report has not yet been published. Hence, it is also aimed to document the ceramic and artifact remains from the earlier excavation.

However, the ancient mound at Rupnagar is located at a point where the River Sutlej enters into the plain from the hills. The left bank of the River is dotted with four prominent and distinct mounds are noticeable, the highest of which rises to nearly 21m from the surrounding plains and the general elevation of the mound is 300.079m MSL. Among these mounds, the southern one is densely occupied and partly excavated by Y.D.Sharma, western mound conceals the Harappan Cemetery and the northern mound was excavated at several points. The archaeological remains at Rupnagar are spread in an area of roughly 12 hectares. On the elevated portion of the mound, Nalgarh Kothi is located which makes the landmark of the site.

During the period under review; the trenches were laid out in order to have probing on all the directions of the mound. The major objective was to probe the earliest occupation at the site, i.e. the Harappan and associated levels. However, trenches were also taken up in other parts of the site in order to collect samples of various occupational levels.

With these objectives trenches were opened up on the rain gully of the southern slopes, (south of Nalagarh Kothi), as well as on the western-most part of the mound which revealed the presence of Harappan Cemetery during the earlier excavations.

Likewise, a datum point was fixed on the north-east corner of the pavement of Nalagarh Kothi with 0, 0 as its coordinates. The entire site was then gridded in 5m x 5m squares and their position determined according to their direction and distance. Thus, a trench located at a distance of 100 m east is labeled as E100, 100m west as W100, 100 m north as N100 and so on. A trench located at a distance of 100m on east and 50m north is labeled as N50E100 and so on and so forth. This system largely helped in the case of larger mounds where the traditional system of X, Y, Z and A division of squares had a limitation of 26 trenches and beyond that multiple alphabets had to be used.

A 25cm baulk was also left on all directions of the 5m x 5m trench so that a 50cm baulk could be retained between trenches for maintaining the section and recording the stratigraphy. Further, the reference peg was identified as the north-western peg of a trench. In total, 21 trenches of 5m x 5m were dug, as indicated below.

Out of the 21 trenches, eight trenches, viz, N45E145, N45E140, N45E135, N45E130, N45E125(Pls.29A-B), N45E120, N50E145 and N50E140 were laid out on the north-eastern slope of the mound in order to determine the earliest occupational levels of the site; six trenches, namely, S65W20, S65W10, S65, S70W25, S70W15 and S70W5 on the south-south-western slope of the mound; four trenches, viz, S20W175, S20W170, N20W190 and N20W185 on the western most mound and three trenches, viz, N5E20, N5E25 and N5E30 on the rain gully.

As indicated above, eight trenches of 5mx5m were laid out on the northeastern portion of the mound and on the slopes, with an objective to reach the earliest levels easily. The habitational level of Harappan/Bara was reached in the six trenches N45E145, N45E140, N45E135, N45E130, N45E125, N45E120, at a depth of around 50cm itself.

The evidence indicated that this portion of the mound is heavily eroded and due to which only 50cm – 100cm wide cultural levels could be exposed. The remaining portion of the cultural levels of this period has been eroded and refilled due to activities of the later period. Thus, the southern portion of the six trenches yielded deposits of Harappan/Bara levels, while the northern half revealed a mixed deposit, mostly Historical.

The Harappan/Bara levels are characterized by huge pit activities as evidenced from all the six trenches. The excavation also brought to light a unique feature of habitation at this part of the mound. The habitation layers are superimposed on a 0.22m thick mud platform

running in a northwest-southeast orientation which could be exposed in N45E140 and N45E135 trenches. This mud platform could not be traced in other trenches due to erosional activities explained above. This platform rests on a 0.65m thick yellowish silt and sand mixture, the character of which indicates an anthropogenic activity.

This yellowish silt and sand mixture layer rests on the blackish grey silt of the River Sutlej. Thus, the evidence gleaned from these six trenches shows that, the habitation at the northeastern portion of the mound, commenced by suitably laying of a 0.20m – 0.30m thick compact layer of yellowish silt and sand mixture, followed by the construction of a mud platform to have a firm ground.

The series of pit activities cutting the regular habitational layers above the mud platform could be assigned to the Harappan/Bara levels. The excavation also brought to light several broken burnt bricks, however, not confirming to the Harappan standardization.

The trenches N45E145, N50E140 and N50E145 brought to light the remains of a *lakhauri* brick-kiln (Pl.29C) in association with a series of burnt ashy layers. The presence of brick-kiln was noticed at a depth of 0.70m from the reference peg which consisted of both burnt and un-burnt *lakhauri* bricks (Pl.29D). The impression of removed burnt bricks could also be noticed among the remains.

The trench N50E140 was excavated further below the remains of brick-kiln and the

natural soil was reached at a depth of 3.30m from the reference peg. The habitational activity in this trench could be noticed in the form of a layer of river pebbles arranged horizontally. The evidence is further corroborated from excavations at other parts of the mound during the previous excavations, wherein it had been reported that the river pebbles were used in the earliest phase of activity here.

However, no structural activity was noticed in this trench above the layer of pebbles.

The pottery remains from the Harappan/Bara levels consist predominantly of red ware, both sturdy and thin. The excavation did not yield typical and hallmark Harappan pottery but brought to light pottery having affinity with the Harappan types and in association with Bara ware. By and large, the Harappan ware is plain and devoid of painted motifs, however, a few sherds with black paintings on red slip could be noticed. A sherd having the typical pipal leaf motif (Pl.30A) was also found. Another remarkable find is the occurrence of three broken sherds with typical Harappan signs (Pl.30B), which might have formed part of an inscription.

The first sherd has the part of the famous Harappan sign “yoke bearer”, here, the lower half of the standing human figure, below the shoulder and right yoke is preserved, while the left yoke and head portion is broken all along the deep incision made to create the sign on the potsherd during wet condition. The second sign has the “fish” preserved in a more or less complete condition. The third sherd preserves only part of a vertical stroke, which might

have represented “U” motif. All these sherds indicate the classical Harappan sign system.

The prominent shapes noticed are dish-on-stand, storage jars, goblets, beakers, vases, bowls, miniature vessels etc. The Bara pottery is characterized by the typical red ware with chocolate and black painted motifs, consisting of wavy lines, geometrical motifs etc. The pottery is represented by red ware with plain surface above the shoulder, while rusticated below it, with a variety of patterns.

The ceramics from the later levels include red ware, red polished ware and few glazed wares. The excavation also brought to light considerable quantity of animal bones from the Harappan/Bara levels. The sediments were subjected to floatation and charred floral remains were also collected along with charcoal remains.

Antiquities retrieved from the Harappan/Bara levels include typical steatite disc beads, chert blades (both Rohri chert and black chert), faience bangles and beads, beads of agate, a steatite button seal, bone points, terracotta bangles (Pl.31A) etc. The antiquities from the Historical levels yielded human and bird figurines (Pls.31B-C), glass bangles, beads of terracotta and stone, coins (Pl.32D) and so on. Another interesting feature is the occurrence of terracotta human and animal figurines assignable to eighteenth-nineteenth centuries CE, based on stylistic grounds.

The excavation on the southern portion of the mound was carried out in six trenches of 5m x 5m dimensions. The trenches, namely, S65W20, S65W10, S65, S70W25, S70W15 and S70W5 were laid out on the slope to the

south of the Nalagarh Kothi along the N – S axis.

The excavations in the trenches S65W10 and S70W5 were resumed to a considerable depth. The trench S65W10 was excavated up to a depth of 2.35 m below reference peg, while the trench S70W5 was dug up to a depth of 6.65m the former one did not reveal any remains of structures and consist chiefly of eroded deposits, the latter brought to light habitational remains in the form of two successive mud floors having hearths in each. A rectangular hearth was found in association with a mud floor in the trench S70W5 at a depth of 1.48m from the reference peg. The hearth is lined with mud bricks along the eastern arm. The mud bricks measure 34cm x22cm. The hearth consisted of ash and charcoal. The occupational levels posterior to that of the hearth indicated lot of disturbances and erosional activities, as evidenced from the topsy-turvy remains of burnt bricks. The erosional activities run in a northeast-southwest direction in this trench. Another hearth, apsidal in shape, with the mouth towards the western side was encountered at a depth of 1.83m from the reference peg and at a lower level of the above mentioned hearth. This hearth is also associated with a mud floor and remains of fine layers of ash and charcoal were found. The habitational remains can be datable to Medieval Period, based on the pottery remains.

The excavation was continued to a depth of 6.65m in S70W5. The remains indicated mainly of eroded deposits. The pottery remains from this deposit are also fragmentary in nature and devoid of any clear cultural

markers, even though, stray finds of grey and painted grey ware were found from the lowest level in trench S70W5.

The trench S70W25 yielded the remains of a burnt brick structure oriented in an east-west direction. The structure consists of four courses and traced to a length of 2.06m with a width ranging from 0.38m-0.6m. A threshold with a width of 1m was also found. The structure belongs to the Medieval Period. The artifacts unearthed from this area include terracotta figurines, beads, bangles of faience, hopscotch and a stone pestle.

A huge rain gully of north-south orientation is noticed to the east of Nalagarh Kothi and the deepest portion is located at the northern edge of the mound. However, the rain gully is totally covered with thick vegetation at the lower portions and the upper portions are with less vegetation. The mid portion of the rain gully was selected for probing in order to retrieve various kinds of samples including floral and faunal remains of the Historical Period and to understand the changes in the dietary practices over a period of time. The trenches N5E20, N5E25 and N5E30 were excavated in this area and the trench N5E25 was dug to a depth of 6.3m. The exposed remains belong to Post-Gupta Period.

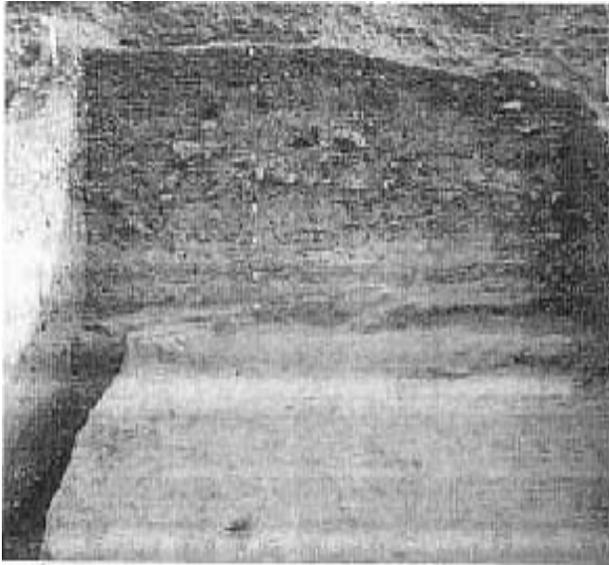
A burnt brick structure constructed with reused bricks with an orientation of northwest to southeast was exposed at a depth of 1.5m from the reference peg in the western portion of N5E20 trench (Pls.32A-C). The structure consists of seven courses has an extant height of 0.35m and the exposed length is 0.84m while the width measures 0.35m. This

structure can be datable to the Post-Gupta Period, based on the pottery remains.

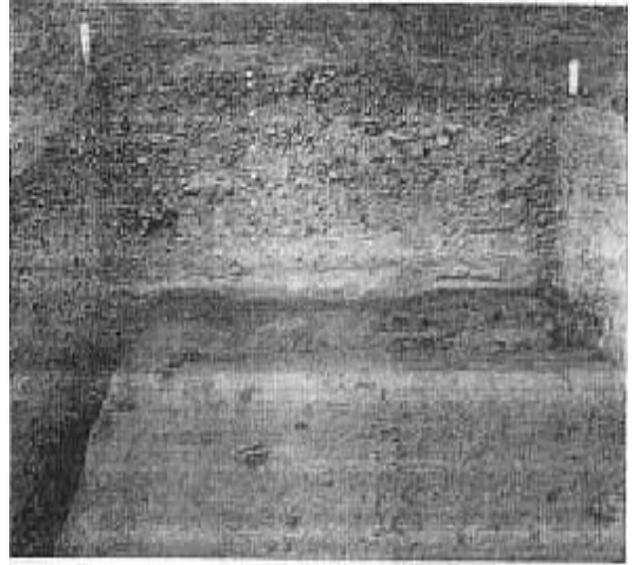
Two more structures of burnt bricks were encountered from the levels assignable to the Gupta Period. The first structure is found at a depth of 2.50m from the reference peg, towards the eastern portion of the trench.

A burnt brick wall running in a north-south orientation along with several associated floor levels was encountered. The floor levels yielded a variety of charred grains as well as pottery. A full pot was excavated along the eastern section and in association with this structure. The wall takes a turn towards the east, the portion of which is highly disturbed. The structure consists of seven courses with an extant height of 0.36m. The size of the bricks is 30cm x 20cm x 3cm. Another brick structure of five courses was encountered at a depth of 3.31m below reference peg in the south-western portion of the trench. The artifacts found from this trench include terracotta objects like animal figurine, wheel, sling ball, hopscotch, beads, stone pestle; bangles of glass and shell; copper and iron objects.

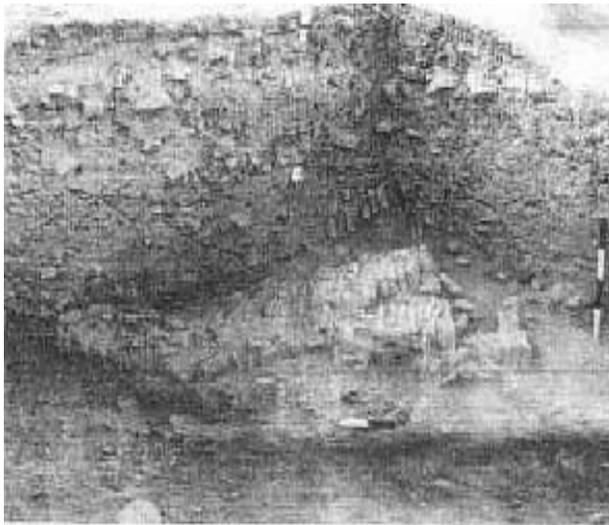
Four trenches were laid out in the western most part of the mound wherein the Harappan Cemetery was encountered in the previous excavations. However, during the current season of working, the evidence of cemetery remains could not be encountered as the excavation was limited in nature due to various constraints. The remains of Painted Grey Ware associated layers were exposed in two trenches, laid out on the eastern periphery



A



B



C

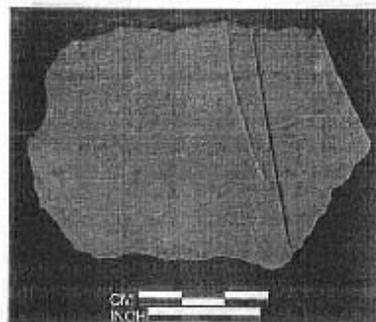
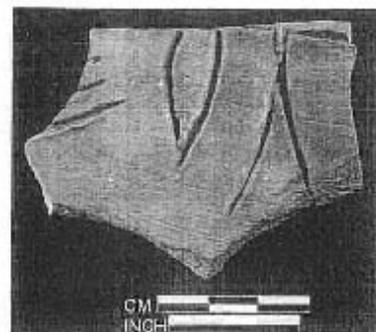


D

*Ropar: A-B, general view of the trenches N45E125, C, remains of bricks in a brick kiln N50E140 and D, lakhauri bricks*

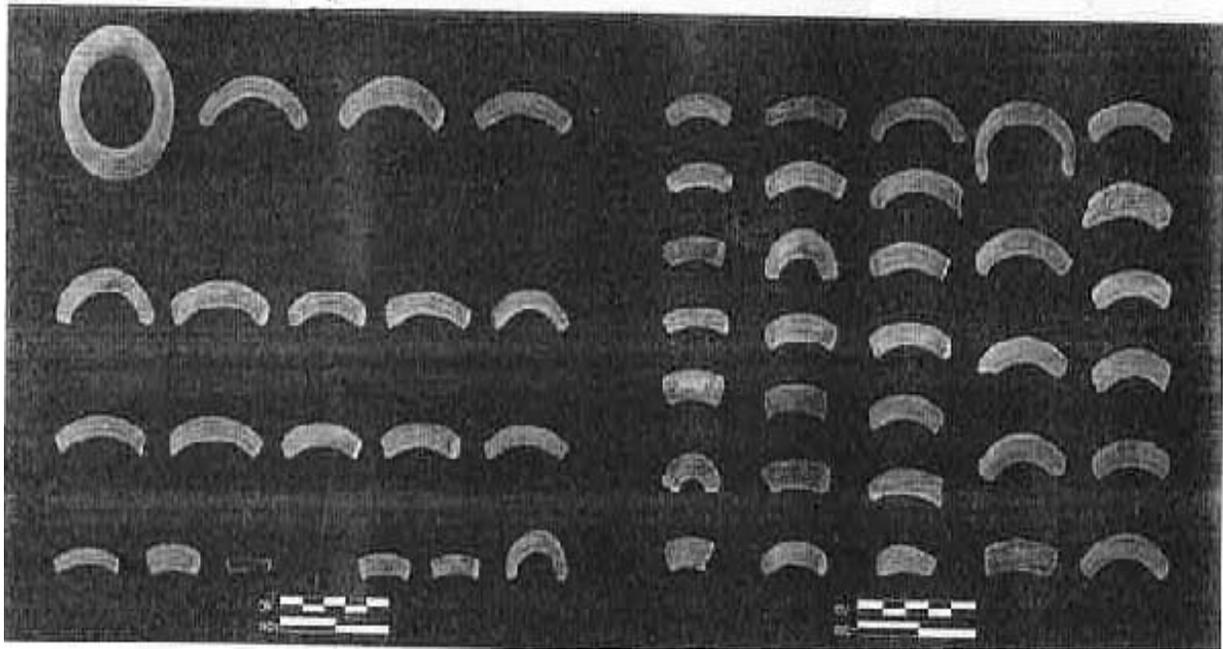


A

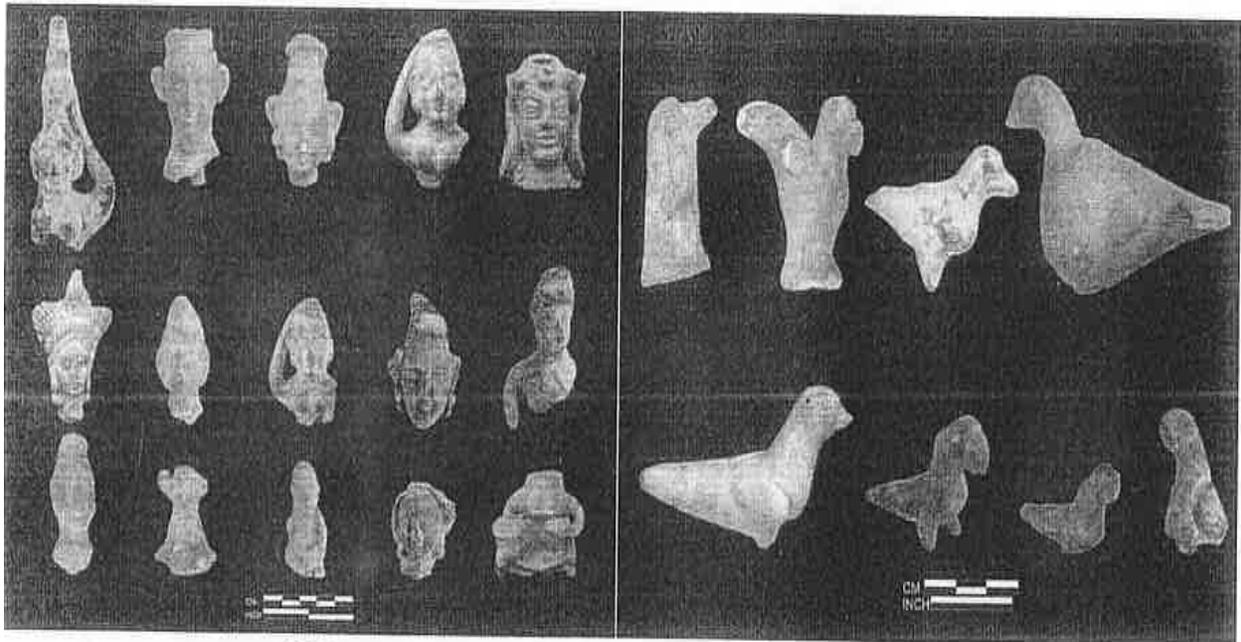


B

*Ropar: A, pipal leaf motif on a sherd and B, potsherds with Harappan signs*



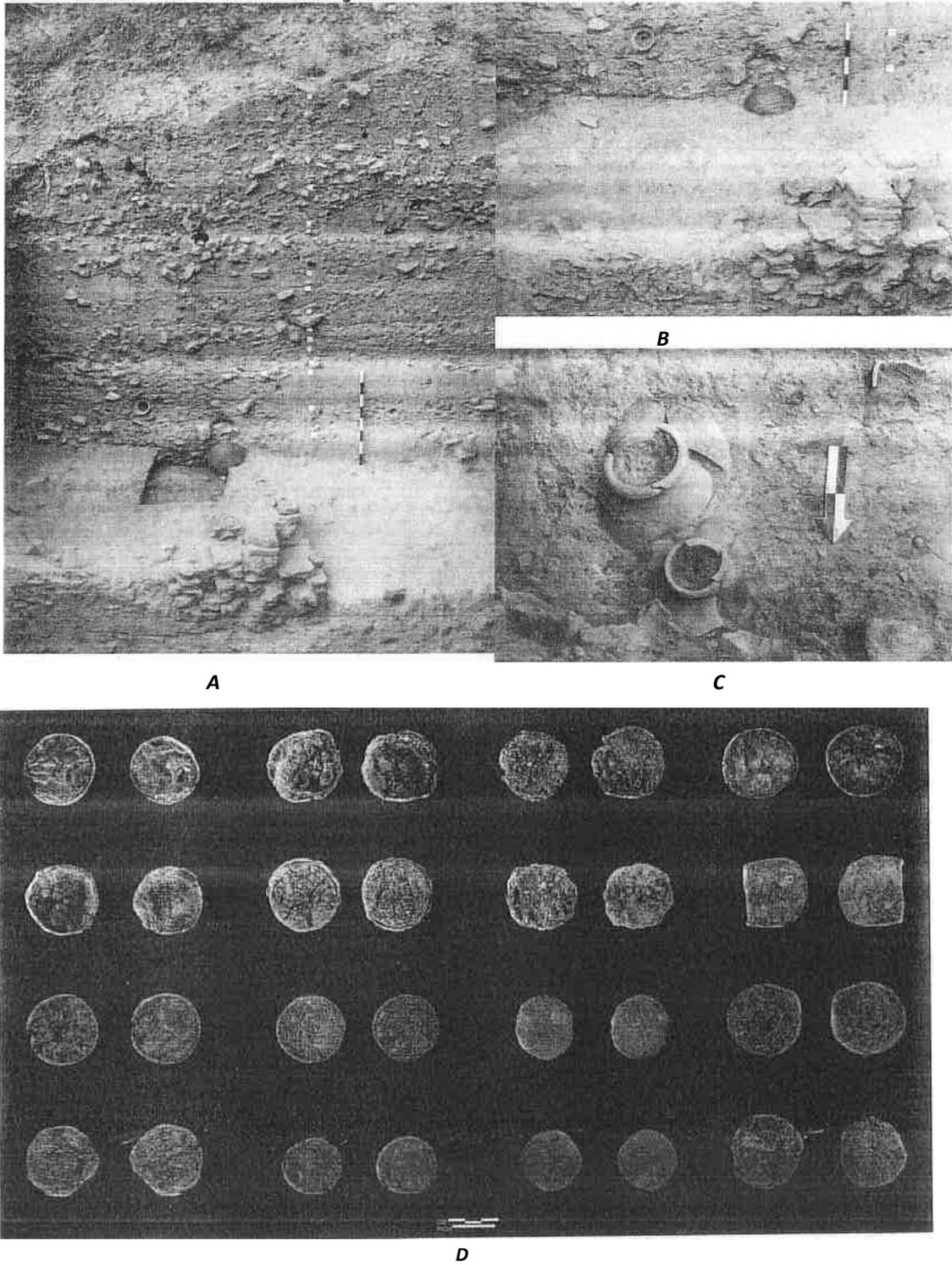
A



B

C

*Ropar: A, terracotta bangles, B, terracotta human and C, bird figurines*



*Ropar: A, view of section facing west (N5E20); B-C, pots in situ ((N5E20) and D, coins found from different levels*

of this mound. The pottery finds from this excavation include that of Painted Grey Ware and associated red ware.

## RAJASTHAN

### 23. EXPLORATION IN THE VALLEYS OF RIVERS SOM AND MAHI, DISTRICTS DUNGARPUR AND BANSWARA

Archaeological explorations were undertaken along the Som River Valley, under the general direction of J.S.Kharakwal of the Institute of Rajasthan Studies, JRN Rajasthan Vidyapeeth University, Udaipur, assisted by Kul Shekhar Vyas, Hansmukh Seth, K.P.Singh, Rohit Menaria, Narayan Paliwal, Soyab Qureshi and Hitesh Bunkar, in order to understand the archaeological potentiality of southern Rajasthan and revisiting a few known sites in Dungarpur and Banswara Districts. During the survey, following Microlithic, Bronze Age and Iron Age sites were located;

The site **Aspur** (23°57'; 74° 05') is located in Dungarpur District, earlier reported by R.C. Agrawala, but, at present, entirely en-croached by the villagers.

About 20km west of Aspur, on the bank of the Som River, another site **Karelia** (23°59'; 74°58') revealed multicultural deposits of about 2m thick, containing Ahar Culture and findings of the Historical and Medieval periods.

The site **Kahalkot** (23°30'.819";74° 01'.499") is situated on the left bank of the River Mahi, the alluvial terraces of which unfolded scattered

microliths, such as, flakes, blades and fluted cores made on agate. On the opposite site of the river, remains of the Medieval Settlement and Temples have been identified.

The low mound **Bhagora** (23°34'56"; 74°11'13"), named after the Siva Temple, Bhagoreshwar Mahadev, dated VS 1585, is placed about 2km south of Pratapur-Garhi Tehsil in Banswara District. The ancient settlement is located on the bank of a seasonal rivulet near the Siva Temple which yielded microliths and ceramics of the Historical and Medieval Periods. Besides, few potsherds of undefined shapes which do not tally with the potsherds of the Historical or Medieval Periods have also been recovered.

**Mahipul** (23°38'30";74° 07'22") is a microlithic site, located about 20km east of Sagwara Tehsil, District Durgarpur, on the bank of the River Mahi, near Dharana Mata Shrine. Microlithic tools made on agate and local chert were discovered from the site, besides; fluted cores, flakes and debit age have been gathered. Several ring stones and hammer stones were collected during exploration. The ring stones have shallow depressions in the central part.

On the opposite bank of the River Mahi, another site **Vakavada** (23°38'38"; 74°07'46") is situated which yielded similar microlithic tools like Mahipul. The section of the river shows a thick deposit of ashy material, resting on whitish clay and lenses of sorted fine sand and gravel deposits.

Sited about 70km south east of Dungarpur on the bank of the River Mahi, **Galiakot** (23° 31'01"; 74°07'17") revealed remains of a

Medieval Settlement including ceramics. The pottery shapes are represented by dish on stand, bowl with flared rim/sides, jar/pot of red ware and jar/pot or *handi* of grey ware. Slags were found scattered on the surface. Two temples of Indo-Aryan Style have been traced out during exploration, which could be contemporary to the Medieval Settlement.

**Nithua-gamri** ( $23^{\circ} 54'50''$ ;  $74^{\circ}07'29''$ ) is located on the Som River Valley, about 45km east of Dungarpur Town. Nithua and Gamri are two villages next to each other, the low flattened mounds unfolded Historical and Medieval potteries, represented by bowls, basins, jars and pots, besides, saddle querns have also been collected from the site.

**Palodara** ( $23^{\circ} 31'01''$ ;  $74^{\circ}07'17''$ ) is located about 6km south of Banswara, on the bank of a seasonal rivulet. Close to the village was found a large Historical site, which is partially eroded by the stream. On the left bank of the rivulet an exposed section was found, the deposit of which measures about 2.40m. The surface collection revealed Historical and Medieval pottery. Besides, iron lumps and slags were found scattered on the site. The site is under cultivation due to which a number of structures were partially visible on the surface.

The archaeological site **Arthuna** ( $23^{\circ} 29.483'$ ;  $74^{\circ} 06.038'$ ), located about 55km south-west of Banswara, is a centrally protected monument and famous for its large Brahmanical Temple Complex, belonging to Early Medieval and Medieval Periods. Within the complex, few temple remains were found underlined by older deposits, perhaps belonging to the Early Medieval Phase. Besides, grey and red wares of Medieval Phase were encountered here. The shapes

include variety of jars, pots, carinated pots, bowls and basins.

**Jhadas and Odwada** are the two villages situated near Garhi-Partapur Tehsil, District Dungarpur. A few fragmented Brahmanical icons datable to twelfth-thirteenth century CE were noticed in these villages. One of significant images is standing Vishnu while others are incarnations of Vishnu, such as, *Rama*, *Varaha*, *Buddha*, *Parashurama*, *Vamana*, *Kalki* etc. Another fragmented icon was identified as seated image of Siva and Parvati. At Odwada village, a large icon of Ganesha was discovered lying near a pond. All these icons were made of green schist.

The site **Khamera** ( $23^{\circ}46.782'$ ;  $74^{\circ}28.495'$ ) located about 7km north of Ghatol Tehsil, Banswara District, revealed several large mining shafts near the village Sadadi Dhani. These mines were sunk in the small hillocks and the openings of most of the mines were found circular, ranging from 1.5 to 5m in diameter and their width gradually increased as they became deeper. Prominent chisel marks were noticed on the wall of the mines indicating that the mining was done by sharp tools. These mines are quite identical to the ones discovered few years ago at Bhukia and Jagpura in the northern part of this Tehsil. According to Banswara District Gazetteer, 1974, this region is known for iron ore. Several stone alignments and structures close to the mines were also traced which may indicate that these could be residential structures of the miners.

**Virpur** ( $23^{\circ} 55.238'$ ;  $74^{\circ}41.421'$ ), positioned near Suhagpur in Pratapgarh Tehsil, 3km off the road leading to Banswara, the ancient mound is a smelting- cum- habitation site,

spread in an area over two hectares, having thick concentration of slag, in the form of large chunks with fluid impression, indicating that the ore was heated at around 1100 degree C(temperature). The slag is consisted of spongy and glassy material and brownish in appearance. The site also revealed a large number of fragments of tuyeres and huge stone block and chunks of stones out of which copper sulphate was leaching out. It is likely that both copper as well as iron were smelted at this site during the Medieval Period.

In the south-eastern part of the site, remains of a *Nagara* Style octagonal Siva Temple of Early Medieval Period were identified. Two inscribed architectural members possibly belonging to the Siva Temple were found lying in the village. The inscription belongs to thirteenth century CE. Stone alignments, partially exposed structures, a number of hammer stones, bird shots, and bangle fragments were also noticed at the site. Besides, potsherds, represented by red and grey wares belonging to Medieval Period were also recovered; predominated shapes are jars in the total collection.

## TAMILNADU

### 24. EXCAVATION AT VIKKRAMAM, DISTRICT THANJAVUR

The Chennai Circle, of the Survey, conducted trial-trench excavations at the Buddhist site, Vikkramam ( $10^{\circ}28' 10.87''$  ;  $79^{\circ} 24' 37.56''$ ), under the project entitled “Exploration and Trial Excavation of the Buddhist Sites in the Coastal Part of the Districts of Thanjavur, Tiruvarur and Nagapattinam”.

The village Vikkramam, Pattukottai Taluk, lies about 15km east of Pattukottai and is locally called “Buddhadikollai”. The

excavations aimed at ascertaining the persuade of Buddhism in the Chola Country and impact of maritime contacts on the growth of Buddhism in this part of the country; moreover, to locate the Buddhist Temple where the Buddha Statue originally existed and also to re-examine the nature of the area, as well as the causes of the decline of Buddhism in Chola Country in the later period.

Accordingly, a trial trench (VKM-1) of 2m x 2m was laid on the southern side of the site which was later extended as the structural activities were found to spread further.

Trench VKM-1 was divided into 10 quadrants of 2m x 2m each, figured as QDT I, QDT-I', QDT II, QDT-II', QDT III, QDT-III', QDT IIA, QDT IIB, QDT IIIA, QDT IIIB. Another trench (VKM-2) was laid on the northern part of the site measuring 2mx2m area.

Trench VKM-2 proved to be insignificant, as it was found to contain neither any structural activities nor antiquarian remains. Hence, focus was given on the VKM-1, where some kinds of brick structural activities were emerging, which too was found to be disturbed due to agricultural activities.

Structural activities were found in the QDT-I, QDT-II, QDT-IIA and QDT-IIIB of VKM-I. Other quadrants revealed only brickbats with compact clay at a depth of 0.5m to 0.30m. Digging in QDT-I and QDT-II exposed single course brick wall in east-west alignment. Most of the wall alignment comes under the northern side of the trench. The length of brick wall is 4.15m and the maximum width is 0.25m. Full size brick was not found in this alignment as the wall seems to be constructed of the broken bricks. Potteries and antiquities were not encountered in this excavation.

In QDT-IIA, at a depth of 0.5m; a brick wall with east-west alignment was noticed. Further digging up to 0.30m revealed 4 courses of brick structure. Here, in this construction, apart from broken bricks, some full size bricks (24cmx12.5cmx4.5cm) seem to have been used. The length of the structure is 1.58m. The bricks are placed in header alignment and there is an 'L'-shaped portion, forming an offset like feature and a kind of niche was also observed in this structure.

In QDT-IIIB, at the depth of 0.5m, a brick wall having east-west and north-south alignment was found in the north-west corner of this trench. Further digging exposed 5 courses of brick wall at a depth of 0.30m. The wall was exposed to its full after removing the baulks of the QDT-IIA and QDT-IIIB. The length of the wall from east-west is 1.18m and north-south 1.25m. The remains of the brick wall represent that for the veneering, full bricks have been used and the core part was constructed with broken bricks and brick bats. The cementing mortar is only mud. Stratigraphically, the top soil was humus of 0.5m deposit, followed by a 0.30m layer of compact soil with brickbats. In this layer only the brick structural activities are encountered. Beyond the depth of 0.30m, natural soil appeared.

In the end, whole site seems to have suffered much damaged due to the leveling of ground for agricultural activities and for plantation of coconut trees.

### **25. EXCAVATION AT ALAMBARAI, DISTRICT KANCHIPURAM**

The Directorate of Archaeology, Tamilnadu carried out excavations at Alambarai (12° 16' 30"; 80° 1'), a village on the sea shore, is

located at a distance 106km south of Chennai, on the East Coast Road, under the direction of C.P.Singh, assisted by V.Ramamurthi, R.Sivanantham, S.Sreekumar, S.Vasanthi, to reveal the socio-cultural condition prevailed during seventeenth-eighteenth century CE in this region. It was also aimed to expose the flourishing port at the site which was established to maintain the commercial and political relation between Alambarai and Pondicherry (present Puducherry) during eighteenth century CE.

Excavation was conducted within the premises of dilapidated fort and habitation area. Four trial trenches were laid out for the purpose. During excavation antiquities pertaining to eighteenth century CE were recovered. These include sherds of coarse red ware, porcelain sherds, copper pieces, iron nails and pieces, lead ball and pieces, cannon balls, spindle whorls, spout, hop scotches, smoking pipes, terracotta lamps, pieces of bangle, broken glass bottles, amulet etc. In addition to these, slags of copper, iron and glass, crucibles, and moulds of coin were also unearthed. The occurrences of crucible, coins moulds, slags of copper, iron and glass indicate minting of coins and manufacturing of utensils and other household objects during seventeenth and eighteenth century CE.

## **UTTARAKHAND**

### **26. EXPLORATION AT TARAI REGION, DISTRICT UDHAM SINGH NAGAR**

Archaeological reconnaissance has been conducted in Tarai Region, under the direction of D.N. Dimri, assisted by Niraj Verma and Rajeev Pandey of the Dehradun Circle,

of the Survey and discovered the ancient sites<sup>1</sup> of archaeological importance.

The site **Gargaj** (28°51'46"; 79°35'38") is situated about 30Km east of Rudrapur Town, where, the ancient remains are spread about 1 km. away from village Bara. The site revealed a *Minar* (Tower) made of *lakhauri* bricks, probably used as a watch tower during the Mughal Period. Nevertheless, red ware of coarse to medium fabric, datable to Kushana and Gupta Periods, recovered from the site which suggests that the antiquity of the area goes much earlier than the existing Mughal Tower. Regrettably, this ancient settlement has been levelled due to cultivation by the local villagers.

On the western margin of the village **Ajeetpur** (28°50'20" ; 79°35'41"), lies an ancient mound, which revealed painted and plain red ware assignable to Kushana, Gupta and Post Gupta Periods. The site has now been wiped out due to plantation.

The mound **Kishanpur** (29°18'13"; 79°47'58") is located on the Kashipur-Dehradun National Highway, at a distance of about 4 km from Jaspur Tehsil Headquarters. Here, archaeological remains are stretched over an area of 500mx 500sq.m. The total thickness of occupational deposit is more than 1m, however; a portion of the mound is presently used as a brick kiln. Explorations divulge that the site must have been an important settlement during the Kushana Period.

Among the pottery, black painted red ware is common. Shapes include storage jar, lid, spouts and incision burners etc. It has also been learnt from the present residents that some ancient sculptures and copper coins have taken away by the people in the past. However, their present location is not known.

Located about 5km. away from Jaspur, on Jaspur- Patrampur Road; the ancient remains are found on the outskirts of the village **Badionwala** (29°19'00"; 78°51'23"). At present, the mound has been levelled for cultivation, still, the amount of pottery and their shapes retrieved during exploration, indicate that the site remained under habitation from late phase of Painted Grey Ware Culture, followed by Kushana, Gupta and Post-Gupta Periods. The grey wares, devoid of any painting, of thin to coarse fabric, associated with Painted Grey Ware Culture, were recovered. Among other ceramics, red ware of Kushana Period, red polished ware of typical Gupta Period and knife edged bowls of Early Medieval Period have come across through investigation. Fragments of burnt bricks of different sizes have also been recovered from the site.

At a distance of about 7km from Jaspur near Tumariya Dam, the site **Bhogpur Farm** (29°18'54"; 78°52'53") is placed which yielded red wares of Late Kushana and Gupta Periods. The site **Teerath** (29°20'31"; 78°55'05"), locally known as a Teerath Jungle, seems to be one of the most important ancient settlements in this region. Located about 16 km. north of Jaspur, on Jaspur- Patrampur Road, the ancient mounds have been traced out in the forest area. There are three mounds; one located about 50m away from the main mound, while the other is positioned at a distance of about 100m. The total cultural deposit of the site could be more than 2m. The area probably remained under water, therefore, pottery picked up from the site has got tendency of peeling off. The pottery assemblage may be assignable to late phase of the

1. As Survey of India's toposheets is not available due to restricted zone, hence the names of the sites do not go after the spellings of toposheets.

Painted Grey Ware Culture followed by the Mauryan, Kushana, Late Gupta and Medieval Periods. Among the antiquities, one terracotta bead of areca-nut shape, one barrel shaped bead, fragments of animal figurine and iron spearhead have been retrieved (Pl 33).

About 7km. from Jaspur, on Jaspur-Patrapur Road, the village **Kalyanpur** itself (29°17'49" ; 78°51'41") is situated on an ancient settlement, which revealed potteries of Late Kushana and Gupta Periods.

The village **Mandwa khera** (29°17'49" ; 78°49'10") is situated about 14km from Jaspur on Jaspur-Kashipur Road near modern Canal. Ancient remains are found about 1km west of this village. Sherds of red ware having coarse to medium fabric were collected from the site. Some of the potsherds have been provided with chocolate slips.

Among the shapes, fragments of carinated *handi*, storage jars, bowls, vases and dishes deserve special mention which belongs to the Early Kushana, Kushana, Gupta and Late Gupta Periods.

**Raipuri** or **Angadpur** (29°20'03" ; 78°46'39" ) site is located about 8km from Jaspur, on Kashipur-Dehradun Road. River Fika flows about 3km west of the site. The mound has partially been eroded and retains nearly 1.5m habitational deposit intact. Red wares of Late Kushana to Gupta Periods were exposed. Black paintings in the form of horizontal bands have been executed on the exteriors of the jars. Besides, few miniature pots and terracotta hop scotches were discovered from the site.

The ancient mound **Jagatpur Patti** (29°14'25" ; 78°53'35") is positioned at a distance of about 8km east of Jaspur, on Jaspur-Kashipur Road, spread in an area of approximately 800mx800m, near the Sher Ali Baba ki *Mazhar* (grave). Cultural deposit of the site is nearly 1.5m thick. A large amount of grey ware associated with Painted Grey Ware Culture has been picked up from the site which is devoid of any painting. The typical shapes are usual featureless bowls and dishes as reported from other Painted Grey Ware sites. Red wares of different shapes and sizes, belonging to the Kushana, Gupta and Late Gupta Periods have been gathered too in course of exploration. Among the antiquities, one terracotta ghat-shaped bead, terracotta bangle and hopscotch remained the significant findings (Pl.34).

At a distance of about 14km north of Jaspur on Jaspur -Kashipur Road, on the bank of the River Tumadiya, the site **Girdhai Munshi** (29°15'32" ; 78°55'08") is located where the ancient remains are extended in an area of about 300m x 300m, unfortunately a major part of the mound has been levelled for cultivation. The pottery collected from the site is red ware of different shapes belonging to Gupta and Late Gupta Periods.

The site **Jhankat**, in Tehsil khatima, exposed red wares of Late Kushana to Early Medieval periods in course of survey. Another site **Kanaura** in Tehsil Bajpur revealed red wares probably of Gupta or Late Gupta periods during exploratory work.





A



B

*Jagatpur Patti: A, terracotta objects and potsherds, B, potsherds*

UTTAR PRADESH

27. EXPLORATION IN MAU SUB-DIVISION,  
DISTRICT CHITRAKOOT

The UttarPradesh (UP) State Archaeology Department, Luck now, continued (2010-

11,pp. 117-120) an archaeological exploration in the Development Block-Ram Nagar, under the direction of Rakesh Tewari, assisted by Ram Naresh Pal and discovered the following sites/villages, bearing antiquarian remains;

<i>Village/Site</i>	<i>Nature of remains</i>
Agurhunda Pahari Ki	Upper Palaeolithic and Mesolithic tools
Akharwar	Microliths, Early Historical, popularly known as Kotia Culture with red ware and black ware
Amirti	Microliths, Early Historical / Kotia Culture with red ware, black ware and Early Medieval Remains
Aror Ki Pahari	Upper Palaeolithic and Mesolithic tools
Bariya	Early Historical/ Kotia Culture with red ware and black ware
Begrehi Ki Pahari	Mesolithic tools (flakes, blades, blade -lets and other fragments of stone tools)
Bhakarwar	Early Historical / Kotia Culture with red ware and black ware
Chakaudh	Medieval mound with red ware and two stone <i>Kolhu</i>
Chhotiki Bariya	Early Medieval with Red Ware
Deundha	Microliths and Early Historical/ Kotia Culture with red ware and black ware
Devasthan Ki Pahari Purva	Upper Palaeolithic and Mesolithic tools
Devkali	Early Medieval mound with red ware

Devra	Early Medieval mound with red ware
Devipur Ka Dih	Early Medieval mound with red ware
Diwani	Early Historical/ Kotia Culture, with red ware and black ware
Etwa	Medieval mound with red ware, two stone <i>Kolhu</i> and Medieval Temple
Hanna Vinaika	Red ware and broken sculptures of eleventh-twelfth century CE.
Jorwara	Early Historical/ Kotia Culture with red ware and black ware
Kapuri Ki Pahari	Upper Palaeolithic and Mesolithic tools
Kherwar	Early Historical/ Kotia Culture with red ware and black ware
Kolhia Ki Pahari	Upper Palaeolithic and Mesolithic tools
Lauri	Early Historical and Medieval pottery
Lohangri	Microliths and Early Historical/ Kotia Culture with red ware and black ware
Mawia Khurd	Early Historical/ Kotia Culture with red ware and black ware
Naraina Khera Ki Pahari	Upper Palaeolithic and Mesolithic tools
Piprorh	Red ware and Medieval Temple
Purwadih	Medieval mound with red ware
Raipura Village	Early Historical/Kotia Culture with red ware and black ware
Silauta	Early Medieval mound with red ware
Tenduya Mafi	Remains of a temple and broken sculpture of eleventh-twelfth century CE.
Uphrauli	Remains of a temple and broken sculpture of eleventh-twelfth century CE.
Usradih	Early Historical/Kotia Culture with red ware and black ware

**28. EXPLORATION IN KARBI TEHSIL, DISTRICT CHITRAKOOT**

Under the general guidance of Rakesh Tewari, of the Uttar Pradesh State Archaeology Department, Lucknow, Ram Naresh Pal has conducted village-to-village exploration in Manikpur Block and brought to light 38 sites, bearing Prehistoric, Early Historic, Early Medieval and Medieval remains.

The main findings of this survey are painted rock shelters with microliths, reported from Khameshwar Valley, Bhauri ki Pahari, besides, stone *kolhu* and remains of various temples of eleventh-twelfth century CE and fragmentary stone sculptures of different gods and goddesses have come across during the survey.

As far as rock paintings are concerned, mostly, grey colour was utilized. Hunting scenes depicting man with bow and arrow before elephant and deer are the main subject matters of these paintings. A part from paintings, flakes, different types of blades, fragmented and fluted cores, manufactured on chert, chalcedony and quartzite stones, remained the major microlithic artifacts; recovered from the sites like, Sumergiri ki Pahari, Char ki Pahari, Pateri ki Ghati, Sarhata, Kanwara, Khameshwar Ghati, Kali Ghati, Ohan Bandh Wali Pahari, Kolhu ki Ghati, Hata, Hanua and Kushai Ghati etc.

The antiquities of the Early Historic Period related to northern black polished ware, Kushana and Kotia Cultures have also been noticed in course of the investigations. The main sites are Lahri, Gahri, Agarhuda, Murkata, Semardaha, Rampuriadih, Paterdih (kher),

Pokhri ka Purva, Koluadih and Amhadih. The pottery of Lahri represents the northern black polished ware or its earlier culture.

The main pottery types are dishes and deep bowls of black slipped ware, besides, large and small jars (*matka*) and *chhichhle* bowl of red ware, carinated or *Kokhdar handi*, pitcher or *Ghara*, jar or *matka* and so on are the major pottery types of Kotia Culture. Geometrical designs are also found on a few pottery. Fragments of baked bricks and iron slags are other significant remains of the Early Medieval and Medieval periods. Clay pot, *matka*, *ghara*, bowl, basin are the main pottery types. Major Early Medieval and Medieval sites are Barkot, Zardaha, Marachanda Char, Bilaukhar, Kharaundha, Dahlia ka Purva, Hata, Purana Manikpur, Belrahadih, Badaukher, etc.

The temples which have come to light through this exploration are by and large in ruined condition. Fragmentary sculptures are found scattered, close to these temples remains.

The major temples with their fragmented sculptures are Somnath, Bhairam Baba, Bhardevan, Unchadeeh, Anandi Mata, Devraha Baba and Datiya Ashram.

**29. EXCAVATION AT HULASKHERA, DISTRICT LUCKNOW**

The archaeological excavation at Hulaskhera in Mohanlal Ganj Sub-Division of Lucknow was undertaken by the Uttar Pradesh State Archaeology Department, under the general direction of Rakesh Tewari, assisted by R. K. Srivastava and K.K.Singh, with a view to

collect the charcoal samples from an earliest level of Period I of this site, besides, ascertaining more details about this level.

The previous excavations did not yield any charcoal samples and provided a tentative date of seventh century BCE. It is worthwhile to mention here that the earlier excavations at Hulaskhera exposed 5.25m thick deposit of habitation that yielded the following remains period-wise: Period-IA; Black Slipped Ware, Black and Red Ware, Red Ware, Period-IB; Painted Gray Ware, Black Slipped Ware, Black and Red Ware, Red Ware, Period-II; Northern Black Polished Ware and associated Ceramics, Period-III; Remains of Sunga and Kushana periods, Period-IV; Gupta and Post Gupta remains, Period-V; remains of Early Medieval period. The recent excavations at Hulaskhera further corroborate the said habitational deposit and the division of periods as it was proposed previously. During the period under report, excavation was taken up in the quadrant III of trench no Zq 9, measuring an area of 1.25m x 2.00m and 2.00m x 2.00m, respectively.

The selected areas were already excavated earlier to the depth of 2.70m and 3.60m below the surface (up to Period-III i.e. Kushana Level). A little portion of Period III remained unexcavated during the earlier period, along the brick structures of Sunga and Kushana periods. Therefore, the excavation started below the Kushana level this year.

Ceramics of period III comprise red ware of medium fabric; shapes were of utilitarian type which includes incurved bowls, inkpot type lids, high necked water vessels decorated with stamped designs and sprinklers.

Period II is marked by the appearance of Northern Black Polished Ware and associated red wares, black slipped wares etc. Charcoal samples were collected from this level.

Period I is divisible into two sub-periods, Period IA and IB, on the basis of the appearance of Painted Grey Ware. Black Slipped Ware, Black-and-Red Ware and Red Ware are common in both the sub-periods. A good number of charcoal pieces were collected from period I.

The present excavations revealed iron objects i.e. iron lids, iron nails from period IA, prior to Northern Black Polished Ware Phase. The AMS dates of charcoal, collected around the iron objects is sixteenth to seventeenth century BCE. It is further stated that it is an important date of iron, found from Sai Gomti Valley for the first time. It is also worthy to mention here that the iron is present almost from the beginning of the habitation at the site.

### **30. EXPLORATION IN BANGRA REGION, DISTRICT JALAUN**

Regional Archaeological Unit, Jhansi of the Department of Uttar Pradesh State Archaeology continued (2010-11, pp. 121-124) village-to-village exploration in Bangra Region of Madhogarh during the year under review. In course of exploration, Suresh Kumar Dubey, under the direction of Rakesh Tewari, explored eighty five villages, their hamlets and valley of River Pahunj and the following sites of archaeological importance were noticed:

<i>Village/Site</i>	<i>Nature of Remains</i>
Ahetagain	Mound with red ware of Medieval period.
Amkhera	Mound with red ware of Medieval period.
Ashahna	Mound with Medieval period.
Atagaon	Mounds with northern black polished ware, black slipped ware and red ware
Atrehti	Remains of a temple and an image of Hanuman of Medieval period.
Bhaupura	Mound with thick red ware.
Chamaran ka Purva	Red ware of Medieval period
Chandrapura	Red ware of Medieval period
Dhundhsagar	Red ware of Medieval period
Gaorabhupaka	Medieval Temple
Garerana khurd	Mound with iron slag, red ware of Medieval period.
Gohani	Mound with iron slag, red ware of Medieval period
Gopalpura	Remains of stone temple, stone sculpture and a <i>garhi</i> of Late Medieval period.
Itwakanar	Red ware of Historical to Medieval period.
Jamrehi Abbal	Mound with red ware of Medieval Period.
Kailor	Mound with northern black polished ware, red ware and terracotta ball

<i>Village/Site</i>	<i>Nature of Remains</i>
Karmara	Mound with red ware of Medieval period.
Kurtala	Fragmentary pieces of stone sculptures.
Migani	Mound with red ware of Medieval period.
Nunaicha	Black slipped ware, red ware, stone sculptures.
Padkula	200 years old temple with Siva- <i>lingam</i> .
Rampura	Red ware of Medieval period.
Rampura Madhogarh	Mound with red ware of Medieval period.
Sarra	Mound with red ware of Medieval period, remains of a <i>garhi</i> , stone sculpture.
Silaua	Red ware of Medieval period.
Sirsa	A pair of <i>garhi</i> and mound with red ware.
Sravan	Old fort on the mound.
Sudama	Fragmentary stone sculptures
Tilia	Mound with red ware.
Unchagaon	Black slipped ware, red ware, terracotta figurines, iron slag and the Medieval Temple.

**31. EXCAVATION AT ROHANA KHURD, DISTRICT MUZAFFARNAGAR**

The site Rohana Khurd (29° 35.245''; 77° 42.302'') was excavated under the directions of Jaya Menon of Aligarh Muslim University, Aligarh and Supriya Verma of the Jawaharlal Nehru University, New Delhi, assisted by Deepak Nair, Biswajit Deb Verma and Ranjith

Kumar Varre, Aadil Zubair and students from both the Universities.

The site is located in Charthawal Block, almost 18 km north of the town of Muzaffarnagar on the Muzaffarnagar-Deoband-Saharanpur Road, also known as State Highway 59. The distance between Deoband and Rohana Khurd is around 20 km. A road branches off from Highway 59 to its

east, opposite the Rohana Railway Station, leading to the main settlement of Rohana.

The modern settlement of Rohana is considerably large in size and divided into two parts. The northern part is known as Rohana Kalan village and the southern part as Rohana Khurd village. The archaeological mound with full of potsherds, attaining a height of about 8m from the present ground level, is located to the south-east of Rohana Khurd village and is locally known as *Bhumia Khera* or *Khera Khel Aashram*. Further to its east, around 400m away, the Kali River(West), originates from the Doon Valley, makes a sharp meander, bringing it very close to the mound of Rohana Khurd, which could have been the source of water for the settlement in ancient times (Fig.16).

Before commencing excavations, the elevated area of the mound circular in nature, (8m high from the current field level) measuring 170 x 140m area was taken for survey to understand the nature of pottery scatter and the possibility of off-sites. Thus, a rectangle of 280m (north-south) and 210m area (east-west) was surveyed. The survey collection comprised primarily ceramics and a few artifacts (Fig.17). A total of 9533 non- diagnostic sherds were analyzed.

The use of mica was noticed in many the sherds. Mica was used in two ways, in decoration and dusting. A total of 1492 rims and 1610 bases were analyzed among the diagnostic sherds. Among these sherds, 152 rim types were identified. The most distinctive were the bowls and dishes of the Painted Grey Ware and grey ware with featureless, straight or incurved rims. Apart from these, there were several rims of red wares that helped to fix the

chronology of the site. The open category of vessels were in use from the fourth century CE and to twelfth century CE for example, sherds with bilateral/nail-headed rims with incurved sides; bilaterally projecting rims with incurved sides; and bilaterally projecting beaked rims with incurved sides, etc. and bowls with flaring sharp-edge rims with tapering sides and out-going featureless rims with thickened grooved exterior and incurved/tapering sides, both ranging approximately from the sixth to the twelfth centuries CE.

In the closed category of vessels, were those with externally projecting rims with a beak-like horizontal projection; bilaterally projecting rims with a thick round rib below on the exterior and a concave neck dating roughly to the beginning of the fourth century CE; externally projecting rims with a concavity on the exterior and externally projecting rims with a concavity on the top and a beak-like projection, both ranging from fourth till the twelfth centuries CE or so; externally projecting rims thickened on the lower part of exterior of the period ranging from the sixth to the twelfth centuries CE; externally projecting rims with convex top, externally re-curving into a carinated projection; externally projecting beak-shaped rims; all of the early medieval period ranging from the sixth to the twelfth centuries CE or so. A rim type having a long duration from the sixth century CE until the twelfth century CE, in the closed category, include vessels with externally projecting rims with a carinated projection below, on the exterior. Some rims which were characterized by the use of appliqué dented and pinched designs were

found mainly in the closed category of vessels but some of these rims also existed in the open category of vessels. These rims range from the beginning of the fourth to twelfth centuries CE or so.

Among the decorated sherds a total of 330 sherds in non-diagnostic category or body sherds were analyzed as also were 24 diagnostic or rim sherds. The decorative techniques include incising, painting, appliquéing, stamping, moulding as well as the use of graffiti. Another technique noted was the application of slurry in bands on leather-hard clay vessels onto which mica was applied to create a decorative effect.

A total of 38 non-ceramic objects were collected from the survey units. These were classified into three categories, terracotta, stone and slag. Twenty two objects of terracotta were collected that comprised an eroded and broken animal figurine, one cylindrical bead, a broken bangle piece, a broken anvil, 3 broken terracotta discs, one marble with incised cross on the top, intact and 2 fragmentary spindle whorls, a terracotta tile piece, 5 worked sherds or pottery discs, a fragment of wheel with a hole in the middle and 4 unidentified terracotta objects.

In stone objects, a total of fourteen pieces were found, most of which were pestles. Out of 6 pestles, 4 are made of red sandstone, 1 is of grayish sandstone and 1 of quartzite. 3 worked fragments of red sandstone were also found. One survey unit also yielded 2 decorated pieces of chalk like material which might be architectural fragments. These fragments bear a sort of foliage design but are in a fairly eroded and powdery condition.

Three other stone pieces include an unidentified small black-coloured stone piece, a purplish sandstone piece and a sedimentary stone piece.

From the survey, two heavy slags were found which might belong to a metal. These are porous and blackish and brownish in colour. The micro-analysis of the ceramics and artifacts revealed occupation in the Painted Grey Ware Period. The site was also occupied in the latter half of the first millennium CE is evident from the pottery types, such as sharp edged bowls. Possibly around the eleventh century CE, this settlement was abandoned. Later on, part of the mound began to be used as a burial space and more recently for ritual purposes.

With this much of scrutiny, digging was resumed to confirm the cultural sequence at the site followed the survey at Rohana Khurd. The method of excavation involved the Harris Matrix method, which, in the absence of baulks, is useful for archaeological stratigraphy and recording. In total, all across the site, twenty squares were opened up for excavation. Of these, sixteen squares measuring 3mx3m, two squares (RKD-1 and RKD-2) of 5mx5m and other two squares of 2mx3m (RKD-18) and 2mx1.5m (RKD-20) respectively were undertaken for excavation.

Initially, almost at the top of the mound, in an open area, two squares were opened (RKD-1 and RKD-2) which were located 1.046 m below the site datum (281.046 m above sea level). RKD-1 and RKD-2 were soon abandoned after disturbed deposits were encountered, caused by the digging up of soil

for raising the plinth of a newly built temple in recent years. To the east of this disturbed area, two new squares were opened up which were named RKD-10 and RKD-11. These were located 1.836 m below the site datum.

Two other squares, located around 50m apart from each other, were also opened up in the southwestern part of the mound to ascertain any lower level deposit as the survey data revealed a great deal of grey ware and painted grey ware coming from this area. While RKD-3 was located 6.4 m below site datum, RKD-4, was located 6.046 m below site datum. These trenches revealed no sealed deposit as they were mainly comprised of run-off deposits from the mound with natural soil appearing only after around half a meter down in the digging. On the southwestern edge of the mound, RKD-5 and RKD-6 were opened just outside the running track. These trenches were at 3.455 m below site datum. In these trenches too, the deposit was mainly limited to pulverized pot sherds. The natural soil was reached here at the depth of 1 m from the sub-datum point of these trenches.

RKD-8 (1.6 m below site datum) was opened in the southern part of the mound and was closed very soon after a large dump of bowls and other forms, though in comparatively much lesser proportion, showed up. The square was closed partly due to the constraints of workforce and time. Moreover, in RKD-10 and RKD-11, located around 35 m away from RKD-8, a similar kind of deposit was revealed which needed careful attention and slow removal to document the dump and the deposit below it. Therefore, it was decided to concentrate only on RKD-11 which was excavated down to 4.356 m below site datum. The deposit in RKD-11 contained pottery

ranging from the sixth to the tenth century CE or so. An AMS date (Beta 356709) was obtained for a sample of charred organic material from locus 23 of RKD-11. The 2 Sigma calibrated date (with 95% probability) of the sample ranges from 680-880 CE (calibrated BP 1270-1070).

In the northeastern part of the mound near the edges, only one square RKD-9 was opened. It was also located a bit off from the running track. It was excavated from the top level down to the natural soil. Looking as if sealed, it revealed a rather complicated deposit. It was this square that was one of the prime units for post-excavation analyses.

A series of squares were opened up in the south-eastern part of the mound which was an intermediate elevated area above the present ground level. This area is actually a field with a sloping gradient which is still being ploughed intermittently but not given much attention for agricultural operations due to its infertility on the one hand and because it serves as a route for cart and tractor traffic, connecting the surrounding fields to the mound and the village in turn, on the other hand.

The squares opened up initially in this area were RKD-7, RKD-13, RKD-14, RKD-15, RKD-16 and RKD-19. At first RKD-7 and RKD-13 were opened up parallel to each other in the north-south direction. The rest of the squares were opened subsequently extending in the eastern direction.

All these squares were related to each other, thereby enabling an open view in a horizontal plane. The ceramics in this area were primarily of the period ranging from the sixth to the tenth centuries CE or so.

The contiguous squares RKD-7, RKD-13,

RKD-14, RKD-15, RKD-16 and RKD-19 revealed interesting evidences for habitation at just about 30-50 cm depths from the sub datum. This entire area revealed several superimposed floors with storage pits and hearths. The area where these squares are located was 4.253 m below the site datum.

At the south-eastern end of this field RKD-12 was opened up which was located around 10m away from the above mentioned trenches. This trench revealed dumps and pits in which mixed material was found. The pottery ranges from tiny grey ware sherds to red ware ranging from the fourth to the tenth centuries CE or so. In the centre of this field, located at a distance of 5m between the contiguous squares RKD-7, RKD-13, RKD-14, RKD-15, RKD-16, RKD-19 and RKD-12, three more squares RKD-17, RKD-18 and RKD-20 were also excavated. RKD-17 revealed a huge dump of pottery that basically belonged to the period ranging from the sixth to the tenth centuries CE or so. RKD-18 also produced a similar kind of dump scatter, which was smaller in scale as compared to RKD-17.

Artifacts of diverse materials were recovered from the excavations. Terracotta artifacts include 4 wheels, 16 discs, 43 spindle whorls, 9 beads, a tile, 13 bangle pieces, 9 animal figurines, 2 balls, a top, 6 reels, 3 miniature vessels, a votive tablet, 2 pellets, a tablet, a seal, 2 plaques, a human figurine, 75 worked sherds, as well as 3 and 27 unidentified objects of clay and terracotta respectively. Artifact of other materials include 2 rings, a nail, a rod and various unidentified pieces of iron, 2 glass beads, 2 agate beads, 2 carnelian beads, 2 red jasper beads, 3 beads of faience/vitreous materials, a crystal bead, 12 glass bangle pieces, a golden glass bead, 3

bone points, a bone pendant, a ring, an antimony rod and fragments of copper, 2 cowries, a piece of shell-bangle and stone artifacts comprise 13 grinders/pestles/mortars, an incised disc, a marble piece and numerous worked fragments. Two squares, RKD-7 and RKD-9 were selected for preliminary analyses (Fig.18). For the unit RKD-7 (29° 35.227'; 77° 42.342'), the sub-datum was fixed at 4.253 m. Artifacts and features were recorded using GPS coordinates and UTM points. The maximum depth reached in RKD-7 was 40 cm in locus 9 in the north-west corner. No further operations were taken up after locus 9 to reach the natural soil. In all eight features were recorded in the unit.

Among these, six comprised floor fragments; one has been identified as a storage pit and the last one as a firing installation or activity. Further, no pits were found. Several ceramic forms such as jar/pot, bowl, basin, lid and lamp were found (Fig.19). Among the closed category of vessels, that can be dated from about the sixth/seventh centuries CE onwards are Type 7(externally projecting beak-shaped rim), Type 13 (externally projecting rim, thickened at the lower part of the exterior); Type 27 (externally projecting rim with a beak-like horizontal projection), Type 37 (externally projecting rim with a concavity on the top and a horizontal beak-like projection), Type 86 (externally projecting rim with a concavity on the exterior) and Type 131 (externally projecting bifurcated rim with a concave neck). In the open category are vessels with rims having appliqué and dented designs. Among the decorated sherds, the chequered impressed sherds are also present which are found from about the fifth century CE onwards. Bowl Type 126-2 (externally

projecting horizontal flanged rim with slightly slanting sides) from Feature 2 can be dated to between the sixth and tenth centuries CE. It also bears a painted design of loop/arches on its splayed out rim. Among bowls from RKD-7, the otherwise popular sub-type 12-17 with obliquely-cut rim and tapering sides is conspicuously absent which dates around the fourth to sixth centuries CE. The majority of bowls found in this unit belongs to the sub-type 28-22 which is again found the sixth century CE onwards. These are sharp edged rim bowls with tapering sides. While many of these types have a long duration, a charcoal sample from locus 4 (Beta-320139) that was dated by the AMS technique has provided a more definitive date. The 2 Sigma calibrated date (95% probability) of the sample ranges from Cal CE 770 to 900 (Cal BP 1180 to 1050) and Cal CE 920 to 940 (Cal BP 1030 to 1010). The AMS date thus also suggests that this area was occupied in the closing centuries of the first millennium CE.

Particular attention was paid to RKD-9 during the excavation and this was dug down to natural soil, thus becoming the index square for the site. RKD-9(29° 35.289'; 77° 42.397') is located in the north-eastern part of the mound near the edge, on the sloping gradient of the mound and is 3.225 m below site datum. On the top it looked like a sealed deposit without any disturbance. The space of the trench and area around it was used for the purpose of drying cow-dung cakes and storing in little enclosures known as *bitiya*.

In total, 21 loci were excavated in RKD-9. The natural soil was reached in locus 21 at the depth of 5.86 m below site datum and excavation was continued for confirming

natural soil till 6.03 m below site datum. Within these loci, several features, such as floors, pits and storage pits were identified. Structural evidence comprised of a clay mud platform, a grain storage structure containing several charred wheat grains, and post-holes. The chronological assessment of RKD-9 needed careful attention due to the numerous pits in it, which disturbed some of the deposits. The upper two loci were very close to the surface and were represented by pottery ranging from the sixth to the tenth centuries CE or so, but also slightly mixed with modern material. From locus 3 to locus 5, the representative pottery ranged from the fourth to the tenth centuries CE or so. The deposit was relatively less disturbed from locus 6 to locus 15, but there were still a few examples of pottery of the fourth and fifth centuries CE. The lower deposits, from loci 17 to 21 are undisturbed and are representative of the Painted Grey Ware period.

Various ceramic forms found include jar/pot, miniature pot, and dish; bowl, trough and lid. Among chronologically sensitive ceramics are various rim-types of the jar/pot category. These include rim-type 178 dated to the fourth-fifth centuries CE; Types 27, 30, 37, 86, 131, 168 and 192 of the period ranging from the fourth to the tenth centuries CE or so; Type 7 of the period ranging from the sixth to the tenth centuries CE or so; Type 13 of the period ranging from the sixth to the tenth centuries CE or so; and Type 1 that had a long usage from the fourth to the tenth centuries CE or so. Among bowls, Type 12-17 was typical of the fourth-fifth centuries CE while Type 28-22 was in use from the sixth to the tenth centuries CE or so. Type 41 was the rim

for a common basin form in the period ranging from the sixth to the tenth centuries CE or so, while Type 194 was a *handi* typical of the period ranging from the fourth to the tenth centuries CE or so.

The painted grey ware and grey ware in general from Rohana Khurd are not very fine as compared to the sherds found from Alamgirpur, Atranjikhhera, Ahichchhatra, Hastinapura, Jakhera and other sites. Many of the grey ware sherds are slightly thicker than the finer grey ware. These relatively thick sherds are late and considered to belong to the Northern Black Polished Ware period. An AMS date has helped to ascertain the chronology for the Painted Grey Ware deposits. While locus 21 marks the level of natural soil, a charcoal sample from locus 19 (Beta-320140) was dated by the AMS technique. The 2 Sigma calibrated date (95% probability) of the sample ranges between Cal BCE 360 to 270 (Cal BP 2310 to 2220) and Cal BCE 260 to 170 (Cal BP 2210 to 2120). The range of the date falls well within the late Northern Black Polished Ware period. Thus, it is likely that at Rohana Khurd, the lowest deposits marked by loci 17 to 20 from RKD-9 may represent the overlap of Painted Grey Ware and Northern Black Polished Ware Periods.

The excavations at Rohana Khurd have revealed no evidence of the Harappan or Late Harappan ceramics. Three beads of faience/vitreous materials have been found, which cannot be used to suggest Harappan or Late Harappan occupations, as such materials were used for beads in the first few centuries CE.

Thus, the settlement history of Rohana Khurd appears, on the basis of the preliminary survey

and excavations, to have begun in the Late Painted Grey Ware or Painted Grey Ware/Northern Black Polished Ware overlapping Period. The surface survey had revealed a dearth and a near absence of the pottery of the first few centuries CE.

Further, post excavation analysis also suggests a dearth of ceramics of this period as well as a total absence of the typical incurved bowl and stamped pottery generally associated with this same period. Thus, there appears a gap in occupation in the first few centuries CE. The site was re-occupied in the fourth century CE. It also appears that the upper limit of the occupation at the site of Rohana Khurd is up to the tenth century CE. This is suggested by the two AMS dates mentioned above. The absence of later occupation is suggested on the basis of several reasons. First, there is no pottery such as is found at sites like Lal Kot. Second, the small sized knife-edged bowls are absent at the site. Third, the conical lid that is peculiar to the period dated between the thirteenth to fifteenth centuries CE is also absent. Fourth, and last, no sherd of glazed ware was found either in the survey or in the excavations.

On the whole, the study of the type and quantification of artifacts, ceramics and structural remains recovered in the excavations suggests that Rohana Khurd remained a rural settlement throughout its history with a few non-local materials such as stone beads, metal objects and worked spotted red sandstone suggesting contacts with other areas.

The excavation has highlighted certain critical methodological issues related to field archaeology in India. First, the excavations at Rohana Khurd showed that mounds that



**Fig. – 16: location of Rohana Khurd**

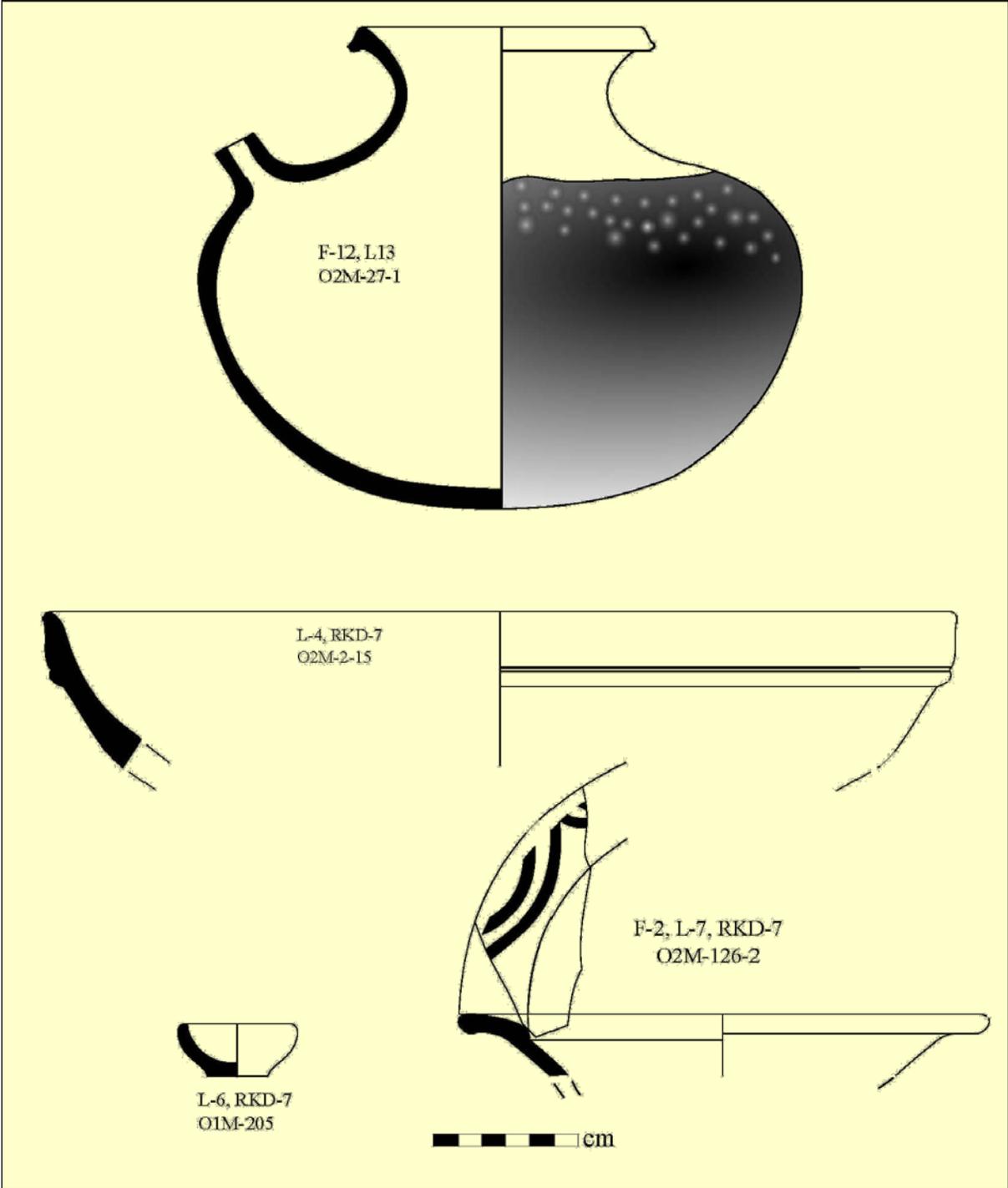


Fig. 17: Rohana Khurd: pottery

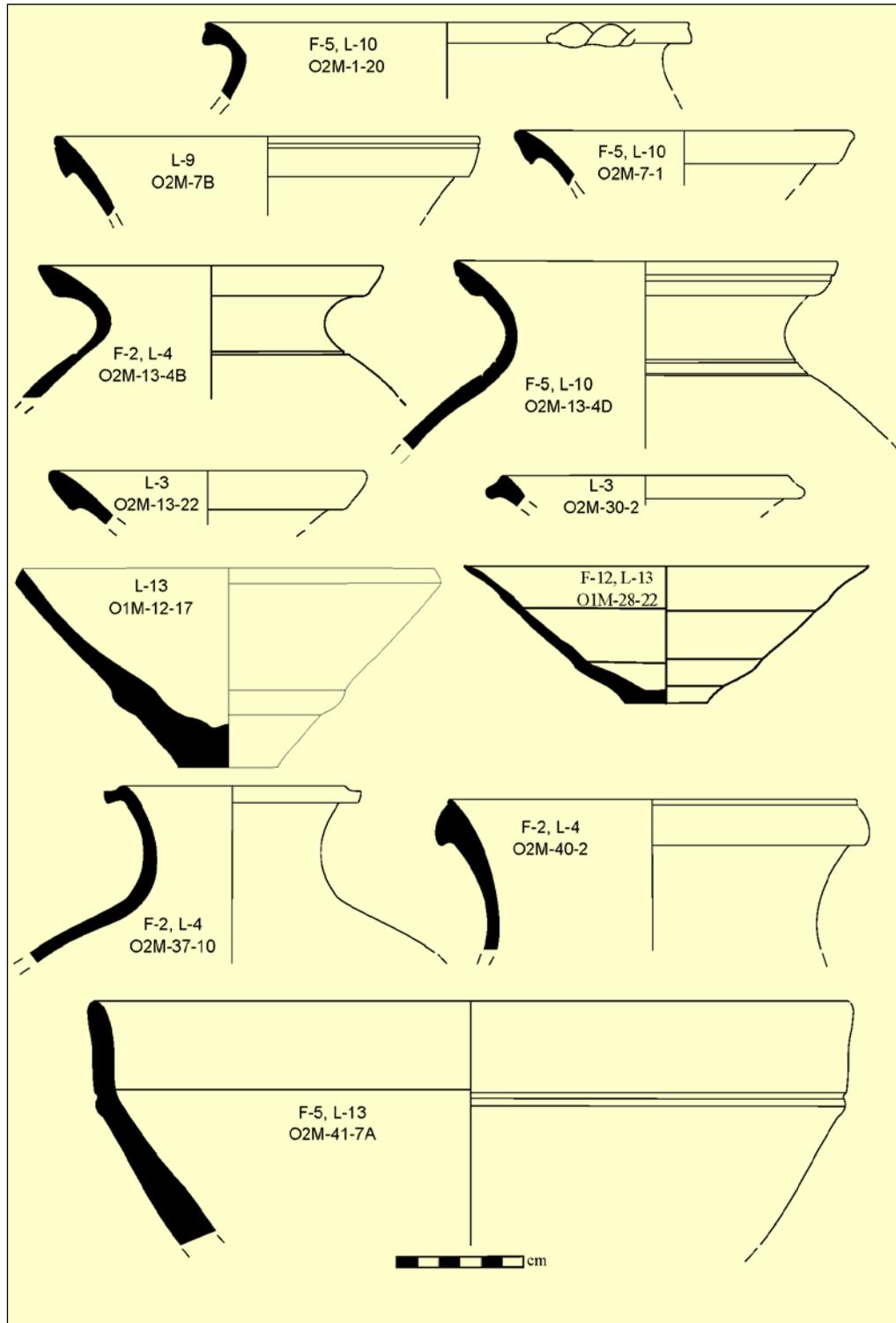


Fig.18: Rohana Khurd: pottery

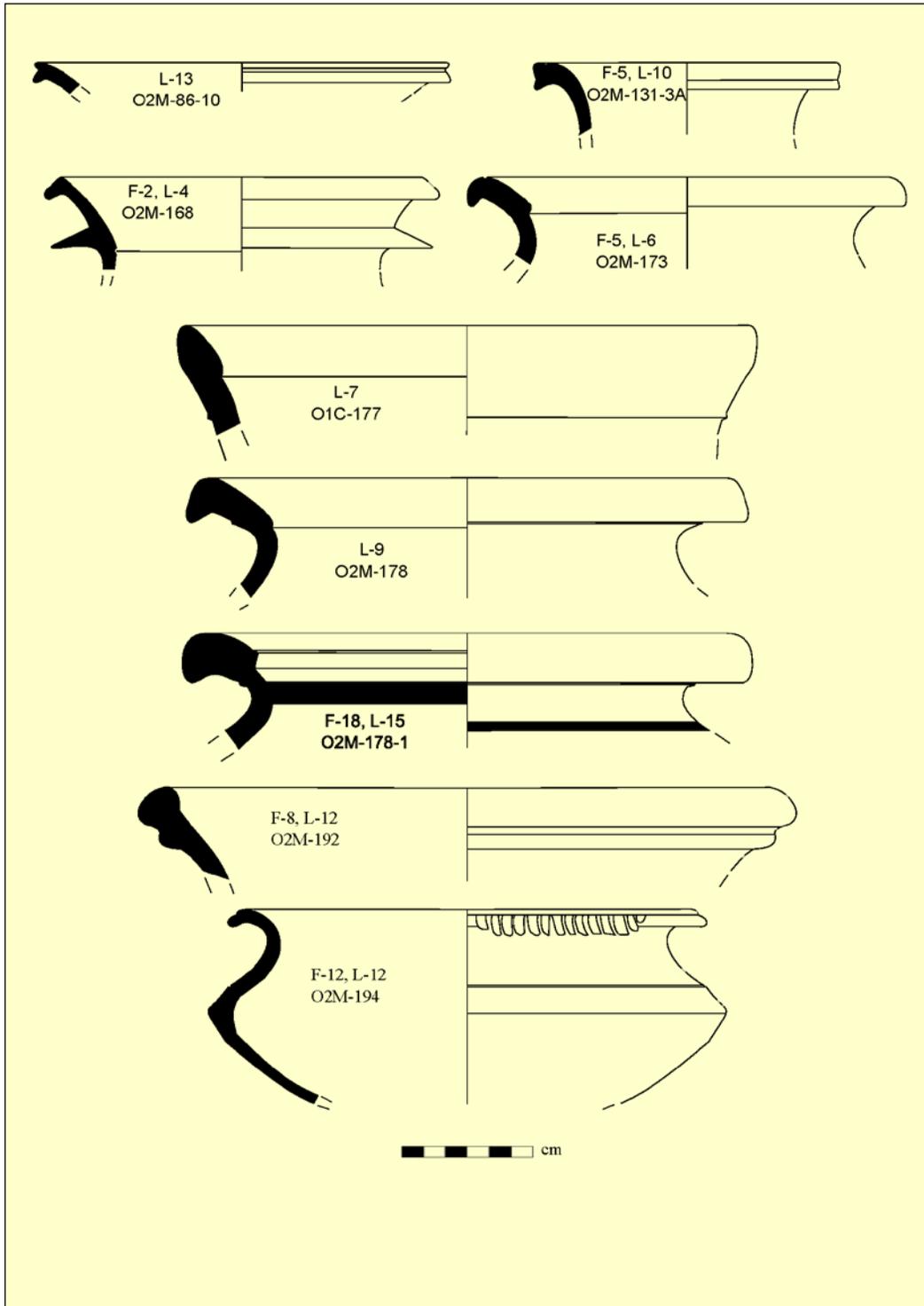


Fig.19: Rohana Khurd: pottery

appear to be seemingly undisturbed actually had been altered considerably due to both natural factors and human activities. Second, and more important, there is a need to move away from making a brief visit to a site where stray sherds are hastily picked up and a cultural sequence suggested without adequate documentation to support the veracity of the assertion. Such kinds of hastily conducted surveys often tend to misreport on the size of sites as well. For instance, Rohana Khurd was reported by archaeologists who surveyed it as recently as within the last five years as 8 hectares, when, in fact, this survey found the site to be just about 2.5 hectares. Admittedly, the edges of the mound have been cut over the years and it is likely that during the period of its maximum occupation in the latter half of the first millennium CE, it may have extended to about 4-5 hectares. Thus, a wrong identification of ceramics and in turn of chronology as well as an incorrect assessment of site size can lead to an interpretation of the nature and function of a settlement that is highly unreliable for students of archaeology. For instance, in this case, the prevailing notion was that Rohana Khurd was a regional centre of the Ochre Coloured Pottery/Harappan period. However, this systematic survey and excavation has completely overturned such a hypothesis.

## WEST BENGAL

### 32. EXCAVATION AT BANGARH, DISTRICT DAKSHIN DINAJPUR

In continuation with the previous years' excavation at Bangarh, the Kolkata Circle, of the Survey carried out the said work under the

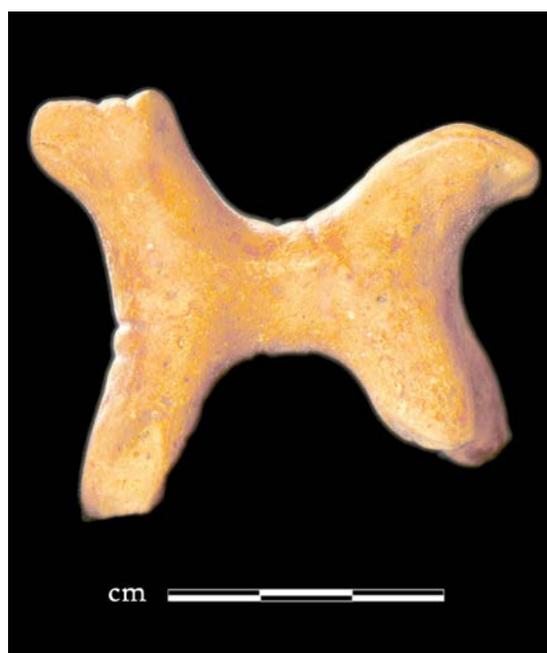
guidance of T. J. Baidya with the assistance of S.Maiti, P.K.Naik, S.M. Ketkar, K. Saha, P.N. Biswas, D.Moitra, S. Basak, S.Sarkar, S.Roy and A.Giri with the objective of getting a comprehensive idea of the entire site that has been dated from the Chalcolithic to the Medieval period as per the past findings. Trenches were opened up on the southern slopes of the Citadel Complex, i.e.the main mound. Two trenches XB4 and XB5 were taken up for excavation. In course of digging at a depth of 4.74m, a brick wall measuring 11m in length, 0.87m in width and 0.31m in height was exposed. The structure consists of 5 to 6 courses of bricks which are irregular in nature. The size and shape of the bricks vary from 25 to 16cm. in length, 17 to 10cm. in width and 6 to 7cm. in thickness. Mostly re-used bricks were used for the construction of the wall.

Another brick structure has also been exposed in the area, at a depth of 5.28 m. The structure is running east-west direction in the form of a wall. From the jerry built character of the structure of re-used bricks it is difficult to ascertain the purpose of its construction. The length of it is 9.50m., the width 0.65m., and it has 3 to 4 courses of bricks. Dull red wares of medium to coarse fabric and occasional occurrence of buff colour sherds of thin variety has also been noticed. Antiquities are very few.

The next phase of occupation in this trench indicates a prosperous stage as noticed from the structural remains found at a depth of approx. 7m. A compact working floor level made of brick-bats has been exposed that covers almost the total area of the trench. Another noteworthy discovery is a ring-well lying in north-western corner of the trench.



A



B



C



D

*Bangarh: A, celt, B, terracotta animal figurine, C, female figurine and D, agate bead*



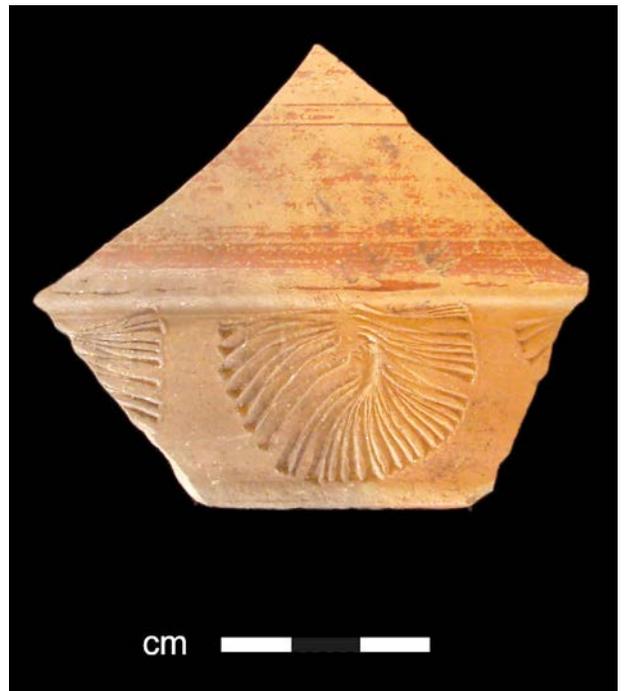
A



B

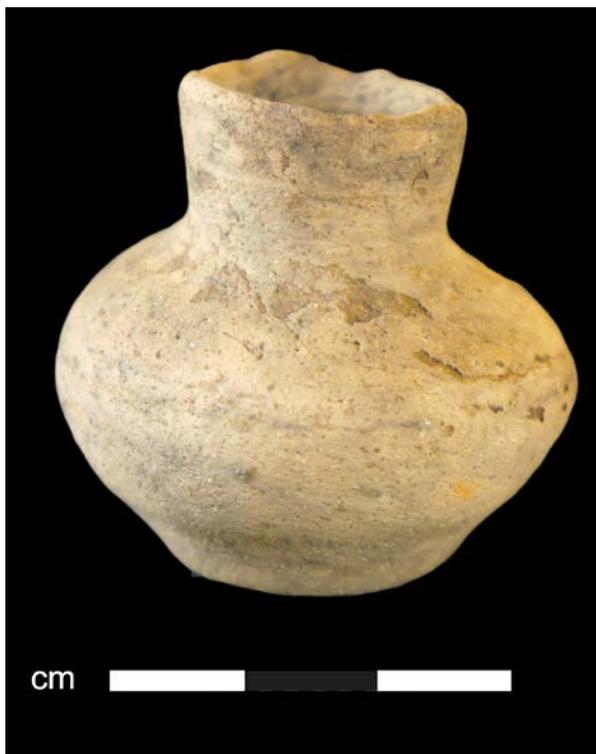


C



D

*Bangarh: A-D, decorated pot-sherds*



A



B



C



D

*Bangarh: A, miniature pot, B, stone sculpture, C decorated potsherd and D, silver punch marked coin*

Only 4 nos. of ring of the well have been exposed, the height measures 76cm. The approx. dia of the ring is 72cm. Besides the ring well, a brick structure of rectangular shape has been exposed. This structure covers an area of 3.35m in length, 0.40m in width and 0.29m in height. Different sizes of bricks were used in the structure; the length varies from 39 to 34cm, the width from 26 to 24cm and thickness from 5 to 4cm. The nature and associated remains of the structure probably indicates the existence of a small bathing complex. Few pot sherds have been collected within the structure. In the exposed floor/working level numerous pot-sherds and broken tiles have been collected. The pottery assemblage consists of dish, bowl, jar, vase, etc. and the red ware seems to be the dominating one.

An important find is a highly polished stone implement, a tiny celt like object measuring 6 cm. x 3.7cm. (Pl.35A). Similar reference of stone tool has been mentioned by Prof. K G Goswami in his report (Goswami 1948:32).

The significant antiquities unearthed from the excavation includes terracotta animal figurine, terracotta female figurine, semi precious stone bead, decorated pottery, incised decorated sherd, silver punch marked coin, miniature pot, fragmentary stone sculpture, (Pls.35B-37) etc.

### 33. EXCAVATION AT MAHADEBBERA, DISTRICT PURULIA

The Department of Archaeology, University of Calcutta, undertook excavations at the site Mahadebbera under the direction of Bishnupriya Basak. The site is located between 23°11'30" and 23°11'36"N and between 86°11'48" and 86°11'56"E within

500m northwest of Ghatbera village, on the left bank of a low order channel, the catchment area of the River Kumari (Fig.20). Extensive erosional activity resulting in badland formation has exposed rich deposits of microliths (Pl.38), lying in the middle of a forest land covering an area of 224 sq.m. The site is marked by the Ayodhya Hill Range to the west and north-west. The hill of Gajaburu in the north-west, located at a distance of approximately 2 km as the crow flies from the site-- is a typical denudational hill varies in relief from 300m above MSL and less. Intensive explorations in the foothill region of the Ayodhya Hills, Purulia were conducted since 1998-99 to 2006-07, with some gaps in between. Four major zones of microlithic sites were marked with a total number of 24 sites, all located on the banks of numerous streams draining the slopes of the hills. Mahadebbera is the first site chosen for excavation during the period under review because of its heavy concentration of tools in a badland topography that exposed the artifact context.

Eventually a 3m x 3m trench MDB1 was laid out. Four points of the trench were marked as NW (northwest), SW (southwest), NE (north-east) and SE (southeast) after fixing the northern or north-western direction. The NW point was taken as a datum point whose elevation and angularity were measured by auto level set at a base station close to the trench. The digging operation was done up to a depth of 3.29m from the surface. Three distinct layers have been demarcated in the trench besides surface humus (0-0.15m). Layer 1 (0.15-1.55m) is composed of reddish silt, hard, compact and pedogenised. Excellent pedal structures are seen in the form of irregular blocks, showing weathered quartz

and feldspar grains. Layer 2 (1.55m—1.82m) forms the main context of the microliths. It is colluviums, constituted of cobbles of weathered schist, quartz and quartzite and smaller granules in a matrix of reddish silt with plenty of sand grains. Layer 3a (1.82m to 2.10m) is constituted of reddish silt which grades down to red, loose sandy sediment, devoid of microliths, marked as Layer 3b (2.10m-3.29m). Both are seen as components of a parent layer where the upper part differs from the lower, texturally. No artifacts are

found in either layer 3a or 3b. The microlithic assemblage unearthed from the excavated trench chiefly constitutes of cores flakes in different stages of reduction and chunks. Finished tools have been noticed outside the excavated trench.

The principal raw material used in the manufacture of the microliths is rhyolite, followed by a small percentage of black chert and green quartzite. A very few specimens of red chert and jasper has been found.

**LIST OF ANTIQUITIES: EXCAVATED TRENCH**

<i>Raw material/nodules</i>	<i>Cores</i>	<i>Flakes</i>	<i>Chunks</i>	<i>Chips</i>	<i>Finished tools</i>
0	6	61	2	20	0

**OUTSIDE THE EXCAVATED TRENCH**

<i>Raw material/nodules</i>	<i>Cores</i>	<i>Flakes</i>	<i>Chunks</i>	<i>Chips</i>	<i>Finished tools</i>
0	40	373	13	0	8

**34. EXCAVATION AT MOGHALMARI, DISTRICT PASCHIM MEDINIPUR**

The Department of Archaeology, University of Calcutta resumed its excavation programme at Moghalmari (21° 59' 33''; 87° 17' 46'') in Dantan Police Station, under the Direction of Asok Datta, assisted by Rajat Sanyal and Durga Basu as well technical and non-technical staff members of the Department. The excavation was conducted in two phases

between the months of March and May; 2012. The basic objectives of excavation were to trace out the southern and south-western outer wall of the monastic complex as well as the Sanctum Cell or Temple/Shrine of the site, in order to reconstruct the plan of the monastery. Moreover making co-relation between different structural elements within monastic complex was also aimed.

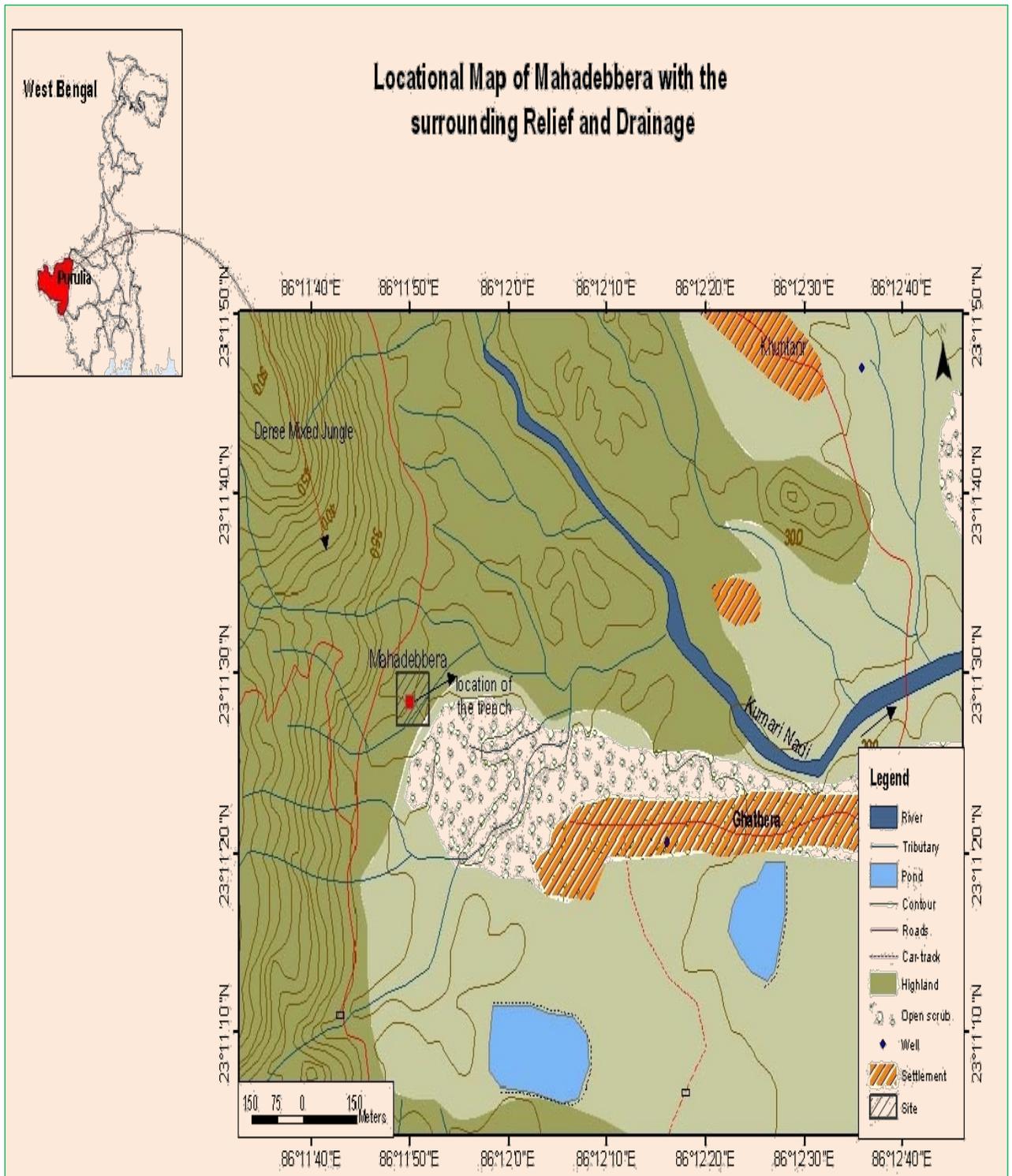


Fig. - 20



A



B

*Mahadebbera: A, cores (excavated materials) and B, finished tools (surface Collection)*

Initially six trenches were laid out, namely, E9, D9, C9, B9, A9, XA9, measuring 6mx6m in the south and south-western periphery of the mound. The excavation reveals a massive lime plastered outer wall, running towards the west, but in trench XA9 it makes a turn towards the northern direction. This outer wall which was originally plastered with lime and decorated with stucco floral (especially Lotus Petal) and animal/ human figures was severely damaged in the south-western part of the mound. In XA9 trench, this wall has been traced below the plinth level. It also reveals that the outer wall was wider in the foundation level while it was made deliberately narrower above the foundation level by making a number of off-set projections at regular intervals for the beautification of the wall as well for economy. Consequently; the outer wall varies in thickness between 1.27m and 0.80m. Earlier excavations have exposed two corners of this structure in south-eastern and north-eastern parts of the mound. This year the south-western corner of the structure in trench XA9 has exposed, the extent length of southern and eastern wall, measures 60m each, it can therefore be concluded that the plan of the monastery was a 60mx60m square structure with entrance in the northern part, presently it is concealed under the huge gateway of the second structural phase of the monastery.

The excavation further reveals that the height of the plinth of the early monastery in K7 (eastern wall) was 3.5m which can further be divided into three segments viz. upper, middle and lower. The lower portion measuring almost 2m is a simple lime plastered wall with three offset projections at the extreme end and above it, the middle portion which is almost a

bulging one, measuring about 0.50m, created by architectural designs using different decorative bricks. The decorations of lotus petal, geometric and other floral designs have come up. The top or the upper portion having almost 1m space was created to accommodate pilasters, after every 0.70m, which provided square boxes of 0.70x0.70m. These square boxes were utilized for placing stucco figures of both animal and human character. At the top of these pilasters there are full blown lotuses (Pl.39A). The entire composition of the outer wall of the monastery is provided with many architectural designs which indicate wonderful engineering skill. A *surkhi* rammed floor is found all along the monastery which has been identified as *pradaksinapatha*. A circular votive stupa was found on this *pradaksinapatha* in trench G10 of the southern part of the mound.

In addition, three more trenches namely E8, E7 and E6 in north-south direction were taken up for excavation to understand the relationship between the outer wall and the inner structural elements. After an average digging of 0.53m in these trenches, a brick wall with lime plaster on its inner face having a width of 0.80m was found running in north-south direction from the centre of these trenches. While clearing the debris attached to the outer face of this wall in trench E7, a stucco human head was suddenly discovered (Pl.39B) and gradually the panel of stucco figures decorating this wall in all the trenches was exposed. The stucco figures consist of divine and semi-divine human characters are placed in 70cmx70cm square boxes created by pilasters after every 0.70m gap on the wall. The wall is further decorated with lotus petal and other floral designs. Altogether 13 such

stucco figures have been retrieved from the debris, of which some are intact while few others are partially or substantially damaged due to either plundering or brick hunting. Among the identified stucco figures, the important ones are *gana* figure, dancing couple (PI.39C) *Kuvera* figure, *Janguli* figure (PI.39D), seated male figure (PI.40A) and flying *gandharva* etc. The rests are either divine or semi-divine figures. One broken medallion of wheel was also found among the composition (PI.40B). It appears from excavation that this decorative wall towards the north is badly damaged due to plundering from time to time. Four terracotta votive tablets were found from the trench E6 at the depths of 1.60m, 1.64m, 1.85m and 1.95m respectively. Of these votive tablets; two are complete, while the other two are broken. In one votive tablet, Buddha as a central figure is shown seated in *padmasana*. He is flanked by two Bodhisattvas on each side while there are two rows of miniature sitting Buddha figures shown below (PI.40C). In another votive tablet, Buddha as a central figure is shown seated in European Style and placed in a temple (PI.40D), he is flanked by two Bodhisattvas on each side. They are also placed in temples and below, there is an inscription of Buddhist creed which reads as “*Ye dharma hetu prabhababa....*”. Below the inscription, there are miniature votive stupas. This votive tablet is very interesting since the temple in the tablet appears to be a true replica of *Nagara* style with clear sign of *amlaka shila* on the top. This is interesting from the point of view of its origin and diffusion from Middle Ganga Valley where it was first appeared around 5<sup>th</sup> century CE. According to Prof. Peter Skilling, this type of votive tablet

was locally made and exclusively for local use or its application was restricted to a particular area or region. The remaining represents the later type.

Other antiquities include terracotta lamps, stucco fragments, decorative bricks, sprinklers, iron nails, footed bowls, hopscotch, spouted bowls etc. Besides, large number of red, black, grey sherds and moulded and appliqué red and grey sherds have also been unearthed.

The excavation was resumed again in the month of May to trace the alignment of the decorative wall containing panel of stucco figures and to examine whether this was the actual temple wall of the monastery or something else. This question becomes very much apt in view of the fact that a number of votive tablets have been found at different levels near this wall in trench E6 which makes it quite imperative that this might be the temple area of the monastery.

Two trenches E5 and E4 were taken up for excavation to trace the alignment of the decorative wall exposed earlier in the trenches E8, E7, E6 and later three more trenches namely, D6, D7 and F4 were also dug. After a digging of 1.56m in trench E5, the wall was encountered, but in case of E4, the wall at a depth of 1.75m was found which means, this decorative wall having beautiful stucco figures found earlier in trenches E8, E7, E6 at a depth of 0.53m below surface level, are in fact lost in these two trenches due to severe damage of the upper part of the wall. However, it has been traced at a lower level which signifies that this decorative wall runs through trenches E9, E8, E7, E6, E5, E4 towards northern direction and measures 31.90m. This wall has an average width of 0.80m, but where it is

projected the width becomes 1m.

The thickness of projection varies between 14m and 0.20m. This wall contains beautiful stucco figures of divine and semi-divine human figures and is badly damaged in its northern direction. This wall makes a projection after 13.33m from the southern end and the projected portion measures 6.66m where the thickness of this wall becomes 1m. At a depth of 1.75m in trenches E5 and E4, another massive brick wall running parallel to the stucco decorative wall (Pl.41A) at a distance of 1.88m had come across in trench E5 and 1.68m in trench E4. The width of this wall is 1.45m, but without any decoration or any lime plaster either on inner face or outer face which denotes that it was constructed later. The purpose of making such a huge structure (Wall) so close to the stucco decorative wall was not immediately clear. However, as the digging continued, few connecting walls attached to the stucco decorated wall at a regular interval of 7.55m were discovered. This means that the connecting wall (Pl.41B) was constructed later to support the decorative wall. It was further confirmed that the rectangular chambers/boxes measuring 7.55m x 1.75m were deliberately created between the decorative walls by the connecting wall and later these boxes were filled up with fresh clay without any external particles. The clay was used as packing material against the decorative wall. The thickness of the fresh clay deposit in trench E5 is 2.50m, while it is 1.90m in trench E4. The filling in trench E5 started at a depth of 2.40m, while it started from a depth of 3m from the present surface level in the trench E4. The floor or the so called *surkhi* rammed *pradaksinapatha* in

these trenches were encountered at a depth of 4.90m from the surface level (Pl.42A). It is observed that most of the terracotta votive tablets have been found from trench E4, above the clay deposit. It appears that once the stucco decorative wall of the shrine area was in a position to collapse. To protect and preserve this wall, they must have made such attempt which appears to be very effective from engineering point of view since the discovery of large number of votive tablets from trenches E6 and E4 tend to suggest that after engineering point of view since the discovery of large number of votive tablets from trenches E6 and E4 tend to suggest that after the filling with clay, the shrine or the temple was in service. The variation in thickness of clay deposit in different trenches is mainly due to nature, character and extent of the damage of the decorative wall in each trench. The maximum clay deposit is found in trench E5, where the extent of damage is extreme. In this trench, the original brick decorative wall was practically replaced by an artificial mud/brick jelly wall, obviously after its destruction and subsequently it was lime plastered and decorated with stucco figures specially lotus petal design and over it white painting was applied. The decorative wall might have been destroyed by those who plundered the monastery. But the reason for this artificial replacement of the decorative wall is not clear, why the people did not replace it with brick wall for mending instead of using very non-durable material for replacement? The Reduced Level of *surkhi* rammed floor or "*pradaksinapatha*" was checked at three points viz. trench E5, G10, K7 located in central, southern and eastern parts of the mound. The respective RL is

19.915m, 19.980m and 20.375m, that means the *pradaksinapatha* remains more or less at the same elevation.

From trench E4, thirteen terracotta votive tablets have been found; few are complete, while many are damaged. However, these votive tablets can be classified into four categories. The first two types have been reported earlier from trench E6, while the other two types are (a) Stupa, shown here as the central figure, surrounded by hundreds of miniature stupas (b) without any impression. One terracotta seal was collected from the excavated earth mixed with brickbats, the inscription of the seal relates to Buddhist creed and written in early *Siddhamatrika*, reads as “*Ye Dharma hetu prabhava...*”

**(Pl.42B).**

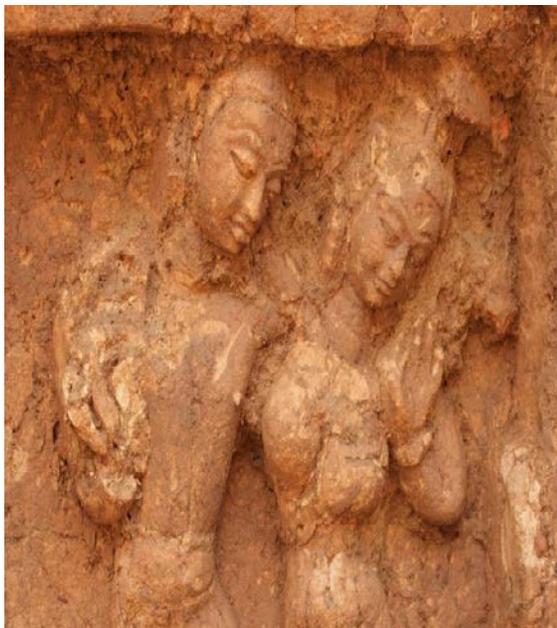
It appears further that the northern and the western parts of the monastery were either destroyed or plundered from time and again, as result of which there were several phases of construction and renovation before it was finally crumbled by the plunderers. A second monastery was constructed over the ruins of the early monastery around 9<sup>th</sup> /10<sup>th</sup> CE, after a gap of several years. It had neither the resources nor the engineering skill, built without any lime plaster and stucco decoration. On the basis of archaeological evidences, including paleography and art form/style, the early monastery can be dated about sixth century CE that only be compared with the similar monasteries like, Vikramshila, Nalanda, Paharpur, Mainamati of India and Bangladesh.



A



B

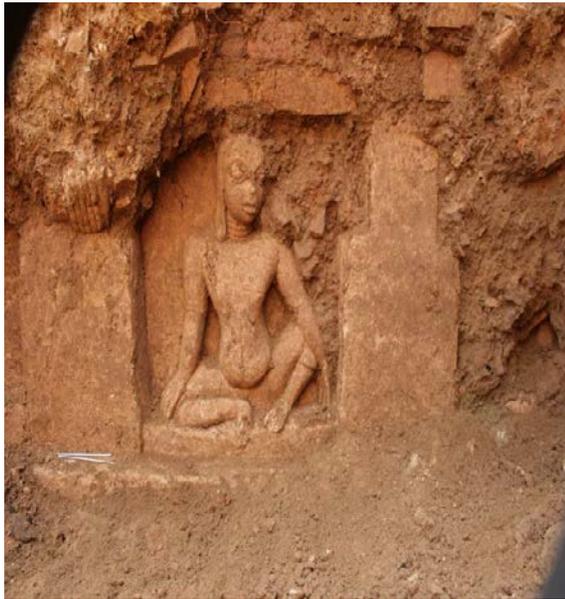


C



D

*Moghalmari: A, pilaster crowned by stucco lotus, B, stucco head, C, dancing couple and D, female figure playing vina*



A



B



C



D

*Moghamari: A, stucco male figure, B, medallion, C-D, inscribed votive tablets showing Buddha as the central figure.*

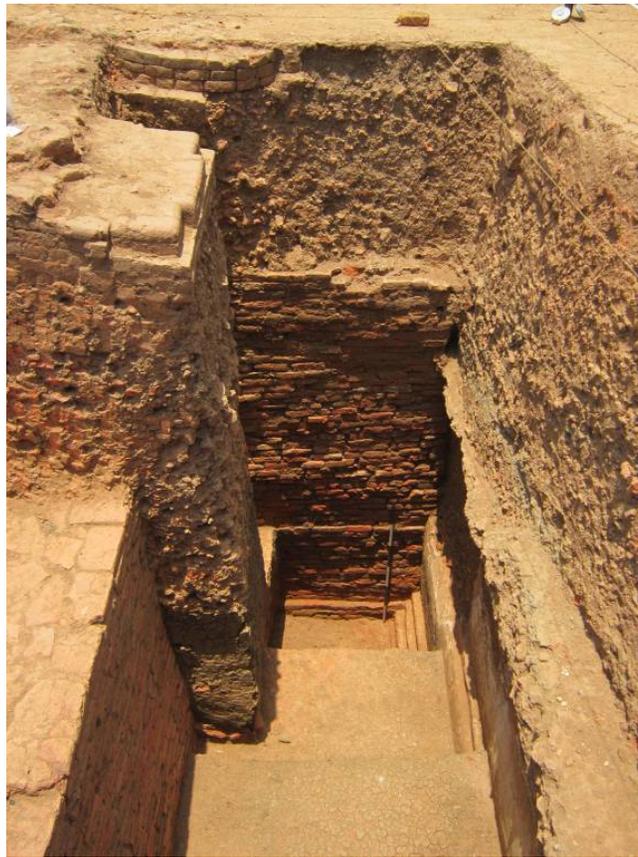


A



B

*Moghamari: A, stucco figures within the niche on the western wall and B, connecting wall with the decorative wall.*



A



B

*Moghalmari: A, general view of E5 showing the protective and the decorative walls and B, terracotta inscribed seal*

## II.EPIGRAPHY

### SANSKRITIC AND DRAVIDIC INSCRIPTIONS<sup>1</sup>

#### ANDHRA PRADESH

**1. BRAHMI INSCRIPTION,UPPUGUNDURU,  
DISTRICT PRAKASAM**

This inscription, engraved on a lime stone pillar, recovered from the surface of a Buddhist site at Uppugunduru, is written in Prakrit language and Brahmi characters, dated about third century CE. It records the gift of a lime stone pillar by a person *Kasapa-(da) ma*.

**2. KAKATIYA INSCRIPTION,RAVULAKOLLU,  
DISTRICT PRAKASAM**

This inscription in Telugu characters is engraved on a loose stone slab, found by the side of the Venugopalsvamin Temple. It is dated in *Saka* 1194 (1273 CE). It records the grant of one thousand *putti* of land by an official *Mahamandalesvara* Chakra Narayana to Ramanujadasa (a temple official) for conducting offerings and rituals at the Temple of Chenna Gopinathadeva of Ravulakolanu **(Pl.43)**.

**3. TELUGU INSCRIPTION, GARANIMETTA,  
DISTRICT CHITTOOR**

This hero-stone inscription engraved on a slab fixed in the field of the village Garanimetta, is written in Telugu language and characters of the eighth century CE. It records that a person named Mannagamamimana Kamunru, son of Sadegata (a *mahut*), died in a battle pierced by an elephant.

**4. TELUGU INSCRIPTION, NAGULAPADDU,  
DISTRICT PRAKASAM**

The stone containing this inscription is lying in the premises of a ruined Siva Temple and it is written in Telugu language and Telugu-Kannada characters of seventh-eighth centuries CE. It seems to record some grants given by Sri Ayymampa to Aridoyyee Bhatara **(Pl.44)**.

#### KARNATAKA

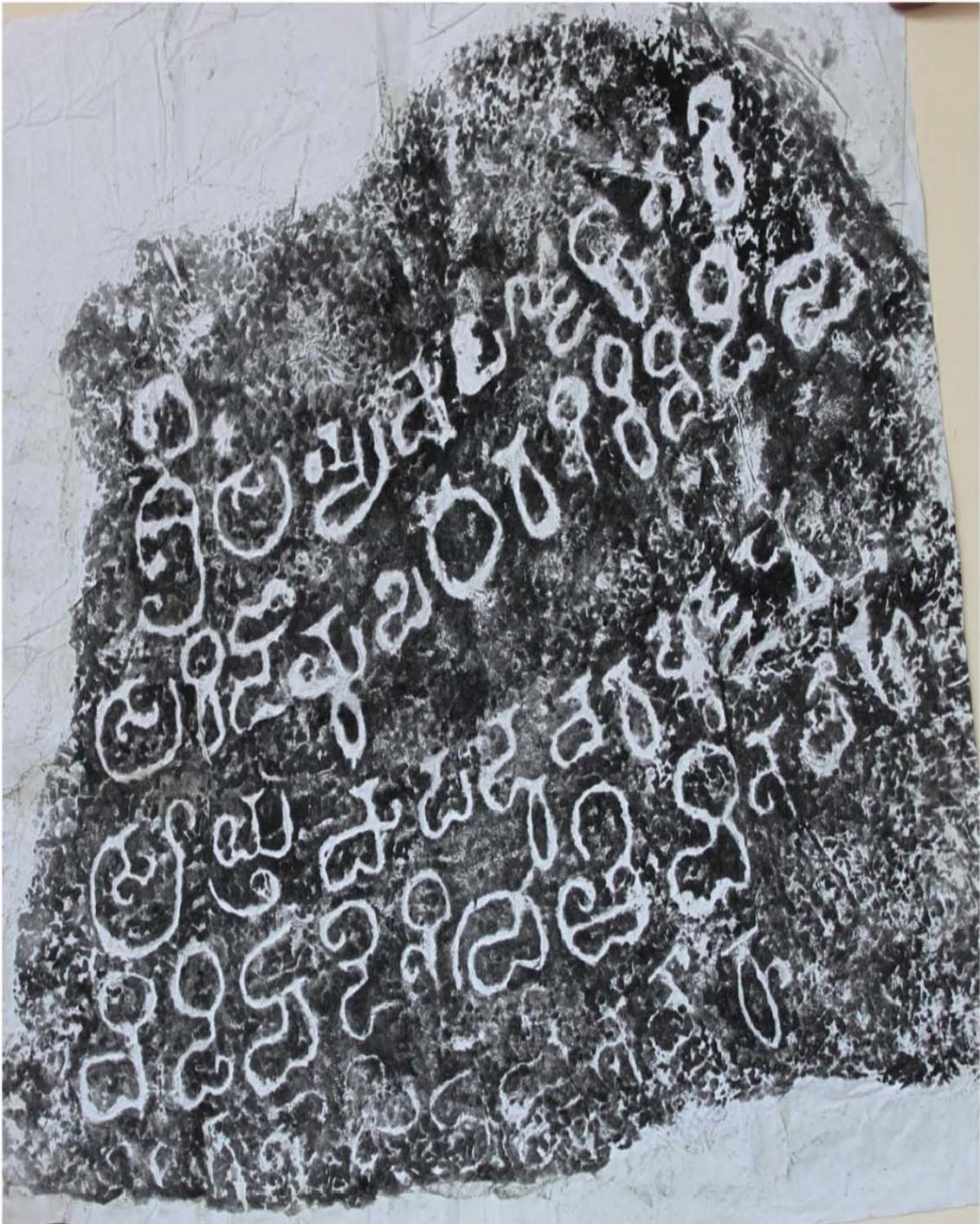
**5. KALYANA CHALUKYA INSCRIPTION,  
HANAGAL, DISTRICT HAVERI**

This Kannada inscription, engraved on a slab is lying in the Garden of Kumaresvara B.Ed. College. It belongs to the reign of Tribhuvanamalla Vikramaditya VI and is dated to Chalukya *Vikrama* Year 44 (1119 CE). It registers the gift of a land to the deities Kanthesvara, Sarasvati and Machesvara in the Siva Temple at Pantipura by *Mahamandalesvara* Tailapadeva. The gift was made for the worship and food offerings to the deity Kanthesvara and for feeding the ascetics of the temple. Further, it also refers to certain endowments and entrusting Lords to carry out the repairs to the temple of Svayambhu Kantheshvaradeva and states that the gift was entrusted to *Tatpurushapandita* **(Pl.45)**.

<sup>1</sup>Information from T.S. Ravishankar, assisted by D.M. Nagaraju, Jai Prakash, S. Swaminathan, S. Nagarjuna, K. Karuppaiah, K. Munirathnam, K. Paneerselvam, Anil Kumar R.V, Meka V Raghavendra Varma, Nagarajappa, Yesubabu and Krishnamurthy of the Epigraphy Branch of the Survey.



*Ravulakollu: inscription on a stone slab*



*Nagulapaddu: inscription on a stone slab*

**6. VIJAYANAGARA INSCRIPTION, BANAHALLI, DISTRICT MYSORE**

This Kannada inscription is fixed on the back side of the rice mill in the village Banahalli. It belongs to the reign of Venkatapati II and is dated into *Saka* 1524 (1602CE). It records that the chief of Venkatapatiraya, Ramarajanayaka, son of Chennodeya, made a grant of wet and dry lands in the village Banahalli and garden along with the income from customs (*sulka*), for making offerings to Basavalinga-Devaramatha at Votahala for the merit of his parents.

**7. KANNADA INSCRIPTION, CHIKKARAMAPURA, DISTRICT KOPPALA**

This inscription with a depiction of a platter (*Talige*) engraved on a bed rock lying on the left bank of the River Tungabhadra and is written in Kannada language and characters. The main purport of this inscription and the platter is to state that Vakkala Chanda Yadapana Nayaka, the brother of Prouda Devaraya used to visit this place to take food during the summer season.

**8. KANNADA INSCRIPTION, HOSAGANGURU, DISTRICT CHIKAMAGALORE**

This inscription, engraved on a stone slab, in Kannada language and characters, dated in *Saka* 1519 (1597CE), belongs to the chief of Santebennuru Nayaka. It records the gift of the village Sagaragrama by the chief Sitarama Nayaka for providing food offerings and for burning lamp to the God Ranganatha.

**ODISHA**

**9. EASTERN GANGA INSCRIPTION, BHUBANESHWAR, DISTRICT BHUBANESHWAR**

This copper plate inscription engraved on a stone slab, in Nagari characters and Sanskrit language of the eleventh century CE, originally found from Sanipeta (Pl.46), District Srikakulam, Andhra Pradesh, now

housed in the State Museum of Odisha. It belongs to the Imperial Ganga ruler Anantavarman Chodagangadeva, son of Rajaraja I and the grandson of Vajrahasta III. The grant was issued from *Kalinganagara* and was addressed to the assembled *Kutumbavinas* and the other officials like *Purohita*, *Amatya*, etc. of the District of Varahavattam. It records the grant of the village *Vuravada* in *Varahavattani* to one Aditya, the brother of Vallenakhaya and the son of Suryadeva belonging to *Salankayana-gotra* and a resident of *Sanivada*. It states that the members of the donee's family served under the imperial Gangas as ministers for several generations. The village was granted as a rent free *agrahara* to the donee on the occasion of *Uttarayana Sankranti*.

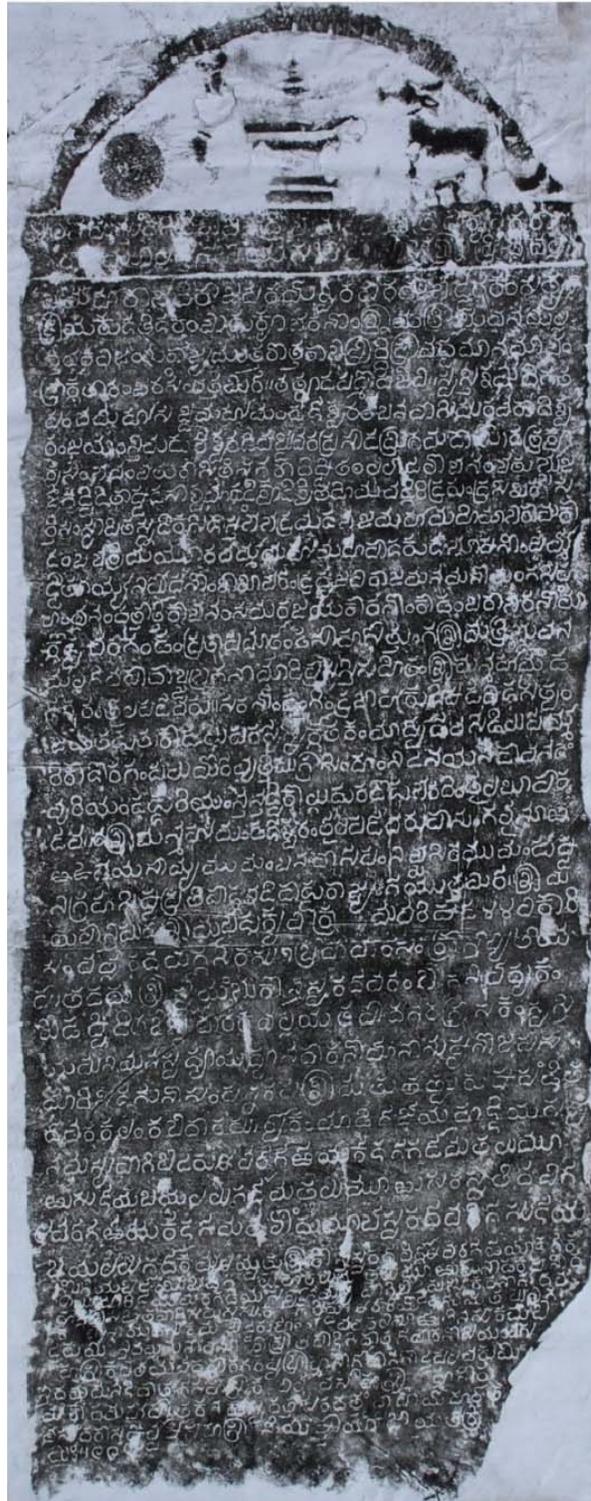
**TAMILNADU**

**10. TAMIL INSCRIPTION, NAMANUR, DISTRICT SIVAGANGA**

This Tamil inscription in Vatteluttu characters of about the tenth century CE is engraved on a stone slab fixed in the sluice of a big water tank. It reads as *Avanicharap-perumadai* i.e. the sluice of *Avanichchuran* (probably, name of an individual who caused the sluice).

**11. CHOLA INSCRIPTION, KAMARASAVALLI, DISTRICT ARIYALUR**

This inscription in Tamil language and characters of the tenth century CE is found engraved on the southern wall of *ardha-mandapa* of Saundaresvara Temple. It is dated in the eighth regnal year (979 CE) of the Chola ruler Parakesari Varamana (Uttama Chola). It records burning of a perpetual lamp by Ayyapolil-Ainnurruvar of Kamaravallich-Chaturvedimangalam in honour of their servant Kurumban alias



Hanagal: inscription on a stone slab



Sanipeta: copper plate inscription

Manamer Kudichchingm-Valanjiyar of Videlvidigu-Chaturvedimangalm in Takklur-Nadu, who seems to have been killed in a fight.

**12. CHOLA INSCRIPTION, SRIRANGAM, DISTRICT TIRUCHCHIRAPPALI**

This inscription is in Tamil language and characters of the thirteenth century CE and it is dated in the thirty-first regnal year of the Chola ruler Rajaraja III (1237CE). It is found engraved on the outer wall of the fourth *prakara* (facing east) of the Sriranganathaswamy Temple. It records that a person named Kulamukku-Govindanavayamanavalar, his brother Govindakuninambimanavalar and the horse-traders of Malaimandalam petitioned the deity (Temple Authorities) to provide land for creating an *agrahara* (Brahmanical Settlement) and also for residential settlement to the *Vaishnavas* well-versed in the Vedas. It is stated that they wanted to create this settlement for the merit of their parents, Govindachchmanavalar and his mother. It is further stated that they wanted to create an *agrahara* after the name of the elder brother Navayan Govindachaturvedimangalam. They also petitioned the temple authority to sell land at Gunasilamangalam which was owned by the temple at Pachchilkurram in Rajaraja – Valanadu. The temple accordingly sold one such land for 17,000 *kuli* for 17,000 *kasu*. It is also recorded that 32 *nali* of oil was to be measured out to the temple. The temple accountant Haricharanalayapiriyar wrote the deed and several persons figured as signatories in this transaction.

**13. CHOLA INSCRIPTION, TIRUVAIYYARU, DISTRICT THANJAVUR**

This long inscription in Tamil language and characters of the twelfth century CE is found

engraved on the northern side of the *patti* portions of the *ardha-mandapa* and central shrine of the Uttara-kailasa of Panchanadisvara Temple. It is dated in the third regnal year of the Chola ruler Rajendrachola I (1015CE). It records that the Queen Dantisattivitanki alias Olokamahadeviyar who had caused Olokamahadevi-Isvaram-Udaiyar Temple in stone endowed land and apportioned it for the maintenance of several personnel, singers, priests, dancing girls and other service personnel who were employed in the Temple. The break-up of the apportionment of lands allotted to various service personnel are also given. It further records that, if it is noticed that the left-over lands after allotment were not sufficient to meet the requirement for providing food offerings and conducting rituals and also for burning lamps in the temple, the Queen could issue orders for the resumption of a portion of the allotted lands and made them over to the God (Pl.47A).

**14. CHOLA INSCRIPTION, VADASERI, DISTRICT KARUR**

This inscription in Tamil language and characters of nine-tenth century CE is engraved on a stone slab, erected on the bank of a tank and dated in the eighth regnal year (965CE) of Rajakesarivarman (Sundara Chola). It records the assignment of one *nali* of paddy per *kalam* for upkeepment of the tank by an individual Viracholaperaiyan for the merit of Alagiyak-Kudan kandan (Pl.47B).

**15. HOYSALA INSCRIPTION, TIRANIPALAIYAM, DISTRICT TIRUCHCHIRAPPALI**

This inscription in Tamil language and characters is engraved on the door-jamb of the *ardha-mandapa* of the Perumal Temple of the Tirunipalaiyam village. It is dated in the

twenty-fourth regnal year (1278CE) of the Hoysala ruler Vira-Ramanatha. It records that SengunravanMaravanaliasVisaiyanarayanadevan (Srutiman community) donated 300 *kuli* of land at Arasanpalichchey to the God of Arasapuyandara-Vinnagar-Emberuman as Tiruvidaiyattam.

**16. RASHTRAKUTA INSCRIPTION, VALLIMALAI, DISTRICT VELLORE**

This Tamil inscription belongs to the Rashtrakuta ruler Krishna III (939-967CE) and it records the administrative reforms carried out by his official Krishnaveliya Desai Idankidana Devappaiyyan. It is also recorded that he came to Merpadi to receive lands for his livelihood and on that occasion he scrutinized the temple accounts there (Pl.48).

**UTTAR PRADESH**

**17. BRAHMI INSCRIPTION, MATHURA, DISTRICT MATHURA**

This inscription, preserved in the State Archaeological Museum at Mathura was found at Jamalpur mound in Mathura, and is engraved on the pedestal of a seated image of *Sakyamuni*. It is written in Sanskrit,

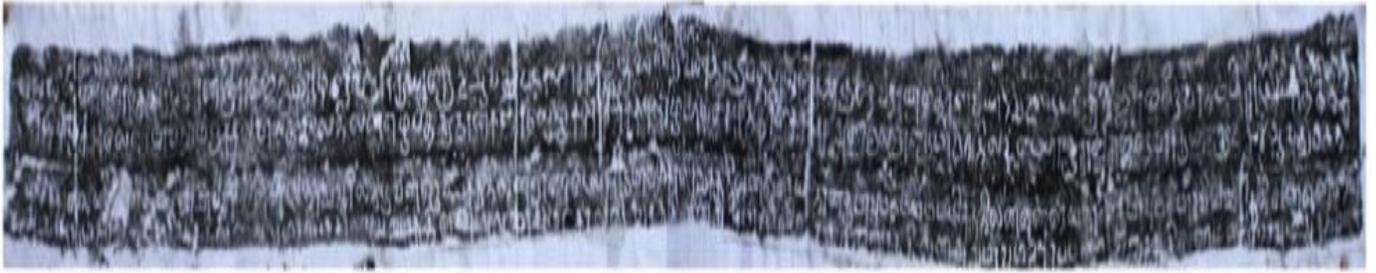
influenced by Prakrit language and Brahmi characters and dated in *Saka* 94(172-73CE).It records the installation of the image of the Holy *Sakyamuni* by the monk Nagamitra for the welfare and happiness of his parents, Upadhyayacharya's elder son Sata and all sentient beings (Pl.49A).

**18. EARLY NAGARI INSCRIPTION, VARANASI, DISTRICT VARANASI**

This fragmentary stone inscription is kept in the Department of Ancient History and Archaeology, B.H.U., Varanasi. It is in Sanskrit language and in Early Nagari characters of eighth century CE. It records the construction of a temple (*Kirtti*) dedicated to the God Rudraditya by Sivarudra, son of Dhanapala, grandson of Silata (Pl.49B).

**19. BRICK INSCRIPTION, VARANASI, DISTRICT VARANASI**

This brick inscription in Brahmi characters and Prakrit language of first century BCE is preserved in the Department of Ancient History and Archaeology, B.H.U., Varanasi. It records that Damamitra, son of Asvavatayani performed *Asvamedha Yajna*.

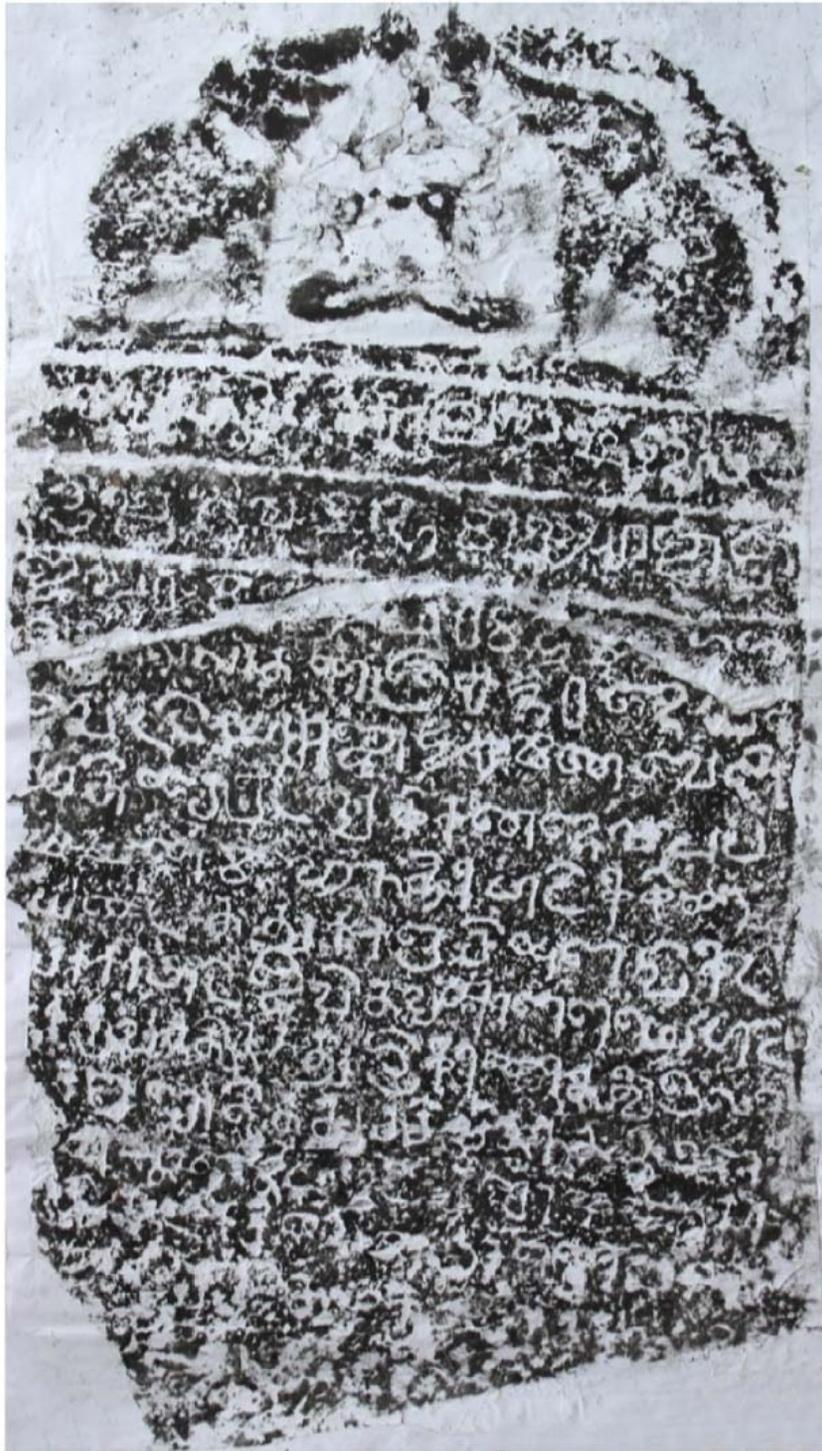


A

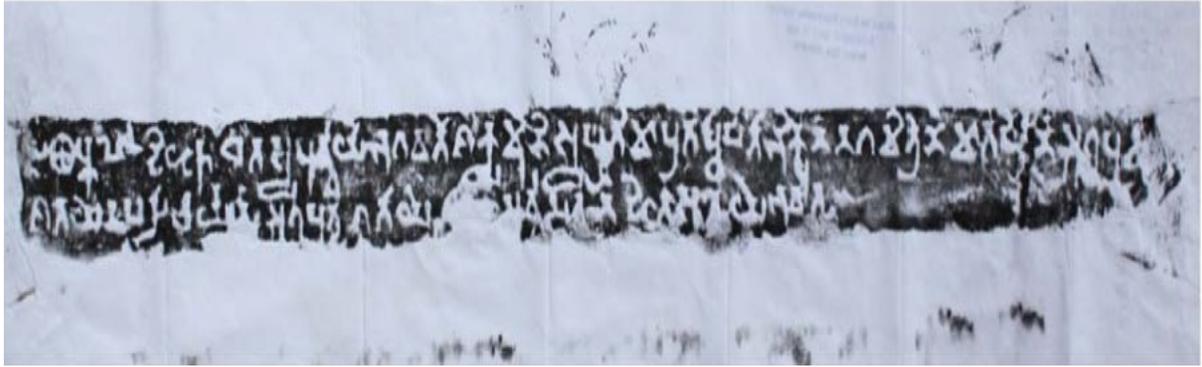


B

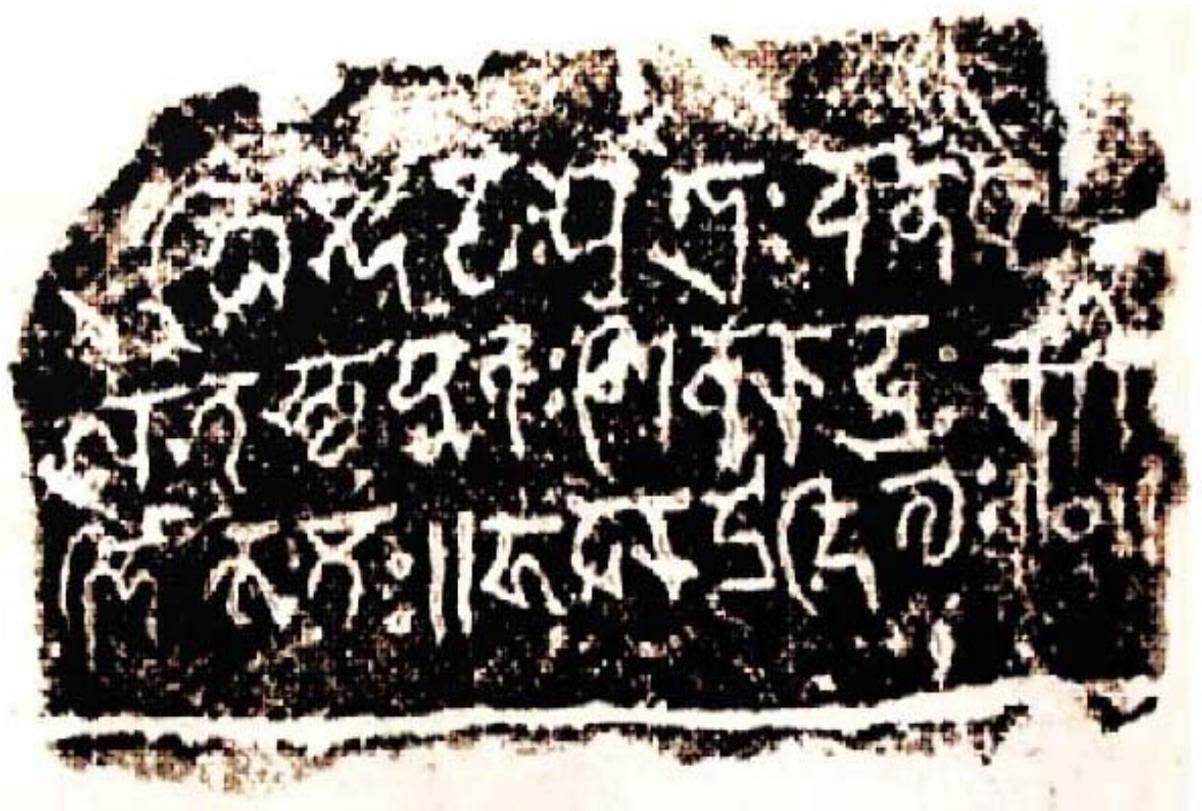
*Chola Inscriptions: A, from Tiruvaiyyaru and B, Vadaseri*



*Vallimalai: Rashtrakuta inscription*



A



B

*Mathura: A, Brahmi inscription and B, Varanasi: inscription on a stone slab*

## ARABIC AND PERSIAN INSCRIPTIONS<sup>1</sup>

### GUJARAT

#### 1. MUGHAL INSCRIPTIONS, MODASA, DISTRICT SABARKANTHA

This record originally recovered from a well, now kept in the Museum of Arts College, Sabarkantha, is of the time of Mughal Emperor Aurangzeb (1658-1707CE). It registers the construction of a well during the administration of Mirza Abdullah Baig in the fifth regnal year of the Emperor in AH 1073 (1663CE). The Persian text is written in *Nastaliq* style of Calligraphy. There is another small tablet found from the same well, which contains only the date evidently of the construction of this well.

#### 2. EPITAPHS, MODASA, DISTRICT SABARKANTHA

This epitaph from Makki Shah's Graveyard at Modasa mentions the death of one Masud, in the year AH 827 (1424 CE). The Persian text is executed in *Naskh* style of calligraphy.

### RAJASTHAN

#### 3. LODI INSCRIPTION, BAYANA FORT, DISTRICT BHARATPUR.

This badly damaged and fragmentary loose slab bears an important Persian inscription referring to the erection of a mosque, during the reign of Sultan Sikandar Lodi (1489-1517 CE). Unfortunately, the date and the builder's name are not legible. This record affirms that when Bayana Fort came under the hands of Sultan Sikandar Lodi, after the rule of Tughluq and Sayyid, the Sultan saw that a mosque is built there. When Sikandar Lodi claimed the throne of Delhi after Bahlul, the

*qala'dar* of Bayana Sharaf, son of Ahmad Khan Jalwani, was reluctant to obey him. The Sultan then sent Umar Khan Sarwani to take the charge. The construction of this mosque and mention of the Sultan Sikandar Lodi in this inscription indicate at suzerainty of Sikandar on Bayana Fort. It is not clear that where exactly that mosque was situated, as the small fragment bearing the inscription does not furnish any information regarding this matter. The *Naskh* calligraphy of this record conforms to the style of Lodi epigraphs substantiating its chronology (Pl.50A).

#### 4. MISCELLANEOUS INSCRIPTION, SOMALPUR, DISTRICT AJMER.

A small tablet in Persian on the façade of a mosque says that this is the Jami Mosque of Sultan-Ul Hind (i.e. dedicated to the famous Chishti Saint lying buried at Ajmer) built in AH 1201 (1786-87CE).

#### 5. MISCELLANEOUS INSCRIPTIONS, JAIPUR, DISTRICT JAIPUR.

The first record from Mir Ji ka Bagh locality, in Persian verse mentions the erection of a mosque by Mir Qurban Ali in the year AH 1315 (1897-98CE). The text is composed by poet Nagahan. Another Persian record from the same place is an epitaph of Khujista Banu, wife of Mir Qurban Ali mentioning her death in the year AH 1310 (1892-93CE). One more epitaph from the same place registers the demise of a person at the age of 52 in AH 1320 (1902-03CE). The year of death is composed in a chronogram by Bismal. The third record of this series is a tablet fixed above the entrance of the *Dargah* of Mir

1. Information from Dr. G.S. Khwaja, Director (Epigraphy), Arabic and Persian Inscriptions assisted by Dr. M.A.Zeya and Mr. Mohd. Shahnawaz Alam, Epigraphy Branch of the Survey. This Branch copied and examined eighty (80) Arabic & Persian inscriptions during the year out of which few important ones are being highlighted here.

Qurban Ali which says that it is the resting place of Mir Qurban Ali Mujaddadi. It bears the date of its construction as AH 1328 (1910-11CE). One tablet on the façade of a mosque in *Chardarwaza* locality in Jaipur registers the construction of Masjid-I Bagh-I Subh-Sadiq in the *Dargah* of *Maulana* Diya-Ud -Din in AH 1213 (1798-99CE). Another record, virtually an epitaph, in Persian verse mentions the demise of a saintly personality *Maulana* Diya-Ud-Din in AH 1230 (1815-16 CE). The date is also composed in a chronogram.

#### 6. EPITAPH, JAIPUR, DISTRICT JAIPUR.

This damaged record executed on a pillar of *Baba* Fatah Shah's Tomb in Motidungri, registers in Persian verses the death of a person in AH 1258 (1842-43CE), whose name is not legible. The last hemistich of the text makes the chronogram for the date.

#### 7. INSCRIPTION OF RAJAS OF AMBER, DISTRICT JAIPUR.

This commemorative record mentions the construction of the tomb of Khushnazarji, a *Nazir* (i.e. Office Superintendent) at the orders of Colonel Sir Sawai Madhav Singh, the Raja of Amber in AH 1327( 1909-10CE).

### UTTAR PRADESH

#### 8. MISCELLANEOUS INSCRIPTIONS, MAU AIMMA, DISTRICT ALLAHABAD.

One Persian inscription registers the construction of an *idgah* at Mau Aimma by the weaver community in the year AH 1255 (1839-40CE). The style of calligraphy of this inlaid tablet is *Nastaliq*. Another inscription from Purani Bazar *Masjid*, at the same place, records the erection of a mosque by one Muhammad Fayyad Ali in the memory of his mother Karim-Un-Nisa in AH 1279 (1862-63 CE). The Arabic text is written in *Naskh* style.

#### 9. EPITAPHS, JAUNPUR, DISTRICT JAUNPUR

One headstone from the graveyard near Nasib Khan Mandi records the death of a saintly person (name not given) in the year AH 1268 (1851-52 CE). The last hemistich of the metric text in Persian makes the chronogram for the date. Another epitaph from the same graveyard registers the demise of a youth Warith Ali Khan in the year AH 1276 (1859-60 CE). The language of this metric text is Persian. One more epitaph from this place comes from the grave of Haider Ulfati, in Purani Bazar. It records the death of a noted poet Haider Ulfati, in the year AH 979 (1571-72CE). It is inscribed by Fakhr-Ud- Din. The Calligraphy of the religious text in *Thulth* style and Persian verses in *Nastaliq* is of high degree. The deceased Haider mentioned in this Persian record as a noted poet of Mughal Emperor Humayun's court (1508-1556CE) who had Ulfati, as his nom-de-plume. He came to Jaunpur at the time of Ali Quli Khan. He breathed his last on the given date in the agony of his son Shaham Baig's separation. The martyrdom of Shaham Baig is mentioned in another epitaph from the same place, which was reviewed in this year.

The fourth epitaph is of Shaham Baig from Purani Bazar. It refers to the martyrdom of Shaham Baig in the year AH 969(1561-62CE). The obituary notice is composed in Persian verse written in *Nastaliq* style of calligraphy. Shaham Baig had many attributes to his personality which were so liked by Emperor Akbar (1556-1605CE) that he called him to his court at Akbarabad. Shaham's separation caused the death of his father Haider Ulfati and while defusing rebel by Ali Quli Khan Shaham was killed by the Mughal

army at Jaunpur in the given year, which is recorded in this epitaph (Pl.50B).

**10. MISCELLANEOUS INSCRIPTION, KHETA SARAI, DISTRICT JAUNPUR.**

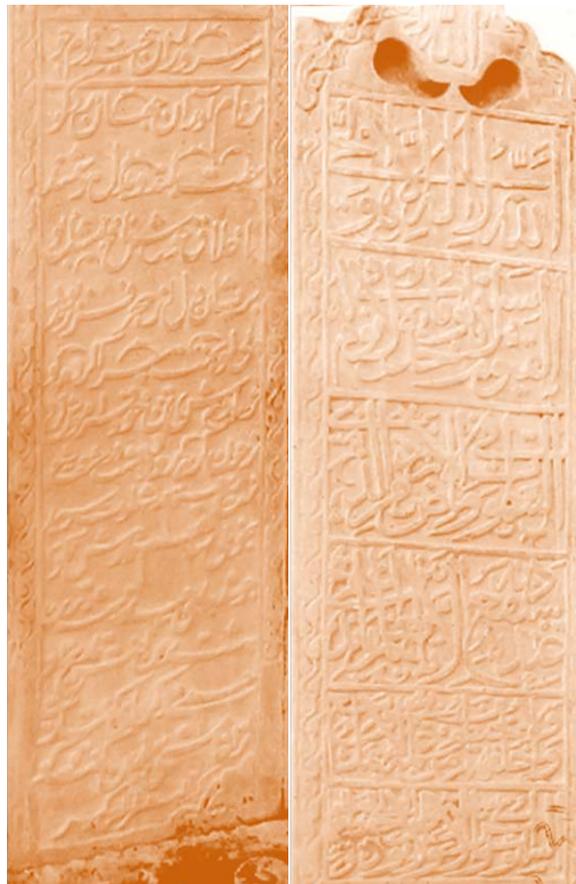
One record from the Jami *Masjid* of the *Bazar* mentions the erection of a beautiful mosque by Raushan Ali in the year AH 1249 (1833-34CE). The metric Persian text is written in *Nastaliq* style.

**11. MISCELLANEOUS INSCRIPTION, JAUNPUR, DISTRICT JAUNPUR.**

One record in the form of a loose slab kept in Shia *Masjid* in Dholgar *Tola* locality assigns the erection of a mosque by Ali Baqar in Year AH 1278 (1861-62CE.). The metric Persian text is written in fair *Nastaliq* style.



A



B

Bayana Fort: A, inscription on a stone slab and B, Jaunpur: epitaphs of Haider Ulfati

### III. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATION

The present report incorporates the palaeo-ethnobotanical study done at Birbal Sahni Institute of Palaeobotany, Lucknow, during 2011-12; on the botanical remains, recovered from the excavations at ancient Ahichchhatra, District Bareilly, Uttar Pradesh, carried out by the Agra Circle of the Survey, under the direction of Bhuvan Vikram in the year 2009. Systematic floatation recovery of botanical remains from this site was put into effect jointly by Dr. Chanchala Srivastava and Dr. Anil K. Pokharia.

palaeo- ethnobotanical significance have also been encountered.

The samples investigated have further added quantitative as well as qualitative data to advanced agricultural practices in this region of the Upper Ganga Plain in ancient times.

#### UTTAR PRADESH

##### AHICHCHHATRA (28° 22'; 79° 08' 12"), DISTRICT BAREILLY

In continuation of previous year's (2010-11, p.156) study, morphological investigations of carbonized seed and fruit remains' comprising of field crops, collected from Ahichchhatra, a prominent site in the Archaeological Atlas of India, were continued. During the year under review, few new finds like *Triticum sphaerococcum* (Dwarf-wheat), a cereal of West Asian origin; fibre crop of *Gossypium* sp. (Cotton) and oil-seed crop *Linum usitatissimum* (Linseed) were analysed.

A number of weeds associated with winter and summer season crops as well as wild taxa of

## IV. OTHER IMPORTANT DISCOVERIES

### KARNATAKA

#### 1. VITTALA TEMPLE COMPLEX, HAMPI, DISTRICT BELLARY

The Karnataka Circle of the Survey, reported about a hoard of ritualistic metal objects, made on copper, brass and silver, while excavating the foundation trench of the *mukha mandapa* of the Devi Shrine of Vittala Temple Complex, in course of restoration work. The objects include lamps, bowls of different sizes, ladles, spouted vessels, *thali*, cooking pots, miniature figurines of Garuda and Hanuman. Besides, fragments of gold finial were also recovered during the clearance of debris near the eastern entrance of the Temple Complex.

### RAJASTHAN

#### 2. VILLAGE NAREHDA, TEHSIL KOTPUTI, DISTRICT JAIPUR

A team from the State Archaeology and Museum Department, Rajasthan, recovered about 200 silver coins of the Mughal Period dated approximately 17<sup>th</sup>/18<sup>th</sup> century CE in course of explorations.

### UTTARAKHAND

#### 3. JHANKAT AND BHUDHAI, TEHSIL KHATIMA, DISTRICT UDHAM SINGH NAGAR

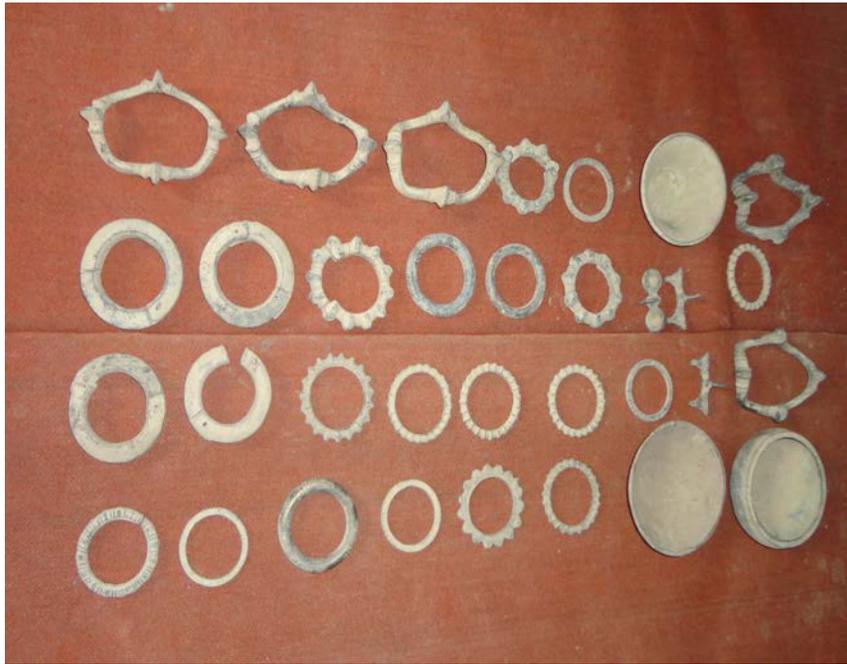
On receiving information from the Police Station Khatima that several metal ornaments have, been recovered from the villages Jhankat and Bhudhai (PI.51A), immediately a team of the

Dehradun Circle of the Survey, was sent to examine the said objects.

After examination, it has been found that the ornaments are of the recent past, belong to *Tharu* Tribes, who are still residing in this area. Overall, 34 ornaments including bangles, armlets, anklets, toe rings and bowls kept in a copper vessel, were traced out from village Jhankat, while three similar types of objects have been found from village Bhudhai, during levelling of the field.

#### 4. KANAURA, TEHSIL BAJPUR, DISTRICT UDHAM SINGH NAGAR

Some more ornaments/artifacts recovered from village Kanaura (PI.51B) kept under Police custody at Bajpur, were also examined by the team of the Dehradun Circle, of the Survey. Eighteen (18) metals objects, almost similar to those found from Khatima, were uncovered from the field, during levelling of the ground. These artifacts include bangles, toe rings and *manjiras* which appear to be the ritualistic objects.



A



B

*A, Jhankat and Bhudai: metal ornaments and B, Kanaura: metal objects*

## V. MUSEUMS

### 1. ARCHAEOLOGICAL MUSEUM, CHANDERI

During the year under review, the old showcases have been remoulded and refurbished as per requirement. Two numbers of power inverters of 2 KVA have been installed for proper lighting in three galleries. In addition, twenty numbers of damaged iron pedestals have been replaced by teak wood pedestals in the Jain Gallery. The showcases in Anandam Gallery have been re-arranged properly so that visitors can move easily. Eighteen numbers of fire extinguishers (ABC stores pressure type) have been fixed in four wooden-glass cases, at appropriate places of the museum. A Jain stone pillar (in five parts) has been installed on a rounded podium and an image of *Panch-Ganesa* has been fitted on a rectangular podium of the museum campus. The water tightening work of the roof to prevent the seepage of water has been done. The acrylic labels to the objects, displayed in all galleries, were replaced with S.S. Sheet labels. Sixteen close circuit T.V. cameras were installed for keeping close watch on artifacts displayed in the galleries, corridors, inner and outer courtyards. A permanent shed over 64 KVA generators was constructed and fenced with iron grills. A well-equipped strong room has been constructed for housing antiquities of the reserve collections, besides, racks and

wardrobes were also provided for safe custody of the antiquities/objects.

### 2. HAZARDUARI PALACE MUSEUM, MURSHIDABAD

During the period under review, a good number of badly damaged old furniture, stored in the reserve collection, was renovated for periodical display in the museum galleries. Several Persian; Arabic and Urdu documents of the Record Room as well as the Library were en-listed and documented. Besides, the work of replacement of eleven numbers of close circuit T.V. cameras, 22 numbers of adopters was also carried out. The repairing work of two DVR machines of the existing CCTV System was done.

### 3. ARCHAEOLOGICAL MUSEUM, JAJPUR, RATNAGIRI

During the year under review, installation of Air-Conditioners in all the galleries of the museum was provided for visitor amenities, besides, kiosk, recordable CCTV cameras, smoke detectors in all the galleries have been installed. Pertinent lights around the museum buildings have also made available for safety and security.

### 4. SALAR JUNG MUSEUM, HYDERABAD

The museum is presently housing thirteen thousand objects from different parts of the world and suitably displayed in thirty eight galleries. During the year under consideration, the museum has not only performed different

annual events/celebrations regularly, but also organized several exhibitions on different occasions, such as, Birth Anniversary Celebration of Dr. B. R. Ambedkar, Contemporary Photography Exhibition in association with the Victoria and Albert Museum, London, International Exhibition on “Treasures of Ancient China” in association with the Archeological Survey of India and State Administration of Cultural Heritage, Art Exhibitions, China, Special Photo Exhibition on Indian’s Struggle for Freedom, Mahatma Gandhi and Reflections on Democracy, 60 years of Salar Jung Museum, Churches of Medak Diocese, Relics of Masumeen, priya Dhatri and so on and so forth.

Seminars or Workshops on “Dr.B.R. Ambedkar and The Indian Constitution” “Hyderabad Heritage – The Way Forward”, “Introduction of Photographs”, “Kondalpally Toys Making” were held during this period.

Besides, the museum has also organized monthly lectures in collaboration with Historical Society of Hyderabad and arranged a special lecture on “Architectural Heritage of Andhra Pradesh”. All these events were arranged as parts of the educational and cultural activities.

#### 5. ARCHAEOLOGICAL MUSEUM, TAMLUK

In this season, six numbers of CCTV cameras with DVR, having 16 Channels Recording System, along with LCD colour monitors have been installed in the museum for safety and security of the antiquities. Two sets of inverters have been fitted in the museum for power back-up, during power failure.

#### 6. VICTORIA MEMORIAL HALL (VMH), KOLKATA

The museum presently accommodating a large number of invaluable collections which has duly been exhibited in different galleries are

being enriched regularly. During the year under review, physical verification and digitization of nine hundred artifacts (900) of Rabindra Bharati Society (RBS) Collection was completed. Besides, the work of entering 6491(six thousand four hundred and ninety one) objects in JATAN Data Base Software has been carried out. In addition, restoration work of oil paintings, antique frames, housed in the Memorial Museum has been made. The Memorial also provided technical assistance to the Hon’ble High Court and the Governor House (*Raj Bhawan*), Kolkata, to carry out the restoration work of the paintings, antique frames and sculptures housed there. Apart from the said works, the museum also preserved 14 numbers of artifacts, relating to Rabindra Nath Tagore’s collections, 24 numbers of *Kalighat* Paintings, 22 numbers of water affected maps, 16 lithographs of Charles D’Oyly, 124 artifacts of RBS collections and evaluated and checked 35 photographs from CSMVS for Hope Foundation, conserved priceless manuscripts and books of VMH Collection, given treatment to 4 big sculptures and 27 numbers of metal objects and so on.

With a view to promoting art and culture, the memorial patronized seminars/ lectures/ workshops on the topics include “Museums and Memory”, “River of Smoke”, “Conservation of Archival Materials”, “Does Our Government Value Our Precious Heritage?” “Analysis of British Indian Portrait and Landscape: Connectivity between Art and Imperialism in Victoria Memorial Hall”, “Art and the British Empire: Some New Perspectives” etc. Further, the museum organized screening of films like, “*Kalighat* Paintings”, “*Bazar* Paintings” and “Everything Remains”. Moreover, the museum arranged

special exhibition on “Hoppe’s Santiniketan”, sound and light show on “Pride and Glory - The Story of Calcutta” a symposium on “Environment and Development” besides, Sit and Draw Competition, Debate Competition for the students on special occasions.

A unique exhibition on photographs from 1929 by Emil Otto Hoppe was arranged by the museum during this period. Regarding book release “Something Old, Something New – Rabindra Nath Tagore’s 150<sup>th</sup> Birth

Anniversary Volume” another one in collaboration with Oxford University Press “Talking Back the Idea of Civilization in the Indian Nationalist Discourse”, the museum also took part.

To strengthen security surveillance, the Memorial installed ten numbers of multimedia kiosks pertaining to various galleries, big scanner machine and fixed door frame metal detector in front of the north gate.

## VI. ARCHITECTURAL SURVEY

### TEMPLE SURVEY (NORTHERN REGION)

In continuation of previous year's work (2010-11, pp. 184-188), the last segment of the project entitled as "Architectural Survey of Kachchhapaghata Temples of Vidisha, Morena and Gwalior Districts of Madhya Pradesh" was commenced by the Temple Survey Project, Northern Region of the Survey, under the direction of K.Lourduswamy, assisted by M.C.Joshi, S.K.Bajpai, A.Vyas, L.K.Bhagchandani, S.K.Srivastava and K.R.Molviya. Altogether, twelve temples were documented during the year under consideration.

The said districts under survey are encompassed with magnificent temples of Kachchhapaghata Period, such as, Bajra Math Temple, Athakhambha Temple, Chaukhambha Temple and Hindola *Torana*, all are located in Gyaraspur, about 65 km from Vidisha. Besides, Padaoli Siva Temple, Chausatha Yogini Temple, Kakanmadh Siva Temple at Suhanuiya and the Siva Temple, Chaubaya comes under the District Morena. In addition, the District Gwalior covers other two temples.

Bajra Math Temple, situated near the southern part of the village Gyarasur, is a triple shrined ruined temple complex. Facing east, the central shrine is dedicated to Surya, as it is corroborated by the seated figure of the God Surya on chariot, driven by seven horses, depicted on the *lalata*. The temple stands on a small plain raised *jagati* and a *padmapitha* lies

above it. The usual *vedibandha* is composed of *khura*, *kumbha* and *kalasa*, followed by *jangha* in two registers, the lower one is decorated with figures of *astadikpalas*, various deities and *nayikas*, while the upper one is left plain. The central part of the shrine has *pancharatha latina sikhara* and on either side, the temple is having a *phamsana* or pyramidal roof. The temple is provided with a common *rangamandapa* of nine bays in front, once resting on twelve pillars. At present, only six pillars are existed and four new pillars were added during conservation work to hold the structure. The entire *mandapa* appeared to have been transected by *kakshasana* or balustrade, in the past. The other two shrines at the right and left sides of the main shrine are dedicated to Siva and Sankarshana-Balarama respectively.

Remains of the decorated Siva Temple at Vidisha, locally called Aathkhambha Temple, made on reddish sandstone, the extant parts of which are composed of four central pillars of a *mandapa*, two pillars of an *antarala* or *kapili* and a sanctum entrance doorway, with profusely carved *sakhas*. The *bhadra* pillars of the *mandapa* stand on a double moulded square base. The shaft portions are fully decorated. The *antarala* has two pillars of *bhadra* type which are shorter than the *mandapa* pillars. The lintel displays seated Siva figure, whereas the image of seated Brahma and Vishnu are shown at the terminal ends, with their usual attributes.

The remains of Padaoli Siva Temple (Fig.21) in Morena District only presents well decorated *mandapa* part; survived by ornate pillars, architraves and ceilings, along with figural friezes and decorative ornaments. Facing east, the temple is standing over an elevated *adhithana*. The *mukhamandapa* is supported by two full sized *bhadra* pillars with the entrance marked by *chandrasila*. The *mahamandapa* or *rangamandapa* is supported by *misraka* pillars and the highly decorated *vitana*. The pillars are decorated with bands of *kirtimukhas*, *ghatapallava* and floral designs, capped by a square ribbed capital and *kumara* bracket. The entire *mandapa* ceilings and architraves are exquisitely carved and decorated with rows of figures, depicting various events of the *Ramayana*, *Mahabharata* and *Puranas*. The Brahmanical deities' viz., Surya-Narayan, Vishnu, Siva, *kalyana-sundaramurti*, Vinayaka, etc are also represented. The other depictions like, *gurusishya*, *sura-sundaris*, *vidhyadharas*, *gandharvas*, amorous couples, musicians are noteworthy to be mentioned. The warriors are shown in foreign face and dress and the entire ceiling, decorated with coffered and cusped designs of high quality and richness is undoubtedly one of the best examples of the Kachchhapaghata Art.

Chausath-Yogini Temple is a remarkable specimen of Kachchhapaghata architecture at Mitaoli (Fig.22). Having a circular plan bearing 65 miniature meditation cells, facing east, the great Chausath-Yogini Temple contains a Siva shrine at the centre, locally called Akteshvara Mahadeo which has two *Siva-lingas* in the sanctum. The shrine has double pillared corridors with roof. Evidences

of some inscriptions on the pillars are also noticed.

Siva Temple, Kakanmadh, highest among all the Kachchhapaghata Temples at Suhaniya, is a magnificent structure and can be compared with the Kandariya-Mahadeva Temple at Khajuraho in terms of bold sculptural ornaments. This *sandhara* temple, measuring roughly 30m in length, stands on an enormous *jagati*. Unfortunately, the *sikhara* and *mahamandapa* shows only the courses, bereft of the face-stones. The temple is comprised of a sanctum, enclosed by ambulatory with three transepts, *antarala*, *mandapa* with lateral transepts and a *mukhamandapa*, approached from the east by a flight of steps. The pillars are of *bhadra* type and exceptionally tall and ornamented only on the upper one fourth parts, depicting bands of scrolls, *kirtimukhas* and *ghatapallava* and supported by brackets of plain curved profile. The central ceiling is lost but a few surviving peripheral ceilings show usual coffered cusped design.

The Siva Temple, Chaubaya is located about 2km south-east of Padaoli on the south-eastern direction. The temple is consisted of a *garbhagriha*, an *antarala* inside and a pillared porch showing modern structure. There is a *Siva-linga* inside the sanctum and three sculptures, one on each wall of the sanctum. The *vedibandha* has usual *khura*, *kumbha* and *kalasa* mouldings. The *jagati* and *kapili* are adorned with Brahminical deities.

A small Vishnu Temple at Mitaoli, located about 38 km from Gwalior on a high hill, is approached through a flight of about hundred steps. Facing east, the temple is standing upon a high stone built platform, with a small rectangular *garbhagriha* and a simple *trisakha*

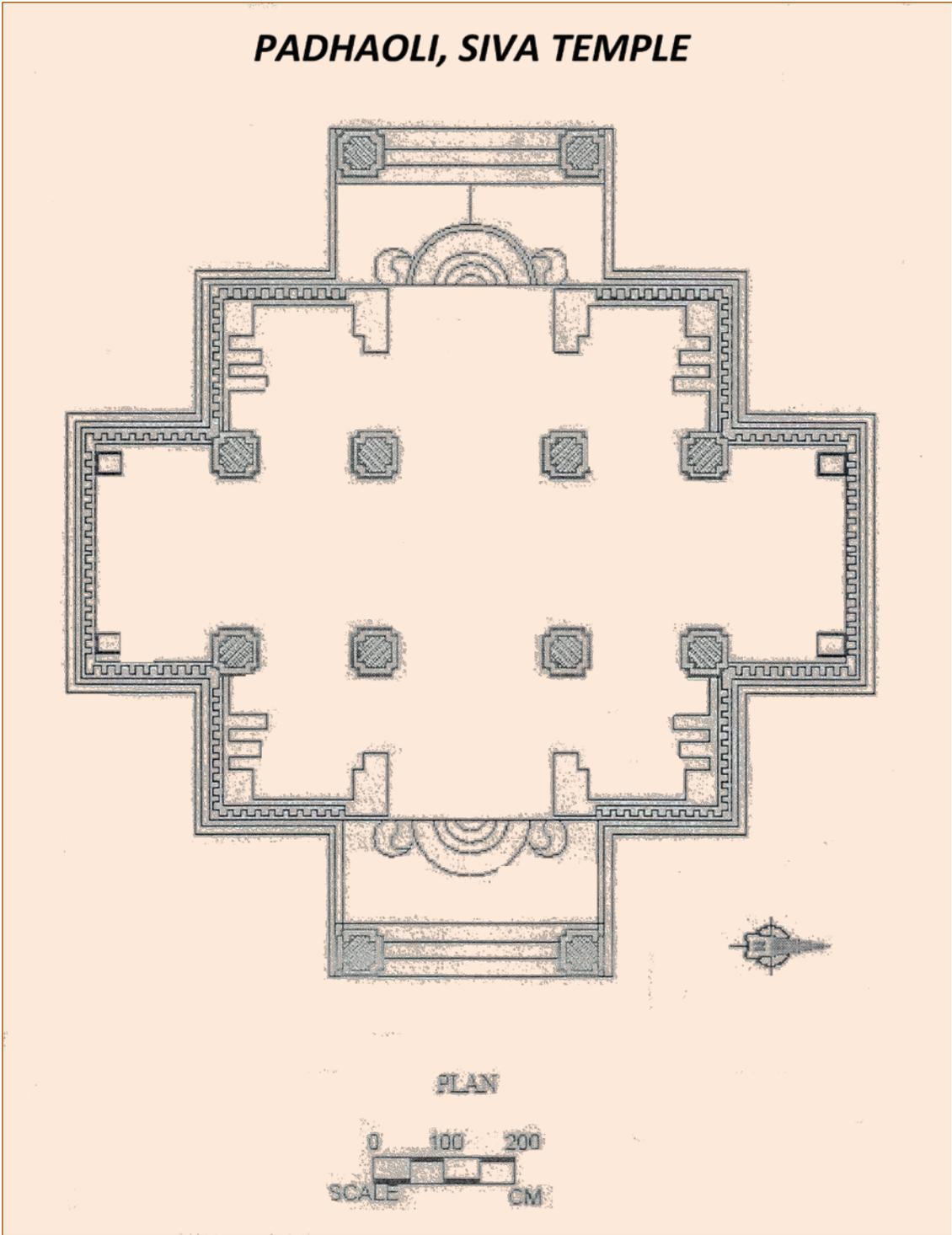


Fig 22

MITAOLI, CHAUSATHA YOGINI TEMPLE

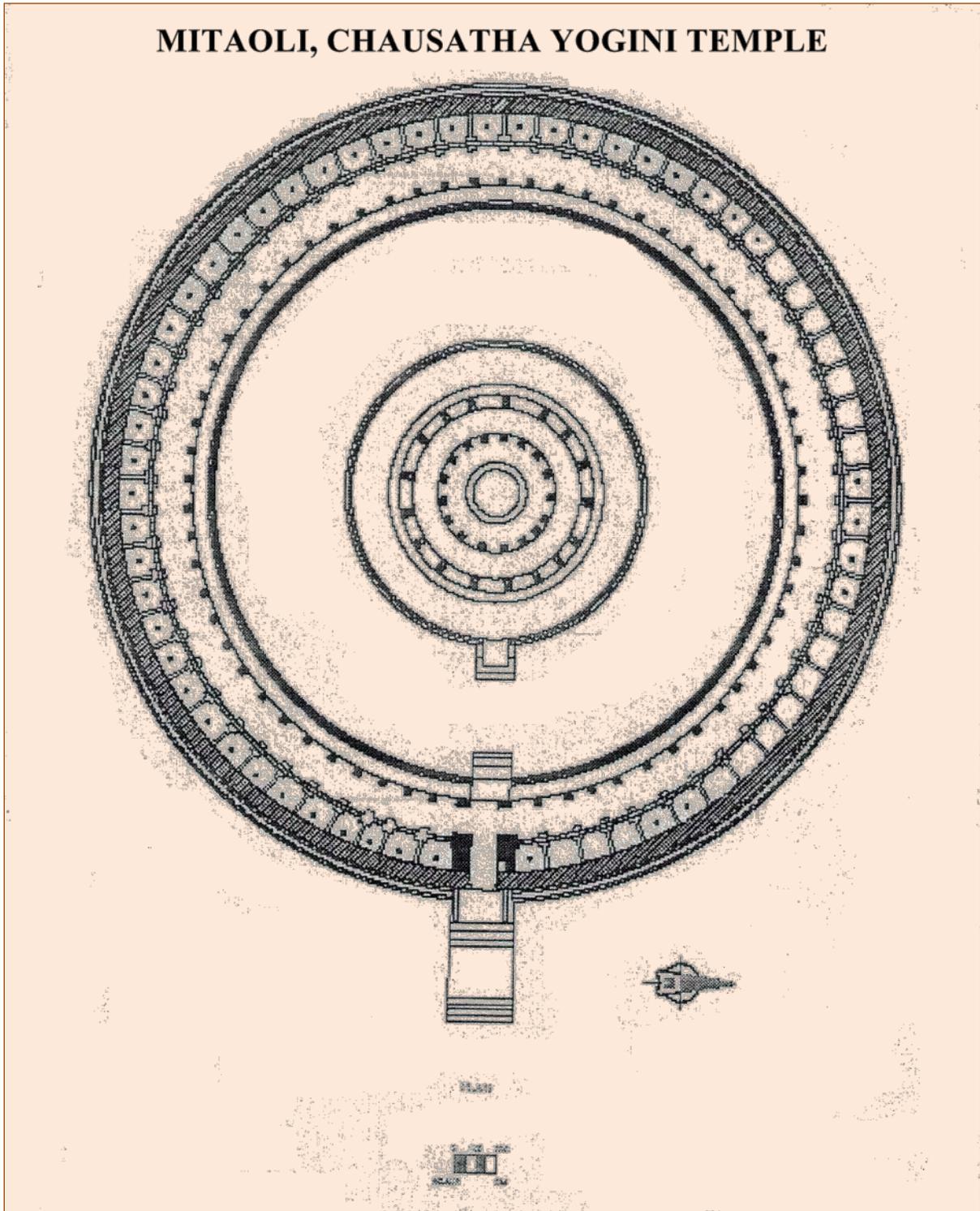


Fig 23

doorway, depicting Vishnu on the *lalata*, flanked by Brahma and Mahesa on the cardinal ends. Recesses are shown with *Navagrahas* in *tribhanga* posture. The *trisakha* doorway is composed of *puspasakha*, *manavsakha* and *puspasakha*. The River goddesses, Ganga-Yamuna are demonstrated at the *pedya*, accompanying with their attendants. The doorsil is adorned with the usual central *mandaraka*, flanked by fighting scene of lion and elephant on the cardinal ends. There is a *prabhamandala* without central deity in the rear wall of the sanctum, with traces of feet of Lord Vishnu. The walls of the temples are very plain, depicting four sculptures, one on each wall. The walls are supported by four corner pillars and pilasters, two on each side. The *bhadra* niche possesses standing sculptures of deity but they are not identifiable due to high

erosion. Interestingly, the *jagati* has an underground chamber and a *bharvahaka* figure is depicted in one of the corners which indicate later addition.

The Sun Temple Aniti faces east and stands upon a *jagati* of dressed sand stone. On plan, it is of *pancharatha* type and consisted of a *garbhagraha*, an *antarala* and a *mandapa*. Contrary to other Kachchhapaghata Temples it has open ambulatory path around the sanctum. The roof of the *mandapa* is supported by pillars decorated with pots and foliage motifs. Though a *Siva-linga* is placed in the sanctum but on the *lalata* the figure of Surya on horse chariot, suggests the temple was dedicated to the Sun God. The left cardinal end of the lintel is occupied by Siva with his consort but the figures at right cardinal end are not clearly visible and they seem to be the images of Lord Vishnu and his consort.

## VII. PRESERVATION OF MONUMENTS

### MONUMENTS OF NATIONAL IMPORTANCE

#### BANGALORE CIRCLE

#### KARNATAKA

##### 1. ANANTASAYANA TEMPLE,

##### ANANTASHAYANAGUDI, DISTRICT BELLARY

The bulged out and fallen eastern *mahadwara* (main gate) has been dismantled and restored by using the original blocks and new blocks matching the original.

##### 2. GOPALKRISHNA TEMPLE, THIMALAPUR, DISTRICT BELLARY

The temple complex has been fenced by crimped wire mesh with iron angles over a dwarf wall.

##### 3. KRISHNA TEMPLE, KRISHNAPURAM, DISTRICT BELLARY

The dislodged architectural stone members of the tank or *pushkarani*, located in north-west corner of the temple, have been restored with available stones.

##### 4. KUDURE GOMBE MANDAPA, HAMPI, DISTRICT BELLARY

Fallen western wall of the *mandapa* was restored as per the original, using available stones. The missing slab of the roof of the *mandapa* has been restored with available stones and provided with water proof coat.

##### 5. PATTABHIRAMA TEMPLE, KAMALAPUR, DISTRICT BELLARY

The southern part of the temple along the road was fenced by a dwarf wall with crimped wire mesh. The undulated stone flooring on the southern side of the *prakara* wall was re-laid

with available stones, maintaining proper gradient.

##### 6. RANGA TEMPLE, KAMALAPURA, DISTRICT BELLARY

The missing, fallen *prakara* wall was restored as per the original, using available stone.

##### 7. SIVA TEMPLE, THIMALAPUR, DISTRICT BELLARY

The out-of-plumb *mukhamandapa* of the temple was carefully dismantled and restored as per the original after proper documentation.

##### 8. VISHNU TEMPLE, KAMALAPURA, DISTRICT BELLARY

The fallen and out-of-plumb eastern cloistered *mandapa* was restored with available architectural stone members.

##### 9. VITTALA TEMPLE COMPLEX, HAMPI, DISTRICT BELLARY

The out-of-plumb open *mandapa* in front of the Devi Shrine, to the north of the main temple was dismantled and restored.

##### 10. FORT AT CHITRADURGA HILL, CHITRADURGA, DISTRICT CHITRADURGA

The fallen/missing fort walls and bastions were reconstructed with available stone members. Fresh weather proof coat was applied to the restored fort walls, bastions and retaining walls. Suitable gates were provided to the entrance of *Bandi khane*. The mud structures of *tankashala* inside the fort, was strengthened by restoring the missing portions with mud mixed with hay, lime and

ash. The missing portions have been provided with wooden logs wherever necessary.

**11. HILL FORT AND RUINED PALACE, UCHANGIDURGA, DISTRICT DAVANGARE**

Fallen fortification walls near Harihara Bagilu, Maleya Bagilu and Kostalamma Temple were restored with available stone blocks, using lime mortar in 1:3 ratios. The upper surfaces of the newly reconstructed fort walls were water tightened to stop leakage.

**12. SRIKANTESWARA TEMPLE, NANJANGUD, DISTRICT MYSORE**

The undulated stone flooring on the southern side of the cloistered *mandapa*, northern side of the *pradaksinapatha* and western sides of the temple were re-laid.

**13. SIDLU MALLIKARJUNA TEMPLE, BETTADAPURA, DISTRICT MYSORE**

The dilapidated *mandapa* along with the flight of steps leading to the temple were carefully dismantled, after proper documentation and later restored maintaining the original pattern.

**14. TRIKUTACHALA TEMPLE, SOMNATHPURA, DISTRICT MYSORE**

The out-of-plumb cloistered *mandapa* and *prakara* at the west and north were completely dismantled and restored as per the original. During the course of conservation, debris all along the *mandapa* of the temple was removed and the *adisthana* (plinth) portion was exposed. A drain at a distance of 3m was provided at north, south and west to arrest the seepage of water into the foundation of the *mandapa*.

**BHOPAL CIRCLE**

**MADHYA PRADESH**

**15. KARAN TEMPLE AND SIVA TEMPLE, AMARKANTAK, DISTRICT ANUPPUR**

The resetting work of ashlar masonry has been taken up in 2010-11(2010-11, p. 206), at these monuments. The old dislodged and pulverized ashlar stones have been removed and serviceable stones were stacked at the site for further use. Besides, a dwarf wall with MS grill has been provided to enclose the area to check trespassing.

**16. PATALESWAR TEMPLE, AMARKANTAK, DISTRICT ANUPPUR**

The work of repairing and fixing the *chhajja* stones of the temple has been carried out.

**17. BADAL MAHAL, CHANDERI, DISTRICT ASHOK NAGAR**

The broken and missing *kangooras* of the fortification wall in CR masonry have been reconstructed in lime mortar, matching with the original. The terrace of the wall was re-laid with lime concrete and recess pointing has been done to the CR masonry wall. The work was continued from 2010-11(2010-11, p. 206) (Pl.52).

**18. CHANDERI FORT, CHANDERI, DISTRICT ASHOK NAGAR**

The conservation works like resetting and conserving CR and RR masonry, mending and jointing of stone beams and pillars, water tightening of existing profile of the fortification wall, stitching of cracks, resetting



A



B

*Badal Mahal, Chanderi: A, before and B, after reconstruction of the fortification wall*

of out-of-plumb structures, debris clearance and fixing of *chhajja* have been carried out at the fort (2010-11, p. 206). Besides, the works of laying of pathway, repairing and resetting of stone-on-edge pathways of the contemporary period, have also been completed.

**19. TALAB GROUP OF MONUMENTS, KADWAHA, DISTRICT ASHOK NAGAR**

In continuation of previous year's (2010-11, p. 206) work, recess pointings to the RR masonry wall have been completed. In addition, the excavation work in foundation for constructing supporting wall of the WBM Road and at the same time, PCC work are going on for making an approach path to the monuments.

**20. KAMALAPATI PALACE, BHOPAL, DISTRICT BHOPAL**

Basic frame work for setting up of an Interpretation Centre-cum-Art Gallery on the second floor of the Kamalapati Palace has been continued (2010-11, p. 207) and completed. Besides, the inner side wall of the structural remains of *panchakki* has been plastered with lime and provided with a polycarbonate sheet on the ceiling, matching the ambience.

**21. FORT, ATER, DISTRICT BHIND**

The conservation work of RR masonry wall and *lakhauri* brick wall of the fort has been attended to. Pointings to the front fort wall have also been taken up. The works are in progress.

**22. SIVA TEMPLE, ASIRGARH FORT, DISTRICT BURHANPUR**

At this temple, the conservation works like underpinning, pointing, stone masonry work

and providing of lime concrete flooring have been taken up during the period under review. The dry stone pitching work for sustainable surface has been completed.

**23. EXCAVATED SITE, BIJAMANDAL, KHAJURAHO DISTRICT CHHATARPUR**

The resetting work of the dismantled architectural members of the excavated site has been taken up for conservation. In addition, the works of restoration and consolidation of *jagati* and *adhithana* portions of the temple are in progress.

**24. RANI MAHAL, SINGORGARH FORT, DISTRICT DAMOH**

Missing wall of CR masonry of the *Rani Mahal* has been restored and the remaining structures have been conserved.

**25. SOMVATI KUNDA, MANDU, DISTRICT DHAR**

The RR masonry works of the walls and cells in and around Somvati Kunda are in progress.

**26. RANMUKTESHWAR TEMPLE, KAKRAMATH, DISTRICT DINDORI**

The work of recess pointing with combination mortar of the open joints of the temple wall has been taken up to check seepage during rainy season. Simultaneously, the top walls and the surfaces are going to be watertightened. The works are in progress.

**27. TOMB OF MOHAMMAD GHASUS AND TANSEN COMPLEX, HAZIRA, DISTRICT GWALIOR**

In continuation of previous year's (2010-11, p. 209) work, removal of *murrum* and laying of lime concrete pathway, along with stone edging around the lawn and on both sides of the pathway are in progress.

**28. EXCAVATED SITE, PAWAYA, DISTRICT GWALIOR**

The works of providing lime concrete and

removal of bulged brick pavement and resetting the same in its original alignment are in progress.

**29. CHAUSATH-YOGINI TEMPLE, BHERAGHAT, DISTRICT JABALPUR**

The works of stone pitching for acquiring solid and durable surface and recess pointing on the wall to protect the mortar from coming off have been carried out at this temple. Besides, re-aligning of MS girder post to the staircases and fixing of GI pipe railing works are in progress.

**30. TAPSI MATH, BILHARI, DISTRICT KATNI**

The work of lime *surkhi* plaster over the wall below *chhajja* stone is in progress since 2010-11(2010-11, p. 209). In addition, the work of fixing stone bracket and *chhajja* stone is also on going.

**31. YASHODHARMAN'S VICTORY PILLAR, SONDHANI, DISTRICT MANDSAUR**

Sandstone flooring wherever decayed and missing was laid. Resetting of the dismantled portions has been carried out as well, maintaining the original pattern (PI 53A).

**32. GARHI, PADAOLI, DISTRICT MORENA**

Lime concrete was provided to the damaged *Burj* and the platform wall of *Garhi* and at the same time the water tightening work has been taken up to avoid leakage.

**33. GROUP OF TEMPLES, BATESHWAR, DISTRICT MORENA**

The broken and fallen structural members of temples, pillars, roof slabs have been removed and reset as per original by providing strong lime concrete support. The work of pointing is in progress.

**34. CHOUMUKHNATH TEMPLE, NACHNA, DISTRICT PANNA**

Removal of loose stone flooring for resetting inside the temple complex, providing of apron and water tightening works are on going at this temple

**35. AJAYGARH FORT, AJAYGARH, DISTRICT PANNA**

The conservation and resetting works of stone slabs, pillars and other members of the temple along with providing of copper dowels are in progress.

**36. SIVA TEMPLE, BHOJPUR, DISTRICT RAISEN**

Replacing the temporary set of steps and providing of wooden staircases in front of the sanctum of the Siva Temple have been completed to facilitate the visitors (PI.53B).

**37. BUDDHIST REMAINS, SANCHI, DISTRICT RAISEN**

Providing and fixing of tactile for visually impaired persons has been installed from the entrance gate to the Stupa 1 and 3.

**38. MARSHALL HOUSE, SANCHI, DISTRICT RAISEN**

The construction of compound wall is in progress.

**39. GAURJHAMAR FORT, DISTRICT SAGAR**

The works of brick masonry in lime mortar in the wall and arches and providing of lime concrete pathway are in progress.

**40. RAHATGARH FORT, SAGAR, DISTRICT SAGAR**

Constructions of dry stone pitched pathway for approach to the monument and stone work for *chhajja* are in progress.

**41. BUDDHIST STUPA AND REMAINS, BHARHUT, DISTRICT SATNA**

The work of providing RCC post for land



A



B

*A, Yashodharman's Victory Pillar, Mandsaur: sand stone flooring and B, Siva Temple, Bhojpur: wooden-staircases*

marking around the protected area is in progress.

**42. BUDDHIST STUPA, PANGORARIA, DISTRICT SEHORE**

The works of resetting of old damaged stone wall and the staircases are in progress.

**43. VIRATESHWAR TEMPLE, SOHAGPUR, DISTRICT SHAHDOL**

A dwarf wall with MS grill has been provided around the temple. The construction of RR and CR masonry wall on the side of the pathway is also in progress.

**44. SIVA TEMPLE AND MONASTERY, CHANDREH, DISTRICT SIDHI**

The works of providing and laying stone flooring as apron and fixing of MS grill over a dwarf wall are in progress.

**BHUBANESWAR CIRCLE**

**ODISHA**

**45. BARABATI FORT, CUTTACK, DISTRICT CUTTACK**

In continuation of previous year's (2010-11, p.213) work, the restoration of the moat wall on southern side has been taken up by way of replacing decayed stone blocks with new dressed laterite stone blocks in combination mortar. Besides western side moat-wall was also exposed during the clearance work (Pls.54-55).

**46. KEDARESVARA TEMPLE, CHOUDWAR, DISTRICT CUTTACK**

In continuation of previous year's (2010-11, p. 214) work, the restoration of the compound wall has been completed.

**47. ANCIENT SITE, BANESWARANASI, DISTRICT CUTTACK**

The restoration work of the *jagamohana* at Padmesvar Mahadeva Temple has been taken up by way of replacing the decayed stone blocks and bricks (which were provided by the local kings before independence) with the khondalite stones as per the original pattern. The work is in progress.

**48. CHANDRASEKHAR JEW TEMPLE, KAPILAS, DISTRICT DHENKANAL**

Restoration work of inner side *prakara* wall is in progress. In addition, laying out of khondalite stone flooring around the temple is continuing.

**49. KANAKESVARA MAHADEVA TEMPLE, KUALO, DISTRICT DHENKANAL**

In continuation of previous year's work (2010-11, p. 214) the structural repair to the exposed compound wall has been completed by resetting the original architectural members. Newly carved khondalite stones were provided in the missing portions with traditional lime mortar. Besides, laying out of khondalite stone flooring around the temple is in progress.

**50. GANGADHARASVAMI TEMPLE, KOTAKOLLA, DISTRICT GANJAM**

In continuation of previous year's (2010-11, p. 214) work, the restoration of the kitchen and repairing of courtyard have been completed and the peripheral development-cum-beautification of the environs of monument is in progress.

**51. ASOKAN ROCK EDICT, JAUGARH, DISTRICT GANJAM**

The construction of dwarf wall with M.S grill

is in Progress.

**52. EXCAVATED BUDDHIST SITE, UDAYAGIRI – 2, DISTRICT JAJPUR**

In continuation of previous year's (2010-11, p. 215) work, the restoration of brick walls of the shrine has been completed. The conservation work of the dilapidated stone paved floor level in front of the monastery of Udayagiri -2 has been taken up by replacing the decayed stones with the new dressed khondalite blocks and using the traditional lime mortar. The work has been completed (Pl.56).

**53. JAGANNATHA TEMPLE, JAJPUR, DISTRICT JAJPUR**

In continuation of previous year's (2010-11, p. 214) work, the restoration work of the compound wall and resetting of khondalite stone flooring over the platform in front of the temple has been completed.

**54. EXCAVATED BUDDHIST SITE, RATNAGIRI, DISTRICT JAJPUR**

The construction of dwarf wall with GI chain links has been completed.

**55. KHANDAGIRI AND UDAYAGIRI CAVES, BHUBANESWAR, DISTRICT KHURDA**

In continuation of previous year's (2010-11, p. 214) work, the restoration of the ancient steps is taken up by replacing the decayed stone with new one in traditional lime mortar as per the archaeological norms. The work has been completed.

**56. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

In continuation of previous year's (2010-11, p. 214) work, the sand stone flooring on the western side of the temple was taken up with

traditional lime mortar and the work has been completed. The restoration work of the sub-shrine is in progress (Pl.57).

**57. ANANTAVASUDEVA TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

In continuation of previous year's (2010-11, p. 215) work, sand stone flooring has been provided around the temple using the traditional lime mortar to protect the seepage of rain water to the foundation of the temple and also for smooth movement of the visitors. The restoration work of the sub-shrine is in progress.

**58. SAHASRALINGA TANK, BHUBANESWAR, DISTRICT KHURDA**

In continuation of previous year's (2010-11, p. 215) work, the restoration and pointing work of the tank is in progress. The restoration work of the dilapidated small shrines around the tank has been taken up by way of resetting the architectural members to their original position. The decayed ones and the missing parts of the temple have been replaced with the new dressed sand stones as per the original pattern. The work is in progress (Pl.58).

**59. BRAHMESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

The work of sand stone flooring around the temple commenced in the previous year (2010-11, p. 215), using traditional lime mortar has been done.

**60. MAITRESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

The watertightening of the *sikhara* by the way of pointing has been completed.

**61. MEGHESVAR TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

The renovation of the ancient tank of the

temple is in progress. Besides, the *sikhara* of the temple has been water tightened by the way of pointing (Pl.59).

**62. BHASKARESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

The watertightening of the temple is in progress by the way of pointing. The fixing of M.S. grill over a dwarf wall has been completed.

**63. PAPANASINI TANK, BHUBANESWAR, DISTRICT KHURDA**

The damaged and broken southern side stone wall of the tank have been restored and reset. The work is completed.

**64. DAKSHYAPRAJAPATI TEMPLE, BANPUR, DISTRICT KHURDA**

In continuation of previous year's (2010-11, p. 216) work, repairing of the damaged floor has been taken up by way of replacing the decayed ones with new dressed laterite blocks, as per the original. The work has been completed.

**65. ANCIENT SITE, HARIPURGARH, DISTRICT MAYURBHANJ**

In continuation of previous year's (2010-11, p. 215) work, structural repairs are in progress by way of pointing and replacing the decayed bricks with old sturdy bricks found from the excavation using traditional lime *surkhi* mortar, as per the original. The work has been completed (Pl.60).

**66. LORD JAGANNATHA TEMPLE, PURI, DISTRICT PURI**

Repair to the *garbhagriha* was taken up during the Rathayatra from 3<sup>rd</sup> July to 11<sup>th</sup> July, 2011 when the presiding deities were shifted to Srigundicha Temple. As per the

recommendation of the Technical Expert Committee and Temple Administration, the following conservation measures were attended. The works involve, a) cleaning of the *garbhagriha*; b) epoxy pointing of first floor of *garbhagriha* and floor of *bhogamandapa* ;c) replacement and painting of *kanakamundi* of the main temple; d) painting and repairing of MS door of *bhogamandapa*; e)white washing of *jagamohana*, *natamandapa*, *bhogamandapa*, *gumuta* and *meghanadaprachira*. Besides, repairing of *kalasa* of western and northern *gumuta* has been completed. Laying of khondalite stone flooring to the western side of the temple is in progress. The work of restoration of damaged *chalas* of *Simhadvara* (eastern entrance) with new khondalite stone after deplastering the loose cracked lime plaster is in progress (Pls.61-63).

**CHANDIGARH CIRCLE**

**HARYANA**

**67. JALMAHAL, NARNAUL, DISTRICT MAHENDERGARH**

Repairing of the main tank has been done by underpinning and pointing on the walls wherever necessary. R.R. Masonry work including laying of lime concrete on the ram of the tank on north-eastern side has been completed. To provide MS grill fencing on dwarf wall around the protected as well as existing parking area, excavation of earth for foundation, laying of concrete bed and RR masonry work for foundation and superstructure have been carried out. Damp proof Coating was also applied.



A



B

*Barabati Fort: during clearance work of western side moat wall*



A



B

*Barabati Fort: A, during and B, after restoration work of southern side moat wall*



A



B

*Udayagiri-2: A, before and B, after conservation of stone paved floor*



A

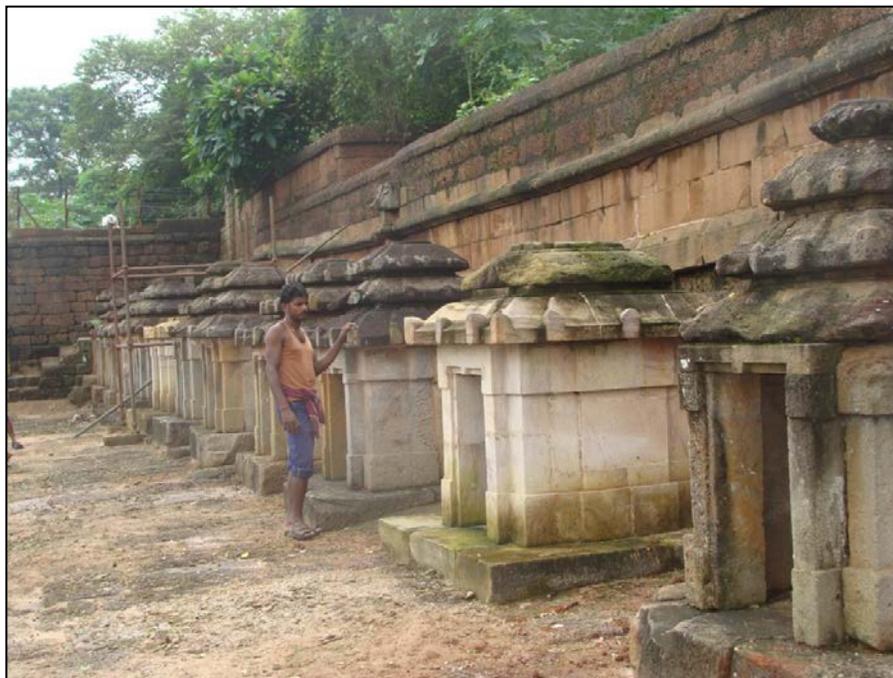


B

*Lord Lingaraja Temple: A, during and B, after conservation of sandstone flooring*



A



B

*Sahasralinga tank: A, before and B, after conservation of small shrines*



A



B

*Ancient Tank, Meghesvar Temple: A, before and B, after renovation*



A



B

*Ancient site, Haripurgarh: A, before and B, after conservation of excavated structures*



A



B

*Lord Jagannatha Temple: A, before and B, after restoration of damaged chala of Simhadvara*



A



B

*Lord Jagannatha Temple: A, before and B, after resetting and installation of kalasa of western Gumuta.*



A



B

*Lord Jagannatha Temple: A, before and B, after resetting and installation of kalasa of northern Gumuta*

**68. ANCIENT SITE, AGROHA, DISTRICT HISSAR**

Clearance of bushes has been done and provided MS grill fencing on dwarf wall around the site.

**69. GUJRI MAHAL, HISSAR, DISTRICT HISSAR**

Damaged and decayed lime plaster has been removed from the outer surface of the walls of the monument. The damaged portions of stone masonry walls and apron on eastern side of the monument have been removed carefully for restoration. The work is in progress.

**PUNJAB**

**70. EASTERN GATE AND ADJOINING CELLS, NURMAHAL, DISTRICT JALANDHAR**

After removal of vegetation, cells have been exposed by taking out filled waste. The said work is in progress.

**71. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA**

After removal of damaged and decayed brick masonry of inner fortification wall on the southern side it has been repaired by mud brick masonry in mud mortar in the core and *lakhauri* brick masonry in lime mortar, including pointing as veneering. The work is in progress. Besides, laying of concrete flooring and fixing of MS grill gate have been provided for development of parking, in front of the entrance gate.

**72. ANARKALI BARADARI, BATALA, DISTRICT GURUDASPUR**

Lime concrete apron has been provided with edging of tile bricks. Doors and windows of deodar wood have been fixed wherever necessary.

**73. SARAI AMANAT KHAN, DISTRICT AMRITSAR**

Restoration of the remaining cells of the south-western side with *lakhauri* brick masonry work has been taken up. The work is in progress.

**CHENNAI CIRCLE**

**TAMILNADU**

**74. CLIVE'S HOUSE, FORT ST.GEORGE, CHENNAI, DISTRICT CHENNAI**

The trickle sky light fiber sheet on the western side of the terrace has been replaced with the new one. Providing of sheet flooring in a big segment of this old building has been completed. The work of removing damaged plasters in patches has been followed by replastering. Shed has been provided to the Genset. The work of conserving tiled roof in front of the guest room has been completed.

**75. RAMPART WALL, FORT ST.GEORGE, CHENNAI, DISTRICT CHENNAI**

The work of water tightening the terrace on the northwestern side of the rampart wall has been completed. Providing of gates to the cells, below the fortification wall has been done. The work of painting the grills and gates on the east and north of the fort, below the rampart wall has been attended to.

**76. OLD BRITISH INFANTRY OFFICER'S MESS, FORT ST.GEORGE, CHENNAI, DISTRICT CHENNAI**

The work of conserving joist in the Gallery 8 and 9 of the museum has been completed. The works of providing sheet roof, new tiles for flooring, brick masonry wall for the toilet blocks have been done. Besides, antiskid tiled flooring in front of the toilet portion for the physically challenged persons has been

provided. Granite stone flooring on the eastern side of the ramp has also been provided.

**77. DHARMESWARA TEMPLE, MANIMANGALAM, DISTRICT KANCHIPURAM**

The work of conserving the Amman shrine, *nandhi peedam*, *balipeedam* and southern side of *Thirumathil* by pointing has been carried out.

**78. SHORE TEMPLE, MAMALLAPURAM, DISTRICT KANCHIPURAM**

The damaged chain link fencing partly on the northern side and fully on eastern and southern sides has been removed and replaced with new one.

**79. ROCK CUT CAVE, NARASAMANGALAM, DISTRICT KANCHIPURAM**

Fencing has been provided to the northern side of the monument.

**80. MEGALITHIC CISTS, MAGANIYAM, DISTRICT KANCHIPURAM**

The work of fencing around the site is in progress.

**81. MEGALITHIC CISTS AND CAIRNS, SIRUKALATHUR, DISTRICT KANCHIPURAM**

The work of fencing around the site is in progress.

**82. VENKETASAPERUMAL TEMPLE, TIRUMUKKUDAL, DISTRICT KANCHIPURAM**

The work of fencing to the northeast corner of the temple has been completed. The landscaping and laying of garden have been carried out in the temple and medicinal floras were also planted.

**83. FORT VELLORE, VELLORE, DISTRICT VELLORE**

The work of conserving lower moat-wall on the northern side of the fort has been completed.

**84. ROCK CUT CAVE, VILAPAKKAM, DISTRICT VELLORE**

The work of conserving the *Dargah* at the top of the hill has been completed.

**85. BRAHMAPURISWARA TEMPLE, BHAHMADESAM, DISTRICT VILLUPURAM**

The works of conserving the brick *chhajja* of the *mukhamandapa*, walls and flooring of the *mahamandapa* have been done. Besides, bulged out *balipeeda*, *nandimedai* and *dwajathambamedai* have been conserved.

**86. FORT RAJAGIRI, GINGEE, DISTRICT VILLUPURAM**

The conservation work of the masonry wall on the east of Chakrakulam and the damaged steps of the tank has been carried out as per original. Besides, providing of fencing around the existing toilet block on the eastern side is also in progress.

**87. FORT KRISHNAGIRI, GINGEE, DISTRICT VILLUPURAM**

The southeastern corner of the fort has been fenced.

**88. PONDICHERRY GATE, GINGEE, DISTRICT VILLUPURAM**

Watertightening of the terrace of the gate has been done and the damaged entrance on the north of the gate has been restored. The cracked stone parapet wall and portion of bastion were also conserved.

**89. APTHSAHEYSWARA TEMPLE, SENDAMANGALAM, DISTRICT VILLUPURAM**

The work of conserving the cloistered *mandapa* on the south-east and the *prakara* wall on the eastern side has been completed.

**90. BRIHADISVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT ARIYALUR**

The work of conserving the front *mandapa* of

Amman Shrine has been completed.

**91. SIVAGANGA LITTLE FORT ENCLOSING THE BIG TEMPLE, THANJAVUR, DISTRICT THANJAVUR**

The work of conserving the north-west corner of the fort has been completed. Removal of vegetations from the fortification wall and laying of concrete and plastering the same with combination mortar to prevent rain-water inside the fortification wall has been carried out.

**92. RANGANATHASWAMY TEMPLE, NAMAKKAL, DISTRICT NAMAKKAL**

The works of removing dead plaster and re-plastering the *madapalli* of the temple have been carried out. The stone joints of the steps and the walls on the eastern side of the temple have been pointed. Besides, the work of pointings to the walls and floors of the *mahamandapa* of main shrine and walls of Amman Shrine were completed. The old broken stone flooring of the *mahamandapa* of Amman Shrine has been removed and replaced with new ones. Pathways were provided close to *Balipeeda* tank and fencing has been done on the southern side

**93. NARASIMHASWAMY TEMPLE, NAMAKKAL, DISTRICT NAMAKKAL**

The *madapalli* of the temple and *prakara* wall on the southeastern corner have been conserved. Plastering of outer wall of plinth portion of *yagyasala* of the temple has been carried out and the work of conserving the floor of *Krishnasannathi* and *Nammalvarsannathi* has been completed.

**94. MURUGANATHASWAMY TEMPLE, TIRUMURUGANPOONDI, DISTRICT TIRUPPUR**

Doors were provided to the entrance and *madapalli* of the Balasubramaniya Temple.

**95. PRE-HISTORIC BURIAL SITE AT TIRUKKATTALAL, DISTRICT PUDUKOTTAI**

The work of fencing around the site has been completed.

**96. TIRUMALAI NAYAKA PALACE, SRIVILLIPUTTUR, DISTRICT VIRUDUNAGAR**

The work of conserving damaged roof of the *Mahal* has been completed. Removing of an old, damaged stone flooring in the south-west corner and inner part of the *Mahal* and relaying the same with fresh one has been done, maintaining the original pattern.

**97. FORT AND TEMPLE, THIRUMAYAM, DISTRICT PUDUKOTTAI**

The fortification wall on the northern side of the fort has been conserved. The work of removing damaged lime mortar from stone joints and strengthening the same by pointing and plastering on the eastern side of fort wall has been completed in combination mortar as per original.

**DEHRADUN CIRCLE**

**UTTARAKHAND**

**98. JAGESHWAR GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA**

Repair to the miniature shrine near Mritunjaya Temple at Jageshwar Temple Complex started last year (2010-11, p. 252), has been completed during the period under review. The temple was completely in dilapidated condition and 90% architectural members were weathered, dislodged and became fragile. All architectural members were taken out and reset again in its original position. The stone blocks which were completely fragile were also replaced with new stone blocks

matching to the original fabric of monument. In addition, damaged stone floor of the temple complex has been repaired and old drainage system was revived. The compound wall was also constructed around newly built staff quarters at Jageshwar.

**99. BALESHWAR GROUP OF TEMPLES, DISTRICT CHAMPAWAT**

Though the work to the repairs of Baleshwar Group of Temple was initiated at the end of the previous year, but major works have been taken up during this period. The original stone floor was in dilapidated condition and most of the stone slabs were broken into pieces. Due to inadequate drainage system, there was serious problem of water stagnation particularly during the rains. In addition, large numbers of architectural member of the temple were scattered on the floor which were creating inconvenient to visitors and devotees. Platform along with enclosure wall was further repaired, raised and all architectural members were placed properly over it. Entire floor of temple complex has been repaired by way of providing new stone slabs matching to the original. Proper underground drainage system has now been provided in different alignments which ultimately connect the main drainage nearby the monument (Pl.64).

**100. SITABANI TEMPLE, RAMNAGAR, DISTRICT NAINITAL**

During the period under review conservation of the group of Temples at Sitabani have been taken up. The cement plaster done in the recent past on the exterior of the Sita Temple was racked out and in place of re-plastering only pointing with traditional mortar was done. Now the temple has been brought in its original condition. In addition, flooring around

the octagonal Siva Temple has been attended to and retaining wall has also been provided on the slope to stop further erosion of platform in which octagonal Siva Temple stands.

**101. GROUP OF TEMPLES, PANDUKESHWAR, DISTRICT CHAMOLI**

Repairs to the Vasudev Temple have been resumed during the period under review. The weathered copper sheets from *mandapa* were replaced by new one and openings were sealed and made water tightened. In addition, works of repairing the floor and providing proper drainage systems have been taken up. The work is in progress.

**102. RUDRANATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI**

In continuation of last year's work (2010-11, p. 254) repair to remaining part of the floor of Temple Complex has been completed. The damaged and missing stone slabs have been replaced with fresh one and entire area was made watertightened.

**103. SUN TEMPLE, KATARMAL, DISTRICT ALMORA**

Northern compound wall of the Temple Complex which was fallen due to heavy rains has been restored (Pl 65)

**104. BAIJNATH GROUP OF TEMPLES, DISTRICT BAGESHWAR**

Compound wall which was washed away during the rains by heavy flood in River Gomti has been reconstructed during the period under review.

**DELHI CIRCLE**

**DELHI**

**105. KOTLA FIRUZ SHAH, DELHI**

Pointing of joints and underpinning in RR

masonry were carried out to strengthen the *baoli* (stepped well) and pillars at the Palace area. Lime plastering work is in progress.

**106. GHAZIU'D-DIN TOMB, DELHI**

The broken marble *jalis* were replaced with the new ones, maintaining the original pattern.

**107. TRIPOLIA GATE, DELHI**

The broken and missing red sand stone pieces of the arch were replaced with fresh ones, as per original and lime plaster work was also carried out.

**108. CITY WALL OF KASHMIRI GATE, DELHI**

The pointing of RR masonry of *kangooras* and arches were carried out.

**109. PURANA QILA COMPLEX, NEW DELHI**

Underpinning in RR masonry and pointing work of closed cells along the fortification wall right from the Main Gate to Talaki Gate were completed.

**110. HUMAYUN'S TOMB, NEW DELHI**

New arches were reconstructed over the western side dwarf wall of the monument. Besides, the works of lime plastering and marble inlay in the eastern side cells, below the main platform, red sand stone veneering and marble inlay work on the western side cells of the tomb are in progress. The wooden doors were provided to the cells of the basement of the tomb. In addition, lime plastering work and inlay work in southern and eastern sides and outer cells at *Sunder Burj* in *Sunder* nursery are in progress in collaboration with Agha Khan Trust. Upgradation of drinking water facility at the monuments is in progress. Inlay works at main tomb of Isha Khan and northern *Baradari* are

still continuing. Dismantling of old decayed plaster and replastering the same as per original at Barbar Tomb has been taken up. The work is in progress.

**111. RAJON-KI-BAIN, NEW DELHI**

The damaged dwarf wall was repaired by RR masonry. Pointing of open joints and plastering with the help of lime *surkhi* was done to strengthen the cells.

**112. JAHAZ MAHAL, NEW DELHI**

The damaged red sand stone sloping-*chhajja* and missing semi-precious stones were replaced with new ones, as per original. The work of RR masonry in composite mortar was attended too.

**113. GANDHAK-KI-BAOLI, NEW DELHI**

The retaining wall of *Baoli* was strengthened by plastering with composite mortar and pointing of joints of random rubble masonry has been done.

**114. HERITAGE BUILDING, QUTB, NEW DELHI**

Broken and missing red sand stones were replaced with new ones, as per original. Lime plaster was applied to strengthen the structure. The frame of saal-wood was fixed at the roof.

**115. ADILABAD FORT, NEW DELHI**

The eastern gate and southern side fortification wall were repaired by underpinning in RR masonry and pointing of open joints. At the western side, approach pathway was attended too.

**116. RED FORT, DELHI**

At *NaubatKhana*, the damaged and dismantled old plaster and semi-precious stones were replaced with new ones, as per original.



A



B

*Baleswar Group of Temples: A and B, before and after conservation*



A



B

*Sun Temple, Katarmal: A and B, before and after restoration of compound wall*

The construction of the pathway in between *Naubat Khana* and *Diwan-i-Am* in RR masonry was attended too. Damaged and missing inlay work with semi-precious stones was replaced with new ones, as per original at *Rang Mahal*, *Sawan* and *Bhadon* Pavilions. At *Sawan*-pavilion, replacement work of broken marble *chhajja* is in progress.

**117. FATEHPURI MASJID, DELHI**

Repair and restoration work of the left side minarets at east gate of the mosque was completed. The lime plaster work is in progress.

**118. SIRI FORT, NEW DELHI**

Dwarf wall towards Panch Sheel Road was repaired by underpinning with RR stone and pointing of the open joints.

**119. NILI MOSQUE, NEW DELHI**

Broken and missing red sand stones of the arch were replaced with new ones, as per the original. The lime plaster work at eastern side of the mosque was also completed.

**120. SAFDARJUNG TOMB**

Dismantling of damaged old lime concrete surrounding the main platform of the mausoleum is in progress. Red sandstone paved flooring was provided around the main platform of the mausoleum. The lime plaster was applied to the north-west and south-west sides of the *burjis*. At the western side, wall of *Jungli Mahal* has been taken up for lime plastering work, which is in progress.

**121. YANTAR MANTAR, NEW DELHI**

Decayed and pulverized lime-cement concrete surrounding the wall of the structure was taken out and red sand stone paved flooring

was provided around the Yantar Mantar or *Mishra Yantra*.

**DHARWAR CIRCLE**

**KARNATAKA**

**122. FORT WALL, MEGUTI TEMPLE, AIHOLE, DISTRICT BAGALKOT**

In continuation of previous year's (2010-11 p.260) work, the dismantled and fallen fort walls as well as the inner retaining wall have been reconstructed in dry masonry and mud mortar as per the original (Pl.66)

**123. GALAGANATH GROUP OF TEMPLES, AIHOLE, DISTRICT BAGALKOT**

The protection limits of the monuments were provided with RR masonry compound wall and fixing angels using existing materials.

**124. RAMESHWAR TEMPLE, BEVOOR, DISTRICT BAGALKOT**

Broken beams of the temple were replaced with new ones and the compound wall has been constructed with sand stone slabs, providing MS grill over it matching the ambience.

**125. HUCHAPPAYYA TEMPLE, AIHOLE, DISTRICT BAGALKOT**

The out of plumb portion of the wall has been dismantled and reconstruction of the same has been done using new stone blocks as per the original (Pl.67).

**126. JYOTIRLING TEMPLE, AIHOLE, DISTRICT BAGALKOT**

Levelling of the area, earth work for foundation of the drainage line for sub shrines, flooring and construction of dwarf wall have been completed. Dismantling, reconstruction

and consolidation of the sunken sub-shrine have been done and sand stone flooring has been laid. Construction of veneered dwarf wall by fixing coping stone has been done. New stone members to roof slabs, lintel, *kakshasnas*, beams and missing portions have been provided as per original.

**127. MALLIKARJUN GROUP OF TEMPLES, AIHOLE, DISTRICT BAGALKOT**

Earth work has been done for foundation of the drainage line and laying concrete bed. Removal of rank vegetation and providing of new stone members to the roof slabs, lintel, *kakshasnas*, beams, missing portions have been carried out. Construction of veneered wall has been completed.

**128. CHARANTHIMATH TEMPLE, AIHOLE, DISTRICT BAGALKOT**

Levelling of the area and clearance of rank vegetation has been done. Sandstone flooring has been laid by removing the undulated portion and fixing of curbing stone has been done.

**129. OLD JAINA TEMPLE (MELGUDI) HALLUR, AIHOLE, DISTRICT BAGALKOT**

After clearance of rank vegetation and debris, excavation was carried out to lay concrete foundation for the sub-shrine. The works of laying sandstone flooring for the pathway and apron around the temple, along with fixing of curbing stones having proper jointing, have been done. Construction of veneered compound wall has been completed.

**130. RAMADEVA TEMPLE TALIKOTI, AIHOLE, DISTRICT BAGALKOT**

Rank vegetation has been removed and the area has been levelled. Concrete bed has been provided for foundation of the compound wall. Providing of sandstone flooring for the

temple has also been done.

**131. BHUVARAHA TEMPLE, HALASI, DISTRICT BELGAUM**

Dismantling and reconstruction of the sunken portion on the front of the temple have been done. Inner veneering wall has been provided, in addition, de-silting of the water tank has been attended to.

**132. GROUP OF MONUMENTS, HALASI, DISTRICT BELGAUM**

Levelling of the undulated area in front and on the rear side of Kalmeshwara Temple has been carried out. After excavating the earth, concrete bed has been laid to construct the compound wall using rubble and laterite stones in cement mortar all around the Suvarneshwar Temple.

**133. HAZAR KHOTRI, BIDAR, DISTRICT BIDAR**

The clearance of rank vegetation and providing and fixing of MS grill have been executed wherever necessary. After removing dead lime concrete, fresh lime concrete has been provided to watertighten the leaky roof (Pls.68-69).

**134. BAROOD KOTA, BIDAR, DISTRICT BIDAR**

Construction of missing veneering wall has been provided including filling of core, using rubble stones.

**135. FORT WALL (WESTERN SIDE) AND MOAT, BIDAR, DISTRICT BIDAR**

After removing bulged and out-of-plumb veneering portions of the fort and moat walls, the same have been reconstructed. Missing/collapsed merlons of fort wall and moat-wall have been constructed, maintaining the original pattern.

**136. TRIPLE MOAT AND GATEWAY, BIDAR, DISTRICT BIDAR**

The permeable roof top has been rendered

watertight after removing the dead lime mortar. Trap stone masonry wall has been constructed after dismantling out-of-plumb portion.

**137. BHAMANI TOMBS, ASHTUR BIDAR, DISTRICT BIDAR**

After dismantling damaged, partially fallen, slanted roof, new roof has been provided using lime mortar and teakwood beam with French polish to the wooden members.

**138. ALI BARID, IBRAHIM BARID AND AMIR BARID, BIDAR, DISTRICT BIDAR**

Distempering on the wall has been done after applying wall care *putty*. The leaky roof has been watertightened. Damaged wooden doors and windows have been replaced with new ones and also provided teakwood frames and M.S. grill, wherever required.

**139. MADARASA OF MAHMUD GAWAN, BIDAR, DISTRICT BIDAR**

Portions of out-of-plumb masonry wall have been reconstructed as per original, after removing the affected segments. Merlons have been provided wherever needed. Besides, MS grill has also been fixed (Pl.70).

**140. ARQILLA, BIJAPUR, DISTRICT BIJAPUR**

Missing and fallen parts of the ancient wall has been reconstructed with arches using CR stone and masonry joints to the wall have been pointed. Besides, moulded cornice has been prepared along with lime plastering of the wall (Pl.71).

**141. MECCA MOSQUE, BIJAPUR, DISTRICT BIJAPUR**

The cracks have been grouted and a layer of fine lime plaster was applied to the leaky roof

of *dalans* and dome of the mosque, after removing the dead one.

**142. GATES, WALLS, CITY & CITADEL BIJAPUR, DISTRICT BIJAPUR**

After removing de-settled ancient barrier wall, the same has been restored as per original using granite stone blocks. Pointing to the stone joints has been done with lime mortar.

**143. FORTIFICATION WALL, GULBARAGA, DISTRICT GULBARAGA**

Construction of the missing portion of the western fortification wall including bastion has been done with new trapped stone blocks in lime mortar (Pl.72).

**144. HATHI GATE, GULBARAGA, DISTRICT GULBARAGA**

Repairs to the undulated stone-flooring pathway matching with the original have been made.

**145. PREHISTORIC SITE VUBHUTHALLI, GULBARAGA, DISTRICT GULBARAGA**

Construction of compound wall has been completed along with fixing of mesh over it.

**146. PREHISTORIC SITE RAJANAKOLLUR, GULBARAGA, DISTRICT GULBARAGA**

Construction of compound wall has been completed along with fixing of mesh over it.

**147. SANNATI, GULBARAGA, DISTRICT GULBARAGA**

Construction of compound wall has been completed along with fixing of mesh over it.

**148. VEERBHADRESHWARA TEMPLE, HANGAL, DISTRICT HAVERI**

The works of reconstruction missing portion around the monument using schist stone block and resetting of veneering wall using the same material have been carried out. Undulated stone floor has been repaired.

**149. GALGESHWARA TEMPLE, GALAGANATHA, DISTRICT HAVERI**

Steps leading to the main temple have been repaired using available schist and granite stones. Pathway using schist stone over CC bed has also been provided.

**150. SOMESWARA TEMPLE HARLAHALLI, DISTRICT HAVERI**

Construction of dwarf compound wall using rubble and cement mortar and mounting of MS grill over it has been executed. For better ambience, lawn has been developed using sand, red soil, compost, grass and suitable plants.

**151. TARAKESWARA TEMPLE, HANGAL, DISTRICT HAVERI**

The leaky roof has been watertightened with lime concrete. Veneering wall has been provided with schist stone blocks. Around the sub-shrine apron has been applied.

**152. BILLESWARA TEMPLE, HANGAL, DISTRICT HAVERI**

Reconstruction of missing portion of porch using schist stone block and construction of random rubble masonry wall to prevent sliding of earth has been carried out at the monument.

**153. KADAMBESHWAR TEMPLE, RATTIHALLI DISTRICT HAVERI**

Missing portion has been reconstructed with schist stone block along with the laying of pavement around the Temple. Rubble masonry partition wall of the *mandapa* has been removed to keep it in its original look. Lawn has been developed around the monument **(Pl.73)**.

**154. MUKTESHWAR TEMPLE, CHAUDANAPUR, DISTRICT HAVERI**

Construction of dwarf compound wall using

rubble and cement mortar and mounting of MS grill over it has been done. Lawn has been developed around the monument **(Pl.74)**.

**155. NAGARESHWARA TEMPLE, BANKAPUR, DISTRICT HAVERI**

After removing the dead lime plaster, the leaky roof has been rendered watertight.

**156. MADHUKESHWAR TEMPLE, BANAVASI, DISTRICT UTTARA KANNADA**

Construction of compound wall around the premises of museum building using laterite stone blocks and development of lawn inside, using sand, red soil, compost, grass and suitable plants have been carried out.

**157. GROUP OF MONUMENTS, GEROSOPPA, DISTRICT UTTARA KANNADA**

The heavily damaged doors of all the four entrances of *Chaturmukha Basadi* have been replaced with new teak wood doors, to prevent any untoward incidents. On the roof of *Chaturmukha Basadi*, terracotta tiles have been provided over the lime concrete to make it watertightened. Stone joints of the roof have been treated with lime compatible and vapour permeable bonding agent.

**158. FORT MIRJAN, DISTRICT UTTARA KANNADA**

De-watering and de-silting of the ancient wells inside the fort has been taken up and completed. Removal of rank vegetation including tree roots from the moat, fort walls as well as the complex is in progress. The open wells inside the fort have been provided with suitable grills and mesh over it to prevent mishaps. The eastern and northern entrances have been provided with grill gates to prevent unauthorized entry into the fort area.

GOA CIRCLE

GOA

**159. SE' CATHEDRAL, OLD GOA, DISTRICT NORTH GOA**

The damaged/sunken roof above main altar has been repaired after replacing decayed wooden beams and rafters; the entire reaper has been restored with new ones. (Pl.75)

The peeled off and broken lime plaster at frieze level pilasters has been removed and re-plastered with mouldings and designs, as per the original (Pl.76)

The cracked and peeled off lime plaster of pillar base has been de-plastered and re-plastered as per the original (Pl.77)

**160. CHURCH AND CONVENT OF ST. FRANCIS OF ASSISI, OLD GOA, DISTRICT NORTH GOA**

The peeled off lime plaster in the sacristy has been de-plastered and re-plastered with moulding and design, as per the original. The entire area has been white washed (Pl.78)

**161. CHAPEL OF ST. CAJETAN, OLD GOA, DISTRICT NORTH GOA**

The damaged window of bell tower has been replaced with new one. The peeled off plaster in the interior of bell tower has been de-plastered and re-plastered and applied with white wash (Pl.79).

**162. BASILICA OF BOM JESUS, OLD GOA, DISTRICT NORTH GOA**

The damaged/peeled off plaster of choir portion has been de-plastered and re-plastered. Besides, distempering has been applied on the entire Church area. Only the quadrangle portion of the complex was applied with white wash. The damaged and ugly looking wiring wash. The damaged and ugly looking wiring inside the

Church has been provided with new electrification (Pl.80)

**163. FORTIFICATION WALL OF AUGUDA FORTRESS (LOWER), CANDOLIM, DISTRICT NORTH GOA**

The thick vegetation, grown over the fortification wall has been cleared along with roots and cavities have been filled with combination mortar to prevent further growth.

**164. CHURCH OF ST. AUGUSTINE, OLD GOA, DISTRICT NORTH GOA**

The quadrangle portion of the complex which was susceptible for growth of moss and lichen, causing great inconvenience to the visitors, was laid with new flooring (Pl.81)

GUWAHATI CIRCLE

ARUNACHAL PRADESH

**165. ANCIENT REMAINS, BHISMAK NAGAR, DEBANG VALLEY, DISTRICT WEST KAMENG**

Lime concrete flooring and pointing to the ancient structure have been completed. Besides, vegetation clearance inside the monument has also been undertaken. The work is in progress.

ASSAM

**166. RANGHAR PAVILION, JAYSAGAR, DISTRICT SIBASAGAR**

Pointing to the newly raised ancient boundary wall with lime-*surkhi* mortar has been completed.

**167. GROUP OF FOUR MAIDAMS, CHARAIDEO, DISTRICT SIBASAGAR**

Construction of retaining wall using both standard and special sized bricks to check soil erosion in the left side of the excavated maidam 2 has been completed.



A



B

*Fort Wall, Meguti Hill: A, before and B, after conservation*



A



B

*Huchappayya Temple Complex: A, before and B, after restoration of out-of-plumb wall*



A



B

*Hazar Kothri: A, before and B, after conservation*



A



B

*Hazar Kothri: A, before and B, after conservation*



A



B

*Madrasa of Mohammad Gawan: A, before and B, after conservation*



A



B

*Arquilla: A, during and B, after conservation*



A



B

*Gulbarga Fort: A, before and B, during conservation of the western side bastion*



A



B

*Kadambeshwara Temple: A, before and B, after conservation*



A



B

*Mukteshwara Temple: A, before and B, after conservation*

**168. SRI SRI HAYAGRIVA MADHAVA TEMPLE, HAJO, DISTRICT KAMRUP**

Lime-*surkhi* plasters to the parapet wall and PCC approach in the western side stair cases have been completed. Fixing of pipe railing in the ramp has also been done.

**169. MASONRY REMAINS OF BAMUNI HILL, TEZPUR, DISTRICT SONITPUR**

Construction of breast wall and PCC approach road has been completed.

**170. CACHARI RUINS, KHASPUR, DISTRICT CACHAR**

Exposing of ancient enclosure wall through earth work and construction of approach pathway with chequered tiles has been taken up. Besides, vegetation clearance inside the monument has also been undertaken. The works are in progress.

**MANIPUR**

**171. VISHNU TEMPLE, BISENPUR, DISTRICT VISHNUPUR**

Painting to the MS grills around the complex has been applied. Besides, the work of vegetation clearance inside the monument is in progress.

**MEGHALAYA**

**172. TANK, SYNDAL, DISTRICT JAINTIA HILL**

The works of cleaning of the main tank and vegetation clearance have been undertaken. Moreover, the work of painting to the MS grill has been attended to.

**173. SCOTT'S MONUMENT, CHERRAPUNJI, DISTRICT EAST KHASI HILLS**

The works of painting to the MS grill, pointing to the RR masonry in front of the monument have been completed.

**HYDERABAD CIRCLE**

**ANDHRA PRADESH**

**174. HILL FORT, RATNAGIRI, DISTRICT ANANTAPUR**

The damaged bastion wall was repaired with the available stones in lime mortar near Pattrappa Temple at this fort, as per original **(Pl.82)**

**175. FORT AND TEMPLES, HILL FORT, RAYADURG, DISTRICT ANANTAPUR**

Conservation has been carried out to the damaged walls and parapet walls of the temples, besides, water tightening of the roof of the *Siva* and *Veerabhadra Swamy* Temples in the Upper Fort has been carried out **(Pl.83)**.

**176. HEMAVATI GROUP OF TEMPLES, HEMAVATI, DISTRICT ANANTAPUR**

Pathways of granite stone have been provided in front of the sculpture shed, in the garden and around the *Doddeswara Swamy*, *Malleswara Swamy* and *Virupaksha Swamy* Temples **(Pls.84-85)**.

**177. RAJA MAHAL COMPLEX, LOWER FORT, CHANDRAGIRI, DISTRICT CHITTOOR**

Dressed stone pathways are laid to connect all the monuments for the convenience of visitors. The western gate has also been conserved **(Pls.86-88)**.

**178. VENKATESHWARA VISHNU TEMPLE, MANGAPURAM, DISTRICT CHITTOOR**

For the convenient of physically challenged and elderly visitors wooden ramps were provided.

**179. CAMEL STABLE, GOLKONDA FORT, HYDERABAD, DISTRICT HYDERABAD**

The conservation of camel stables was done by pointing and grouting the damaged walls with lime mortar, as per original.



A



B



C

*Se' Cathedral, Old Goa: A, before, B, during and C, after conservation of roof*



A



B



C

*Se' Cathedral, Old Goa: A, before, B, during and C, after conservation of frieze level pilasters*



A



B

*Se' Cathedral, Old Goa: a, before, and B, after conservation of pillar base*



A



B



C

*Church and Convent of ST. Francis of Assisi: A, before, B, during and C, after conservation*



A



B

*Chapel of ST. Cajetan: A, before, and B, after conservation of bell tower window*



A



B



C

*Basilica of Bom Jesus: A, before, B, during and C, after conservation of choir portion*



A



B



C

*Church of ST. Augustine: A, before, B, during and C, after conservation of the floor*

**180. SRI PARASURAMESWARA TEMPLE, POLI, ATTIRALA, DISTRICT CUDDAPAH**

Conservation has been done by providing lime plaster to the *Vimana* as per original, after removing the dead lime plaster (PI.89).

**181. SRI KAMALASAMBAVESWARASWAMY TEMPLE, PUSHPAGIRI, DISTRICT CUDDAPAH**

Stone veneering has been provided to the damaged *garbhagriha* of the temple as well as on both sides of the *mandapa* (PI.90).

**182. MANDAPA NEAR THE GREAT MOSQUE, GANDIKOTA FORT, GANDIKOTA, DISTRICT CUDDAPAH**

An apron has been provided around the *mandapa* and the steps are repaired to strengthen the structure near the Great Mosque (PI.91).

**183. SRI KODANDARAMASWAMY TEMPLE, VONTIMITTA, DISTRICT CUDDAPAH**

White washing has been done to the peeled off portion over the roof including polishing of the main door of *Gopura*. Dwarf wall has been constructed towards south-western corner of the compound wall.

**184. KONDA REDDY BURZ, KURNOOL, DISTRICT KURNOOL**

Approach pathway matching with existing dressed sand stone slabs has been provided; bulged outer wall has been repaired by using same material (PI.92).

**185. ABDUL WAHAB KHAN TOMB, KURNOOL, DISTRICT KURNOOL**

Pointing of joints of main outer walls with lime *surkhi* mortar has been provided, after removing damaged existing one. Core of the wall is strengthened with grouting using lime slurry.

**186. KALYANA MANDAPA, THOUSAND PILLAR TEMPLE COMPLEX, HANUMAKONDA, DISTRICT WARANGAL**

The reconstruction of *kalyanamandapam* in

Thousand Pillared Temple Complex was continued (2010-11, p.290) as on-going conservation work, including setting of the stone members of *kakshasana* (PI.93).

**JAIPUR CIRCLE**

**RAJASTHAN**

**187. SOLAH KHAMBA, AJMER, DISTRICT AJMER**

Restoration work of *chhajja*, *kangooras*, roof and dome has been completed. Besides, pathways at *Anasagar Baradari* and parking facilities for the tourists have also been provided.

**188. ANCIENT SITE; KALIBANGAN, DISTRICT HANUMANGARH**

Construction of boundary wall with M.S. railing is in progress.

**189. BHANDASAR JAIN TEMPLE, BIKANER, DISTRICT BIKANER**

Conservation work to the collapsed wall and restoration of *kangooras* are in progress.

**190. DEEG BHAWANS, DEEG, DISTRICT BHARATPUR**

Construction of dwarf wall with M.S. grill has been completed.

**191. ANCIENT SITE, BHANGARH, DISTRICT ALWAR**

Conservation of pathways towards right side of Hanuman Temple has been completed. Removal of fallen debris from *Sayed Baba ki* area to *Burj* has also been done.

**192. BAGH KI DEORI, NEELKANTH, DISTRICT ALWAR**

RR masonry has been provided in between *Bagh ki Deori* to *Hanuman ki Deori* inside the complex.

**193. LAL MAHAL, RUPVAS, DISTRICT BHARATPUR**

Restoration of the *kangooras* towards south-

eastern side of the Hanuman Temple is in progress. Conservation of the fort wall has been completed up to a height of 4m. *Lakhauri* brick work on the steps towards ghat has also been executed. The construction of dwarf wall with M.S. grill along the road and moat (northwest) is in progress.

**194. JAISALMER FORT, DISTRICT JAISALMER**

Underpinning work in the bastions 27 to 31 and bastion 38 is going on whereas in bastions 18 and 19, the work has been completed. New wooden stands have been provided to the canons including the railing on the slope of the canon point. Conservation of fallen wall near police *chowki* has been completed.

**195. BHATNER FORT, DISTRICT HANUMANGARH**

Conservation of fortification wall between bastion 16 and 17 and laying of brick pathways from camp office to bastion 10 are in progress. Repairing of old drain inside the fort and construction of dwarf wall towards the eastern side are in progress.

**196. TOP KHANA BUILDING, BADAL MAHAL, KUMBHALGARHFORT, DISTRICT RAJSAMAND**

Watertightening of Top Khana building, plastering and colour washing of the same have been completed.

**197. SIVA TEMPLE, ARTHUNA, DISTRICT BANSWARA**

Stone flooring work around the temple has been completed. Restoration of small shrine situated towards north of the main temple is in progress. Conservation works of missing plinth/ platform and the area from *jangha* up to the *sikhara* of Kumbheshwar Temple have been completed. The work of dwarf wall with M.S. grill around the Jain Temple is in progress (Pl.95).

**198. GANESH TEMPLE COMPLEX, ATRU, DISTRICT BARAN**

The construction of dwarf wall with M.S. railing around the acquired land has been completed. Construction of sculpture shed and display of sculptures has been done. Facility of pathway between roads to the main entrance has also been provided.

**199. KANER KI PUTLI, DISTRICT BHILWARA**

Constructions of dwarf wall and flooring around the Siva Temple have been completed (Pl.94)

**KOLKATA CIRCLE**

**WEST BENGAL**

**200. ADINA MASJID, PANDUA, DISTRICT MALDAH**

Strengthening of the walls and arches by necessary brick work laid in lime *sarkhi* mortar to the mosque has been done.

**201. BAISGAZI WALL, GAUR, DISTRICT MALDAH**

Restoration work of the missing portion of Baisgazi Wall has been completed (Pl.96).

**202. BARADUARI MASJID OR THE GREAT GOLDEN MOSQUE, GAUR, DISTRICT MALDAH**

Restoration work of the missing portion of ancient brick wall around the mosque has been completed.

**203. BETH-EL-SYNAGOGUE, POLLOCK STREET, KOLKATA**

Relaying of lime concrete on roof, painting of inside beams and rafters (*burgahs*) and marble flooring work have been carried out. Polishing on wooden staircases and railings and colour washing on the doors and windows has been completed.

**204. CURRENCY BUILDING, DALHOUSIE SQUARE, KOLKATA**

Structural repairs of the walls, floors and roof



A



B

*Hill Fort, Ratnagiri: A, before and B after conservation of damaged bastion wall*



A



B

*Hill Fort, Rayadurg: A, before and B after conservation of roof, walls and parapet walls*



A



B

*Hemavati Group of Temples, Hemavati: A, before and B after conservation*



*Hemavati Group of Temples, Hemavati: A, before and B after conservation*



A



B

*Raja Mahal Complex, Chandragiri: A, before and B, after conservation of pathway*



A



B

*Raja Mahal Complex, Chandragiri: A, during and B, after conservation*



A



B

*Lower Fort, Chandragiri: A, before and B, after conservation*



A



B

*Sri Parsurameswara Temple, Polilur: A, before and B, after conservation of the Vimana*



A



B

*Sri Kamalasambaveswara Swamy temple, Pushpagiri: A, before and B, after conservation*

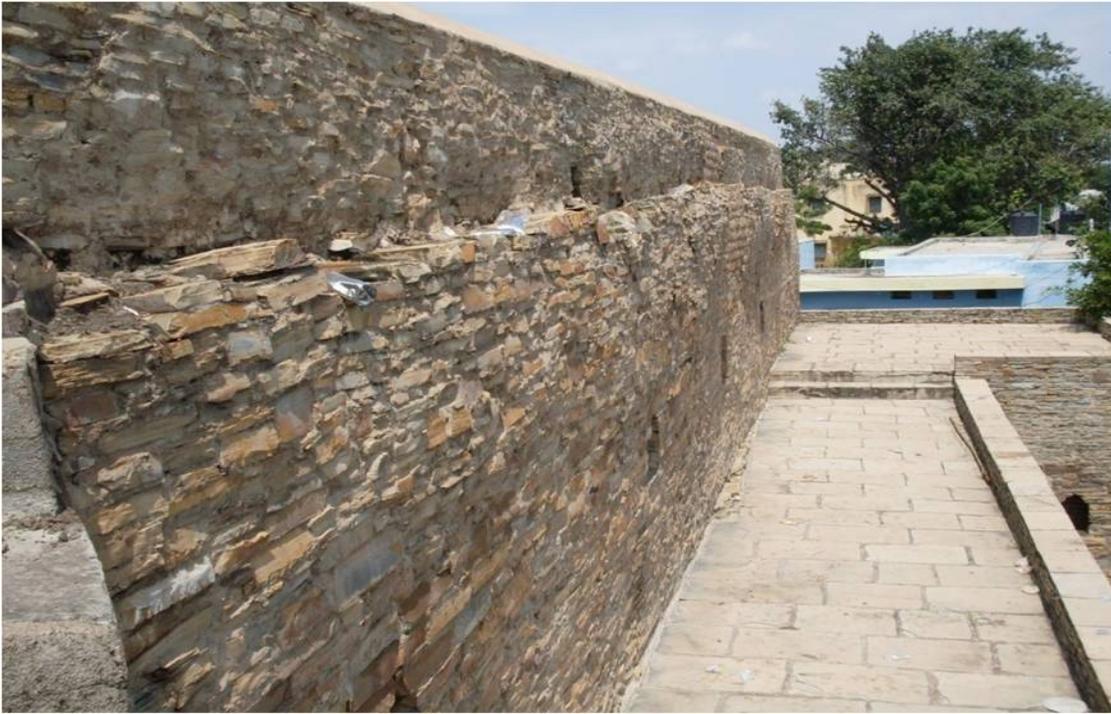


A

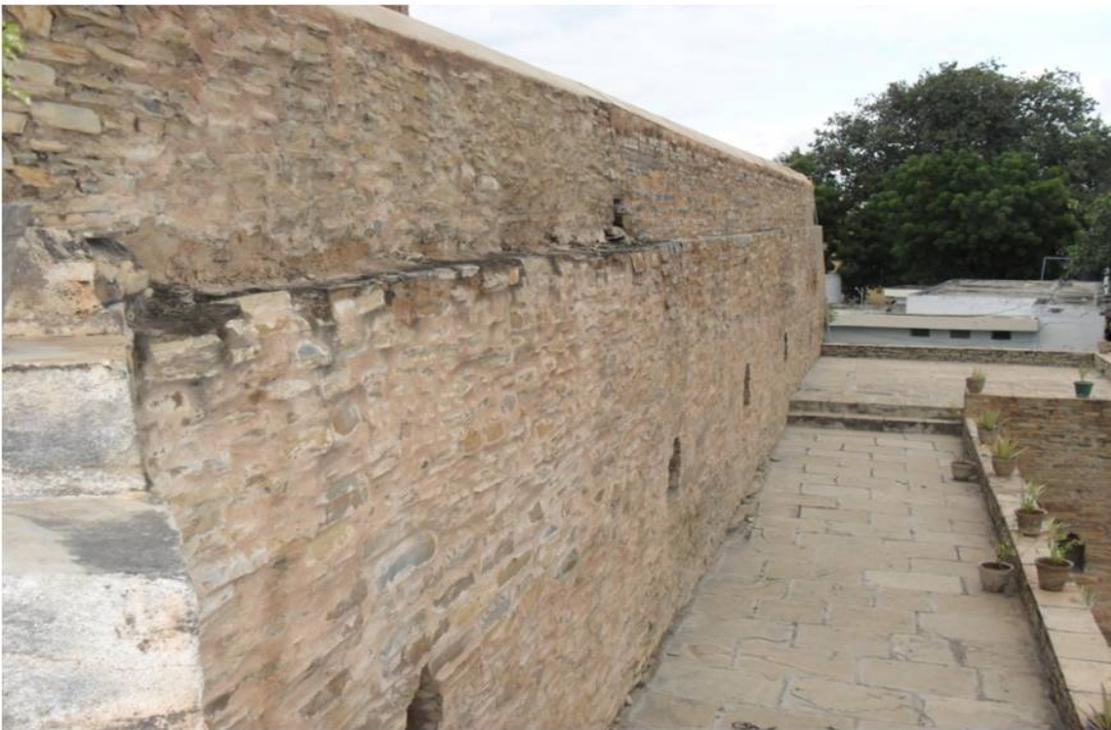


B

*Gandikota Fort, Cuddapah: A, before and B, after conservation of Mandapa*



A



B

*Konda Reddy Burz, Kurnool: A, before and B, after conservation of the wall*



*Thousand Pillared Temple, Hanumakonda: during resetting of Kalyanamandapa*

on the western and southern parts of the monument have been carried out (Pls.97-99).

**205. HAZARDUARI PALACE AND IMAMBARA TOGETHER WITH ADJACENT AREA, QILA NIZAMAT, DISTRICT MURSHIDABAD**

Repairing of the roof by replacement of damaged wooden beams and rafters has been done.

**206. KOCH BIHAR PALACE, KOCH BIHAR, DISTRICT KOCH BIHAR**

Dwarf wall with grill fencing around the newly acquired land near Koch Bihar Palace has been constructed.

**207. MAGHEN DAVID SYNAGOGUE, B.R.B. BOSE ROAD, KOLKATA**

Outside colour washing to doors and windows and necessary repairing work of oxidized fitting has been carried out. Surrounding pathway has been relayed with brick apron. Besides, roof work has been done with lime *surkhi* concrete including polishing work on wooden staircases and railings.

**208. METCALFE HALL, STRAND ROAD, KOLKATA**

Relaying of roof including necessary restoration of damaged pillar capitals and adjoining superstructure at the frontal (eastern) portion has been done (Pls.100-101).

**209. MOUNDS, BANGARH, DISTRICT DAKSHIN DINAJPUR**

Restoration of missing brick wall has been done. Necessary surface drainage system has been provided to the excavated site.

**210. MOUNDS KNOWN AS THE DEVIL'S MOUND AND RAJA KARNA'S PALACE, CHIRUTI, DISTRICT MURSHIDABAD**

The excavated site has been fenced to stop the entry of cattles and unauthorized visitors.

**211. BELVEDERE HOUSE OF NATIONAL LIBRARY, KOLKATA**

Structural repairs to the roof and walls by replacing damaged roof members and relaying of roof in lime concrete has been done including outside face lifting (Pls.102-103).

**212. SANTINIKETAN, DISTRICT BIRBHUM**

Restoration and structural repairs to the heritage buildings in Santiniketan called *Patha-Bhavana*, *Purbo* (East) *Torana*, *Paschim* (West) *Torana*, *Dehali*, *Natun Bari* and *Surul Kothi* including Fresco work have been taken up (Pls.104-105).

**213. VICTORIA MEMORIAL HALL, KOLKATA**

Restoration of the ceiling in Prince Hall including watertightening of roof has been done.

**SIKKIM**

**214. RABDENTSE SITE, ANCIENT CAPITAL OF SIKKIM, WEST SIKKIM, DISTRICT WEST SIKKIM**

Repairs to earthquake affected walls of the ruined structures have been undertaken.

**MUMBAI CIRCLE**

**MAHARASHTRA**

**215. AMBA - AMBIKA GROUP OF CAVES, JUNNAR, DISTRICT PUNE**

Restoration of pillars matching with the existing style, design and shape with trap stone has been executed and the exposed surface is finished with traditional mortar. Chiseling of the surface for matching with stone texture has been completed (Pl.106)



A



B

*Kaner ki-Putli, Bhilwara: A, before and B, after conservation*



A



B

*Siva temple, Arthuna: A, before and B, during conservation*

**216. NANEGHAT CAVES, GHATGHAR, TAL JUNNAR, DISTRICT PUNE**

Fixing of railing towards the low lying area has been executed. Laying of lime concrete for flooring inside the caves and finishing the same in traditional lime mortar has been completed. Removal and refixing of damaged stone flooring as per original in front of caves with available stone has been completed. Fixing of wooden doors and windows of the opening to the caves with bat proof mesh shutter has been done. Removal of the undulated and disturbed existing stone pathways and relaying the same with roughly dressed stones to the path, leading to the caves have been completed (Pl.107)

**217. BURIAL GALLERY, KANHERI CAVES, BORIVALI, DISTRICT MUMBAI**

The railing provided for safety and security of the visitors was damaged and missing at many places. Therefore, it has been provided as per original pattern and design. The debris was accumulated over the miniature stupas at Burial Gallery. After proper documentation the debris was removed scientifically. All the excavated materials have been segregated and screened properly to obtain the antiquities or historical objects. After exposing the site, the miniature stupas were restored with specially moulded bricks, as per original, existing alignment and pattern by using sticky and soft ant hill clay mortar. The work is still continuing.

**218. KONDIVATE CAVES, ANDHERI (EAST), DISTRICT MUMBAI**

The M.S. grill fencing with dressed stone pillar has been provided around the land at Kondivate Caves to stop the illegal entries of local people and to safeguard the monument

and site. The pathway of irregular sized dressed stone, matching to the environment of the caves was provided in front of the caves. The landscaping has been carried out to stop the erosion of soil from the front during the rainy season and to beautify the monument.

**219. BHAJA CAVES, DISTRICT PUNE**

Removal of undulated and disturbed existing UCR stone pavement and providing of approach steps with necessary landing to the existing pathways leading to the caves have been completed.

After dismantling the dilapidated and disturbed existing UCR stone parapet wall, earth work excavation for foundation in hard *murrum* and boulders has been done for, reconstruction of parapet wall in UCR stone masonry to the either side of the pathway to guard the edge of the steps and safety of the visitors (Pl.108)

**220. FOURTEEN STUPAS, BHAJA CAVES, DISTRICT PUNE**

Restoration of pillars by using trap stone and inserting various sizes of bars in the hole fixed with araldite has been executed as per detailed design and drawing.

**221. RAMPART AND FORT WALL, SINDHUDURG FORT, MALVAN, DISTRICT SINDHUDURG**

The work of laying UCR masonry over the rampart in lime mortar has been done. Levelling to drain out the rain water at south eastern side of the fort has been completed.

**222. SINDHUDURG FORT, MALVAN, DISTRICT SINDHUDURG**

Filling of undercut cavities caused due to slashing of sea waves and high tide with the help of coarse rubble masonry for veneering



A



B

*Baisgazi wall, Maldah: A, before and B, after restoration*



A

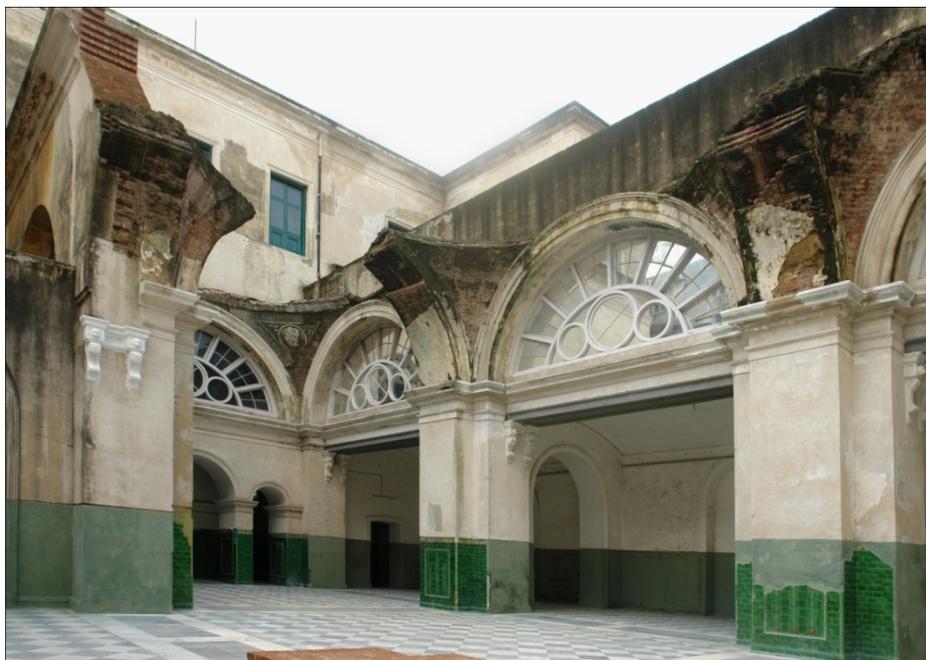


B

*Currency Building, Kolkata: A, before and B, after conservation*



A

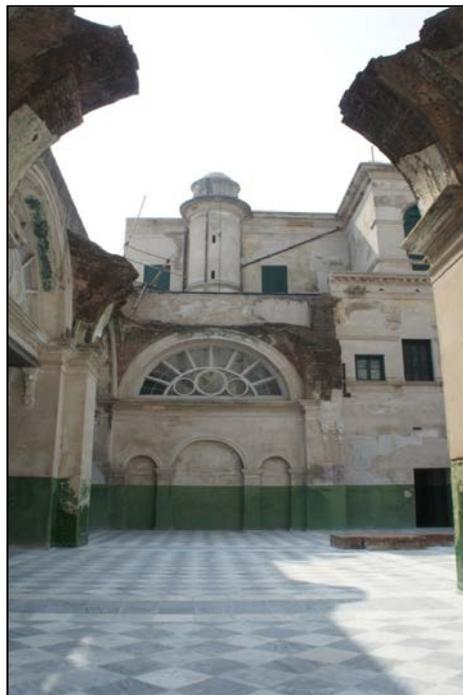


B

*Currency Building, Kolkata: A, before and B, after conservation*



A



B

*Currency Building, Kolkata: A, before and B, after repairing*



A



B



C

*Metcalf Hall, Kolkata: before, during and after conservation*



A



B

*Metcalfe Hall, Kolkata: A, during and B, after conservation*



A



B

*Belvedere house of National Library, Kolkata: A, during and B, after conservation*



A



B



C

*Belvedere house of National Library, Kolkata: A-B, during and C, after conservation*

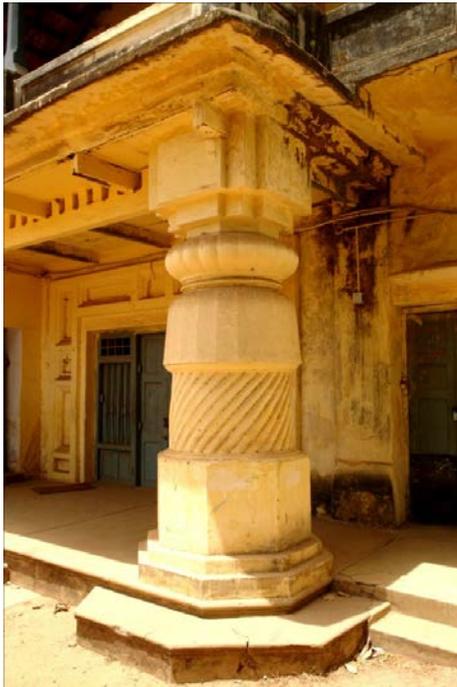


A



B

*Patha Bhavan, Santiniketan: A, before and B, after conservation*



A



B



C

*Purbo Torana, Santiniketan: A, before, B, during and C, after conservation*

including pointing has been completed. Core filling to the undercut cavities of the fort wall with rubble stone in lime mortar has also been done (PI.109)

**223. BUDDHIST STUPA, NALA SOPARA DISTRICT THANE**

During the year 2009-10, seven numbers of miniature stupas were exposed by doing scientific clearance.

During this season, scientific clearance, three more miniature stupas, architectural stone members and a stone pillar having Buddha image and other structures come up around the main stupa. All the exposed structures were restored simultaneously with traditional mortar. The work is still going on (PI.110)

**224. JANJIRA FORT, JANJIRA, MURUD, DISTRICT RAIGAD**

Removal of debris has been done to expose hidden structures close to the open tank and inside the fort. The work is still continuing. (PI.111)

**225. WADA OF DANCING GIRL, DISTRICT RAIGAD**

The whole monument was covered with vegetation, plants and fallen debris. Hence, huge cracks developed on the walls of the monument and damages occur at various places. The monument is restored by clearance of the debris, vegetation and removal of large plants and subsequently by pointing and watertightening. Stone flooring in the cells of the monument has also been laid out.

**226. EXPOSED STRUCTURE NEAR BAZAR PETH, DISTRICT RAIGAD**

Clearance of thick bushes, shrubs and vegetations from the structure has been done. After removing the debris, buried structures

have been exposed and joints of exposed structures were pointed and watertightened (PI.113).

**227. KOPESHWAR TEMPLE AND CAVES, KHIDRAPUR, DISTRICT KOLHAPUR**

The work of reconstruction of *prakara* wall on the southern side has been executed after providing necessary concrete bed. The inner carpet area around the structure has been cleared and exposed by removing the accumulated earth. Besides, exposing of the original ground level has been done (PI.112).

**228. JAKHINWADI CAVES, DISTRICT SATARA**

Removal of debris, restoration of damaged pillars of the cave nos. 2 to 26 by inserting bars and fixing with araldite, as per the original style and design have been completed. De silting of the ancient water cistern and existing drain in the caves has been carried out.

**RAIPUR CIRCLE**

**CHATTISGARH**

**229. RAMA TEMPLE, SIRPUR, DISTRICT MAHASAMUND**

Consolidation of exposed plinth and platform of adjacent priest house has been done including levelling of the area with approach road to the shrine.

**230. EXCAVATED STUPA, SIRPUR, DISTRICT MAHASAMUND**

Construction of compound wall has been completed.

**231. TIWARDEV VIHAR MONASTERY, SIRPUR, DISTRICT MAHASAMUND**

Structural conservation works to the excavated remains of the monastery by veneering,

underpinning, core filling have been done including watertightening and laying of floor inside the monastery.

**232. HARSHA GUPTA VIHAR, SIRPUR, DISTRICT MAHASAMUND**

Structural repairs, consolidation of the platform of the monastery including laying of flooring inside, have been carried out.

**233. SIVA TEMPLE-6, SIRPUR, DISTRICT MAHASAMUND**

Structural conservation work to the excavated remains and developing of the site by cutting/filling and laying approach road have been done.

**234. PADMANI VIHAR, SIRPUR, DISTRICT MAHASAMUND**

Structural repairs to the excavated remains by veneering, underpinning, core filling have been executed, besides; water tightening work has also been attended to.

**235. BALESWAR MAHADEV TEMPLE, SIRPUR, DISTRICT MAHASAMUND**

Structural repairs to the priest- house and plinth consolidation of the main structure have been done.

**236. SIVA TEMPLE-1, SIRPUR, DISTRICT MAHASAMUND**

Approach road to the temple has been laid.

**237. SIVA TEMPLE-4, SIRPUR, DISTRICT MAHASAMUND**

Structural repairs like underpinning, core filling, veneering and watertightening have been carried out in this year.

**238. NEWLY EXCAVATED MONASTERY NEAR SCHOOL, SIRPUR, DISTRICT MAHASAMUND**

Structural repairs along with development of the site by cutting and filling the area and

providing due approaches have been carried out.

**239. SRP-16, SIRPUR, DISTRICT MAHASAMUND**

Bulged and damaged structures have been restored by underpinning, core filling, watertightening etc. besides, and suitable approach road has been provided along with overall development of the site.

**240. LAXMAN TEMPLE, SIRPUR, DISTRICT MAHASAMUND**

Outer periphery of the monument has been fenced to restrain illegal entry and at the same time development of the approach path and adjacent tank of the temple has been done.

**241. SIVA TEMPLE-3, SIRPUR, DISTRICT MAHASAMUND**

Development of the area by landscaping and laying approach road and apron on all sides of the monument has been completed.

**242. SRP-21, SIRPUR, DISTRICT MAHASAMUND**

Structural conservation works by veneering, underpinning, core filling and watertightening, have been done.

**243. SIVA TEMPLE-2, SIRPUR, DISTRICT MAHASAMUND**

The damaged structures have been restored by veneering, underpinning, core filling and water tightening.

**244. SRP-13, SIRPUR, DISTRICT MAHASAMUND**

The dilapidated structures have been repaired by veneering, underpinning, core filling and water tightening.

**245. BHAND DEUL, ARNAG, DISTRICT RAIPUR**

Structural repairs by way of plinth consolidation with matching stone blocks have been completed.



A



B



C

*Amba-Ambika group of Caves: A, before, B, during and C, after restoration of pillars*



A



B



C

*Naneghat Caves: A, before, B, during and C, after conservation*



A



B



C

*Bhaja Caves: A, before, B, during and C, after conservation*



A



B



C

*Sindhudurg Fort: A, before, B, during and C, after conservation of the fort wall*



A

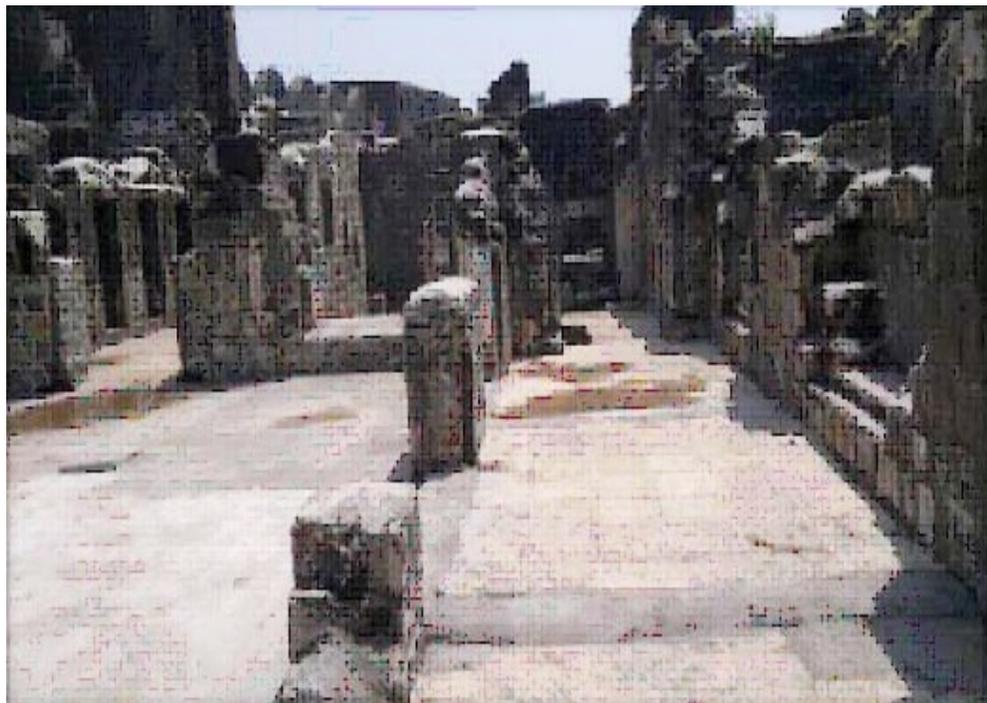


B

*Buddhist Stupa, Nala Sopara: A, before and B, after restoration*



A



B

*Janjira Fort, Janjira: A, before and B, after conservation*



A



B



C

*Kopeshwar Temple and Caves: A-B, during and C, after conservation of the prakara wall*



A



B



C

*Bazar Peth, Raigad: A, before, B, during and C, after conservation of the exposed structures*

**246. RAJIV LOCHAN TEMPLE, RAJIM, DISTRICT GARIABAND**

Developments of the site by dismantling of illicit construction, laying of approaches and construction of the boundary wall have been attended to **(Pl.114)**

**247. RAMCHANDRA TEMPLE, RAJIM, DISTRICT GARIABAND**

Development of the site has been carried out by levelling the land, laying approaches and providing apron all around the temple.

**248. MAHADEV TEMPLE, TUMAN, DISTRICT KORBA**

Structural repair to plinth portion of Temple nos. 1 and 2 has been executed **(Pl.118)**.

**249. CHAITURGARH FORT, LAPHA, DISTRICT KORBA**

Structural repair to the main gate of the fort has been done with necessary core filling and laying due approach road. The small gateway has also been restored as per existing material available at the site.

**250. RATANPUR FORT, RATANPUR, DISTRICT BILASPUR**

Laying of pathway around the fort area and brick conservation work to the ruined Palace no.1 and 2, by veneering, underpinning, core filling, water tightening have been completed including structural repairs to the gate nos. 2 and 3.

**251. BHIMAKICHAK TEMPLE, MALHAR, DISTRICT BILASPUR**

Structural repair has been done by fixing the damaged and missing lintel block, after necessary mending and strengthening of the pieces, which were lying inside the Temple **(Pl.115)**.

**252. EXCAVATED REMAINS, MALHAR, DISTRICT BILASPUR**

The damaged and bulged out structures have been restored by underpinning, veneering and due water tightening.

**253. BISDURIYA TEMPLE-1, RATANPUR, DISTRICT BILASPUR**

Structural repair by brick veneering, underpinning has been done together with consolidation of the exposed plinth.

**254. SIVA TEMPLE, ADBHAR, DISTRICT JANJGIR-CHAMPA**

The damaged plinth of the shrine has been rendered consolidate.

**255. KESHAVNARAYAN TEMPLE, SHEORINARAYAN, DISTRICT JANJGIR-CHAMPA**

Structural repairs to the temple and nearby excavated remains have been done; in addition, brick apron has been laid around the temple to prevent stagnation etc. **(Pl.116)**

**256. GANESH STATUE, BARSOOR, DANTEWADA, DISTRICT SOUTH BASTAR**

Structural conservation works to the dilapidated temple and adjacent shrine have been executed.

**257. MEGALITHIC SITE, GAMMEWADA, DISTRICT SOUTH BASTAR**

Consolidation of the tilted base has been carried out.

**258. MAHADEV TEMPLE, NARAYANPUR, BHATAPARA, DISTRICT BALODABAZAR**

The out-of-plumb *mandapa* has been reset, after proper documentation and dismantling **(Pl.117)**.

**SRINAGAR CIRCLE**

**JAMMU AND KASHMIR**

**259. MUGHAL ARCADE, VERINAG, DISTRICT ANANTNAG**

Restoration of the weathered, broken and decayed brick walls, arches and domes of the cells has been carried out with the brick tiles of the required size and lime etc. (Pl.119)

**260. ANCIENT STUPA, MONASTERY AND CHAITYA TOGETHER WITH ADJACENT SAND, PARIHASPORA, DISTRICT BARAMULLA**

The peristyle wall on the southern side of the *Chaitya* and its core masonry has been repaired.

**261. MOSQUE AND OTHER ANCIENT REMAINS ON THE ISLAND (WULAR LAKE), DISTRICT BARAMULLA**

Restoration of the out-of-plumb and damaged enclosure wall at 2<sup>nd</sup> terrace level, which is made of R.R stone has been done. Laying of concrete foundation to the wall in composite mortar has also been completed (Pl.120).

**262. ANCIENT FORT, AKHNOOR, DISTRICT JAMMU**

The missing, damaged and bulged portions of central bastion of the fortification wall towards east, and the gateway across the bastion close to the river bank have been restored with brick masonry in composite mortar, besides; restoring the rampart leading to the top of the bastion has been done (Pl.121).

**263. TOMB OF ZAIN-UL-ABIDIN'S MOTHER TOGETHER WITH ADJACENT LAND, ZAINAKADAL, DISTRICT SRINAGAR**

In continuation of previous year's work, water-tightening of northern wing of the roof has been taken up after removing old, dead and loose brick concrete, topped by old lime plaster. Thus, 50 mm thick brick concrete has

been relayed in combination mortar, mixed with 20 mm brick aggregate, concealed with 20 mm thick lime plaster. The haphazard electric wiring and fixtures were replaced by proper wiring duly concealed in conduit running along the periphery of the walls and arches.

**264. ANCIENT FORT ATTRIBUTED TO RAJA SUCHET SINGH AND SAMADHI OF THE QUEEN OF RAJA SUCHET SINGH, RAMNAGAR, DISTRICT UDHAMPUR**

The restoration of out-of-plumb, damaged and fractured 2<sup>nd</sup> fortification wall has been carried out near moat facing east with rectangular stone blocks in coarse masonry partly with salvaged and partly with new stones set in lime mortar after laying lime concrete over the top to render it water-tightened. The buried partition walls of rooms have been exposed by removing debris that had accumulated over them. Later, these exposed walls have been restored in coarse masonry with lime mortar after the lime concrete is laid under the floors of the rooms. Ornamental plaster has been provided in composite mortar to the front façade of the *Samadhi* of Raja Suchet Singh, replacing the dead and making good for the missing plaster. The stone slabs of assorted size have been laid in floors of outer terrace of façade of the *Samadhi*.

**265. ANCIENT PALACES ATTRIBUTED TO RAJA SUCHET SINGH, RAMNAGAR, DISTRICT UDHAMPUR**

To check soil erosion of terraces, spanning from southern to eastern corner, the damaged and out-of-plumb supporting wall has been restored with coarse rubble masonry in composite mortar, after providing brick concrete in lime mortar to the foundation of



A



B

*Rajiv Lochan Temple, Rajim: A, before, and B, after conservation of approach road*



A



B

*Bhimachick Temple, Malhar: A, before and B, after conservation*



A



B

*Keshava Narayan Temple, Sheorinarayan: A, before and B, after conservation*



A



B

*Mahadev Temple, Narayanpur: A, before and B, after conservation*



A



B

*Mahadev Temple, Tuman, A, before and B, after conservation of plinth*

the wall. Repairs by applying ornamental plaster on the wall of *Nawa Mahal* facing east, have been done including stitching of cracks in the walls with *lakhauri* brick. The Iron Grill gates of lock-up rooms have been replaced with the doors made of *Deodar* wood, as per the original pattern. The open courtyard has been provided with stone- slab flooring, over brick concrete foundation, after repairing old, sagging and damaged ones (PI.122)

THRISSUR CIRCLE

KERALA

266. SIVA TEMPLE, PALLIMANAH, DISTRICT THRISSUR

Foundation and wall of the dilapidated *Ootupura* (Dining Hall) was strengthened with new laterite blocks wherever required as per original. Replacement of damaged rafters and other wooden roof members of *Ootupura* are in progress.

267. SIVA TEMPLE, NETRIMANGALAM, DISTRICT PALAKKAD

Laying of *pradaksinapatha* around the main shrine with new and old granite slabs is in progress.

268. SIVA TEMPLE, CHEMMANTHITTA, DISTRICT THRISSUR

Replacement of damaged wooden members of *chuttambalam* and *thidappalli* (kitchen) with new ones and laying of Mangalore tiles on the roof is in progress.

269. SIVA TEMPLE, PERUVANAM, DISTRICT THRISSUR

The damaged rafters of the roof of the upper *tala* of Madathilappan Shrine have been replaced with new teak-wood members as per the original. The work of fixing copper sheets

over the wooden planks is in progress.

270. SRI RAMA TEMPLE, THRIPRAYAR, DISTRICT THRISSUR

Granite stone flooring around the *garbhagriha* has been laid to avoid water stagnation and a proper drainage has been provided to allow rain water to drain out from the *garbhagriha* easily.

271. BEKAL FORT, PALLIKARE, DISTRICT KASARGOD

MS Grill fencing on the north side of the fort has been provided.

272. ST.FRANCIS CHURCH, FORT KOCHI, DISTRICT ERNAKULAM

Wooden balcony of the Church has been restored properly by replacing the damaged wooden beams and planks with new wooden members, as per the original. Repairing work of wooden staircase on the southern side has also been undertaken (PI.123).

273. BHAKTAVATSALA TEMPLE, CHERMADEVI, DISTRICT TIRUNELVELI

Re-conditioning of the stone floor in the *mahamandapa* and *sankaramadam* has been completed. The original plinth level of the temple on the south-western part was exposed and plinth protection course has been given to arrest percolation of water into the foundation.

274. VALISWARA TEMPLE, TIRUVALISWARAM, DISTRICT TIRUNELVELI

The out-of-plumb outer *parkara* wall (west) has been reconstructed including the brick-core and strengthening of the foundation, as per the original.

275. PARTHASARATHI AND KRISHNA TEMPLE, PARTHIVAPURAM, DISTRICT KANYAKUMARI

Water seepage on the *vimana* of main shrine has been arrested by grouting and plastering



A



B

*Mughal Arcade, Verinag: A, before and B, after conservation*



A



B

*Ancient remains, Wular Lake:A, before and B, after conservation*



A



B

*Ancient Fort, Akhnoor: A, before and B, after conservation*



A



B

*Ancient Palace, Ramnagar: A, during and B, after conservation*

wherever necessary. The stucco figures have been consolidated, as per the original.

**276. FORT VATTAKOTTAL, VATTAKOTTAL, DISTRICT KANYAKUMARI**

Providing new stones to the missing portion of veneering stone in the eastern part of the inner fort wall has been done.

Besides, conservation of core wall including earth filling in between bastion has been taken up. The work is in progress.

**VADODARA CIRCLE**

**DAMAN AND DIU**

**277. FORT WALL, MOTI DAMAN, DISTRICT DAMAN**

The works of providing lime plaster to the outer and eastern side of the fort walls and repairing of parapet wall have been taken up. The works are in progress **(Pl.124)**

**278. FORT AND INSIDE BUILDINGS, DIU, DISTRICT DIU**

The pathway laid earlier had weathered, eroded and badly damaged, became undulated causing problems to the visitors for smooth movement. It has been re-laid.

**GUJARAT**

**279. AHMED SHAH'S MOSQUE, DISTRICT AHMEDABAD**

The work of dismantling bulged brick masonry wall is in progress **(Pl.125)**

**280. BHADRA TOWER BESIDE BHADRAKALI TEMPLE, DISTRICT AHMEDABAD**

The work of dismantling worn-out and decayed wooden members, such as, planks, beams, rafters and brackets of the ceilings of first floor's backside rooms, close to the Clock

Tower, has been completed and laying of lime concrete on the terrace is in progress.

**281. MALAV TANK, DHOLKA, DISTRICT AHMEDABAD**

Reconstruction of missing, bulged ashlar masonry wall near inlet and chain link fencing on brick dwarf-wall surrounding the tank are in progress.

**282. CAVES, TALAJA, DISTRICT BHAVNAGAR**

The work of providing GI pipe railing in front of the caves is in progress.

**283. DARBARGADH, SIHOR, DISTRICT BHAVNAGAR**

The work of removing old damaged plaster from walls at the entrance gate and repairing of damaged flooring of the rooms are in progress.

**284. DURVASA RISHI'S ASHRAM, PINDARA, DISTRICT JAMNAGAR**

The work of laying stone flooring in the open courtyard and structural repairs like dismantling and resetting of the wall behind the *Ashram* are in progress.

**285. GUHADITYA TEMPLE, VERVALA, DISTRICT JAMNAGAR**

The work of construction of R.R masonry compound wall, with G.I. pipe sliding door has been completed and laying of due approach road in lime concrete is in progress.

**286. MAGDERU TEMPLE, DHUSANVEL, DISTRICT JAMNAGAR**

Construction of the compound wall by excavating the earth for foundation, laying of cement concrete in foundation and providing R.R masonry in lime mortar, are the ongoing works during the period under review.



A



B

*St. Francis Church, Kochi: A, before and B, after conservation*

**287. GADHI AND FORTRESS, OLD DHINKI, DISTRICT JAMNAGAR**

The work of providing RR masonry compound wall and chain link fencing of the same has been completed. (Pl.126)

**288. KHAPRA KODIA CAVES, DISTRICT JUNAGADH**

The work of providing and fixing teak wood grills in caves has been completed and oil painting of these wooden grills is in progress.

**289. EXCAVATED SITE, KOTADA (DHOLAVIRA), DISTRICT KACHCHH**

The works of dismantling and resetting of bulged-out random rubble masonry walls and structures, and de-silting of eastern and southern series of reservoirs are in progress.

**290. EXCAVATED SITE, SURKOTADA, DISTRICT KACHCHH**

The work of dismantling and resetting of bulged-out random rubble masonry walls and structures within the Citadel area is in progress.

**291. RAO LAKHA CHHATRI, BHUJ, DISTRICT KACHCHH**

Construction of R.R masonry protection wall, in place of, former barbed wire fencing has been taken up this year. The work is in progress.

**292. VITTHALBHAI HAVELI, VASO, DISTRICT KHEDA**

The works of laying lime concrete on the terrace, applying plaster on the walls, dismantling and re-fixing of wooden members like planks, beams, rafters and brackets from the bulged and tilted walls and re-construction of brick masonry wall have been completed.

**293. BAWAMAN'S MOSQUE, CHAMPANER PAVAGADH-ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

The work of constructing stone approach

pathway inside the protected area has been done (Pl.N127).

**294. CITADEL WALL, CHAMPANER PAVAGADH-ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

The works of dismantling and resetting of bulged ashlar masonry and reconstruction of the missing ashlar masonry are in progress.

**295. CITYGATE COMPLEX, CHAMPANER PAVAGADH - ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

The work of reconstruction of fallen and missing rubble masonry of the fort wall is in progress (Pl.128).

**296. KAMANI MASJID, CHAMPANER PAVAGADH-ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

The works of dismantling and resetting of bulged ashlar masonry and reconstruction of missing ashlar masonry steps of the platform in an open courtyard are in progress (Pl.129).

**297. LAKULISH TEMPLE, CHAMPANER PAVAGADH-ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

The work of dressing of approach pathway to the temple is in progress.

**298. LILA GUMBAJ KI MASJID, CHAMPANER PAVAGADH-ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

The work of reconstruction of missing and fallen ashlar masonry of the drain is in progress (Pl.130)

**299. PATAI RAWAL'S PALACE, PAVAGADH HILL, CHAMPANER PAVAGADH-ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

The works of reconstruction of rubble masonry wall supporting underground water tank and water-tightening of the tank, reviving

water channel by way of repairing are in progress.

**300. RUINED HINDU AND JAINA TEMPLE, CHAMPANER PAVAGADH-ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL**

Clearance work to expose the buried structures is in progress.

**301. RATNESHWAR MAHADEV TEMPLE, RATANPUR, DISTRICT PANCHMAHAL**

The works of reconstruction of recently exposed plinth (*jagati*), providing top flooring to the platform and laying of apron to the *jagati*, besides, approach stone pathway from the entrance gate to the Temple are in progress

**(Pl.131).**

**302. HINGLOJIMATA TEMPLE, KHANDOSAN, DISTRICT PATAN**

Chain link fencing around the protected area has been provided.

**303. GROUP OF TEMPLES AND KUND KHED RODA, DISTRICT SABARKANTHA**

The work of providing chain-link fencing on dwarf wall has been carried out and laying of pathway from entrance to the temple is in progress.

**304. EXCAVATED SITE, KAYAVAROHAN, DISTRICT VADODARA**

The entire documentation (photographs and line drawing) of the monument has been done and conservation of a portion of excavated structures by pointing, water tightening etc is in progress.

**305. HIRA GATE WITH ADJOINING CONSTRUCTION, DABHOI, DISTRICT VADODARA**

The works of reconstruction of fallen ashlar masonry, minor repairs, water tightening of the roof and flooring of the corridor of *Kalika Mata* Temple are in progress.

**306. NANDODI GATE WITH ADJOINING CONSTRUCTION, DABHOI, DISTRICT VADODARA**

Providing chain-link fencing over dwarf wall, its plastering, painting and white washing have been done and minor repairing to the gate is in progress.

**307. QUTUBUDDIN MAHMAD KHAN'S TOMB (HAZIRA), DISTRICT VADODARA**

Dismantling of uneven stone approach pathway and laying of a new one is in progress.



A

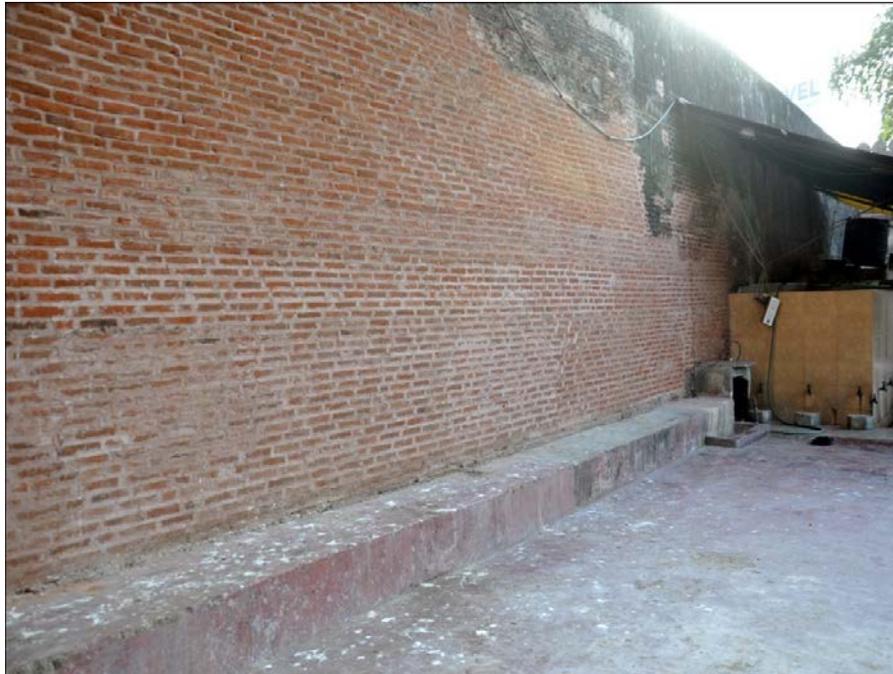


B

*Fort wall, Moti Daman, Daman: A, before and B, after conservation*



A



B

*Ahmed Shah's Mosque, Ahmedabad: A, before and B, after conservation of brick masonry wall*



A



B

*Gadhi and fortress, Old Dhinki: A, before and B, after conservation*



A



B

*Bawaman's Mosque, Champaner Pavagadh: A, before and B, after conservation*



A



B

*City Gate Complex, Champaner Pavagadh: A, before and B, after conservation*



A



B

*Kamani Masjid, Champaner Pavagadh: A, before and B, after conservation*



A



B

*Lila Gumbaj ki Masjid, Champaner Pavagadh: A, before and B, after conservation*



A



B

*Ratneshwar Mahadev Temple, Panchmahal: A, before and B, after conservation of exposed jagati*

## VIII ARCHAEOLOGICAL CHEMISTRY<sup>1</sup>

### TREATMENT OF MONUMENTS AND PAINTINGS

#### ANDHRA PRADESH

##### 1. SRI VEERABHADRA SWAMY TEMPLE, LEPAKSHI, DISTRICT ANANTPUR

In continuation of previous year's (2010-11, p. 350) work, the exterior wall surfaces of the temple including south and east *prakara* walls and *mandapa* made of granite stone blocks were taken up for preservation, which consisted mainly of surface cleaning and removing extraneous deposits, consolidating the weakened stones, applying fungicides and protective coating. The affected stone surfaces were scrubbed clean of microbiological growth and all other surface deposits of dust, dirt, soot, oil and greasy accretions using a mixture of ammonia solution (3%) and a non-ionic liquid detergent (1%) solution in water in a ratio of 3:1. Tough layers of lime and red ochre coats were removed mechanically using a (3-5%) solution of glacial acetic acid in water and then the treated surface was washed with plenty of plain water to remove all remnants of cleaning agents, if any. As needed, the fragile areas in the inner *prakara* wall having some inscriptions were consolidated with Wacker's OH-100, stone strengthener (an ethyl silicate based adhesive). After the surface cleaning of the stone, fungicidal treatment was done with (2%) sodium pentachlorophenate solution in water

Wacker's B.S.-290 diluted in M.T.O. solvent in a ratio of 1:12 was applied to the treated and dried stone surfaces as a protective coat. The work is in progress.

##### 2. TRIKOTESHWARA AND BHEEMESWARA TEMPLES, PUSHPAGIRI, DISTRICT CUDDAPAH

In continuation of previous year's (2010-11, p. 351) work, the preservation of the monument was carried out in order to remove unwanted accretions of lime, oil, grease, settled dust, dirt, water marks, bat excreta etc from the carved pillars, ceiling and walls in the interior and red ochre, iron stains, lime deposits from the exterior and interior of *mandapa* surface. The monument is made mainly of shale with the members of slate. The treatment of stone surfaces was mechanically done following usual methods. Tough lime and red ochre accretions from the sculptures were eliminated using aqueous solution of acetic acid (2-3%) and for iron stains oxalic acid (5%) solution in water was used for their complete elimination. Remnant of acids, if any, was neutralized with mild alkaline solution of ammonia followed by thorough wash with plain water. After the cleaning treatment, a coat of (2%) sodium pentachlorophenate solution in water was applied to the entire treated and dried stone surfaces as a fungicide treatment, by brush. Finally, Wacker's B.S.-290 (a silicone-based

1. Information from Director (Science) of the Survey, Dehradun

water repellent material) diluted in M.T.O. solvent in a ratio of 1:15 was applied to the stone surfaces as a protective coat.

**3. SRI VISHWANATH SWAMY TEMPLE  
SHUAPALLE, DISTRICT CUDDAPAH**

In continuation of previous year's work (2010-11, p.351), thick layers of microbiological growth along with dust, dirt and soot accretions on the exterior surface of the temple, were cleaned by chemical and mechanical methods. Fungicidal treatment, followed by protective coating was applied on the affected surface.

The cleaning of interior walls, pillars, ceiling and sculptures of *mandapa* was mainly focused on the removal of lime, iron stains, bat excreta, water marks, oil and greasy accretions from the stone surfaces using mild acetic acid, oxalic acid, neutral detergent and ammonia solution in water followed by thorough wash with water.

**4. SRI CHENNA KESAVA SWAMY TEMPLE,  
PUSHPAGIRI, DISTRICT CUDDAPAH**

The exterior façade of *Rajagopuram* of this temple made of shale along with the architectural members of slate and stucco was found to be damaged and disfigured by effects of the various soiling materials. It was taken up for chemical treatment during the period under review. The layers of dead microbiological growths along with dirt and dust were removed by mechanical cleaning. The stone sculptures were cleaned with (2-3%) solution of acetic acid in water, for the removal of lime and red ochre coats an oxalic acid (5%) solution in water was used for the elimination of iron stains. A coat of (2%) solution of sodium pentachlorophenate in aqueous medium was applied to the cleaned

and dried surfaces by brush as fungicidal treatment. Finally, a coat of Wacker's SMK 1311 in water was applied to the stucco surfaces and Wacker's B.S.290 diluted in M.T.O. solvent in the ration of 1:15 was applied to the stone surfaces by brush as water repellent treatment. .

**5. GOLKONDA FORT, DISTRICT HYDERABAD**

The *Khilwat* and other loose structures near *Rani Mahal* of the fort received comprehensive chemical treatment. The micro-vegetation growth was cleaned by mechanical treatment. The treated and dried surfaces were given a coat of (2%) sodium pentachlorophenate as fungicide in aqueous medium. Finally, the treated and dried surface was protected with Wacker's B.S.-290, diluted in mineral turpentine oil solvent in 1:15 ratio. The work has been completed.

A part from the above, the chemical treatment and preservation of some metallic objects of the fort consisting of canons, balls and gun made of wood and metal affected by the corrosion of metals was taken up. On cleaned and dried metal surface (2%) solution of PVA in toluene was applied as preservative coat. Insecticidal treatment was given to the wooden surface followed by application of wood preservative.

**6. ABDUL WAHAB KHAN'S TOMB, KURNOOL,  
DISTRICT KURNOOL**

The exterior walls of this stone monument were subjected to cleaning treatment for the removal of thick layers of micro-vegetation growth, rust patches and lime coat. The micro-vegetation growth was cleaned mechanically. All the treated and dried surfaces were given fungicidal treatment and preservative coating. Nearly, 92% work has been completed during

the period under review.

**7. KUNDALI SANGAMESWARA SWAMY TEMPLE  
ALAMPURE, DISTRICT MAHBOOBNAGAR.**

The preservation processes consisted mainly of surface cleaning and removing micro-vegetation growth, dirt, lime wash, red ochre, and soot and oil accretions from the sandstone outer and inner walls of the temple; applying fungicide and protective coating for long-term protection. The layers of micro-biological growth and other extraneous deposits were removed mechanically. The treated surfaces were given a coat of (2%) sodium pentachlorophenate in water as fungicide and finally a silicon-based water repellent material i.e. Wacker's B.S.-290 diluted in mineral turpentine oil in 1:12 ratio was applied to the exterior stone surfaces as a protective coat. The work is still in progress and during the period under review nearly 85% work has been completed.

**8. RAMAPPA TEMPLE, PALAMPET, DISTRICT  
WARANGAL**

The *gopuram*, *mandapa* and other structures of the temple have been taken up for conservation measures like surface cleaning, application of fungicides and protective coating for long term preservation. The monument is built of sandstone, granite, basalt and brick overlaid with lime plaster. The micro-vegetation growth was removed mechanically. The treated exterior surface was given a fumigicidal coat Wacker's SMK-1311 in water was applied to the stucco-surfaces and Wacker's B.S.-290 diluted in turpentine oil in the ratio 1:12 was applied to the stone surfaces as protective coats.

**ASSAM**

**9. RANG GHAR, JOYSAGAR, DISTRICT SIBSAGAR**

The exterior surface of this brick structured monument coated with lime plaster was found to be badly affected by a heavy growth of micro-vegetation, dust and dirt deposits and bird droppings. All these extraneous deposits were removed mechanically using a mixture of ammonia solution and non-ionic Teepol liquid detergents in water in low concentrations and dried surface was given fungicidal treatment with dilute aqueous solution of Santobrite followed by the surface application of two coats of silicon-based Wacker's B.S.-290 in mineral turpentine oil wet on wet to provide water repellency to the stucco surface.

**10. VISHNUDOL, JOYSAGAR, DISTRICT SIBSAGAR**

The exterior surface of this brick structure coated with stucco plaster, decorated with some stone sculptures was chemically cleaned and conserved during the period. A mild alkaline solution of ammonia in water was used for the eradication of microbiological growths from the plastered surface and a neutral solution of Teepol detergent was used for the removal of extraneous deposits of dust, dirt, soot and bird droppings. After the cleaning operation was over, the dried surface was subjected to fungicidal treatment with santobrite followed by water repellent treatment with Wacker's B.S.-290 diluted in M.T.O. (mineral turpentine oil) solvent in the ratio of 1:14.

**11. SIVDOL AND GHANSY HOUSE, JOYSAGAR,  
DISTRICT SIBSAGAR**

The external stucco surfaces of these two

brick structures were subjected to preservation treatments like surface cleaning, fungicidal and hydrophobic treatment and coating. The micro-biological growth, dust, dirt, bird's droppings and other surface accretions were removed by chemical-mechanical methods using a mixture of aqueous ammonia and Teepol detergent and gently brushing with the help of soft nylon brushes. On the completely dried surface, fungicidal treatment and preservative coating was applied.

### BIHAR

#### 12. VIKRAMSHILA MAHAVIHARA, ANTICHAH, DISTRICT BHAGALPUR

In continuation of previous year's (2010-11, p.352) work, the brick structured main Stupa and decorated plinth of the monument was taken up for scientific preservation measures like surface cleaning and applications of fungicide and protective coatings. The cleaning process involved removing the micro-biological growths, dirt, dust, birds' droppings and other extraneous materials from the surface by chemical and mechanical methods. On the dried surface of the brick substrate, fungicidal treatment was given using aqueous solution (5%) of Santobrite. The weak fragile and powdered surface of terracotta decoration at plinth area was consolidated with an ethyl silicate based stone strengthener, Wacker's-OH 100 and finally, completely dried surface was provided water repellency with silicon-based Wacker's B.S.-290 in mineral turpentine oil(1:14) in two coats wet-on-wet.

#### 13. MONASTERY COMPLEX 11, NALANDA, DISTRICT NALANDA

The brick structured Monastery Complex 11

was taken up for chemical conservation, such as, cleaning, consolidation, biocide and hydrophobic treatment. The layers of microbiological growths dirt dust, bird excreta etc. were removed by chemical and mechanical methods using a mixture of non-ionic liquid detergent and a weak alkaline ammonia solution. The cleaned surface was given to fungicidal treatment using (2%) aqueous sodium pentchlorohenate solution to arrest re-growth. The fragile and weak surfaces were consolidated with the help of an ethyl silicate based stone strengthener Wacker's OH-100. Finally, a silicon-based water repellent chemical Wacker's B.S.-290 diluted in mineral turpentine oil (1:14 ratio) in two coats wet-on-wet was applied to the cleaned and dried surfaces to protect the brick materials against future bio-deterioration.

### DELHI

#### 14. NAUBAT KHANA, RED FORT, DELHI

In continuation of previous year's (2010-11, p.356) work, the restoration of exposing the hidden paintings (i.e. removal of lime wash layers) and preservation of exposed paintings was continued during the period under review. The entire painted surface is covered with multiple layers of thick lime wash, dust, dirt, soot etc. with traces of layers of paintings underneath visible at some places. To expose the upper most layer of painting, thick coat of lime wash was removed skillfully using glacial acetic acid as well as by mechanical means without causing out damage to the original paintings. The cleaning of exposed painted surface was carried out with organic solvents using in judiciously surfaced proportions (tri-ethanol amine, 2- ethoxy

ethanol, acetone, ethyl alcohol etc.) with turpentine as restraining agent. Large and deep cracks and gaps in the painted plaster were filled with a re-touching paste containing lime putty, marble dust and water as needed. Bulged out areas were fixed by injecting lime based putty in liquid form. Filleting of broken edges was also made by a fine lime based retouching mortar. Colour integration of painting was kept minimal wherever required using earth colours. Finally, 1% P.V.A. solution in toluene was applied for preservation. The work is still in progress.

#### 15. SHAH BURJ, RED FORT, DELHI

In continuation of previous year's (2010-11, p.357), work, the entire sandstone and lime plastered surfaces of the monument affected badly by micro-vegetation growth along with layers of dust, dirt, soot, bird droppings and pollutants from vehicular traffic were cleaned and conserved. The cleaning of sandstone and stucco surfaces was carried out with a mixture of (3%) ammonia solution and (1%) non-ionic liquid detergent for the removal of soiling materials. The stucco surface was also treated with calcium hypochlorite solution in water for the effective removal of micro-biological growth. Clay Pack cleaning method was adopted to remove layers of sticky dirt and soot from marble surface using fuller's earth with suitable chemical additives. On the cleaned exterior surface aqueous sodium pentachlorophenate (2%) was applied as fungicide and finally preserved with a coat of silicon-based Wacker's B.S.-290 diluted in mineral turpentine oil to provide water repellency to the substrate surface.

#### 16. BHADON PAVILION, RED FORT, DELHI

In continuation to previous year's (2010-11,

p.356) work, the interior and exterior walls of this monument affected by thick layers of dirt, soot, bird droppings, cobwebs, etc. besides microbiological growth were uniformly cleaned and conserved.

The surface cleaning was carried out with a mixture of ammonia solution (3%) and non-ionic liquid detergent (2-5%) solution in water. Absorbent Clay Pack cleaning method was adopted to remove soot and sticky deposits from marble surface using a paste of fuller's earth charged with chemical additives in water. Finally, fungicidal treatment and preservative coatings were applied as usual.

#### 17. RAMPART WALL, RED FORT, DELHI

In continuation to previous year's (2010-11, p.357) work, the red sandstone wall (under Flag-Mast) facing *Chandni Chowk* was cleaned by removing all surface dirt, dust, soot, bird droppings, pollutants etc. besides, remnants of calcareous deposits and other encrustations in order to improve its aesthetic look. A mixture of aqueous solution of ammonia (3%) and non-ionic liquid detergent was used for general cleaning operations.

Calcareous deposits were removed mechanically using diluted acetic acid solution on affected areas only followed by thorough washing with plenty of water. The metal finials (9 nos.) received from Delhi Circle were cleaned and suitably retouched using golden powder in varnish. Two black stone figures of elephant at *Hathi Pole* (Gate) were cleaned and conserved. Cracks in the teeth were filled with lime based putty and araldite. Finally, the exterior surface of the elephant figures was colored suitably as needed.

The huge brass gate at entrance to the *Meena Bazar* was found to be covered in thick layers

of dust and dirt, soot, bird dropping etc. and the metal surface had darkened due to atmospheric corrosion effects. The lower part of brass gate was badly disfigured having red spots due to visitors spit. The treatment of the brass gate has been done by chemical cleaning with (3%-5%) alkaline solution of sodium potassium tartrate in distilled water, followed by the application of dilute solution of lacquer varnish in thinner as a preservative coat. The work was completed.

**18. QUWATUL-ISLAM MOSQUE, QUTB COMPLEX, NEW DELHI**

In continuation of previous years (2010-11, p.357) work, the chemical conservation work on the exterior portion of this monument was continued and completed. The chemical cleaning of stone surfaces was carried out. Exterior lime plastered surface was subjected to cleaning treatment using calcium hypochlorite solution in water for the elimination of biological growth. Iron stains from the stone surface were removed with oxalic acid followed by rinsing with distilled water. Clay pack washing method was adopted to remove deposits of sticky dirt, soot and atmospheric pollutants from the quartzite/lime stone surface using fuller's earth with suitable chemical additives. Besides, sodium pentachlorophenate (2%) mixed with distilled water was applied on exterior surface as fungicidal treatment and finally a preservative coating was given on the exterior lime plaster and stone surface.

**19. ILTUTMISH TOMB, QUTB COMPLEX, NEW DELHI**

The external and internal walls of this monument made up of sandstone/quartzite and

marble were taken up for scientific conservation measures which consisted mainly of surface cleaning and removing dust and dirt, soot and atmospheric pollutants from stone surfaces; removing biological growths, bird droppings; removing water soluble salts from stone surfaces; consolidating weakened stone surfaces; applying biocides and protective coatings. The chemical cleaning was carried out using a mixture of (2%-3%) ammonia solution and (1%-2%) non-ionic liquid detergent solution in water. Salt affected areas were treated with wet paper pulp poultice for the extraction of water soluble salts from stone substrates. Marble surface was cleaned with a water based pack of fuller's earth containing suitable chemical additives. Highly fragile and weakened areas were consolidated with an ethyl silicate based stone-strengthener, Wackers's OH-100. Fungicide sodium pentachlorophenate(2%) in distilled water was applied all over the surfaces except marble and finally a protective coating of Wacker's B.S.-290 diluted in MTO solution was applied in two coats wet on wet(1:11 ratio) on exterior quartzite and sandstone surfaces of the monument.

**20. POTI'S TOMB, HAUZ KHAS, NEW DELHI**

The scientific conservation and preservation work was taken up on the exterior façade of this monument, which is made up of sandstone, stucco plaster/mortar and quartzite. The entire façade was badly affected by deposition of dust and dirt, soot besides bird's excreta and other pollutants. The stucco surfaces and the lower walls of the monument were covered with enormous growth of micro-vegetations.

The chemical cleaning was carried out with a mixture of (2%-3%) ammonia solution and (1%-2%) non-ionic detergent solution in water for the removal of adherent dust, dirt, smoke and soot. Exterior lime plastered surface was to cleaning treatment using calcium hypochlorite solution in water for the removal of micro-biological growth. After cleaning, fungicidal and protective coatings were applied on the affected segments.

#### **21. DADI'S TOMB, HAUZ KHAS, NEW DELHI**

The scientific preservation work was taken up on the exterior part of this monument which is made up of lime plaster and quartzite. The entire surface was affected by dust, dirt and soot deposition, graffiti, bird droppings etc. besides micro-vegetation growth. The treatment of sandstone and stucco plaster surface was carried out with a mixture of (2%-3%) ammonia solution and (1%-2%) non-ionic detergent solution in distilled water for the removal of all these extraneous deposits.

Stucco surface was also treated with calcium hypochlorite solution in water for the elimination of micro-flora. After cleaning treatment (2%) fungicide sodium pentachlorophenate dissolved in distilled water was applied all over the exterior surface and finally double coat of Wacker's B.S.-290 diluted in mineral turpentine oil wet-on-wet (1:11 ratio) was applied as protective treatment.

#### **22. HIRA MAHAL, NEW DELHI**

The conservation intervention carried out on the stucco plaster, and stone surfaces of this monument affected by the extraneous depositions like dust, dirt, soot, bird excrement besides enormous growth of micro vegetations through scientific measures like

surface cleaning and removing extraneous deposits, biocide and hydrophobic treatment. The rusted iron grinders and other metallic strips supporting the sandstone slabs of the roof were stabilized with (3%) 1, 2, 3-benzotriazole solution in methylated spirit.

The cleaning of sandstone, marble and stucco surfaces was done following the customary process.

The absorbent clay pack cleaning method using water based packs of fuller's earth with chemical additives as needed was adopted to remove sticky dirt and sooty accretions from marble surface. The stucco plaster surface was treated with calcium hypochlorite treatment for the removal of micro-flora. After cleaning treatment, (2%) sodium pentachlorophenate in water was applied all over the surfaces except marble and finally double coat of a silicon-based Wacker's B.S.-290 diluted in mineral turpentine oil wet on wet (1:11 ratio) was applied on the treated and dried surfaces as protective treatment.

#### **23. THE LAL GUMBAD, MALVIYA NAGAR, NEW DELHI**

The conservation work was carried out on the lime plaster, sandstone, wooden portion, marble, and quartzite surfaces consisted on surface cleaning and application of fungicide and protective coating. The entire surface was affected by the extraneous depositions of dust, dirt, soot, smoke, graffiti, bird excrement and other pollutants. The exterior parts of this monument were covered with thick layers of micro-vegetation growth. The chemical treatment of sandstone, marble, quartzite and lime plaster surface was carried out, followed by fungicidal treatment and protective coating. The work is in progress.

**24. UNKNOWN TOMB, WAZIRPUR KA GUMBAD COMPLEX, R.K.PURAM, NEW DELHI**

The scientific conservation work carried out on the lime plaster and quartzite surfaces of the monument, by way of chemical and mechanical cleaning, fungicidal treatment and finally application of protective coatings. The sandstone and stucco surfaces were mechanically cleaned. Lime plastered surface was treated with bleaching powder to eliminate micro-flora. After cleaning, a coat of (2%) sodium pentachlorophenate dissolved in distilled water was applied all over the exterior surfaces and finally double coat of Wacker's-B.s.-290 diluted in mineral turpentine oil wet on wet(1:11 ratio) was applied to the treated and dried surfaces.

**GOA**

**25. ST. FRANCIES OF ASSISI CHURCH, OLD GOA**

A badly torn and damaged oil painting on canvas supported by wooden panels measuring 13ft x 11ft was adequately repaired and restored. The painting was cleaned of all surface dirt, accumulated dust, darkened varnish layer using organic solvents like diacetone alcohol, cello solve etc. with turpentine as restraining agent and after that fresh picture varnish was applied as protective coating. The restoration work also included in removal of thousand copper nails from the painting and fixing of canvas on wooden panel with wax and resin mixture flattened with hot spatula.

**26. SE CATHEDRAL CHURCH, OLD GOA**

Two paintings measuring 7ft x 4ft each in sacrament of Church affected heavily by salt deposits caused due to seepage of moisture

were cleaned and preserved with fresh picture varnish.

**GUJARAT**

**27. RUDRA BAI STEP WELL, ADALAJ, DISTRICT GANDHINAGAR**

The oblong stepped- well(*Baoli*) runs from south to north made of carved sandstone found badly affected by micro biological growth, dust, dirt, accretions of bat excreta, hand grime, seepage marks, etc. was taken up for conservation measures like cleaning, consolidation and hydrophobic treatment. In some areas the problem of pulverization of stone was also observed due to salt action. Micro-vegetation growth and other superficial accretions were removed by chemical and mechanical cleaning methods. The accretion of bat excreta was eliminated with ammonium bicarbonate and ammonium carbonate solution applied in a poultice of wet paper-pulp and carboxy-methyl cellulose followed by treatment with very dilute solutions of citric and oxalic acid. The weakened stones were consolidated with an ethyl silicate based stone-strengthener Wacker's OH-100. Fungicidal treatment with (2%) sodium pentachlorophenate in water to arrest re-growth of micro vegetation was also given. Finally, a silicon-based Wacker's BS-290 in mineral turpentine oil was applied on all treated and dried surfaces as hydrophobic treatment.

**28. EXCAVATED STRUCTURE, DHOLAVIRA, DISTRICT KACHCHH**

The southern and eastern part of the citadel walls and east gate found to be beset with problems of micro vegetation growth, dust,

dirt and salt depositions on the stone surfaces which were taken up for chemical conservation measures. Micro-vegetation growth along with layers of dust and dirt were removed by chemical and mechanical means using aqueous solution of (2%-3%) ammonia and (1%) non-ionic liquid detergent followed by brushing with soft nylon brushes. Extraction of water soluble salts from the stone surface was carried out by wet paper pulp method. After cleaning treatment, the dried stone surface was given biocide treatment using (2%) sodium pentachlorophenate solution in de-mineralized water. Finally, for long term protection, silicon-based water repellent, Wacker B.S.-290 in mineral turpentine oil was applied to the stone surfaces.

**29. JAIN TEMPLE, PAVAGARH, DISTRICT-PANCHMAHAL**

In continuation of previous year's (2010-11, p.362) work, from the group of four Jain temples, Adinath Temple was taken up for chemical treatment and preservation intervention during the period under review. This sandstone temple had several problems which included a heavy-micro-biological growth, depositions of dust, dirt, grime, oil bond distempers, thick layers of lime coats etc. on its external walls. At several places the stone surface was highly deteriorated due to weathering effects. Micro-vegetation growths and other superficial accretions were removed by chemical and mechanical cleaning methods. The thick and hard layers of lime coats and oil bond distempers from the carved stone surface were removed by chemical and mechanical means using (2%-3%) acetic acid solution in water. Fragile and pulverized stone

surface of Chandra Prabhu Temple was consolidated with ethyl silicate based Wacker's OH-100. Fungicidal and protective treatments were given on the exterior of the stone surface. The work is still in progress.

**HARYANA**

**30. SHEIKH CHILLI'S TOMB, THANESAR, DISTRICT KURUKSHETRA**

In continuation of previous year's (2010-11, p.363) work, the exterior portion of the monument comprising marble and sandstone was taken up for scientific conservation work during the period under review. The stone surface of the Tomb was covered with micro-vegetation growth, bird excreta, dust and dirt, soot etc besides, sticky touch yellowish layer accretions particularly on the marble surface of the dome. Removal of superficial accretions was carried out with a mixture of aqueous solutions of ammonia and non-ionic detergent. The hard tenacious layer of yellowish accretions was removed by adopting clay pack cleaning method using fuller's earth with suitable additives. The entire cleaned sandstone surface was given fungicidal treatment, followed by a protective treatment. The rough surface of marble was polished manually with a paste of lead oxide, tin oxide and oxalic acid in equal ratio with the help of polishing stones in order to retain the original luster of marble surface.

**31. BAOLI GHAUS ALI SHAH, FARRUKHNAGAR, DISTRICT GURGAON**

The monument is made up of brick, stone and lime plaster. The cleaning treatment was focused on the plastered surfaces of large octagonal *baoli*, circular gallery and tunnels

of the monument having affected by a heavy micro-vegetation growth, dust, dirt, soot deposition and bird dropping. The plastered surface was scrubbed clean of all extraneous deposits using aqueous solution of ammonia and non-ionic detergent with minimum intervention. The fungicidal treatment was given to clean and dried plastered surface of the monument exposed to weather. The work is still in progress.

### HIMACHAL PRADESH

#### **32. BUDDHIST MONASTERY, TABO, DISTRICT LAHAUL AND SPITI**

The restoration of paintings on the southern wall of the SerKhang Monastery was taken up with the help of surface cleaning, consolidation work and applying of protective coatings. The paintings executed in tempera technique on mud plaster ground were badly affected by the depositions and accretions of dirt, soot, oil, mud streaks, besides, development of wide and deep cracks in mud brick walls at some points. All the existing cracks and fissures were filled with a fine mortar and suitably coloured. The reinforcement of damaged painted plaster was carried out by edging the broken ends with a fine retouching paste of appropriate consistency. The wall paintings were cleaned of all surface accretions and deposits with the judicious use of mild organic solvents and turpentine as retraining agent. The colour integration of paintings was also undertaken with earth colours at some points as needed. Finally, protective treatment was done with P.V.A. resin solution (0.5%-1%) in toluene applied to the cleaned and treated painted

surface by paint brush. The work is in progress.

#### **33. SIVA TEMPLE, MANGARH, DISTRICT SIRMOUR**

The external walls and other exposed areas of the main temple and compound walls were covered with thick layers of atmospheric dust, dirt, bird droppings and microbiological growth while the interior areas were badly affected by the later application of coloured distempers in yellow, green and blue, containing soot, grease and oil accretions. A mixture of mild alkaline solution of ammonia and a neutral surface active agent solution in water was used for the removal of all these extraneous deposits from the exterior stone surfaces. The tough thick layers of distemper paints were removed mechanically by using aqueous solution of dilute acetic acid. Soot, smoke, grease and oily accretions from the interior stone surface were eliminated with the help of different organic solvents. After the surface cleaning, the weakened stones were consolidated with Wacker's OH-100 (an ethyl silicate based stone strengthener). Fungicidal treatment was done with the application of sodium pentachlorophenate solution (1-2%) in water and finally a coat of Wacker's B.S.-290 solutions in M.T.O. solvent was applied to the treated and dried stone surfaces by brush in order to impart water repellency.

#### **34. CHAMUNDA DEVI TEMPLE, CHAMBA, DISTRICT CHAMBA**

The ceiling of this temple, decorated with fine wood carving work of floral designs, was covered with thick layers of dirt, soot, grease oil accretions and paint at some places. The treatment of wood consisted of chemical cleaning with mild organic solvents followed

by the application of linseed oil diluted in turpentine as preservative coating. The micro-biological growth and other extraneous deposits from the stone surfaces of the compound wall and shrines were removed mechanically using a mild alkaline solution of ammonia and a non-ionic detergent solution in water. The thick layers of distemper paints from the external walls and pillars of the main shrine were removed by chemical and mechanical cleaning methods. The work also included consolidation of weakened stones having eroded surfaces with the stone strengthener Wacker's OH-100.

**35. RUINED FORT, KANGRA, DISTRICT KANGRA**

The main entrance gate and adjoining walls of the ruined fort were taken up for scientific preservation involving cleaning, consolidation, fungicidal and hydrophobic treatments. The work is still in progress.

**KARNATAKA**

**36. VIRUPAKSHA TEMPLE, DISTRICT HAMPI**

The cloistered *mandapa*, left-side terrace and sculptures were affected and disfigured by thick layers of lime coat, red ochre, dust and dirt and heavy microbiological growth, which were taken up for scientific conservation measures like surface cleaning, consolidation and application of fungicides and protective coating. The work is in progress.

**37. AKRESWRA TEMPLE, HALEALUR, DISTRICT CHAMRAJNAGAR**

It is built of granite stone and is famous for its sculptural depiction on the pillars of *nandi mandapa* and *navaranga*. The details of stone sculptures on external walls were covered in thick layers of micro-vegetation growth, dust

and dirt, birds dropping and other extraneous deposits. These harmful accretions were removed and fungicidal treatment was applied followed by protective coatings. The work has been completed.

**38. AMRITESWARA TEMPLE, AMRITHAPURA, DISTRICT CHICKMAGALUR**

Amriteswara Temple consists of a sanctum sanctorum, *sukanasi*, *navaranga* and *mukha mandapa*, is constructed of chlorite schist stone. The exterior part of the temple was affected with thick micro biological growth, bird dropping and its interior was badly affected with dust, dirt and oily accretions. For the removal of these surface accretions, a solution of neutral liquid detergent solution and ammonia solution in water in 1:3 ratios was used. After removing the harmful accretions completely, the area was washed with plenty of clean water. On exterior portions like compound wall, outer walls, *vimana*, a (2%) sodium pentachlorophenate solution was applied as fungicide. Finally Wacker's SMK-1311 diluted with water in 1:12 ratio was applied in two coats (wet on wet basis) as protective treatment. The work is in progress.

**39. LAKSHMI DEVI TEMPLE, DODDAGADDAVALLI, DISTRICT HASSAN**

Lakshmi Devi Temple is built of schist stone and consists of 4 cells; all surrounded by the stone towers and Hoysala crests. The *vimanas*, compound wall, entrance, *mandapa* of this temple were covered in thick layers of dust, dirt, bird droppings and micro biological growth. Interior sculptures, walls and ceiling were covered with dust, dirt, oily and sooty accretions. The stone surface was cleaned followed by fungicidal treatment and

preservative coatings. The work is in progress.

**40. SOMESWARA TEMPLE, KOLAR, DISTRICT KOLAR**

The exterior walls of the temple covered in thick layers of dirt, old lime wash, red ochre, calcareous accretions, bird droppings, micro biological growth have been cleaned and conserved. The granite stone surface has mechanically cleaned with a mild alkaline solution of ammonia and a neutral detergent solution in water followed by the surface application of sodium pentachlorophenate (2%) solution in water to prevent re-invasion of micro-flora. The extraneous deposits of lime, red ochre and calcareous materials were eliminated by chemical and mechanical cleaning methods, using dilute acetic acid solution followed by washing with plenty of water. Finally, Wacker's SMK-1311, diluted in water in the ratio of 1:2 was applied wet on wet to the treated and dried exterior stone surfaces. The carved pillars and ceiling in the interior affected by the lime wash, soot and oily accretions have been cleaned and conserved.

**41. CHELUVA NARAYANA SWAMY TEMPLE, (RANGANAYAKI SHRINE) MELUKOTE, DISTRICT MANDYA**

The interior walls, pillars and ceiling of the shrine were found covered in thick layers of dirt, lime-wash coating, coloured distemper paintings and soot and oil accretions. The general cleaning of granite surfaces was done with mild ammonia solution and a neutral detergent solution in water. The limy and calcareous accretions were removed mechanically using acetic acid solution (0.5%-1%) in water. For the efficient removal of oil

and soot accretions from fine stone carvings particularly on the pillars, the absorbent clay pack cleaning method using fuller's earth with suitable chemical additives was employed with good results.

**42. SRIKANTESHWARA TEMPLE, NANJANGUD, DISTRICT MYSORE**

In continuation of previous year's (2010-11, p.366) work, the internal walls, pillars, ceiling and sculpture of the big temple built of granite blocks were taken up of for the surface cleaning and removal of dust, dirt, soot and oily accretions using neutral detergent solution and mild ammonia solution. The intricately carved surfaces were cleaned with water based packs of an absorbent clay i.e. fuller's earth. The work is still in progress.

**43. MAHADEVA TEMPLE (INTERIOR) ITAGI, DISTRICT KOPPAL**

Removal of lime from the interior surface of the temple has been carried out, besides, chemical cleaning of the same by using liquid ammonia and non - ionic detergent was completed.

**44. DODDA BASAPPA TEMPLE (EXTERIOR), DAMBAL, DISTRICT GADAG (DHARWAR)**

Removal of dust and dirt from the exterior surfaces of *garbhagriha*, *sabhamandapa* and *mukhamandapa* of the temple, followed by chemical cleaning of the same by using liquid ammonia and non - ionic detergent was completed.

**KERALA**

**45. PARASURAMA TEMPLE, THIRUVALLAM, DISTRICT THIRUVANANTHAPURAM**

In continuation of previous year's (2010-11, p.369) work, the chemical preservation

activities were carried out on north and west side granite compound wall. These walls were covered with thick a coat of lime, moss, dust etc. The thick and hard lime coat from the surface of these walls was removed by using 5% solution of acetic acid followed by neutralisation with ammonia solution. Moss, dust and dirty accretion were removed mechanically by using soft brushes followed by chemical cleaning with ammonia and non-ionic detergent in 3:1 ratio. Afterwards 2% solution of sodium penta chlorophenate solution was applied as fungicide on cleaned areas. Finally Wacker SMK1311 was applied as preservative in 1:14 ratio with water on the surface of granite walls. The work was completed (Pls.132-133).

**46. MATTANCHERRY PALACE, MATTANCHERRY, DISTRICT ERNAKULAM**

The paintings in all galleries were blackish in appearance due to thick deposition of dust, dirt and also due to the presence of old preservative coat. The dust and dirt accretion with the help of moisture formed a thin dark layer on the surface of murals and cause deterioration of paintings. In the underground gallery due to water ingress plaster loses its binding property and falling away and salt efflorescence is also noticed. Following scientific preservation work was carried out:

- (1) Removal of old preservative coat PVA by using Toluene (Sulphur free);
- (2) Removal of dust and dirt accretion, from the surface of murals by using various organic solvents such as 2-ethoxy ethanol, diacetone alcohol, triethanolamine etc;
- (3) Wiping of the cleaned area by Turpentine oil, which acts as a restrainer including colour

re-integration done on the surface of murals on flaked off portions;

- (4) Fixing, filleting and consolidation work done on the fragile and bulged portions especially on the panel *Siva* meeting *Mohini*;
- (5) 1% solution of PVA in Toluene is applied as preservative coat. This Work is completed; (Pls.134-135).

**47. PALAKKAD FORT, PALAKKAD, DISTRICT PALAKKAD**

The chemical treatment has been done on the north-eastern corner of first bastion, wall in between north-east corner and the second bastion, two side's adjacent wall of the temple, inner wall on south and west sides etc. The following works were carried out: (1) Removal of moss and dust accretion mechanically using soft brushes; (2) Scientific cleaning of the portions with liquid ammonia and non-ionic detergent in 3:1 ratio; (3) Applying 2% solution of sodium pentachloro phenate as fungicide on cleaned areas; (4) Finally applying of Wacker SMK1311 as preservative in 1:14 ratio with water (Pl.136).

**48. SIVA TEMPLE, CHEMMANTHITTA, DISTRICT THRISSUR**

The following methods were adopted during the scientific preservation work of paintings: - (1) Accretion like dust dirt, soot and oily accretion and old preservative coat from the surface of murals were removed by using organic solvents like toluene, tri ethanol amine, diacetone Alcohol, 2-ethoxy ethanol etc. (2) Wiped off the cleaned area of paintings with turpentine oil

(3) The lacunae were filled with traditional lime plaster and colour matched with the surrounding area and reintegration was done wherever necessary.

(4) A preservative coat of 2% solution of PVA in toluene was given finally. Chemical conservation on the wooden ceilings, beams, pillars and wooden carvings of *namaskara mandapa* were done.

To remove the thick layer of soot and oily accretion from wood, organic solvents like methanol, ethanol, triethanol amine, toluene, di acetone alcohol etc. were used. Chemical conservation of the granite plinths of the main shrine, *namaskara mandapa* and *chuttambalam* were done using ammonia-non-ionic detergent (3:1) solution. Wacker SMK 1311 has been applied as preservative (1:14 in water). The micro vegetation growth on the laterite compound wall was removed with a solution of teepol-ammonia in the ratio 1:3 and washed thoroughly with water. 3% solution of sodium penta chlorophenate is applied as fungicide and the dried area is preserved with Wacker BS 290 (Pls.137-138).

## MADHYA PRADESH

### 49. GROUP OF TEMPLES, KHAJURAHO, DISTRICT CHHATARPUR

The scientific cleaning and preservation work was taken up for Chitragupta Temple, Matangeshwar Temple and a small shrine between Kandariya and Jagdambi Temple along with platform wall. Deposition of dried microbiological growth as well as other surface accretions was removed scientifically with the help of eco-friendly and non-residual mild chemicals. After cleaning, biocide treatment was given in order to check further

growth of micro-organisms. Finally, hydrophobic treatment to the cleaned and dried surface was given so as to develop water repellency to the surface of monument. The work is in progress.

### 50. BEER SINGH DEO PALACE, DISTRICT DATIA

There are total 8 big and 8 small *chattries* on the 5<sup>th</sup> floor which are the main attraction of the Palace of 18<sup>th</sup> century AD. The domes of *chattries* are lime plastered and the lower portions are made up of stone. Both lime plaster surface and stone portions suffered serious damage due to thick biological growth, which has been removing since 2010-11. The stone surface has been cleaned mechanically. After cleaning; the surface was given biocide treatment and finally hydrophobic treatment in order to impart water repellency.

### 51. BAJ BHADUR PALACE, MANDU, DISTRICT DHAR

The exterior façade of the monument was covered with thick depositions of dust, dirt, dried and active microbiological growth. The lime plastered portion of the monument also suffered damaged with pale black appearance due to the deposition of accretions. Scientific cleaning has been carried out (2010-11, p.371) to remove these harmful accruals from the surface of the monument. Bleaching powder slurry was used for the cleaning of the plastered surface.

Biocide treatment was given to check further growth of micro organisms. Finally, hydrophobic treatment was given to prevent the monument from the effect of water. The work is in progress.



A



B

*Thiruvallam: Parasurama Temple, A, before and B, after chemical preservation of stone sculpture*

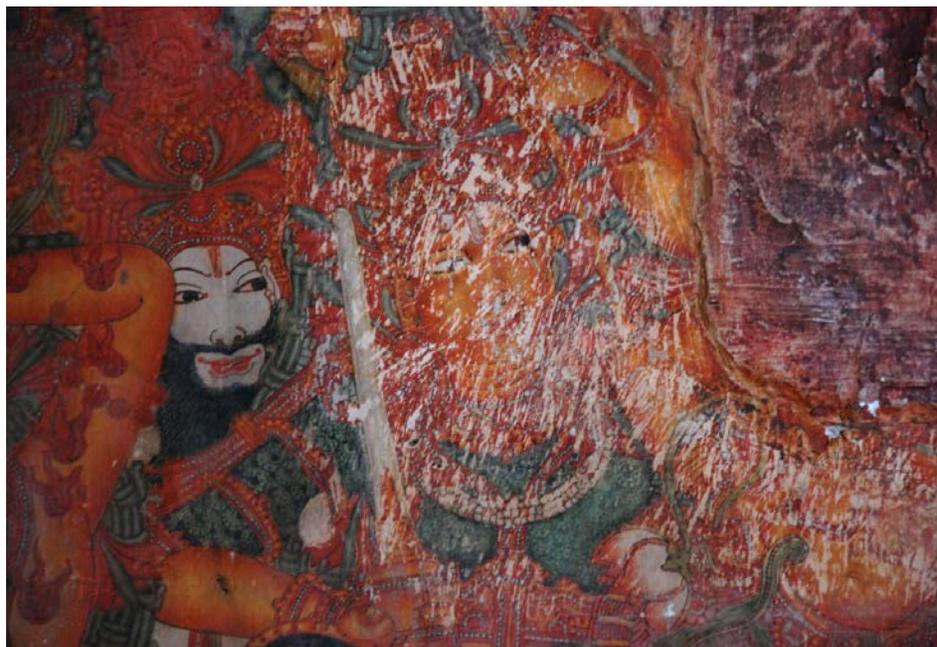


A



B

*Thiruvallam: Parasurama Temple, A, before and B, after chemical preservation*



A

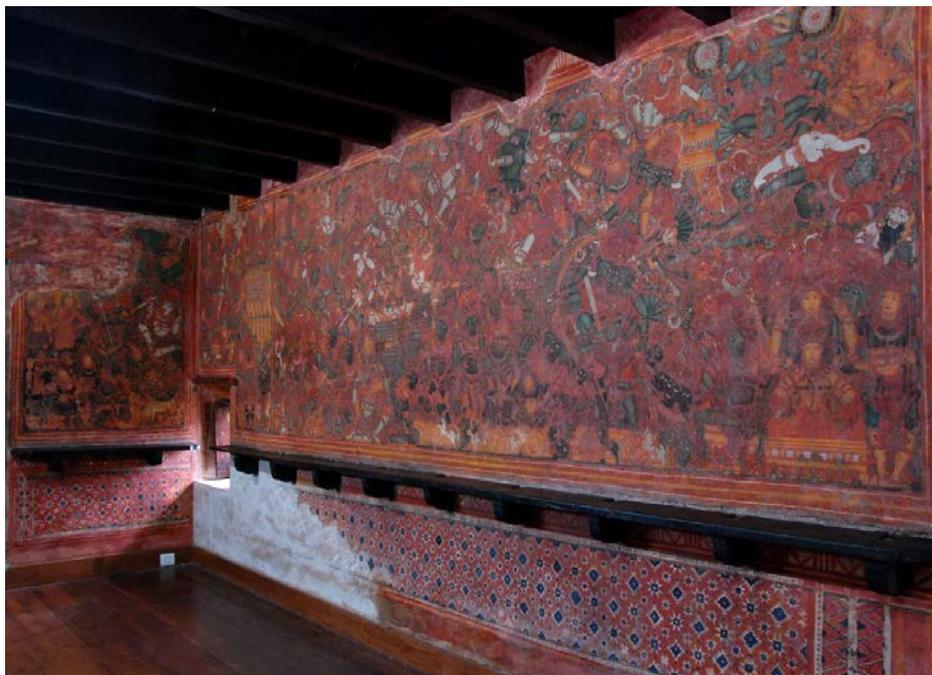


B

*Ernakulam: Mattancherry Palace, Mural painting, A, before and B, after chemical preservation*



A



B

*Ernakulam: Mattancherry Palace, Ramayana Gallery, A, before and B, after chemical preservation*



A



B

*Bastion, Palakkad Fort: A, before and B, after chemical preservation*



A



B

*Chemmanthitta: Siva Temple, Prakara, A, before and B, after chemical preservation*



A



B

*Chemmanthitta: Siva Temple, Mural painting, A, before and B, after chemical preservation*

**52. TOMB, NORTH OF DARIYA KHAN TOMB, MANDU, DISTRICT DHAR**

This tomb is situated to the north of Dariya Khan Tomb no.1 and is also known as Tomb no.2. There is one big and 4 small domes on the top and the walls are made of lime stone. The exterior walls of the monument were covered with thick deposition of dust, dirt and dried micro biological growth. Scientific cleaning has been done ((2010-11, p.372) to make the surface free from such accretions. Filleting work was done on the damaged bordered line of remnants of lime plaster patches to prevent the loss. Biocide treatment was given to the clean and dry surface to sustain biological action. Finally, hydrophobic treatment was given using Wacker's B.S.-290 diluted in mineral turpentine oil to impart water repellent to the stone surface.

**53. ROCK CUT BHARMANICAL TEMPLE, DHARMARAJESHWAR, DHAMNAR, DISTRICT MANDSAUR**

The shrine known as Dharmanath Temple (Dharmarajeshwar) is entirely cut out of the rock. Some sculptures are also carved in the temple in which the prominent ones are *Bhairava avatar* of *Vishnu*. Exterior surface of the structure is having beautiful carvings and is covered with the deposition of dried microbiological accretions including dust and dirt. Scientific cleaning was carried out to make the surface free from accretion like dust, dirt and micro biological growth. Care was taken to preserve the remnants of plaster layers. The cleaned and dry surface was given biocide treatment and consolidation treatment was carried out with Wacker's OH-100, in order to restore cohesion to the deteriorated stone. Finally, a coating of Wacker's B.S.-290

diluted in mineral turpentine oil was applied to impart water repellency to the stone surface.

**MAHARASHTRA**

**54. AJANTA CAVES, DISTRICT AURANGABAD**

The details of the steps taken(IAR 2010-11, p.373) in the scientific conservation and preservation of mural paintings and sculptures at Ajanta Caves may be summarized as follows:(i)General cleaning and removing of accumulated dust and dirt from the painted surfaces with soft feather brushes, paint and hog hair brushes on a regular basis.(ii)Spraying of 2% pyrethrum extract solution in kerosene or M.T.O. solvent fortnightly in unpainted areas or as needed in the caves in order to control insect activities.(iii)Cleaning and removing of the layers of old darkened and yellowed varnishes, P.V.A., soot and oily accretions from the painted surfaces in caves 2,7,9,11,16 and 19 with the judicious use of organic solvents like toluene, di-butyl phthalate and acetone with turpentine as restraining solvent.(iv)Fixing of pigments especially white pigments found in danger of falling off was done with synthetic resin adhesives and finally a coat of P.V.A.(0.5%) solution in toluene was applied to the cleaned and well-dried painted surface with soft hair brushes, as a protective treatment. (v)Strengthening and reinforcement of painted plaster, wherever, found in danger of becoming detached from the rock wall support in caves 1,6,11,17 and 26 was carried out with a mixture of calcium caseinate and an additive. A lime based mending paste containing traditional lime, marble powder, shell powder and water as

need was used to repair cracks and gaps in the paintings. A fine retouching paste with similar composition was used for filleting the damaged and broken ends of the painted plaster.(vi)The rock-cut sculptures in Caves 9, 10 and 26 were washed clean of all surface dirt, dust and other extraneous deposits using a mild alkaline solution or a neutral detergent solution as the situation required.

After the surface cleaning, the weakened stone of the sculptures was consolidated with Wacker's OH-100. The work also included filling and mending of large and deep cracks in the sculpture with a mortar mixture of fine stone powder and epoxy resin and its hardener and steel rods were used for reinforcement.

(vii)The exterior facades of caves 4,14 and 19 have been subjected to conservation processes like surface cleaning and removing microbiological growth, bat excrement, mud-streaks etc; consolidating the weakened stones as needed; applying fungicide and protective coating by chemical or mechanical means as the situation required.

(viii)Monitoring and assessment of climatic conditions inside and outside of the Caves using thermo-hygrographs on a continuous basis and a satellite link automatic weather station.

**55. CHANGDEO TEMPLE, MUKTAI NAGAR, DISTRICT JALGAON**

In continuation of previous year's (2010-11, p.375) work, some of stone sculptures on the exterior west and north side walls of temple were cleaned and consolidated. After the surface cleaning and removing all the unwanted accretions from the sculptural stone, consolidation treatment was done with Wacker's OH-100, in order to improve

cohesive strength. The work also consisted of filling of cracks and mending of exfoliated areas with a mixture of powdered rock and Wacker's OH-100 adhesive. The work is in progress.

**56. TRAIMBAKESHWAR TEMPLE, TIMBAKESHWAR, DISTRICT NASIK**

The preliminary work to start the actual conservation work on this monument was completed during the period under report. The scope of the work to be carried out consists of surface cleaning and removal of thick layers of dirt, dust, bird dropping and microbiological growths from the exterior stone surfaces; application of fungicide and protective coating.

**57. BIBI-KA-MAQBARA, AURANGABAD, DISTRICT AURANGABAD**

The exterior marble and stucco plastered surfaces of main mausoleum and minarets facing west were cleaned and conserved by employing scientific conservation methods.

Calcium hypochlorite solution in water was sprayed on the affected stucco surfaces to eliminate micro-organisms. After surface cleaning, fungicidal treatment was done with (2%) aqueous solution of sodium pentachlorophenate followed by protective treatment with Wacker's B.s.-290, diluted in M.T.O. solvent.

**58. PATALESHWAR CAVES, DISTRICT HEADQUARTERS, PUNE**

The external parts of rock-cut shrines and *nandimandapa* covered in layers of dirt, dust, pollutants, soot, bird droppings and microbiological growths were cleaned and conserved by employing scientific conservation methods. All these extraneous

deposits and growths were eliminated mechanically. The white encrustations on the stone surfaces caused by calcareous deposits were eliminated mechanically using a solution of (1%) acetic acid in water. Fungicidal treatment was done with (2%) sodium pentachlorophenate solution in water followed by application of Wacker's B.S.-290 diluted in M.T.O. solvent in the ratio of 1:13 on the treated and dried stone surfaces to impart water repellency. The oily and sooty accretions in the interior were removed by chemical and mechanical cleaning methods using a mixture of ammonia solution and a little of tri-ethanol amine in water. The work has been completed.

**59. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD**

The rock-cut façade and courtyard walls of the cave no.11 affected by the growth of micro-organisms such as moss, lichen and algae and extraneous deposits of dirt, dust, soot and bird droppings on the rock surfaces have been cleaned and conserved. The cleaning treatment of basaltic stones has been carried out (2010-11, p.374) with a mixture of dilute ammonia solution and non-ionic liquid detergent in water followed by the application of (2%) sodium pentachlorophenate solution in water to prevent reoccurrence of microbiological growth on exterior surfaces. Finally, a coat of Wacker's B.S.-290 diluted in M.T.O. solvent in the ratio of 1:13 was applied to the treated and dried stone surfaces with paint brushes to impart water repellency. At cave 16, deep and wide cracks observed in rock-cut figures of elephants in a row were filled with a mending mortar paste composed of powdered stone and epoxy resin adhesive.

At cave 12, the rock-cut figures of Buddha and Boddhisattava (on side wall) in the main shrine on the ground floor had developed deep and multiple cracks which were also mended and retouched using the same mortar paste. The strengthening measure also included consolidation treatment of the basaltic stone wherever required with Wacker's OH-100 to prevent crumbling.

**ODISHA**

**60. MEGHESWAR TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

The exterior surface of the temple along with its *Jagmohana* affected and disfigured by the growth of micro-vegetation, dust and dirt deposits etc. was taken up for conservation measures like surface cleaning, consolidation, fungicidal treatment and applying protective coatings for long-terms protection.

**61. BAKRESWAR TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

The temple, a sandstone structure, consists of a *Vimana* and *Jagmohan* was found covered in thick layers of dust, dirt, soot, bird droppings and micro-biological growth. The conservation treatment of stone surfaces by the both chemical and mechanical cleaning were carried out. The affected areas were preserved with fungicidal treatment followed by preservative coating.

**62. KHANDAGIRI AND UDAYAGIRI CAVES, BHUBANESWAR, DISTRICT KHURDA**

The rock-cut caves affected by the growth of micro biological agents, accumulated dirt and dust, bird droppings etc. were taken up for chemical conservation measures like surface cleaning, preventive fungicidal and

hydrophobic treatment. The work also included filling and mending of holes, cavities caused due to the fixing of iron nails, with a mending mortar containing stone dust and Wacker's OH-100 adhesive.

**63. EXCAVATED BUDDHIST SITE, LALITGIRI, DISTRICT CUTTACK**

The exposed parts of the monastery, comprising brick and stone structure were cleaned and conserved. The micro-vegetation growth was eradicated by using a mixture of (2%) liquid ammonia solution and non-ionic liquid detergent (1%) and encrusted dirt, dust etc. were removed by chemical and mechanical cleaning methods using non-ionic liquid detergent. Fungicidal treatment was given by spraying 2% aqueous sodium pentachlorophenate solution and finally, two coats of a silicone based Wacker's B.S.-290(wet-on-wet) diluted in mineral turpentine oil solvent in 1:16 ratio were applied to the cleaned and dried stone/brick surfaces as a protective coat.

**64. LORD JAGANNATH TEMPLE, PURI, DISTRICT PURI**

The *Ratna Singhasan* inside the *garbhagriha* and interior walls of the shrine were taken up for cleaning focusing mainly on the removal of accumulated dirt, dust, soot, oil stains and greasy accretions from their granite and khondalite stone surfaces. All the extraneous deposits including the ugly white patches were removed by chemical and mechanical cleaning methods. The silver sheet over the wooden doors at the entrance of *garbhagriha* had become tarnished and it is treated with a mixture of citric and tartaric acids in a ratio of 1:1 in water followed by polishing with brasso. Similarly, the brass sheet over the

wooden doors affected by corrosion were suitably cleaned and polished. The work is in progress.

**65. LORD LINGARAJ TEMPLE, BHUBANESWAR, DISTRICT KHURDA**

The brass sheets over the three wooden doors affected due to the atmospheric corrosion, accumulated dirt and dust etc. were taken up for chemical treatment with a mixture of citric and tartaric acids in a ratio of 1:1 in water followed by polishing with brasso. The work is in progress.

**PUNJAB**

**66. DAKHNI SARAI, DAKHNI, DISTRICT JALANDHAR**

The exterior surface of the monument was found covered in thick layers of microbiological growth, dirt, dust, soot, bird droppings etc. The treatment of lime plastered surface has been done by mechanical cleaning with a mixture of ammonia solution and non-ionic liquid detergent in water in suitable proportion as needed to eradicate the microbiological growth and other extraneous deposits. The work is in progress.

**67. RAM BAGH GATE, AMRITSAR, DISTRICT AMRITSAR**

In continuation of previous year's (2010-11, p.382) work, the plastered and stone surfaces of the monument were washed clean of all surface dirt, dust, soot, bird droppings and micro-biological growth by chemical or mechanical means as the situation required. The much weakened stone blocks of the *Baradari* were consolidated with Wacker's OH-100, a stone strengthener. The treated and dried stone surface was given fungicidal

treatment with aqueous (2%) sodium pentachlorophenate followed by water repellent treatment with Wacker's B.S.-290.

## RAJASTHAN

### 68. TOMB OF ABDULLAH KHAN AND HIS WIFE, AJMER, DISTRICT AJMER

In continuation of previous year's (2010-11, p.382) work, conservation treatment of the monument like, surface cleaning, consolidation and application of fungicide and protective coating was carried out. The exterior stone surface of the tank was scrubbed clean of all extraneous deposits and microbiological growth using a mixture of ammonia solution and non-ionic liquid detergent in suitable concentrations as needed. The sticky and sooty accretions from the stones of ceiling and *chhajjas* were eliminated using citric acid and sodium bicarbonate solution in water. After the cleaning, consolidation treatment of the weakened stones was done with Wacker's OH-100. The cleaned and dried stone surface was then treated with aqueous solution of (2%) sodium pentachlorophenate s fungicide followed by the application of a protective coat of Wacker's B.S.-290 diluted in M.T.O. solvent by brush. The marble tomb of Abdullah Khan's wife was also washed clean of all surface dirt, dust, soot etc. by employing absorbent clay pack cleaning technique.

### 69. JAWAHAR BURJ OF BHARATPUR FORT, BHARATPUR, DISTRICT BHARATPUR

All the four pavilions of the *Burj* having affected by the disfiguring and damaging effects of micro biological growth, encrusted dirt, lime-wash and graffiti were taken up for scientific conservation measures. During the

period, cleaning of slopped brick walls was carried out by adopting chemical and mechanical method using a mixture of dilute ammonia solution and non-ionic liquid detergent solution in water. The work is in progress.

### 70. MAHAKAL TEMPLE AND MANDAKINI TANK, BIJOLIA, DISTRICT BHILWARA

The exterior walls of the Mandakini *Kund* covered in thick layers of micro biological growth, bird droppings, dust and dirt etc. were taken up for scientific conservation measures. The treatment of stucco plastered surface has been mechanically cleaned. The consolidation treatment of the weakened stucco plaster layer was done with Wacker's OH-100. Finally, a coat of Wacker's B.S.-290, suitably diluted in M.T.O. solvent was applied to the entire cleaned and dried stucco plaster surfaces by paint brushes. The work is still in progress.

### 71. THE KUMBHA PALACE, CHITTAURGARH FORT, DISTRICT CHITTAURGARH

In continuation of previous year's (2010-11, p.382-383) work, the stone surfaces of *Panna Mahal* and *Padmini Mahal* were cleaned and conserved by chemical and mechanical methods. The exterior southern and north-western walls and stable portion of these two stone structures were scrubbed clean of all micro biological growths, bird droppings, encrusted dirt and dust etc. using a mixture of diluted ammonia solution and non-ionic detergent solution in water followed by spraying of (2%) aqueous solution of sodium pentachlorophenate as fungicide. After the surface cleaning of stone, consolidation treatment was done with Wacker's OH-100 to improve consistent strength. Finally, a coat of Wacker's B.s.-290, suitably diluted in M.T.O.

solvent, was applied to the entire cleaned and dried stone surfaces by brush.

**72. KALIKA MATA TEMPLE CHITTAURGARH FORT, DISTRICT CHITTAURGARH**

The interior surface of the monument affected badly by the extraneous deposits of dirt, dust, soot and oily substances besides lime was subjected to chemical and mechanical cleaning and consolidation treatment. Absorbent Clay Pack cleaning technique using fuller's earth with some chemical additives was adopted for the removal of sticky dirt, soot and oily substance from the stone surfaces. The thick layers of lime were removed mechanically using diluted acetic acid solution in water followed by treatment with mild alkaline solution to neutralize the effect of acid, if any. After the surface cleaning of stone, consolidation treatment was done with Wacker's OH-100 wherever needed to prevent crumbling.

**TAMILNADU**

**73. GROUP OF TEMPLES AND CAVES, MAHABALIPURAM, DISTRICT KANCHIPURAM**

In continuation of previous year's (2010-11, p.387) work, Mahabalipuram Group of Monuments comprising rock-cut caves, built structures, bas relief panels and monolithic free standing temples were taken up for chemical conservation during the period under review. The treatment of stone sculptural and structural surfaces consisted of mechanical cleaning with a mixture of ammonia solution and non-ionic detergent solution in water in a ratio of 3:1 followed by the application of aqueous sodium pentachlorophenate(2%) in distilled water by spray in order to arrest the growth of micro flora. Finally, a coat of

Wacker's SMK-1311(a silicone resin) diluted in water in a ratio of 1:14 was applied to the cleaned and dried stone surfaces by brush to provide water repellency. The interior portions have also been treated.

**74. SRI UTTAMANATHA SWAMY TEMPLE, KEERANPUR AND AGASTISVARA TEMPLE, VELLANUR, DISTRICT PUDUKOTTAI**

The (entrance) *Gopuram* of the temple affected by heavy microbiological growth, bird droppings, encrusted dirt and dust was taken up for scientific conservation measures, like surface cleaning, application of fungicide and a protective coating. The materials employed for cleaning process were ammonia solution and non-ionic liquid detergent in a ratio of 3:1 in water. For the control of microbiological growth, the fungicide used was sodium pentachlorophenatae (2%) in water applied superficially with a sprayer. For imparting water repellency to the substrate material Wacker's SMK-1311(a silicone resin) in water in a ratio of 1:14 was applied to the cleaned and dried surfaces with a brush. The interior portions of all sub-shrines and the main shrine covered in thick layers of accumulated dirt, soot and oily accretions have also been cleaned and conserved. The treatment of sculptural and structural stone surfaces in the interior has been done by mechanical cleaning with a mixture of ammonium carbonate and ammonium bicarbonate (5%) in water.

**75. NARASIMHA SWAMY TEMPLE AND RANGANATHAN SWAMY TEMPLE, DISTRICT NAMAKKAL**

The ceilings of these two stone temples and interiors of their all sub-shrines affected with accumulated dirt, soot, oily accretions and

graffiti have been cleaned and conserved. Absorbent Clay pack cleaning technique using a pack of fuller's earth charged with chemical additives like ammonium carbonate and ammonium bicarbonate (5%) solution in water was employed for the removal of these extraneous deposits from the granite stone surfaces. This was followed by the mechanical cleaning. Finally, the stone surfaces were washed with water.

**76. MUNKUDIMISVARA TEMPLE, P.V. KALATHUR, DISTRICT KANCHIPURAM**

The exterior surfaces of main *Vimana* and Amman shrine of this temple, coated with stucco plaster of varying thickness were found covered with thick layers of dirt, dust, bird droppings with micro biological growth. The methods and materials employed in the conservation of stucco consisted of surface cleaning and removing all such extraneous deposits by chemical and mechanical cleaning with a mixture of ammonia solution and non-ionic detergent solution in water (3:1); fungicidal treatment with (2%) solution of sodium pentachlorophenate in water; and finally protective treatment with Wacker's B.s.-290 in M.T.O. solvent in a ration of 1:14. In the interior of Amman shrine, the *prakara* walls have been scrubbed clean of all extraneous deposits of lime wash coats and red ochre with acetic acid (5%) solution in water followed by treating the surface with ammonia solution and neutral non ionic detergent solution. The work is in progress.

**77. SRI BRIHADESHWARA TEMPLE, DISTRICT THANJAVUR**

The main *Vimana*, *Keralanthaga*, *Gopuram* and other smaller *Vimanas* of this great temple

affected by microbiological growth, bird droppings, dust, dirt and soot etc. have been taken up for scientific conservation measures. The exterior surfaces of some of these structures have been subjected to mechanical and chemical cleaning, using a mixture of ammonia solution and non-ionic liquid detergent solution (3:1) in water, followed by the application of sodium pentachlorophenate solution (2%) in water as fungicide. Finally, as protective treatment a coat of Wacker's SMK-1311, diluted in water in a ratio of 1:14 was applied to the treated and dried surfaces with a brush. The wall paintings around *Siva* and Amman shrines also received conservation treatment which included surface cleaning, consolidation, strengthening and application of a protective coat with P.V.A. solution (1%) in toluene. The work is in progress.

**78. SRI VARADARAJA PERUMAL TEMPLE, THIRUBHUVANAI, DISTRICT PUDHUCHERRY**

The exterior surfaces of *vimanas* of main shrine and sub-shrines have been cleaned and conserved by adopting mechanical or chemical methods as the situation required. The treatment of stucco surfaces has mechanically been cleaned for the removal of microbiological growth and other extraneous deposits. The cleaned and dried stucco surface was given protective treatment with Wacker's B.s.-290 diluted in M.T.O. solvent in a ratio of 1:14 to impart water repellency. The treatment of stone surface was done with Wacker's SMK-1311 diluted in water in a ratio 1:14 as protective measure. In the interior carved pillars and sculptures were cleaned using a mixture of (5%) ammonium bicarbonate and ammonium carbonate solution in water

followed by cleaning with ammonia solution and non-ionic liquid detergent. The work has been completed.

**79. GROUP OF TEMPLES AT KANCHIPURAM, DISTRICT KANCHIPURAM**

In continuation of previous year's (2010-11, p.387) work, the exterior surfaces of these temples covered with thick layers of dirt, dust, soot, bird droppings and microbiological growth have been cleaned and conserved. The conservation treatment to the substrate materials of these temples (granite, sandstone, stucco) has been done with a mixture of ammonia solution and non-ionic liquid detergent solution in water (3:1), consolidation treatment to the weakened sandstones with Wacker's OH-100; fungicidal treatment with (2%) sodium pentachlorophenate solution in water and finally protective treatment with Wacker's SMK-1311 diluted in water in the ratio of 1:14.

**80. SHORE TEMPLE. MAHABALIPURAM, DISTRICT KANCHIPURAM**

As a preventive measure, the process of removing water soluble salts from the infested areas of granite walls through wet paper pulp poultice technique continued on a regular basis. After the surface cleaning of stone, fungicidal treatment was done with sodium pentachlorophenate (2%) solution in water followed by the water repellent treatment with Wacker's SMK-1311 diluted in water in the ratio of 1:14.

**81. CHANDRAMOULESWARA TEMPLE, NATTERY, DISTRICT THIRUVANNAMALI**

This monument built in sandstone and granite blocks was taken up for conservation measures like surface cleaning, consolidation,

fungicidal and protective treatments. The highly deteriorated and weakened stone carved blocks have been subjected to preventive consolidation treatment with Wacker's OH-100 prior to cleaning to prevent crumbling. The stone sculptures and structural surfaces have been scrubbed clean of all extraneous deposits, dirt, dust, soot, bird droppings and microbiological growth. After the cleaning of stone, fungicidal treatment was done with (2%) sodium pentachlorophenate solution in water. The marks of lime wash coats on the inner side wall of the main shrine have been removed mechanically using (5%) acetic acid solution in water followed by treating the stone surface with ammonia solution and neutral detergent. The work is in progress.

**UTTARAKHAND**

**82. JAGESHWAR GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA**

The ancient Jagnath Temple which is the main shrine of the group, dedicated to Lord Siva, found to be affected by the presence and colonization of micro-flora on its exterior walls and deposition of dirt, soot, smoke, oil and tar accretions on interior walls, pillars, ceiling and sculptures was taken up for conservation measures. The treatment of stone surfaces consisted of mechanical cleaning with a mild alkaline solution and neutral detergent solution, followed by the fungicidal treatment and finally, protective treatment with Wacker's B.S.-290, diluted in M.T.O. solvent in the ratio of 1:14 (in two coats, wet-on-wet system). The stone sculptures and structural surfaces in the interior have been

washed clean of all surface dirt and deposits, greasy and oily accretions with absorbent clay using water based pack of fuller's earth charged with chemical additives as needed. The work is in progress.

**83. LAKSHMI NARAYAN TEMPLE, TELLIHAT, BAIJNATH, DISTRICT BAGESHWAR**

The exterior stone surfaces of the monument were found covered in thick layers of dirt, dust, soot, bird droppings and microbiological growth. In many areas, the stone surfaces had been badly eroded and weakened caused by wind and weather. The methods and materials of stone treatment consisted of mechanical cleaning with a mixture of dilute ammonia solution and non-ionic detergent solution (3:1) in water; applying fungicide, a (2%) aqueous sodium pentachlorophenate was sprayed on the cleaned stone surfaces; consolidating the eroded and weakened stone surfaces with Wacker's OH-100; and finally applying a coat of Wacker's B.S.-290 diluted in M.T.O. solvent in the ratio of 1:14 to the treated and dried stone surfaces with paint brushes as protective treatment. The interior stone surface was also cleaned.

**84. SIVA TEMPLE, LAKHAMANDAL, DISTRICT DEHRADUN**

The sandstone surfaces of the whole monument from exterior as well as interior have been cleaned and conserved by applying scientific conservation methods. In the interior, the stone sculptures and structural surfaces have been washed cleaned of all extraneous deposits of soot, dust, smoke, oil and tarry substances employing absorbent clay pack technique. The blackened surface of the wooden ceiling was cleaned with mild organic solvents and preserved with creosote

oil. The treatment of metal plates over the door adjoining to *ardhamandapa* has been chemically cleaned with a mixture of Rochelle salt and sodium hydroxide solution in water followed by application of, microcrystalline wax dissolved in ether solvent with a paint brush as protective treatment.

**UTTAR PRADESH**

**85. TOMB OF SADIQ AND SALABAT KHAN, DISTRICT AGRA**

The exterior stucco surfaces of both these tombs covered with encrusted dirt, dust, bird droppings and microbiological growth were cleaned and conserved. The lime plastered surface was treated with an aqueous solution of calcium hypochlorite for the elimination of microorganisms. All other extraneous deposits were removed mechanically. After the surface cleaning of lime plaster layer, fungicidal treatment was done and finally protective treatment was given to the cleaned and dried surfaces.

**86. TOMB OF ITIMAD-UD-DAULAH, DISTRICT AGRA**

The paintings in the central hall and western *verandah* of this monument received conservation treatment during the period under review. In general, the painted surface was found covered with layers of accumulated dirt, dust, soot, tar accretions and pigeon droppings. In some areas, paintings in the hall appeared to have been destroyed due to human vandalism and seepage of rainwater. The surface cleaning and removing all extraneous substances with mild organic solvents; consolidating the flaking paint layer with P.V.A. resin; strengthening the damaged

painted plaster by way of measures like fixing, filleting and edging the broken ends of painted plaster with a fine lime based restoration mortar; and finally protective treatment was done with P.V.A. (1%) solution in sulphur free toluene. The existing cracks and fissures in the paintings wherever noticed were repaired with a mixture of lime based restoration mortar with water and retouched. The imposing gateway decorated with inlay work of marble in sandstone was taken up for the removal of accumulated dirt, dust, soot, tar accretions, bird droppings and microbiological growth from its stone surfaces. The treatment of sandstone has been mechanically done, followed by required protective coating.

**87. AKBAR'S TOMB SIKANDRA, DISTRICT AGRA**

The four marble *Chhatris* and corner *burjis* on the first floor of this tomb were already taken up for conservation treatment (2010-11, p.392). The treatment of sandstone surfaces has been mechanically done with a mixture of dilute ammonia solution and non-ionic liquid detergent (3:1) in water, and the marble was washed clean of all surface accretions and deposits with water based pack of fuller's earth charged with chemical additives as needed. The work is still in progress.

**88. TOMB OF NAWAB ISLAM KHAN, FATEHPUR SIKRI, DISTRICT AGRA**

The exterior surface of the monument was found covered with layers of dirt, dust, soot, bird droppings and microbiological growth. The treatment of stucco surfaces of main central dome and *chhataris* has been cleaned with a solution of calcium hypochlorite and an aqueous mixture of dilute ammonia solution and neutral non-ionic detergent, followed by the fungicidal treatment done with 2% sodium

pentachlorophenate solution in water. The work is in progress.

**89. FORT WALL, AGRA FORT, DISTRICT AGRA**

The red sandstone of the fort wall from Amar Singh Gate to Military Gate has been cleaned of all surface dirt, dust, soot, pollutants, bird droppings and microbiological growth, followed by fungicidal treatment and preservative coating.

**90. GOVIND DEV TEMPLE, VRINDAVAN, DISTRICT MATHURA**

The interior surface of this sandstone monument covered with layers of dirt, dust, soot and bat excrement has undergone mechanical and chemical cleaning treatment. The work is in progress.

**WEST BENGAL**

**91. HANSESVARI AND VASUDEVA TEMPLES, BANSBERIA, DISTRICT HUGLI**

The brick-built structure consists of lime plastered roof and decorative terracotta figures. The structure was covered with thick micro-vegetation growth causing damage to the temple as a whole. Chemical cleaning was done using 5% ammonia solution mixed with non-ionic detergent, followed by application of fungicide. Finally, two layers of preservative coatings were applied wet-on-wet basis using silane-siloxane mixture diluted with mineral turpentine oil.

**92. KALACHAND TEMPLE, BISHNUPUR, DISTRICT BANKURA**

Thick growth of micro-vegetation on the walls of the temple has been removed chemically by using mixture of ammonia solution and non-ionic detergent, followed by the fungicidal treatment and preservative coatings (Pl.139).

**93. GROUP OF TEMPLES (12 NOS. TEMPLES):  
KRISHNA CHANDRAJI TEMPLE, DISTRICT  
BARDHAMAN**

The exterior surfaces of the temple were covered with thick micro-vegetation growth. These were cleaned chemically using mixture of ammonia solution and non-ionic detergent. Fungicide was applied to arrest re-growth of micro-vegetation. Finally two coats of preservatives were applied wet-on-wet system **(Pl.140)**.

**94. GROUP OF TEMPLES KNOWN AS BRINDABAN  
CHANDRA'S MATH, GUPTIPARA, DISTRICT  
HUGLI**

The temples are constructed of bricks and plastered with lime mortar. The exterior surfaces of the same were covered with thick growth of micro-vegetation, damaging the structure. Chemical cleaning was done using ammonia solution mixed with non-ionic detergent. After drying out of the surface, fungicide was applied in order to arrest re-growth of vegetation.

**TREATMENT OF EXCAVATED  
OBJECTS AND MUSEUM EXHIBITS**

95. A total number of 155 antiquities received from Excavation Branch, Nagpur and have been chemically treated and preserved.
96. Out of 37 swords received from the Fort Museum, Chennai, 5 swords carrying brass and wooden handles were treated and preserved.
97. The Statue of Mahatama Gandhi, Vellore, made on bronze was cleaned and conserved.

98. Chemical treatment of metal antiquities received from excavations at Dholavira, Lalkot and Sankisa was carried out.

99. Treatment of some 300 objects of Archaeological Museum (*Mumtaz Mahal* Museum), Red Fort, Delhi was carried out. A few of these objects (nearly 17 objects) received are of different nature viz. textile, lithographs, oil paintings.

100. 80 no. of Chinese porcelain received from Central Antiquity Section, *Purana Quila*, New Delhi were chemically treated and conserved.

101. Treatment of 246 copper coins found in a hoard in the excavation at Malhar, District Bilaspur (Chhattisgarh) is under conservation.

102. The ancient sculptures made of basaltic stones on display at Pavnar *Ashram*, Wardha (Maharashtra) have been subjected to conservation treatment which consisted of cleaning, consolidation, fungicidal and protective treatments.

103. The treatment of *Thangka* paintings, (135.0 x 69.0cm.), (119.0 x 67.0cm) and Tibetan manuscript, (67.0 x 20.0cm) received from Central Antiquity Section, Purana Quila, New Delhi was carried out.

**MONITORING OF AIR POLLUTION**

The Science Branch, of the Survey, has been carrying out Air Quality Monitoring at Taj Mahal, Agra, Bibi ka Maqbara, Aurangabad and Charminar, Hyderabad, with the



A

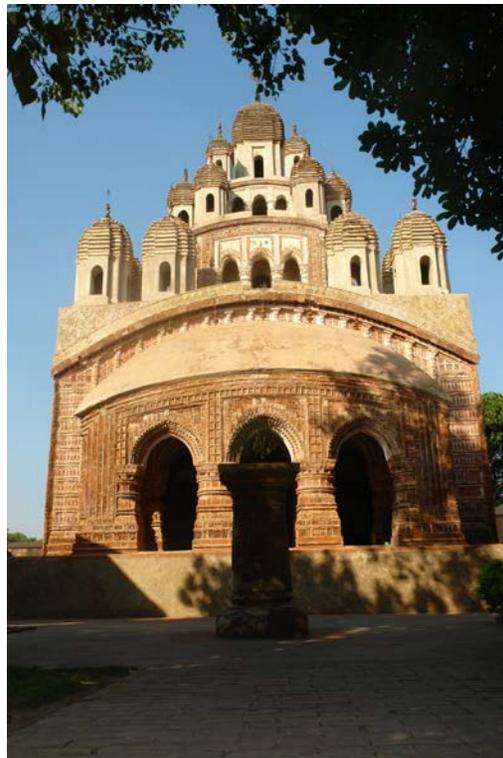


B

*Bishnupur: Kalachand Temple, A, before and B, after chemical preservation*



A



B

*Kalna: Krishna Chandraji Temple, A, during and B, after chemical preservation*

objective to assess the impact of changing environmental conditions on the structure and building materials of ancient monuments and historical buildings. The Air quality monitoring activity consists of ambient air quality monitoring and meteorological conditions.

**1. AMBIENT AIR QUALITY MONITORING STATION, TAJ MAHAL, AGRA**

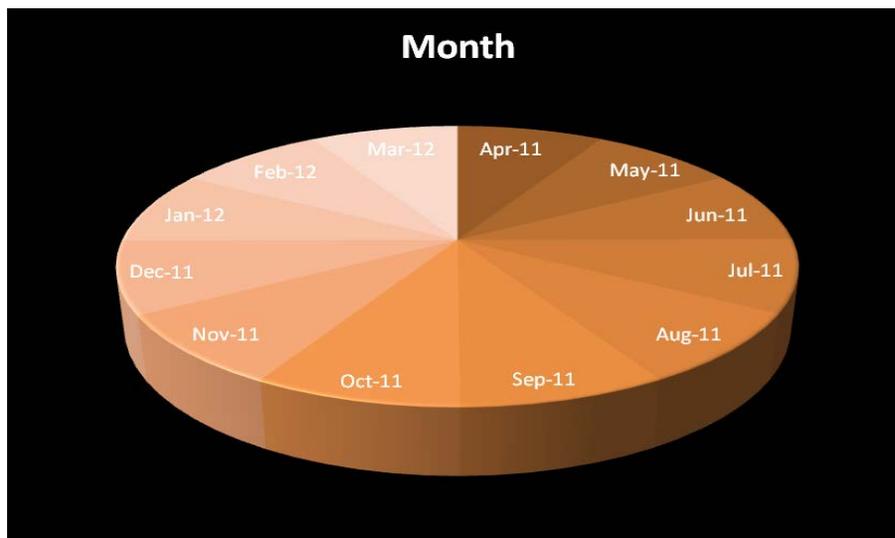
Air Pollution Control Laboratory, Agra continuously monitors the following major atmospheric pollutants round the clock at the monitoring station located at Taj Mahal.

S.No.	Parameter	Sampling Technique	Sampling Time
1.	Sulphur Di Oxide(SO <sub>2</sub> )(ug m <sup>3</sup> )	Modified West and Greek Method (Sequential Air Sampler)	4 Hourly Basis
2.	Oxides of Nitrogen(NO <sub>x</sub> )(ug m <sup>3</sup> )	Jacob and Hochneisser or Sodium Arsenite Method(Sequential Air Sampler)	4 Hourly Basis
3.	Suspended Particulate Matter (SPM) (ug m <sup>3</sup> )	Respirated dust sampler and High volume sampler	8 Hourly Basis
4.	Sulphation Rate Gm SO <sub>3</sub> /m <sup>2</sup> /day	Lead Candle Method	Monthly Basis
5.	Dust Fall Rate(MT/KM <sup>2</sup> /Month)	Dust fall Jar	Monthly Basis

A. The status of Ambient Quality observed during April 2011 to March 2012 at Taj Mahal is presented below.

Table shows Monthly Average Concentration of Pollutants in the ambient air of Taj Mahal

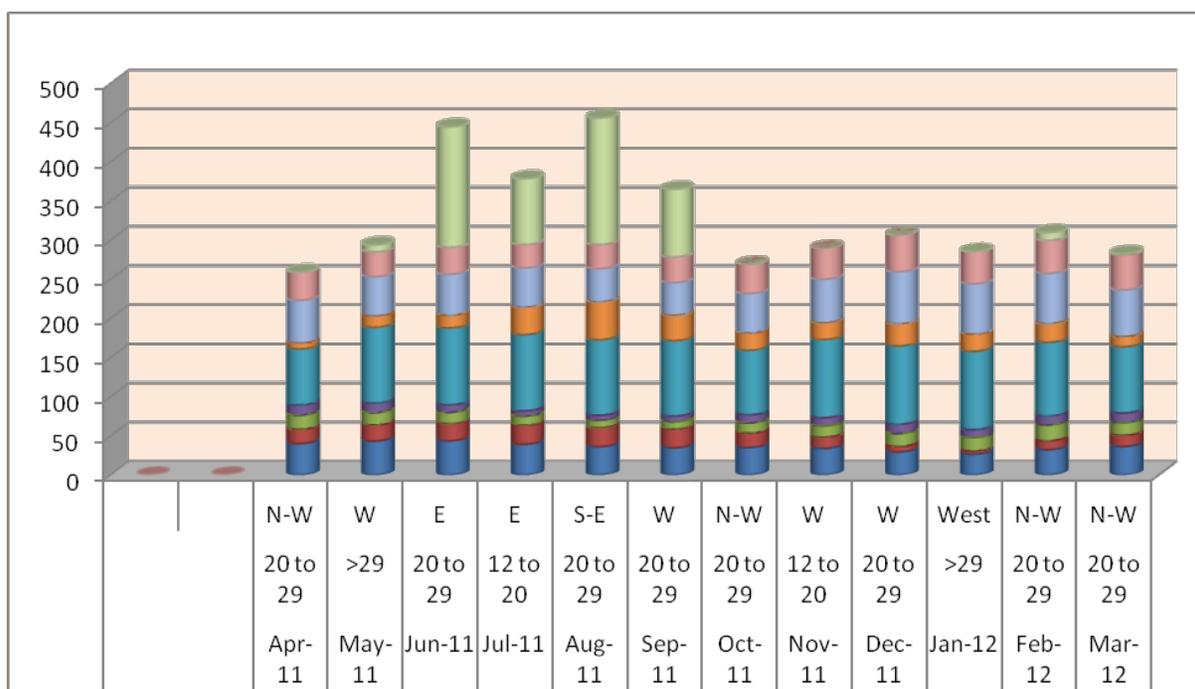
Month	Pollutant								
	SO <sub>2</sub> (ug m <sup>3</sup> )			NO <sub>x</sub> (ug m <sup>3</sup> )			SPM(ug m <sup>3</sup> )		
	Max.	Min	Avg.	Max.	Min	Avg.	Max.	Min	Avg.
Apr-11	3.31	3	3.03	5.41	3	3.78	344.23	118.91	242.04
May-11	3.95	3	3.18	10.32	3.43	5.71	478.67	157.5	261.56
Jun-11	3.23	3	3.02	13.43	3.03	5	315.03	53.23	164.61
Jul-11	3	3	3	4.25	3	3.31	254.36	21.98	80.83
Aug-11	3.01	3	3	4.27	3	3.46	104.42	14.56	49.76
Sep-11	3	3	3	5.33	3	3.26	268.82	21.09	102.09
Oct-11	3.54	3	3.12	7.86	3	4.62	562.41	164.32	323.61
Nov-11	5.66	3	3.26	15.58	5.59	9.48	613.88	217.53	381.73
Dec-11	5.88	3	3.49	18.8	4.89	10.45	565.3	205.28	373.81
Jan-12	3.4	3	3.01	11.48	3.28	5.55	391.84	88.57	240.59
Feb-12	4.5	3	3.17	12.34	5.59	7.32	360.13	186.52	259.2
Mar-12	5.49	3	3.57	11.68	4.08	6.98	732.22	193.22	380.95



B. The meteorological parameters like temperature, relative humidity, wind speed, wind direction, atmospheric pressure, solar radiation are monitored through automatic weather monitoring station (Wind Monitor,WM-271) installed at the site Taj Mahal. Meteorological data, recorded on hourly basis throughout the year is presented for monthly maximum, minimum and average values in the following table:-

**Meteorological parameters recorded in the ambience of Taj Mahal for the year 2011-12**

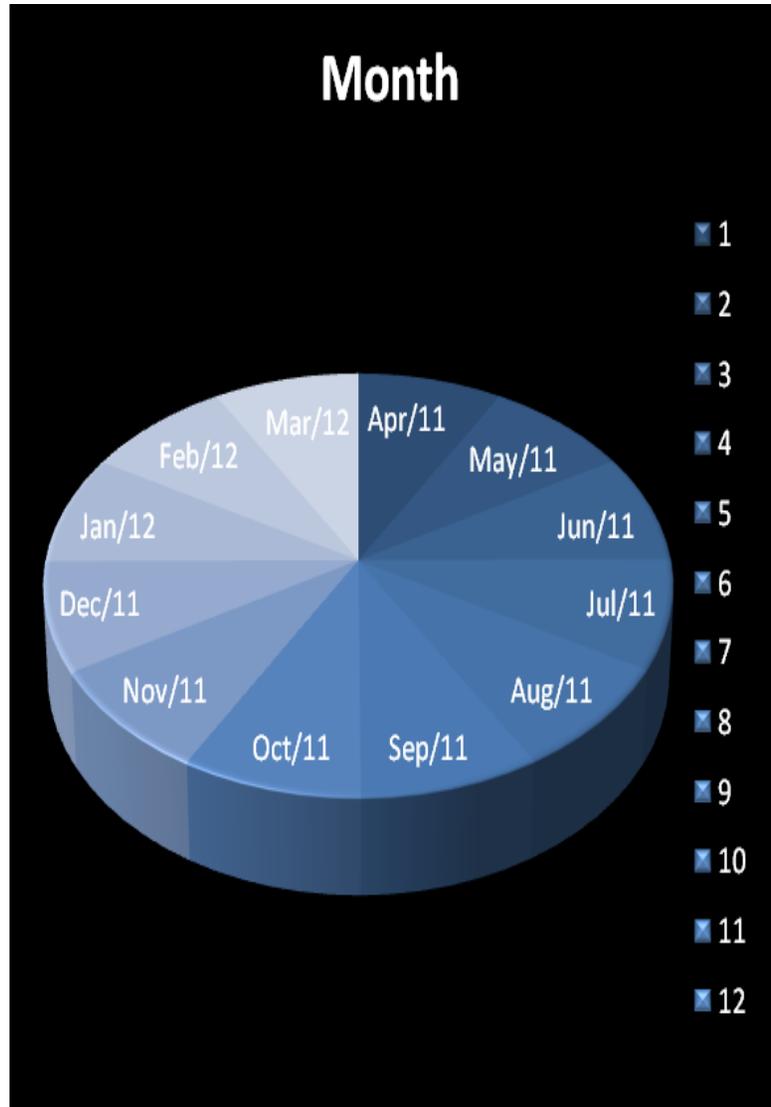
Month	Parameter										
	Wind Speed Km/Hr	Wind Direction (predominant)	Temperature				% Relative Humidity				Rain Fall mm
			Max.	Min.	Max. variation	Avg. variation	Max.	Min.	Max. variation	Avg. variation	
Apr-11	20 to 29	N-W	40	18.2	18	13	71.5	7.3	55	35.6	0
May-11	>29	W	43.2	20.3	15.9	12	97	14.2	50.5	31.5	9
Jun-11	20 to 29	E	43.5	22	14.3	9.4	98.4	16.1	52.6	34.2	154
Jul-11	12 to 20	E	39.1	24.2	11.8	6.6	97.2	35.1	50.4	29.4	84.3
Aug-11	20 to 29	S-E	36	24	9.4	6.6	96.4	48.5	42.5	30.4	162
Sep-11	20 to 29	W	34.5	24.1	9	7.3	96.4	32.3	42	32.4	86.55
Oct-11	20 to 29	N-W	35	18.2	13	10.4	82.3	22.1	50.7	37.1	0
Nov-11	12 to 20	W	33.6	14.3	14.5	10.5	100	21.1	55.9	39.4	0
Dec-11	20 to 29	W	29.3	7	16.5	11.7	100	28.3	66.7	46.7	0
Jan-12	>29	West	26.4	4	17.1	10.1	100	22.2	64.2	40.9	0
Feb-12	20 to 29	N-W	32.2	11.3	20.2	11.3	94.1	24	64.2	42.1	10
Mar-12	20 to 29	N-W	36.2	14.1	16.1	12.5	84.5	13	59.6	44.9	1.5



C. The data showing Sulphation rate and Dust fall rate measured at Taj Mahal have been compiled in the following table:-

Sulphation Rate and Dust Fall Rate for the year 2011-12

Month	Sulphation Rate Gm SO <sub>3</sub> /m <sup>2</sup> /day	Dust Fall Rate (MT/KM <sup>2</sup> /month)
Apr-11	0.0241	5.67
May-11	0.0435	4.15
Jun-11	0.0238	7.7
Jul-11	0.0225	3.39
Aug-11	0.0255	1.79
Sep-11	0.0261	2.59
Oct-11	0.036	2.96
Nov-11	0.041	5.21
Dec-11	0.0258	5.49
Jan-12	0.0105	3.95
Feb-12	0.0181	4.68
Mar-12	0.0158	5.2



**2. AMBIENT AIR QUALITY MONITORING STATION, BIBI KA MAQBARA, AURANGABAD.**

The ambient air quality monitoring has been carried out at Bibi ka Maqbara, Aurangabad to generate data for the following parameters during the period under report.

(I) Suspended Partulate Matter (SPM)

(II) Sulphur di Oxide (SO<sub>2</sub>)

(III) Oxides of Nitrogen (NO<sub>x</sub>)

The meteorological parameters, such as, temperature, relative humidity, rainfall, atmospheric pressure, wind speed, wind direction and sunshine have also been monitored using the equipment satellite link automatic weather station, installed at the site. The data collected have been useful in assessing the impact of pollutants on the preservation and stability of the ancient monument and historical buildings.

**RESEARCH AND ANALYSIS**

**SCIENCE LABORATORY, DEHRADUN**

1. In order to ascertain the exact and detailed nature and composition of Ashokan Pillars, samples collected from eleven different sites in India where these pillars are located were analysed scientifically for identification and characterization of their constituent materials.

2. Identification and characterization of building materials (stucco plaster, mortar and brick) used in construction of Krishna Group of Temples, Hampi (Karnataka) by applying standard and modern methods of scientific analysis.

3. Research Project “Conservation of Ancient Lime Mortar” is under progress.

4. The project entitled Research and Development of natural resin product “Vajralepa” - an ancient coating material for

stone conservation” has been initiated.

5. Scientific analysis of plaster and mortar samples received from Chennai Circle was carried out for chemical composition.

6. Chemical analysis of mortar samples received from Delhi Zone and excavated site Dholavira was completed.

7. Evaluation studies of two chemical products received from M/s Zycosil and Dow Corning are under progress.

8. Laboratory analysis of stones samples (3 nos. from Jageshwar group of temples, Jageshwar, District Almora, 1 no. from Dhandeshwar Group of Temple, District Almora, 10 nos. from Laxmi Narayan Temple and Rakshas Devel Temple at Baijnath and Rock Painting samples from Lakhudiyar, Almora) was carried out.

8. Microscopic, metallographic and analytical studies for the metal samples received from Aurangabad Zone have been completed.

**STONE CONSERVATION LABORATORY AGRA**

During the period under review, the study of petrography of stone samples, collected from different monuments of Uttarakhand and fresh stone samples from Chunar queries has been carried out to determine the texture, grain size, distribution pattern, binding medium and mineral composition of rock employed in the construction. The thin sections of stone samples were subjected to microscopic studies to obtain photomicrographs by using polarizing microscope (NIKON make-Model E-600 POL). The transmitted light microscopy used in identifying the constituent materials exists.

## XI. ARCHAEOLOGICAL GARDENS<sup>1</sup>

### ANDHRA PRADESH

#### 1. NAGARJUNAKONDA, MACHERALA

The works of improvement of water supply system at Hill-Top garden, Nagarjunakonda, extension of surface water tank (50,000 liters capacity) and providing new suitable pump sets accessories etc have been completed. Plantation of fruit tree, orchard etc. has been done in phase manner to beautify the garden. Further, a permanent arrangement for water supply has been done.

### ASSAM

#### 2. THE MOUNDS AND RUINS OF STONE TEMPLE, DA-PARVATIYA, TEZPUR, SONITPUR

The development work of the garden has been done by laying of lawn, dot plantation, and shrubbery border with flower beds to beautify the surroundings of the monuments (PL.141).

### CHATTISGARH

#### 3. BOUDH VIHAR, SIRPUR, CHATTISGARH

The laying-out of garden development work has been taken-up to maintain good environment as well as to beautify the surroundings of the monument. The garden development work is included in laying of lawn, dot plantation, shrubbery border and flower beds. The work has been completed.

#### 4. BALESWAR MAHADEV TEMPLE, SIRPUR, CHATTISGARH

The laying-out of garden development and maintenance work has been done by way of development of lawn, plantation of trees, flower beds bordered by shrubbery plants.

#### 5. RATANPUR FORT, RATANPUR, BILASPUR

The tree plantation and laying-out of garden development work has been taken-up to maintain good environment as well as to beautify the surroundings of the fort area. The work has been completed (PI.142).

### DELHI

#### 6. LUTHIAN CEMETERY, DELHI

The entire area, covered by more than 100 graves, remained undulated and uneven at the time of landscaping work. A layer of good earth was spread on the area without disturbing the graves and grassing was done in left spaces. Besides grassing, the foliage like *Agave*, *Kaner*, *Chandani* etc. are planted (PI.143).

#### 7. QILA RAI PITHORA WALL, NEW DELHI

The Lalkot wall extended by Prithavi Raj III was popularly known as Qila Rai Pithora and remained the first of the so-called seven cities of Delhi. This stretch of wall of Saidullajab Marg on Mehruli-Badarpur Road is almost 2.3 km long. The area was fully covered with wild vegetation and debris that have been cleared. In order to provide sufficient water supply to

1. Information from: Horticultural Branch of the Survey

the area, a bore- well has been installed at the depth of 110 meter, having 200 mm dia; besides, a pumping set was fixed and an irrigation pipe line was laid. The work is completed. The development of informal garden comprises of *bajari* pathways, grass and plantation of fruit, flowering trees and shrubs is completed (Pls.144-145).

### GUJARAT

**8. HEMADPANTI TEMPLE, BAMINI, AHMEDABAD**  
Various fruit plants and other ornamental plants around the temple complex have been provided and pipe-line has been laid for proper irrigation of plants (Pl.146).

### HARYANA

**9. ANCIENT SITE RAJA KARAN KA TILA, MIRZAPUR, KURUKSHETRA**

The landscaping in vast area around the ancient mound known as Raja Karan Ka Tila has been taken up after removal of encroachment. The work of clearance of wild vegetation, irrigation arrangement and development of informal garden in the area around the ancient mound has been done. The drilling of bore well up to the depth of 112 meter including installation of pump set is completed. The work of grassing in informal way to match rural landscape and plantation of shrubs, ornamental xerophytes, flowers and fruit trees has been completed.

### HIMACHAL PRADESH

**10. ROCK CUT TEMPLE, MASRUR, KANGRA**  
The water supply around the monument has

been provided by installing a bore well at the depth of 91.50m, having 6” dia along with a pumping set to water the garden. The work of laying out of pipe line is also completed. The grassing and plantation work around the temple has been done.

### KARNATAKA

**11. SRI RANGANATHA SWAMY TEMPLE, SRIRANGAPATNA, MANDYA**

Nearly six acres of area around the temple has been developed by planting sacred trees like *Michealea champaca*, *Nectanthysis arbertristis*, *phyallinthisis emblica* etc. The garden has nicely been maintained throughout the year (Pl.147).

**12. RAMALINGESHWARA SWAMY TEMPLE, TADIPATRI, ANANTAPUR**

The work of landscaping and proper gardening around the temple has been completed. Plants and shrubs like, *Couroupita guianensis*, *Plumeria alba*, *Millingtonia hortensis*, *Nerium*, *Tabernaemontana coronaria* etc. have been planted (Pl.148).

### KERALA

**13. FORT, PALAKKAD, PALAKKAD**

Renovation of existing garden in the inner area of the fort has been completed with hedge plantation (Pl.149).

### RAJASTHAN

**14. CHITTAURGARH FORT, CHITTAURGARH**

The vegetation in the northeastern part of the Chittaurgarh Fort had vanished due to over grazing and cutting by the local residents. The

district administration had desired to plant more floras inside the fort to revive the vegetation. The foliage like *Azadirachta indica*, *Pongamia glabra*, *Parkinsonia aculeate*, *Bauhinia purpurea*, *Butea monosperma*, *Aegle marmelos*, *Caesalpinia pulcherrima*, *Hibiscus rosa sinensis*, *Tecoma stans*, *Murraya exotica*, are planted to restore the ecological balance.

### UTTAR PRADESH

#### 15. SARDHANA CEMETERY, MEERUT

The area of cemetery has been beautifully

landscaped by laying of lawn and foliage plants. A bore-well has been installed and pipe line has been laid out for irrigation purpose

**(Pl.150)**

#### 16. SADIQ KHAN AND SALAMAT KHAN TOMBS, AGRA

Installation of bore-well for providing required water to maintain the garden and landscaping the same including graasing has been done.



A



B

*Mounds and Ruins of Stone Temple, Tezpur: A, before and B, after development of garden*



A



B

*Ratanpur Fort, Ratanpur: A, before and B, after development of garden*



A



B



C

*Luthian Cemetery, Delhi: A, before B, during and C, after landscaping*



A



B

*Qila Rai Pithora Wall: A, before and B, after landscaping*



A



B

*Qila Rai Pithora Wall: A, before and B, after grassing around the monument*



A



B

*Hemadpanti Temple, Bamini: A, before and B, after development of garden*



A



B

*Sri Ranganatha Swamy Temple, Srirangapatna: A, before and B, after development of garden*



*A*



*B*

*Ramalingeshwara Swamy Temple: A, before and B, after development of garden*



A



B

*Fort Palakkad: A before and B, after renovation of garden*



A



B

*Sardhana Cemetery, Meerut: A, before and B, after landscaping*

## X. PUBLICATIONS

### PUBLICATIONS OF THE SURVEY

1. Indian Archaeology-A Review: The issue for the year 2003-04 was brought out and the issues for the year 1998-99 and 1999-2000 were reprinted.
2. Memories of the Archaeological Survey of India: No. 102, Antichak Excavation-2(1971-81)by B. S.Verma;No.103, Excavations at Bharadvaja Asrama(1978-79) by B.B.Lal;No.104, Further Excavations at Udayagiri-2 Odisha(2001-03) by P.K.Trivedi;No.105, Excavations at Siruthavur (2008) by Sathyabhama Badhreenath were published.
3. Ancient India, New Series: Number 1 under new series was brought out.
4. Epigraphia Indica: Volume XLIII, Part 1 edited by K.V.Ramesh and M. D. Sampath was brought out.
5. Epigraphia Indica-Arabic and Persian Supplement: For the year 2011 edited by G.S.Khwaja was printed.
6. South Indian Inscriptions: Volume XXX for the year 1915 edited by T.S.Ravishankar and others was printed.
7. Coffee Table Publications: Chola Murals; Custodians of the Past: 150 years of the Archaeological Survey of India; and Monuments of Delhi were published.
8. Guide Books: Rani-ki Vav by Kirit Mankodi and Sibsagar by S.S.Biswas were

printed.

9. Other Publications: Geoscientific studies for the conservation of Ellora Caves, edited by Manohar Sinha; Treasures of Ancient China; To Cherish and conserve-The Early Years of the Archaeological Survey of India by John Keay; Bibliography of Indian Archaeology by V.N,Mishra and A.K.Kanungo; Catalogue of Exhibitions Rediscovering India 1961-2011 were brought out.

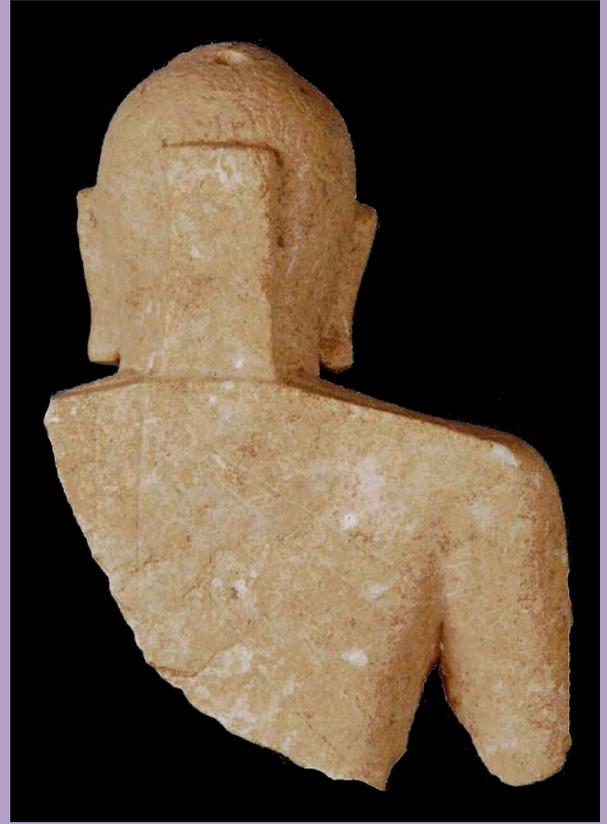
### OTHER PUBLICATIONS

10. Jaipur Circle of the Survey has released a booklet in Hindi entitled "*Deeg ke Rajbhawan*" on the occasion of World Tourism Day on 27<sup>th</sup> Sep 2011, at Deeg Palace, Deeg, District Bharatpur.
11. A booklet (in English) on "*Forts of Rajasthan*" was released in continuation of the series, being published on 150<sup>th</sup> Anniversary of Archaeological Survey of India.
12. A brochure highlighting the "*Importance of World Heritage Week*" was published on the occasion of World Heritage Week by the Dehradun Circle of the Survey.
13. A Booklet published on "*Uttarakhand Ke Rashtriya Sanrakshit Smarak*" (in Hindi) was released on the occasion of 150<sup>th</sup> year celebration of ASI, by the Dehradun Circle.
14. A brochure on "*Traditional Water Structures in the Central Himalaya*" (in Hindi) was published by the Dehradun

Circle based on the theme of the year proposed by ICOMOS on the occasion of the Museum Day.

15. Kolkata Circle of the Survey has released a booklet entitled “*Hazarduari Palace Museum at a Glance*” (in English) on the occasion of the Museum Day.

16. The Victoria Memorial Hall, Kolkata, based on its collection, published catalogues on “*Charles D’Oyly’s Art Works*”, “*Kalighat Paintings*” and an album entitled “*Images of the Picturesque of Ganga*”, Picture Post Cards on “*Mughal Miniature Paintings*”, Note Pads based on the “*Kalighat Paintings*” etc. during the year under review.



**ARCHAEOLOGICAL SURVEY OF INDIA**  
**JANPATH, NEW DELHI-110011**  
**2016**