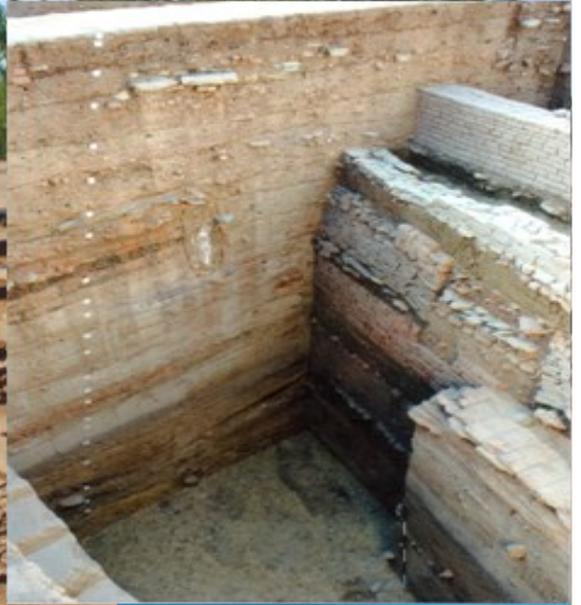


INDIAN ARCHAEOLOGY 2010-11 - A REVIEW



ARCHAEOLOGICAL SURVEY OF INDIA
JANPATH, NEW DELHI

INDIAN ARCHAEOLOGY 2010-2011 – A REVIEW

CHIEF EDITOR

Rakesh Tewari
Director General

EDITORS

D.N. Dimri
DIRECTOR (PUBLICATIONS)

Indu Prakash
SUPERINTENDING ARCHAEOLOGIST

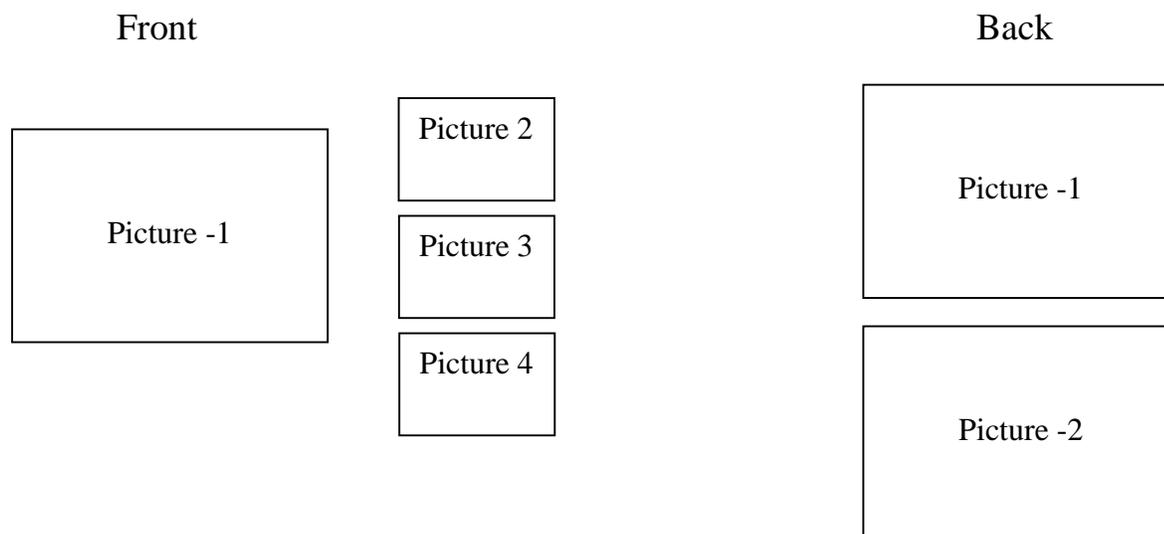


प्रत्नकीर्तिमपावृणु

PUBLISHED BY THE DIRECTOR GENERAL
ARCHAEOLOGICAL SURVEY OF INDIA
JANPATH, NEW DELHI-110011

2016

Illustrations



Front Cover: 1, *Excavated trenches, View from north east*, 2, *section and structures from east*, 3, *kunda* and 4, *stamped vessel*, all from Malhar, Chhattisgarh

Back Cover: 1-2, *Qila Mubarak, Patiala: before and after treatment of paintings*

©

2016

ARCHAEOLOGICAL SURVEY OF INDIA
GOVERNMENT OF INDIA

Printed at.....

PREFACE

I take the privilege to present the issue of *Indian Archaeology 2010-11 – A Review*, before the scholars and general readers.

This volume includes information on archaeological research undertaken during the year 2010-11 throughout the country including explorations, excavations, epigraphy, numismatics, outstanding discoveries, palaeobotany, museums, structural/chemical conservation as well as landscaping work by the Archaeological Survey of India and other organizations. I thank all the contributors and heads of archaeological organizations in the State Governments, Universities, Museums and Research Institutes including our own colleagues in the Survey for their cooperation in bringing out this publication in its present shape. In editing this vast material, some errors might have crept in for which I must tender my apologies. However, in respect of information furnished by the respective contributors, the responsibility lies with them only.

I am grateful to Dr. D.N. Dimri, Director (Publications) and his team in the Publication Section, especially Mr. Lalit, DEO for immaculate typing, formatting and designing the volume and making it press-ready in the record time.

Last, but not the least, I would be failing in my duty, if I do not mention my gratitude to Shri C. Dorje, Former Joint Director General, Archaeological Survey of India for going through the final manuscript and suggesting necessary corrections.

Date:/...../2015
New Delhi


10.06.16
(Rakesh Tewari)
Director General
Archaeological Survey of India

CONTENTS

I.	Explorations and Excavations.....	1
	Andhra Pradesh, 1; Chhattisgarh, 5; Gujarat, 8; Haryana, 33; Jharkhand, 49; Madhya Pradesh, 61; Maharashtra, 62; Rajasthan, 76; Tamil Nadu, 81; Uttar Pradesh, 91; West Bengal, 111	
II.	Epigraphy	117
	Sanskritic and Dravidic Inscriptions, 117 Andhra Pradesh, 117; Karnataka, 118; Kerala, 118; Madhya Pradesh, 118; Tamil Nadu, 121; Uttar Pradesh, 123; Arabic and Persian Inscription, 123 Bihar, 123; Gujarat, 124; Uttar Pradesh, 125	
III.	Other Important Discoveries	127
	Bihar, 127; Kerala, 127; Manipur, 128; Uttarakhand, 129	
IV.	Palaeobotanical and Pollen Analytical Investigations	138
	Uttar Pradesh, 138	
V.	Museums	139
VI.	Architectural Survey	144
	Building Survey Project, 144 Temple Survey, Northern Region, 149	
VII.	Preservation of Monuments	167
	Monuments of National Importance, 167 Aurangabad Circle, 167; Bhopal Circle, 170; Bhubaneswar Circle, 188; Chandigarh Circle, 200; Chennai Circle, 202; Dehradun Circle, 212; Delhi Circle, 214; Dharwad Circle, 217; Goa Circle, 222; Guwahati Circle, 233; Hyderabad Circle, 235; Jaipur Circle, 247; Mumbai Circle, 259; Ranchi Circle, 270	

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

I. EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. EXPLORATION IN BANGARUPALEM, CHITTOOR, KUPPAM MADANAPALLE PALAMANERU, PUNGANURU AND V.KOTA MANDALS OF DISTRICT CHITTOOR

As part of UCG, MRP, P.C. Venkatasubbaiah of the Dept. of History, Archaeology and Culture, Dravidian University, Kuppam conducted archaeological explorations in the above said Mandals and recorded the following sites:

1. Agraharam (13° 23' 20''N; 78° 40'15'' E); A habitation belonging to Neolithic? Megalithic/Early historic periods;
2. Balijapalle (13° 11' 20'' N;78° 51' 25'' E): Neolithic polished axes, made on dolerite and goddess Gangamma in a local shrine;
3. Bandakindapalle (13° 05' N;78° 34' 20'' E): Dolmens with port holes;
4. Bapalanattam (13° 05' 10'' N; 78° 41'20''E): Nearly 300 dolmens, locally known as Pandvula Gudula Bandalu, with port holes;
5. Devadoddi (13° 05' N;78° 34' 20'' E): Neolithic axes, made on granite, Representing goddess Gangamma;
6. Devalampeta (13° 14' N;78° 49' E): Six dolmens in symbolic fashion);
7. Guttapalle(13° 24' 05''N;78° 31' 50''E): two dolmens with portholes;
8. Jagamarla (13° 13' 30'' N;78° 49' 30'' E): Three dolmens, locally known as Beeruvanka Banda with port holes oriented to east;
9. Jambureddipalle (13° 09'N;78° 56' 30''E): Two dolmens, on a hillock known locally as Pandava Banda, with thick capstones supported by granite boulders;
10. Jayanti (13° 10' 40''N;78° 51' 30'' E): A dolmen with thick capstone and porthole;
11. Kalagaturu (13° 15' 30''N;78°42' 50'' E): Fifteen Dolmens and rock shelters nearby this burials complex contained pottery of Megalithic period;
12. Kiramanda (13° 06'55''N;78° 51' 30'' E): Two stone circles of 6 to 10m diameter without the traces of pottery and hence intact;
13. Kommaramadugu (13°03'50''N;78°32'50'' E): Three stones circles and three cairns of

- 3 to 4m in diameter;
14. Kottabavi (13° 27' 40" N; 78° 25' 50" E):
A symbolic dolmen on a bare granite rock surface;
15. Kotturu (13° 06' 20" N; 78° 32' 50" E): Fifteen stone circles with central slabs;
16. Medibanda (13° 07' 20" N; 78° 41' 25" E):
Three dolmens in a symbolic fashion as located on a granite outcrop;
17. Madigapalle (13° 19' 30" N; 78° 44' E):
Two dolmenoid cists in different dimensions;
18. Miniki (13° 22' 10" N; 78° 29' 50" E):
Seven stone circles among which four contain central slabs measuring 10-12m in diameter and other three burials contain cairn packing which measure 8-10m in diameter;
19. Modugupalle (Twenty stone circles with cairn packing and in the dug out area around these burials were found black ware, red ware and black and red ware potsherds);
20. Mornapalli (13° 04' 25" N; 78° 31' 50" E):
Ten stone circles with sparse cairn packing at the centre and some burials having central slab at the centre and there are hero stones in shrine;
21. Nallaracharigaripalli (13° 23' 55" N; 78° 28' 10" E): A dolmenoid cist;
22. Nelapalle (13° 19' 10" N; 78° 41' 44" E):
A dolmen and a dolmenoid cist were located;
23. Obulapouram (13° 15' 30" N; 78° 42' 50" E): Habitational deposits measuring 100 x 100m which is under cultivation belong to Neolithic?/ Early historic period exposing black ware, red ware, stone tools and objects;
24. Pandivaripalli (13° 27' 30" N; 78° 26' 50" E): A dolmen located on a granite hillock near the village;
25. Peddavelagaturu (13° 15' 05" N; 78° 35' 55" E): Burials in three clusters and each cluster consisting of 20 to 25 stone circles with or without central slab and measuring between 8-10m in diameter;
26. Pichigundalpalli (13° 57' 50" N; 78° 26' 30" E): Many disturbed burials with pottery strewn all over. Hero stone near these burials bear the figure of a male with a bow in his left hand, an arrow in his right hand and a sword his waist;
27. Ponipalem (13° 09' 10" N; 78° 57' E): Two dolmens in a field near the village built over the rubble on granite hillock;
28. Pottaganipalle (13° 17' 30" N; 78° 42' 30" E): A dolmen built with fashioned granite slabs facing east;
29. Shanigapalle (13° 06' 10" N; 78° 32' 30" E): Three clusters of burials with seven stone circles in each with or without central slab and the cairn packing is sparsely represented;

EXPLORATION AND EXCAVATIONS

30. Subbanayanapalle (13°29'45"N;78°25'10" E): A dolmen was found near the rope of a granite hill;
31. Venamaladinne (13°18'50"N;78°55"E): Habitational deposits of 150 x 100 x 1m was found to the north-west of the present village which is under cultivation yielding pottery, animal bones, stone tools and stone objects;
32. Yellagaram (12°56'30"N;78°26'30"E): Habitational deposit of 1 to 1.5m thick was located to the south-west of the present village covering an area of 20 acres known locally as 'Paturu' (old place) yielding red ware, black ware, black and red ware of early historic period along with iron slag, animal bones, etc;

2. EXPLORATIONS IN BELAGAL AND GUDUR MANDALS OF DISTRICT KURNOOL

As part of ICHR project for investigation into Neolithic and Megalithic Cultures in the Lower Tungabhadra region of Andhra Pradesh, P.C. Venkatasubbaiah of the Dept. of History, Archaeology and Culture, Dravidian University, Kuppam, carried out field investigations in the above mentioned mandals of district Kurnool and found the following archaeological sites.

Alavala (15° 47' 20"N;77° 37' 40" E): An early historic low lying mound was located on the right bank of Peddavanka, and affluent of Tungabhadra river about 200m away from the present village to its north-east. It measures approximately 20 acres and has an extent of 100x200x2.5m to 3m, exposing full-forms of

earthen pottery of red ware, black ware and black-and- red ware, animal bones, stone objects, brickbats, shell bangle pieces, etc. from the finding of full-forms of pottery and other objects, it is clear that the habitation is intact and large-scale excavation may reveal interesting things for historical reconstruction. The investigator also noticed traces of Neolithic habitational debris, 1km south-west of the early historic habitation which has an extent of 50x60x0.15m yielding potsherds of grey ware, red ware, black ware, buff ware along the pecked and ground stone tools and other objects.

Chamalaguduru (15° 51' 50"N;77° 374' E): A medieval temple dedicated to Lord Siva datable to Chalukyan period as the *kadu* motifs, decorative capitals of pillars, etc., reveal.

The present investigations also lead to the discovery of Neolithic habitations at: Daivamdinne(15°49'N;77°35'25'E),Enugubala (15° 48' N; 77° 36' 10' E), Julakallu (15° 48' 10"; 77° 46' E), Kalugotla (15° 53' 35" N;77° 58' 05" N), Kanakavidupeta (15° 51' N;77° 33' 50" E), Kanakavidupeta (15° 51' 45"N; 77° 33' 50" E), Kambadahal (15° 49' 40"N; 77° 37' 30" E), Mallapuram (15° 49' N; 77° 49"E). Mittasomapuram (15° 53' N; 77° 35" E), Ponakaladinne (15° 50' 30" N; 77° 36' E), Mennipadu (15° 53' 40" N; 77° 57' E); Pulluru (15° 52' 10" N; 77° 59' E); Korivipadu (15° 54' N; 77° 55' 20" E); and Madduru (15° 54' 55" N; 77° 53' 30" E).

The Neolithic material comprised grey ware, buff ware, red ware, black ware, a few

black-on-red painted potsherds, animal bones, pecked and ground stone tools and objects such as hammer stones, querns, axes, adzes, sling balls, rubbers, mullers, etc. and blade tools. At Tsallaguduru, the scholar noticed the habitation in the form of an elevated mound of 3-4m height, from the northern and north-eastern and eastern direction, the vitrified and soft ash normally found at ashmound sites, similar to that found at Kambadahal, which had been erased because of plowing activity as it's adjacent area has been brought under cultivation, hence the pieces of ash could be found all along the field boundary. Potsherds of black-and-red ware, black ware and red ware found on the ploughed zone suggest the sub-surface of the mound would have belonged to early historic times and the lower or bottom part of the mound may belong to Neolithic period.

The Neolithic habitations found range in dimension between 1-3 hectares so far and at certain sites the sparse representation of habitations along with meager remnants of cultural material suggest satellite settlements attached to main sites and that Neolithic populations had vigorous movement with lot of communication of material and information. The yellowish brown chert nodules found at several sites show that the raw material was procured from river-born pebbles derived either from the limestone formation of Kurnool-Kadapa system of rocks or from any other source. The overall picture of the distribution of Neolithic settlements in the area could be seen as a network which survived around 2500 BC., as indicated by the evidence

of an ashmound at Kambadahal which lies about 60km east of Utnoor ashmound, the latter had been excavated by Alchin.

3. EXPLORATION IN WARANGAL FORT, DISTRICT WARANGAL

The Hyderabad Circle of the Archaeological Survey of India¹ under the guidance of K.Veerabhadra Rao and assisted by D. Kanna Babu, A. Suresh, N. Subba Rao, I.V.M. Sarma and M. Sambasiva Kumar conducted explorations in the fort to ascertain its chronology, evolution of architecture and gradual stages of its development and urbanization as there were no such earlier attempts made in this direction. In detail explorations resulted in identification of four vital stages of evolution in formation of the Orugallu fort and its layout as well as the construction of inner temple complexes, civil edifices and other structural remains.

Early Stage: As per the explored evidences available *in situ*, the earliest constructional activity in the fort had started in pre – Kakatiya times i.e. during the rule of Rashtrakuta dynasty over this region. The Rupamma Gudi located near to the southern inner fortification wall stands as the earliest testimony with all its pre – Kakatiya architectural features of 10-11th Century CE. The seated *dwarapalakas* depicted on either side of the door jambs of *garbhagriha* have close similarities with their counterparts found elsewhere in Rashtrakuta temples.

Second Stage: The second stage of cultural activity goes back to the time of early Kakatiya

¹ Archaeological Survey is hereafter referred to as the Survey only.

EXPLORATION AND EXCAVATIONS

rulers which include the mud fortification, Nelasambhuni Gudi, L.P.Gandi temple, etc. and all these historical monuments belong to 12-13th Century CE. This must be formative and fundamental stage which laid a strong foundation for expansion of the fortification at the hands of later mighty rulers.

Third Stage: The great cultural personality of the Warangal fort formed in this advanced stage by projecting its several achievements in different fields like Art, Architecture, agriculture and economy during the 13-14th century CE. The four imposing *toranas* standing on all cardinal directions, the Swayambhu Temple Complex the Jangamayya Gudi, the brick built *sikharas* over stone structures, the royal bathing well – Sringara Bavi and rich crop of sculptures etc. come under this mostly evolved stage. Every part of these edifices reveals the culmination of professional expertise during the rule of Ganapatideva, Prataparudra and Queen Rudrama Devi.

Fourth Stage: The fourth stage portrays the faded picture of Warangal fort after the fall of Kakatiya dynasty. It also projects the impact of Sultans's governance over the fort and more particularly on structural remains like Kushmahal, etc. The ruined structures which flourished during the times of their masters – Kakatias speak about the state of neglect and non-patronization in later days. They have lost all their dignity and charm at the hands of non-local rulers by 14th Century CE. This is considered as final phase in the life and development of Orugallu fort which closed the curtains on its successful story. After exploring all these historical monuments, it was revealed that for over a period of two centuries this mig-

-hty fort witnessed the contribution of its founders in the form of enhancing its grandeur and adding strengths by expansion of encircling walls and bastions. Even today, the military characteristics of the fort are glimmering though it suffered from many painful battles.

CHHATTISGARH

4. EXCAVATION IN MALHAR, DISTRICT BILASPUR

In continuation of last year's work, the Excavation Branch-I Nagpur, of the Archaeological Survey of India, under the Direction of S.K. Mitra, assisted by Samir Diwan, Rajesh Mehar, Sudha N. Velip, H.J. Barapatre (Artist), A.E. Keshwar, B.V. Bhoyar, V.B. Akhare R.G. Nagulwar (Surveyor), S.M. Khairkar (Photographer), P.M. Barik (Modeler), Shaheed Akhtar, D.Kamble, P.C. Dhendwal, Rajesh Patil, K.G. Mudliar, K.M. Dessai, M. Alam, A.M. Tayde, P.R. Masram, Z. Hussain, V. Kanoujiya carried out an excavation at ancient historical site of Malhar. The archaeological site of Malhar (21°83'73" and 82°16'41"E) is situated in the District Bilaspur. Locally known as Gadh (meaning fort), the site is one of the thirty-six forts after which the state of Chhattisgarh is perhaps named. In this season, the excavation site was selected further west of the last year's work, about 60m in distance. In all twenty two trenches were subjected to spade work at this site and three trenches were taken on trial basis to the north of the mound across the unmetalled road, which is bisecting the mound into two.

These excavations have brought to light

many new evidences regarding the structural complexes, terracotta sealings, coins, terracotta human and animal figurines, objects of daily use made on stone, iron, copper, ivory, etc. Besides few baked bricks have foot impression of certain animal which are quite interesting. Huge quantity of ceramic finds in almost all the periods have little distinct representation which were hither to not known to the archaeologists from this region. Special mention may be made here of stamped ceramics of Pd. III. A number of terracotta finials have been reported from period II and III which must have been used for the secular structures (Fig. 1).

In this field season, the excavation has revealed four major periods of occupation. They are:

- Period I** **Pre-Mauryan**
- Period II** **Mauryan and Sunga**
- Period III** **Pre-Gupta**
- Period IV** **Gupta-Vakataka**

Incidentally, this year's excavation has not yielded any prolific remains of period V, may be for the fact that the upper layer has washed away.

Period I: Unlike the first season's excavation, this year also the lower level deposits were hampered for free and proper excavation due to encountering of sub soil water in all the trenches where ever the lower levels have been reached. The pre-Mauryan level was identified mostly on the basis of the variety of black and red ware which has greater grey surface in place of usual red, while the black portion carr-

-ies a very lustrous shining finish more akin to Northern Black Polished Ware of the Gangetic belt. No structural remains were found in this period. Notably, Period I, has failed to provide a single coin, seal or sealing which could have revealed scenario of the period and the time-frame. This period has produced no significant antiquity worth recognition.

Period II: Trenches XB15, XB17, XC17, and XG18 have accounted for period II. Number of stone, burnt brick structures and structures made in combination of both heralded the construction activity at Malhar. Most of these constructions consisted of square and rectangular house plans often damaged by later activities or repairs that were caused by the authors themselves. This period was marked by the presence of two circular granaries excavated in the trench XB15 and XG18 (Pls. 1-5). Both the grain storage constructions were made by mud and burnt fairly well to get a proper terracotta finish. The first granary measured 4.83mx4.0m in East-West and North-South orientation, thus, it is little out of dimension from a perfect circle. Extensive accidental fire has caused damage to the granary. In the trench XG18, the granary is cut by a later foundation pit made for the construction of later house wall. In this granary, an iron tripod and rice grains were found.

The ceramic finds consist of Red ware, dull red ware; Red slipped Ware and Black and Red Ware. Important types like storage jars, medium to heavy vases, dishes, high neck vases, carinated vases, small *lotas* and mini bowls were found. Antiquarian finds from this period consist of beads of semi-precious stone,

EXPLORATION AND EXCAVATIONS

glass and terracotta. A number of terracotta sealings with Brahmi legends of 3rd BCE – 1st Century CE. And a few copper coins are other important finds.

Period III: In period III heralded the beginning of bigger structural activity like construction of bigger house plans, construction of drains and multiple room complexes. These structures accounted for both secular and non-secular usages. In general, majority of the structures have the foundation dug through the ground by digging a trench and filling it with black cotton soil mixed with murrum, stone chips and pebbles rammed together. The foundation is raised with courses of stone slabs over which was raised the brick built wall. While the stone slabs used were of different dimensions, the bricks are mostly measuring 32x16x5.5-06cm and 34x17x5.5-6.5cm in length, width and thickness. In some cases the width was found to be of 07cm. A burnt brick square *kunda* structure is the only secular construction excavated in this year's field work. This *kunda* structure measures approximately 1.60m. Square at the top, it has five steps leading to centre of the structure in descending order originally from all the four sides. The entire structure is lime plastered from inside. At this level a significant find of the season is very big storage jar excavated *in situ* which is coloured from the interior with red wash. Perhaps this is the biggest ever a storage vessel excavated anywhere in India so far.

The ceramic finds of this period were red ware, dull red ware, red slipped ware, black and red ware and limited quantity of black/grey ware. The pottery types consisted of storage

jars, globular vessels, carinated *handis*, and bowls of different sizes, very narrow neck small to medium size globular vessels, flask, basins, lid with knob and a religious vessel having seven spouts. Similar pots are said to be still in use with the present day villagers during the marriage rituals. This period is marked by the presence of sealings. One of them read "*ran~yo sivamaghasa(si)ra(ri)sa*" and the other depicting a seated humped bull to right and below the legend within a parallel margin reads "*rusabha yasa*", both sealings are assignable to 1st Century BCE-CE on the basis of palaeographical studies. A Satavahana silver portrait coin of **Vashishthiputra Pulumavi**, from this period marks an important milestone at Malhar for the first time. It makes all the more important since this has come from proper field excavation. Just below this important numismatic find, a two-room Satavahana brick structure was excavated with an open lime plastered verandah (Pls. 6-9).

Contemporary to this, structures were excavated on the northern side of the mound with two-room complex.

Period IV: In this year's field work, the upper two to four layers have accounted for period IV deposit. This level is characterized by structures made of stones and burnt bricks. Often these structures comprise a single room. However, two or three-room complex is also found. On one occasion, a brick built covered drain has come to light. Largest of the structures excavated in this period admeasures approximately little more than 10m x 5m. This platform is quite similar to one excavated in the first season of work. Most of the other structures were either of one room with or wit-

-hout attached chamber. Unfortunately, not many structures were found intact.

The ceramic repertoire from this period includes red ware, dull red ware, grey ware, black and red ware and red slipped ware. Storage jars, globular vessels, bowls, carinated *handis* all are finished in red colour while in black and red ware mostly bowls are made.

Antiquarian finds from this period include beads of glass, terracotta and semi-precious stone. A highly decorated square stone plaque with religious symbols engraved and arranged in a circle is one of the objects of secular nature among the important finds. Two silver Roman Portrait coins (*dinar*) were excavated from the upper deposit of this period. One of them was later converted in locket while the other is intact. But, unfortunately both of them are highly worn out. Objects of iron include sickle, nails of different kinds and sizes, knife, choppers, arrow, spear heads etc. Other finds include copper coins,

terracotta sealings, saddle quern, terracotta tiles with finger marks and double perforation.

This season, the excavation has yielded approximately four periods of deposit, encountering nearly twenty two layers of occupation with an evidence of flood that has caused complete erosion of the site at the twentieth layer of habitation (Fig. 2).

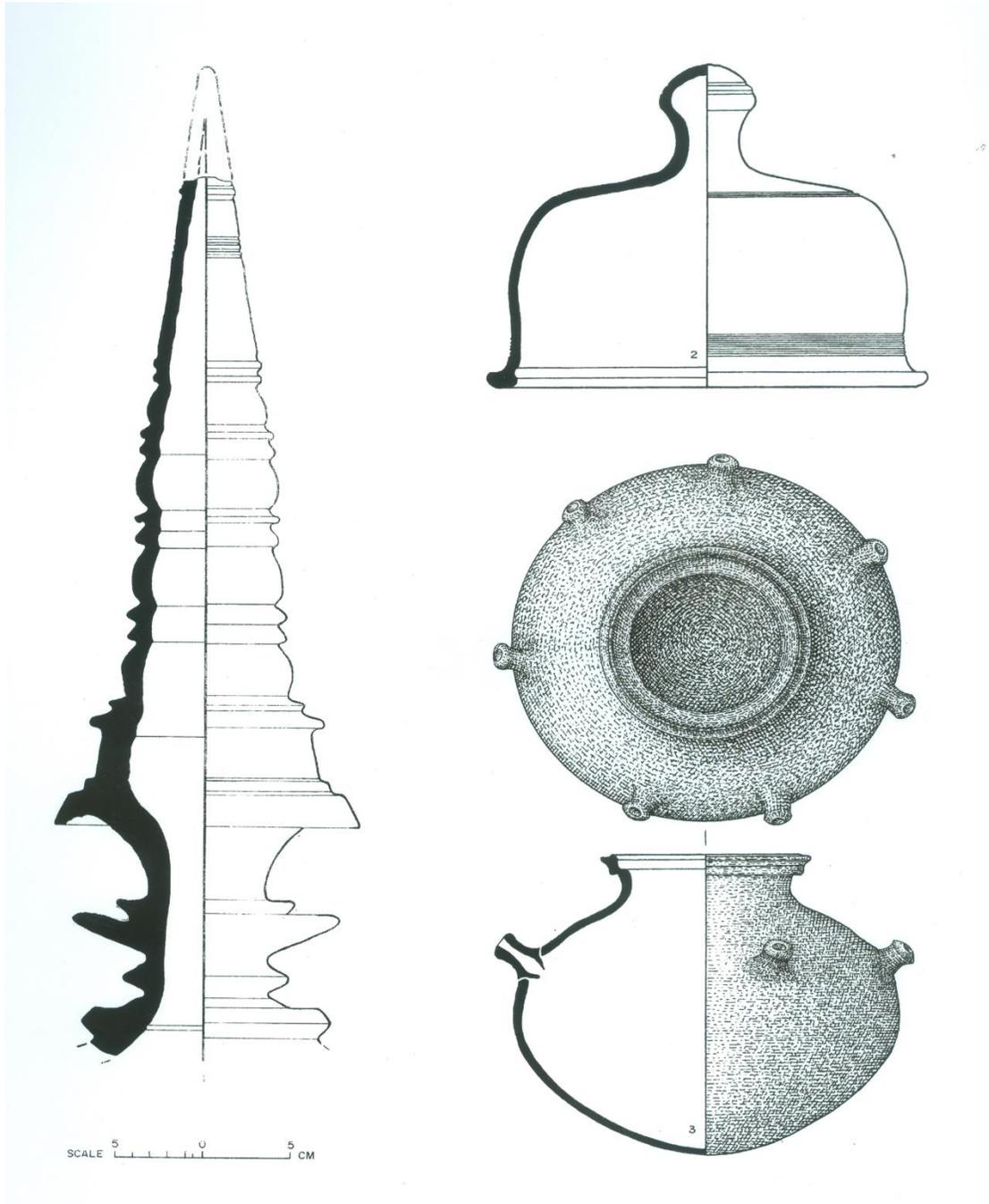
GUJARAT

5. EXPLORATION IN DISTRICT BANASKANTHA

In continuation of the previous year's work, the Excavation Branch-V, Vadodara of the Survey, under the direction of Jitendra Nath assisted by R.N. Kumaran, B.M. Rohit and H.R. Tadvī conducted village-to-village survey partly in the Taluks of Sihori and Deesa in District Banaskantha and discovered the antiquarian remains from the following villages.

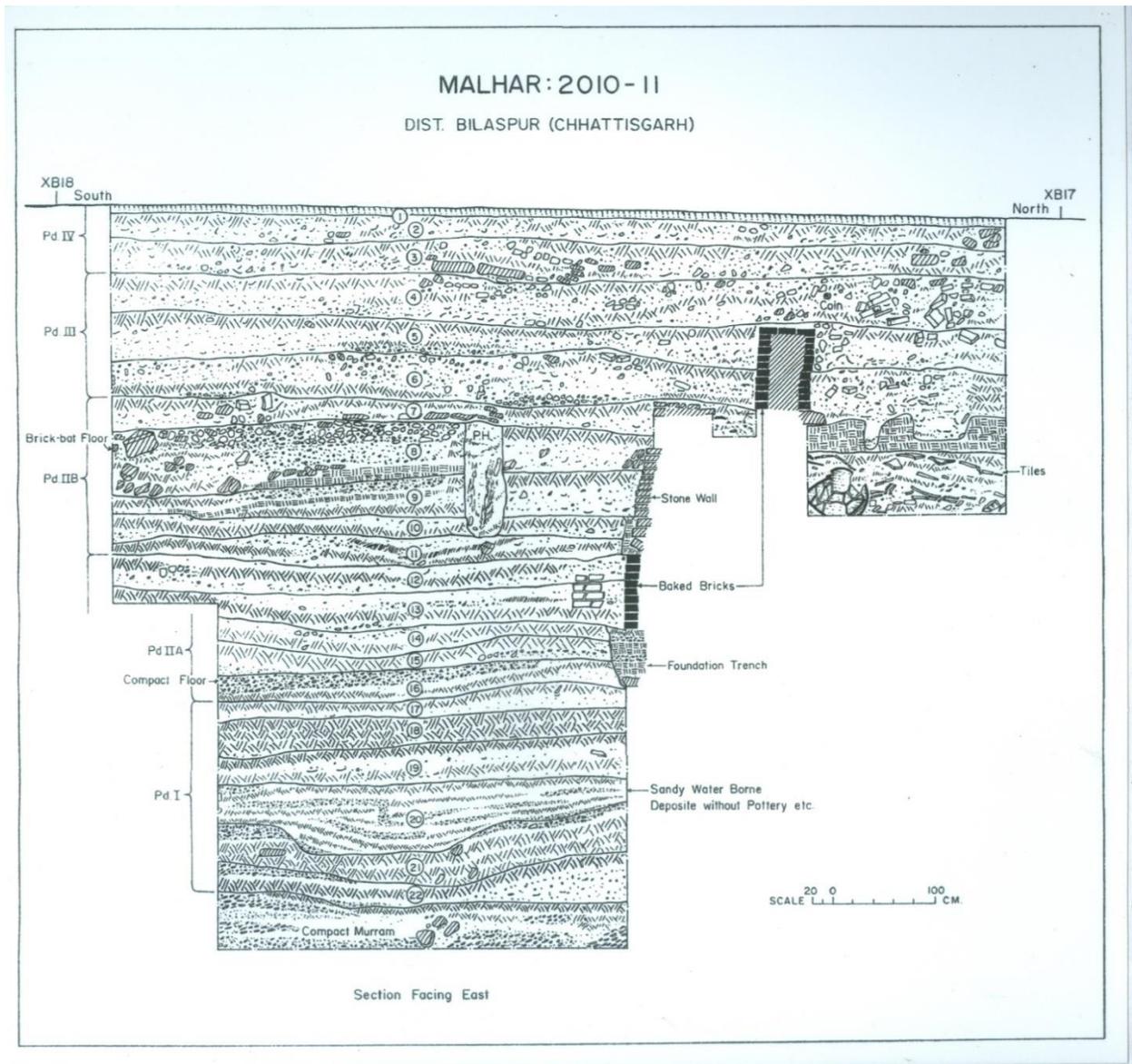
Sl. No.	Name	Taluka	Finds
1	Mudetha 24°09'29"N: 71°58'75"E	Deesa	Medieval architectural fragments and ceramics like red, grey and black ware.
2	Amarnesda 23°55'34"N: 71°55'90"E	Shihori	Medieval architectural fragments and sculptures
3	Anganwada 23°57'78"N: 71°55'71"E	Shihori	Medieval architectural fragments.
4	Arniwada 24°07'13"N: 72°01'03"E	Shihori	Medieval Red ware and Black ware.
5	Balochpura 23°59'56"N:	Shihori	Medieval ceramics, broken sculptures of Ganesh, Nandi, Sivalinga, Buddha and bricks measuring 17cm x 12cm x 2.5 /3cm.

Fig. 1



Spouted vessel finial lid

Fig. 2



Excavated section and structures from different periods



Malhar: Excavated section and structures from different periods- view from east

Plate 2



A



B

Malhar: General view of excavated structures, A, from east and B, from north-east

Plate 3



Malhar: view of Satavahana level structure- from west

Plate 4



Malhar exposed view of kunda



Malhar: exposed granary, Trench XB-1

Plate 6



A



B

Plate 7



A



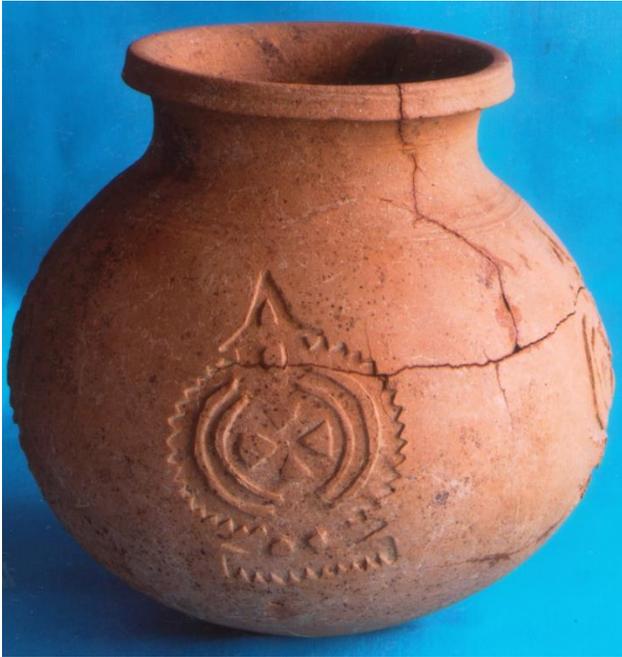
B

Malhar: Silver portrait Satavahana Coin of Vasishthiputra Pulumavi, A, obverse and B, Silver Roman portrait Dinar- obverse

Plate 8



Malhar: sealings with legend, Period II to IV



A



B

Sl. No.	Name	Taluka	Finds
6	Bukoli 24°06'06"N: 72°00'18"E	Shihori	Locally known as 'Kotadia veer', yielded medieval ceramics predominately Black ware, bricks measuring 20cm x 14cm x 4cm / 18cm x 12cm x 2cm, broken architectural members and sculptures.
7	Devpura 23°54'20"N: 71°56'32"E	Shihori	Medieval architectural fragments.
8	Dhanera 23°54'25"N: 71°58'03"E	Shihori	Medieval architectural fragments.
9	Dudhasan 24°00'13"N: 71°58'84"E	Shihori	Medieval red ware, black ware and grey ware.
10	Gangapura 23°56'48"N: 71°55'14"E	Shihori	Microlithic blades and medieval ceramics like black ware, grey ware and red ware.
11	Goliya 24°05'02"N: 71°59'98"E	Shihori	Medieval architectural fragments.
12	Jaliya 23°59'97"N: 72°00'72"E	Shihori	Medieval ceramics like Red ware, black ware and grey ware.
13	Juna Jampar 23°55'82"N: 71°52'52"E	Shihori	Medieval brick structures in exposed section, sculptural fragments, stucco figurines and ceramics.
14	Kamboi 24°00'75"N: 71°58'90"E	Shihori	Damaged Medieval brick fortification 'Gadh' measuring 150m x 100m, ceramics like red ware, red slipped ware, grey ware and glazed ware, architectural fragments, and sculptures and copper coins.
15	Kasara 23°54'79"N: 71°54'69"E	Shihori	Medieval architectural fragments.
16	Khariya 23°56'32"N: 71°49'86"E	Shihori	Medieval ceramics like red ware, black ware, grey ware, micaceous ware, incised, painted sherds and architectural fragments.

17	Mangalpura 24°00'01"N: 71°53'11"E	Shihori	Medieval ceramics like red ware, red slipped ware, black ware and black and red ware.
18	Manipur 24°00'44"N: 71°54'31"E	Shihori	Medieval broken sculptures and inscribed hero-stone.

EXPLORATIONS AND EXCAVATIONS

Sl. No.	Name	Taluka	Finds
19	Nana Jampur 23°56'98"N : 71°50'79"E	Shihori	Medieval sculptures and late medieval 3 storied step-well
20	Ranwada 23°57'27"N : 71°55'01"E	Shihori	Medieval architectural fragments, broken sculptures, saddle querns, stone dabber and a hero stone.
21	Ranwada (Jagir) 24°04'08"N : 71°57'44"E	Shihori	Medieval architectural fragments.
22	Ratapura 24°03'82"N : 71°56'39"E	Shihori	Medieval grey ware, black ware, course red ware, red ware (plain and painted), red slipped ware, bricks and architectural fragments.
23	Ruppara 23°57'81"N : 71°54'55"E	Shihori	Microlithic tools, cores and debitage of semi-precious stones.
24	Tana 23°57'72"N : 71°50'07"E	Shihori	Medieval architectural fragments.
25	Thali 23°57'48"N : 71°54'14"E	Shihori	Medieval sculptures, donkey abusing inscribed hero stone and a broken piece of an iron cannon.
26	Totana 23°53'40"N : 71°51'46"E	Shihori	Medieval red ware, black ware and grey ware
27	Umbri 24°03'48"N : 71°57'87"E	Shihori	Medieval architectural fragments and a memorial stone depicting cow feeding calf.
28	Vada	Shihori	Medieval sculptures fixed within the walls of modern temple.

	23°59'53"N : 71°50'64"E		
29	Vithlod 23°53'61"N : 71°55'37"E	Shihori	Medieval ceramics like red ware, red slipped ware, black ware, grey ware, and black slipped ware, black and red ware.
30	Samanva 24°06'22"N : 71°57'19"E	Shihori	Medieval architectural fragments and inscribed sculptures.
31	Shihori 24°01'92"N : 71°52'22"E	Shihori	Medieval Red ware, Red Slipped ware, Black ware, brick bats and architectural fragments of Hindu temple.

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

6. EXCAVATION AT KHIRSARA, DISTRICT KACHCHH

In continuation of the previous year's work, Excavation Branch-V, Vadodara of the Survey, under the direction of Jitendra Nath assisted by R.N. Kumaran, Amol Kulkarani, N.B. Soni, J.B. Makwana, Partha Dhara, R.S. Shambharkar, B.M. Rohit, S. Nantha Kumar, Ramraj Meena and Priyanka Randive resumed the excavations at Khirsara to define the actual purpose of the multi-coloured mud brick platform exposed last season and to identify the structures in the area which are less disturbed, besides identifying the entrance.

The excavation was taken up by opening new trenches Y31, Y36, Y38, Y39, Y40, Y41, Z37, Z38, Z39, Z40 and Z41 in and adjacent to the citadel area to find out nature and extension of the multi-coloured mud brick platform found in Y39 during the previous season 2009-10. Two trenches Z38/1 and Y38/3 were taken up as index to know the

cultural sequence of the site. The index trench Z38/1, dug up to the depth of 6.36m, revealed the evidences of first human activity right on the top of the bed rock. The stratigraphy reveals evidences of successive layers of flood lanes which indicate that the area was repeatedly affected due to heavy rains or flood. The cultural deposit and the stratigraphy indicate that Khirsara is a single culture site with five distinct structural phases and the site was first occupied by the Harappans of Urban phase i.e. the Mature Harappans.

The excavation has revealed the existence of a well laid citadel within general fortification on the southern side. The exposed walls of citadel revealed that the core built of

multi-coloured mud brick was provided with roughly dressed stone veneering which rests over the bed rock. The total length of the northern wall is about 87m east-west. Besides, a huge multi-coloured mud brick floor on the inner side of the eastern wall was also exposed.

The actual purpose and the extent of the floor could be ascertained only after further investigation. The mud bricks are in the ratio of 1:2:4 and the sizes vary from 10x20x40cm to 12x24x48cm. The foundation of citadel was laid in second structural phase which overlies a thick layer of hard rammed base of the bed rock. The large sized roughly dressed stones were used in the base to bear the load of huge citadel walls. In the later phase some additions and alterations in the citadel wall were observed.

Trench Nos. Q37, R37, R38, S37, S38, T37, T38, U38, U39, W38, W39, W40, X38, X39, X40, X41 and X42 laid to the north of citadel have revealed the existence of "Factory Site or Industrial Area. The two structures were separated by a 5m lane in between. A flight of steps had been provided along the wall to approach the factory site from south. The rooms of the factory site are generally large, interconnected and provided with separate entrances. The stone paved floors were probably leveled with a thick layer of mud and mud brick material. In one of the rooms, circular pillar bases of different sizes with flat tops were found. However, the different alignments of wall indicate that additions and alterations were made at later stages to suite their requirements but the main structure was built in the second phase. The presence of two big furnaces, 'tandoor' *chullah*, and storage jars steatite beads copper implements, weights, shells and shell objects, etc., indicate that

EXPLORATIONS AND EXCAVATIONS

manufacturing units for production of variety of objects were located in this area. Trench X41, X42 and Y42 were taken up with a view to study the nature of the inner partition wall which encloses the 'Ware House' on its south. The excavation has revealed a thick wall in

random rubble masonry with roughly dressed face. The core was filled with rubble stones of various shapes and sizes. It is apparent that additions and alterations were undertaken in the later phases. The wall was raised over the leveled natural bed rock with a rammed base. Just opposite the inner partition wall, about 3.50m apart, structure built of rubble stones in single course with calcareous stone, measuring 4.20m (East-West) was noticed. Towards the south-east corner of the quadrant, a few courses of straight aligned wall abutting the above structure were also noticed.

The space in between was leveled with multi-coloured mud bricks and brick bats and probably used as passage or working space. However, this flooring was disturbed by a deep pit of later phase. The inner partition wall laid in east-west orientation was exposed to a length of 15m towards the west where it comes to an abrupt end and leaves a passage of about 1.40m for entrance to Ware House in between the wall and citadel area. Considerable additions and alterations were made to this wall in stepped fashion and in course the total width was extended to 6.55m. A closed drain was noticed 2.00m away from the south-west corner, which is nearly square in shape and encased with flat stones. Two more drains were also in the wall facing south. Excavation in the trench E37 and F37 exposed the continuation of the fortification wall and the protection wall

built to protect the site from the probable flood threat from river Khari. The protection wall exposed to a length of 9.00m had a width of 2.10m and further extends to either side into the unexcavated trench. The fortification wall located south of protection wall is separated by a distance of nearly 5m. The walls were built in

random rubble masonry using sandstones of various shapes, sizes, colour and texture and mud as building medium. Though the upper portion of the fortification wall is badly disturbed, the lower courses are comparatively intact. The core was filled with mud brick materials, chips, stones, etc. The total width of the fortification wall is about 6.70m. The excavation along the inner side of the fortification wall has revealed fallen debris of fortification as well as huge amount of charcoal and ashes from the stratified deposit. In between the two walls, huge amount of animal bones, mainly jaws along with teeth were noticed. It seems that the animals were slaughtered and buried here. The bones'

samples have been sent for scientific analysis (Pl. 10).

A variety of Harappan ceramics both plain and painted types of red ware, coarse red ware, red slipped ware, reserve slipped ware, chocolate slipped ware, grey ware, perforated ware, black red ware and gritty red ware were noticed along with the antiquities like cubical and truncated spherical weights of agate, quartz, basalt, chert, goethite and sandstone in various denominations, beads made of semi-precious stones include carnelian etched and plain types, agate chert, chalcedony, jasper, lapis lazuli, serpentine, faience, steatite, shell, terracotta, gold, copper, bangles of terracotta

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

and shell, bone points and beads, terracotta animal figurines representing bull beside a few birds, rattles, gamesmen, sling balls, hopscotch, toy carts, wheels, flat, oval shaped saddle querns with or without legs, pounders of sandstone are also recovered in good numbers (Pl. 11).

Terracotta anthropomorphic figurine with painted circular bands and a hole in the centre, found during the excavation perhaps represents a cult object. Six seals of square, rectangular and bar type made of steatite, soap stone and sand stone including the broken ones have been discovered. Besides typical Harappan legends, the two rectangular seals represent figurines of unicorn and a bison on the obverse. The reverse sides of the rectangular seals have knob with perforation (Pl. 12).

7. EXCAVATIONS AT CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK

The excavation at Champaner-Pavagadh Archaeological Park, was carried out by the Vadodara Circle of the Archaeological Survey of India, in collaboration with the Department of Archaeology and Ancient History, Faculty of Arts, M.S.University, Baroda, and the Directorate of Archaeology, Government of Gujarat, Gandhinagar, in an open area facing Three Cells, a centrally protected monument, within the citadel walls making royal enclosure of 15th century CE., founded by Mahmud Begada (1458-1511 CE). The area actually lies between the Three Cells on the south and the 'Maratha Mahal' on the north. The main objective of the present excavation was to understand the true nature of Three Cells and wider context of the Sahar- ki-

Masjid, another centrally protected monument within citadel walls, besides throwing a light on the occupational history of the site area under reference.

The excavations revealed many interesting features. The first was a continuous brick wall aligned to the western wall of the Maratha Mahal. On stratigraphy, it indicated that the structures found in this locality belonged to the Maratha period rather than to the preceding Sultanate period. This is supported by presence of a water channel which is oriented in a manner similar to ones present along the boundaries of the Maratha Mahal. Another significant feature was a long plinth of stone running along the cardinal directions, but abruptly broken at a point from where it followed south-western orientation.

The plinth is decorated with a row of incised diamonds similar to those available on a plinth found from excavations. Therefore, the ***EXPLORATIONS AND EXCAVATIONS***

plinth appears to be removed from its original context, and reused here in secondary context. Yet another interesting feature was a single-walled brick structure associated with a floor of burnt bricks, all over white washed. It has a single rectangular platform with a basalt stone set in the center. Purpose of this structure is, however, not yet known. Besides, plastered floors were found covering a large part of the area so far excavated. At places, the plaster has survived in larger patches also. Antiquities recovered from excavations have been found from a highly disturbed context. This is probably also owing to a lot of gardening and landscaping activities in the area of more recent in origin, as also presence of trees roots and rodent holes. Some noteworthy antiquities recovered included a copper coin, a bent iron

Plate 10



A



B

Khirsara: General view of the excavation,

Plate 11



A



B

Khirsara: Painted sherds



A



B

Khirsara: A, Beads and B, Harappan Seal

object, broken terracotta figurines, a small cannon ball, a fragmentary copper vessel, pieces of iron slag, porcelain and earthenware sherds (Pl. 13).

8. EXPLORATION IN AND AROUND SOMNATH COAST, DISTRICT, JUNAGADH

Field explorations were briefly undertaken along the Somnath coast, District Junagadh by Arati Deshpande-Mukherjee and Sushama Deo, from the Department of Archaeology, Deccan College, Pune. The coastal region between Chorwad and Mul Dwarka was surveyed, where observations on beach deposits and other coastal features and exploration for locating sites and collection of modern shell samples were made.

27

The coast at Somnath is characterized by a narrow, an active sand dune, an old sand dune, and a beach rock which is exposed during low tide. The long but narrow beach is intersected by the mouth of river Hiran in the south. This narrow beach is steep sloping and is backed by two dunes: the old/inactive and new/active dune. The old dune is a linear type of sand dune which runs parallel to the coast. The present Somnath temple is situated on this old sand dune. A few pot sherds and animal bone fragments were found on the exposed surface of the dune during exploration in 2008-09. However, the old dune has undergone severe destruction which resulted in fresh exposure of the dune section yielding cultural material. The exposed dune section is about 150m and is 15m away from the high tide line. The dune section throughout its length beginning from the base of the temple and running southwards has been fairly well preserved. The pottery, animal bones and other

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

cultural material were noticed *insitu* the dune section. At one point the section has been cut by a nullah which flows through it and joins the sea. Around the nullah in section both pottery and bones are visible. Following this the height of the deposit decreases considerably caused by destruction due to movement of people walking down to the beach. Good sections are visible towards the north near the Somnath temple. From the 130m laterally exposed section of the dune, two distinctive layers are visible comprising pottery, animal bones and very few shells. The total thickness of the exposed dune is approximately 6m to 7m cultural material was collected from the dune section by section scraping at GPS location 20°58'0.3.9" and 70°22'11.8" having total exposed thickness of 5.2m the field description in this section is as follows:

EXPLORATIONS AND EXCAVATIONS

0 to 1.6 m	: Layer 2 (pottery, bones)
1.6 to 2.4m	: fine sand with occasional cultural remains.
2.4 to 4.8m	: cultural material throughout
4.8m to 5.2	: Layer 1 (pottery, bones)
Above 5.2m	: coarse sand, no cultural remains.

Along the length of this dune, at another locality, it was observed that above this Layer 1 there is a very fine sand layer without any cultural material. This very fine sand layer is forming the base of the present-day Somnath temple. Through scraping, cultural material comprising ceramic sherds, animal bones, molluscan shells and charcoal were recovered from the following units in the exposed section.

Unit 1- 0-30cm
Unit 2- 30-50cm
Unit 3- 50-90cm

Plate 13



A



B

Champaner-Pavagadh Archaeological Park: exposed structures

Unit 4- 90-110cm
Unit 5- 110-200cm
Unit 6- 200-500cm

The objects found were a terracotta fragment with a perforation; it is probably a handle of vessel. A piece of iron rod was found in Unit 2 while from Unit 4 a semi-circular flat piece of copper was recovered. A few animal bones and potsherds were collected from the surface at the base of the section. All the cultural material collected from the exposed section comprising pottery, bones shells, soil samples were analyzed at Deccan College, Pune. Soil/sand samples taken from the exposed section as well as from the modern beach are being analyzed in the sedimentology laboratory for determining sand size, carbonate content, foraminifers, etc. Charcoal samples were collected from the exposed section. Two

samples from 30-50cm and 90-110cm have been sent to Birbal Sahni Paleobotanical Institute for radiocarbon dating. Fluorine analysis of animal bone samples is currently being carried out at the Chemistry laboratory Deccan College, Pune. By Mr. Sachin Joshi, results of the analysis done on a few samples so far have indicated a late Holocene date. An assorted variety of ceramics were found in the deposit. Their concentration varied throughout the section. These comprised sherds from the rim, body and base. Partially broken pottery was observed *in situ* the exposed section. The ceramics included large storage jars, bowls, *handis*, *lotas*, lamps, etc. The presence of spouts is also visible, which is a common characteristic of ceramics in Saurashtra of the early historic and medieval period. The pottery varied from thick to thin sherds, some poorly

fired, plain without any decoration. Preliminary observations of the ceramic assemblage have indicated a medieval time slot for it. Currently, a more detailed study of the pottery samples is in progress. Presence of glazed ware sherd finely made, well fired with green colour glaze on its inside was observed which is characteristic of the medieval period. Similar ware has been reported from some of the medieval sites in Gujarat. Faunal analysis of bones and shells collected from the exposed section was carried out in the archaeo-zoology laboratory of the Deccan College, Pune. Although in a fragmented condition, the bones are fairly well preserved. These comprised almost all the skeletal elements vertebrae, limb bones, phalanges, teeth, astragalus, etc. A few molluscan shells were also recovered. The following categories of animals were identified. Mammals Cattle bones of cow/buffalo were most common in the collection. These comprised long bone shafts of humerus, femur and metapodials, astragalus, phalanges, calaneum and parts of mandible. Many of the bones bear cut marks and show traces of charring on them. A large first phalanx of buffalo was identified. A few bones comprising mandible, humerus and metacarpal of sheepgoat were also identified. The donkey was represented by a first phalanx. A skull of young pig was also found. Very few bones of wild animals were observed excepting that of a humerus shaft of Nilgai (*Boselaphastragocamelus*). Birds one portion of femur of chicken completely charred was obtained from unit 30-50cm. Turtle the fresh water turtle *Kachuga* sp. is identified by a part of the pelvis from unit 30-50cm. One small charred fragment of a turtle carapace was also found which also belonged to a fresh water variety. Fish throughout the exposed section fish vertebrae of various sizes were observed. These mostly belong to marine fish such as sharks Molluscs

there are mostly of marine origin and include gastropod shells of *Turbo* sp., *Cypraea* sp., *Moneta Moneta*, *Thaïssp.* Limpet. All are indicative of rocky intertidal areas. Marine bivalves comprised only one shell of *Acanthocardia lata*. A single spire portion of the chank shell *Turbinella pyrum* was recovered in the middle section of the exposed dune. In the upper section of the dune was also observed an oyster shell of *Crassostrea* sp. Crustacean the hard calcareous body parts of crab mainly the pincers was also recorded. In addition, places such as Chorwad, Savni, Sutrapada, Pasnawada and MulDwarka area were also visited to record traces of ancient human habitation.

9. EXCAVATION AT KOTADA BHADLI, DISTRICT KACHCHH,

The site of Kotada-Bhadli is located in Nakhatrana Taluka of District Kachchh, Gujarat. The geo-coordinates of the site are 23° 20' N; 69° 25' E. It was first discovered by J.P. Joshi in 1964-65 (IAR 1964-65 Page no 12). It is approximately 3.11 acres in size and is completely intact, a rare feature for Harappan sites. Another unique attribute of this site is that it does not represent a mound in the classic sense. The site is 'flat' within the fortification walls and pottery fragments are exposed on the surface in minimal numbers. The site is located on a confluence zone of two rivers the one on the western side or left side and another on the east side or right side. The confluence of both the rivers is very close to the site and after that the river empty outs in the Banni plains of the Greater Rann of Kachchh. The site was excavated by Department of Archaeology, Deccan College of Post-Graduate and Research Institute, Pune. Bharat Dighe, Devadatta Phule

and Jose Raffehl participated in the excavations. In all, 5 trenches measuring 5m x 5m were excavated. Initial test-trenches were excavated in February-March 2011. Out of 5 trenches, only 1 trench -XC4 was excavated up to virgin soil, provisionally indicating a cultural sequence of 60cm, surrounded by a nearly intact square fortification wall. A four-walled room structure and a fortification wall's inner face on the southern side of the site were exposed. On the inner fortification of northern side, two more walls were exposed, but due to limited excavations their relation with fortification wall is not known. The ceramic assemblage from the site of Kotada Bhadli has been divided into ware and varieties. The basic wares have been identified based on the treatment and paintings. The wares and varieties are as follows:

1. Red Ware: It is further sub-divided into various varieties such as:

- a) Black-on-Red variety or Painted
- b) Red Variety
- c) Bichrome Variety
- d) Red Slipped Unpainted variety and Red Untreated variety

Black on Red Variety: This variety is dominated by fine fabric and in some cases it has medium fine fabric. It is well fired and fashioned made on fast wheel as well as lutting technique. It is treated with brownish red colour. The slip is applied on exterior as well as interior of the open vessels. The painted motifs done on the pottery are geometrical such as wavy vertical lines in panes, jali pattern, horizontal bands etc. The paintings are done in black or brown colour. The main shapes in this category are basins, beakers, convex sided bo-

-wls, dish, dish-on-stand and globular pots.

Biochrome Variety: It has medium fine fabric and is medium fired. It is made using fast wheel technique. On the exterior the paintings are done using two colours viz. cream and black colours. The painted motifs are simple horizontal bands in black colour and cream used as filling colour. The main shapes in this variety are deep bowls.

Red slip unpainted: The fabric of this variety varies from fine to coarse. Large number of pottery in this category is fast wheel made and in some cases the luting marks are there which shows the slab or coiled technique used for the production. Most of the pottery is well fired but some of the pottery types such as globular pot are ill-fired. 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 and in case of open vessels such as bowls dish and dish-on-stand, the slip is applied on exterior as well as interior. The main shapes in this variety are globular pots, squat shaped vessel, dishes, bowls, storage jars, convex sided bowls and lid.

Red Untreated Variety: This variety has coarse and gritty fabric. It is ill-fired and manufactured 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, squat shaped vessels, perforated jars, bowls, etc.

2. Pink Ware: This particular ware has fine to medium fine fabric. It is fast wheel made. 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 shapes are globular pots, deep convex sided bowls, beakers, dishes, cup and lids.

3. Grey Ware: This ware has been subdivided into two varieties based on the fabric.

Fine Grey Variety: This ware has been found in less quantity at the site. It has fine fabric and is smokey grey in section. It is manufactured on the fast wheel. It is treated with the red colour slip on the exterior.

Coarse grey variety: It is ill fired and has gritty fabric. For the manufacturing of this variety clay mixed with large sand particles has been used. The sand particles are visible in all over the pottery. The main shapes identified in this variety are globular pot, and base of dish-on-stand.

4. Kaolinite Ware: This particular ware has been termed as Kaolinite ware because the similar ceramic has been found at the site of Kanmmer, where the excavator has called it as Kaolinite ware. Though the nomenclature is not suitable of the Harappan ceramics, it is used to show that different raw material has been used for the production of this ware. It has fine fabric and it is well fired made on fast wheel technique. The colour of the fabric varies from white to pink in colour. 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 shapes in this ware are bowls, beakers, globular pots, dishes, convex sided bowls etc.

Antiquities: The site is devoid of any exotic antiquities. The list of antiquities comprises some carnelian, terracotta and steatite beads, one small basalt weight, perforated disc and discs. The ceramic observations indicate that the ceramics comprised typical Mature Harappan types as well as regional Sorath Harappan material. The stone structures and the construction style also indicate the Late Mature Harappan period. Based on ceramics and structures, the site has been tentatively put in the bracket of Late Mature Harappan period.

HARYANA

10. EXPLORATION IN DISTRICT FATEHABAD

To establish the geographical context of archaeological sites in the hinterland of the Ghaggar palaeochannel that cuts across parts of northern Haryana, and to gain insight into the spatial and temporal variation of sites within this zone, the team of Land, Water and Settlement Project under the direction of R. N. Singh, Department of AIHC & Archaeology, Banaras Hindu University and C.A. Petrie, Department of Archaeology, University of Cambridge supported by V. Pawar (Rohtak), A.K.Pandey (BHU) and D. Parikh (Cambridge)

carried out a systematic village-to-village survey of a large area on either side of the palaeochannel and a sizeable area to the north. This has been called the Ghaggar Hinterland Survey, and surveys the hinterland of some well known Indus Civilization settlements including Banawali, Bhirrana and Kunal. A total of 182 sites were located during this survey (Table 1). 125 of these sites have not been recorded in previous survey reports and

compilations meaning that up to 69% of sites within this particular area are new to knowledge. In contrast to the Rakhigarhi Hinterland Survey that was carried out by the same project in 2009, the chronological distribution of these new sites is skewed towards the Early Historic (77 sites, 42% new) and Medieval (136 sites, 74% new) period, suggesting that previous surveys have focussed on the identification of Indus Civilization sites

and have not recorded later period sites. Only one Mature Harappan site was new to knowledge, no new Late Harappan sites were discovered, and 6 new Early Harappan sites were identified out of a total of 17. The number of sites of each period is as follows: 17 Early Harappan, 8 Mature Harappan, 2 Late Harappan, 11 PGW, 77 Early Historic and 136 Mediaeval (Fig. 3).

Table 1. List of sites recorded during the Ghaggar Hinterland Survey. Site locations established using a Garmin GPS. Abbreviations EHar = Early Harappan, MHar = Mature Harappan, LHar = Late Harappan, PGW = Painted Grey Ware, NBP = Northern Black Polished Ware, EHis = Early Historic, Med = Medieval. Where sites have been recorded previously, the publication is noted.

Archaeological Findings

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. asl	Period	Previous reporting
1	Alawalwas	Alawalwas	75	29.37	29	43.04	202	Med	

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. asl	Period	Previous reporting
2	Kalotha I	Kalotha	75	27.27	29	44.36	212	Med	
3	Kalotha II	Kalotha	75	28.11	29	44.36	206	Med	
4	Malwala	Malwala	75	24.51	29	43.47	203	EHar	
5	Mohammedki	Mohammedki	75	26.47	29	45.28	214	EHis	
6	Baliala	Baliala	75	30.33	29	43.6	217	EHis	Kumar 2009
7	Kamana	Kamana	75	35.56	29	42.16	216	EHis	
8	Kawalgarh I	Kawalgarh	75	27.14	29	41.16	211	PGW	
9	Kawalgarh II	Kawalgarh	75	37.57	29	42.43	213	EHis	
10	Bhawanikhera	Bhawanikhera	75	39.04	29	43.3	213	PGW	Possehl 1999; Kumar 2009
11	Mahamra	Mahamra	75	38.41	29	44.17	220	Med	
12	Gularwala	Gularwala	75	46.25	29	42.12	211	EHar, MHar, EHis	Possehl 1999; Kumar 2009
13	Dher	Dher	75	46.18	29	42.12	212	Med	
14	Bhodi	Bhodi	75	47.45	29	38.58	227	EHis, Med	
15	Bawan	Bawan	75	46.27	29	35.53	206	PGW, EHis	Possehl 1999; Kumar 2009
16	Dadupur	Dadupur	75	28.29	29	41.07	204	EHis	
17	Hukmawali	Hukmawali	75	26.03	29	41.51	202	Med	
18	Gandha	Gandha	75	22.42	29	41.51	205	Med	Kumar 2009
19	Saharana	Saharana	75	22.42	29	42.44	202	Med	
20	Bharanwali	Bharanwali	75	21.25	29	37.4	214	Med	
21	Khundan	Khundan	75	22.1	29	38.55	197	Med	Chakrabarti and Saini 2009
22	Nagpur	Nagpur	75	25.54	29	39.1	196	Med	

EXPLORATIONS AND EXCAVATIONS

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. asl	Period	Previous reporting
23	Nimdi	Nimdi	75	28.17	29	39.56	178	Med	
24	Haroli	Haroli	75	27.51	29	39.34	201	Med	
25	Banawali	Banawali Sottar	75	23.32	29	35.54	209	EHar, MHar, LHar	Possehl 1999; Kumar 2009
26	Ratta Tibba I	Ratta Tibba	75	22.22	29	36.07	200	Med	
27	Manakpur	Manakpur	75	22.55	29	36.37	201	Med	Chakrabarti and Saini 2009
28	Ratta Tibba II	Ratta Tibba	75	21.33	29	36.1	197	PGW, EHis, Med	
29	Ali Sadar I	Ali Sadar	75	21.27	29	34.46	200	EHis, Med	
30	Jandwala	Jandwala	75	27.35	29	35.12	202	EHis	
31	Mallhar	Mallhar	75	27.1	29	34.48	202	Med	Kumar 2009
32	Chugha Ali	Chugha Ali	75	26.19	29	35.06	202	EHis	
33	Karian Ali	Karian Ali	75	25.37	29	35.31	202	Med	
34	Musa Ali	Musa Ali	75	23.54	29	35.47	199	EHis, Med	
35	Hijarawan Kala I	Hijarawan Kala	75	23.48	29	33.45	201	Med	
36	Hijarawan Kala II	Hijarawan Kala	75	23.36	29	35.11	204	EHis, Med	
37	Hijarawan Khurd I	Hijarawan Khurd	75	22.17	29	34.58	195	EHis, Med	
38	Hijarawan Khurd II	Hijarawan Khurd	75	22.19	29	34.27	201	EHis	
39	Ayalki I	Ayalki	75	29.58	29	34.58	196	EHis	
40	Ayalki II	Ayalki	75	29.51	29	33.29	203	Med	
41	Ayalki III	Ayalki	75	29.44	29	34.05	205	Med	
42	Dhir (Zafarwal)	Dhir (Zafarwal)	75	28.55	29	33.01	208	Med	

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. asl	Period	Previous reporting
43	Dhani Thoba	Dhani Thoba	75	26.5	29	33.54	207	Med	
44	Khan Muhammad	Khan Muhammad	75	25.57	29	32.25	209	EHis, Med	
45	Daryapur I	Daryapur	75	21.05	29	31.21	204	Med	
46	Daryapur II	Daryapur	75	20.28	29	32.01	208	Med	
47	Ali Sadar II	Ali Sadar	75	19.02	29	34.49	202	PGW, EHis, Med	
48	Haripura	Haripura	75	21.12	29	33.14	207	EHis	
49	Karnaui I	Karnaui	75	18.51	29	32.28	222	EHis, Med	
50	Karnaui II	Karnaui	75	19.3	29	32.01	205	EHis	
51	Gehla Khera I	Gehla Khera	75	18.59	29	21.26	210	Med	
52	Gehla Khera II	Gehla Khera	75	18.24	29	30.45	206	Med	
53	Gehla Khera III	Gehla Khera	75	18.07	29	29.32	196	Med	
54	Sahidanwali	Sahidanwali	75	21.04	29	30.26	194	Med	
55	Kharaiti Khera	Kharaiti Khera	75	21.54	29	30.14	199	Med	Kumar 2009
56	Ratta Khera I	Ratta Khera	75	31.4	29	39.15	203	Med	Possehl 1999; Kumar 2009
57	Ratta Khera II	Ratta Khera	75	31.26	29	39.42	208	Med	Possehl 1999; Kumar 2009
58	Barota	Barota	75	30.26	29	35.56	204	Med	Possehl 1999; Kumar 2009
59	Rajabad	Rajabad	75	31.27	29	34.16	211	Med	
60	Majara	Majara	75	31.49	29	31.41	210	EHis, Med	Kumar 2009
61	Bisla	Bisla	75	30.38	29	30.49	203	EHis	
62	Jhalnia	Jhalnia	75	33.27	29	31.08	207	Med	

EXPLORATIONS AND EXCAVATIONS

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. asl	Period	Previous reporting
63	Bhorrana I	Bhorrana	75	32.53	29	33.19	204	EHar, MHar, Med	Possehl 1999; Kumar 2009
64	Bhorrana II	Bhorrana	75	33.38	29	33.47	206	Med	Possehl 1999; Kumar 2009
65	Chimun I	Chimun	75	39.36	29	40.2	211	Med	Possehl 1999; Kumar 2009
66	Lamba	Lamba	75	40.48	29	42.35	217	EHis, Med	
67	Badalgarh	Badalgarh	75	39.16	29	46.13	210	Med	
68	Musa Khera	Musa Khera	75	43.08	29	44.02	215	EHis	
69	Ratta Theh	Ratta Theh	75	42.13	29	42.57	202	EHar, MHar	Possehl 1999; Kumar 2009
70	Karandi	Karandi	75	41.18	29	42.08	206	Med	
71	Ghaswa I	Ghaswa	75	40.11	29	41.07	205	EHar	Possehl 1999; Kumar 2009
72	Ghaswa II	Ghaswa	75	40.36	29	41.07	208	PGW, Med	Possehl 1999; Kumar 2009
73	Chimun II	Chimun	75	39.53	29	40.39	226	EHis	Possehl 1999; Kumar 2009
74	Dharsul Kalan I	Dharsul Kalan	75	44.12	29	40.36	218	EHis	
75	Diwana	Diwana	75	44.34	29	41.3	211	Med	Possehl 1999
76	Dharsul Kalan II	Dharsul Kalan	75	44.29	29	39.59	206	Med	
77	Kullan	Kullan	75	43.45	29	40.02	206	Med	
78	Bhuna I	Bhuna	75	44.33	29	32.05	213	Med	Chakrabarti and Saini 2009
79	Khasa	Khasa	75	45.05	29	32.34	212	EHis, Med	
80	Bhuna II	Bhuna	75	42.01	29	31.58	218	EHis, Med	Chakrabarti and Saini 2009
81	Dulat	Dulat	75	44.31	29	33.49	217	Med	
82	Bahunra	Bahunra	75	41.18	29	37.36	209	Med	Kumar 2009

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. asl	Period	Previous reporting
83	Kheri Rayan	Kheri Rayan	75	42.57	29	37.32	208	Med	
84	Laharian I	Laharian	75	44.31	29	37.32	208	EHis, Med	
85	Laharian II	Laharian	75	43.3	29	37.5	203	Med	
86	Zabtewala	Zabtewala	75	42.02	29	39.38	220	EHis, Med	
87	Nanheri I	Nanheri	75	41.42	29	39.58	204	EHis	Chakrabarti and Saini 2009
88	Nanheri II	Nanheri	75	41.05	29	40.01	201	Med	Chakrabarti and Saini 2009
89	Khera (Bhuthan)	Khera (Bhuthan)	75	36.25	29	34.58	202	Med	Possehl 1999; Kumar 2009; Chakrabarti and Saini 2009
90	Bhuthan Khurad	Bhuthan Khurad	75	35.32	29	33.47	209	Med	
91	Bhuthan Kullan	Bhuthan Kullan	75	35.52	29	32.27	210	EHis	
92	Jandli Khurad I	Jandli Khurad	75	40.35	29	30.6	212	EHis	
93	Jandli Khurad II	Jandli Khurad	75	37.51	29	31.54	218	EHis	
94	Chandrawal	Chandrawal	75	37.42	29	21.13	223	EHis, Med	
95	Hasanga I	Hasanga	75	36.5	29	36.1	180	Med	Kumar 2009
96	Hasanga II	Hasanga	75	37.07	29	36.05	203	Med	Kumar 2009
97	Hasanga III	Hasanga	75	37.45	29	36.19	210	EHis, Med	
98	Nadhuari I	Nadhuari	75	38.32	29	34.11	223	Med	
99	Nadhuari II	Nadhuari	75	39.08	29	34.24	205	Med	
100	Nadhuari III	Nadhuari	75	39.07	29	34.48	209	Med	
101	Ghotru	Ghotru	75	38.22	29	35.47	214	Med	

EXPLORATIONS AND EXCAVATIONS

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. a sl	Period	Previous reporting
102	Aharwan I	Aharwan	75	32.06	29	36	181	Med	
103	Aharwan II	Aharwan	75	32.23	29	36.33	209	EHis, Med	
104	Palsar	Palsar	75	35.33	29	35.51	206	Med	
105	Pandri	Pandri	75	35.57	29	35.38	211	Med	
106	Bhirrana III	Bhirrana	75	33.26	29	34.13	206	PGW, EHis, Med	Possehl 1999; Kumar 2009
107	Fatehabad	Fatehabad	75	28.22	29	30.23	204	Med	
108	Burj I	Burj	75	38.28	29	39.23	208	EHar, PGW, EHis	Possehl 1999; Kumar 2009
109	Burj II	Burj	75	38.18	29	39.27	203	Med	Possehl 1999; Kumar 2009
110	Mohammedpur Sottar	Mohammedput Sottar	75	38.15	29	37.13	207	Med	
111	Kunal I	Kunal	75	39.32	29	37.17	212	EHar, MHar, PGW	Possehl 1999; Kumar 2009
112	Kunal II	Kunal	75	39.23	29	37.33	210	EHis, Med	Possehl 1999; Kumar 2009
113	Kunal III	Kunal	75	39.44	29	38	207	EHis, Med	Possehl 1999; Kumar 2009
114	Kunal IV	Kunal	75	39.57	29	37.38	202	EHis, Med	Possehl 1999; Kumar 2009
115	Lali I	Lali	75	31.59	29	42.3	205	EHis, Med	
116	Lali II	Lali	75	30.28	29	42.51	202	EHis, Med	
117	Sukhlampur	Sukhlampur (Sukhalpur)	75	35.58	29	38.19	205	EHis, Med	
118	Sahnal	Sahnal	75	35	29	37.55	207	Med	
119	Chando Kalan	Chando Kalan	75	37.13	29	38.3	198	Med	
120	Ratia I	Ratia	75	35.35	29	41.33	200	EHis, Med	
121	Ratia II	Ratia	75	33.41	29	41.51	201	Med	

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. a sl	Period	Previous reporting
122	Gandhu Khurd	Gandhu Khurd	75	33.35	29	47.17	204	Med	
123	Boha	Boha	75	33.36	29	50.03	204	LHar, EHis, Med	Possehl 1999; Kumar 2009
124	Gamiwala I	Gamiwala	75	31.5	29	48.29	201	EHar, EHis	
125	Gamiwala II	Gamiwala	75	32.15	29	47.5	207	Med	
126	Thalwala	Thalwala	75	32.25	29	46.24	207	Med	
127	Gadhar	Gadhar (Gadharpati)	75	30.5	29	51.2	219	EHar, EHis	
128	Kalipur	Kalipur (Karipur)	75	33.39	29	53.37	219	Med	Possehl 1999
129	Fallu Dogran	Fallu Dogran	75	31.55	29	53.57	210	Med	
130	Ram Nagar Bhattal	Ram Nagar Bhattal	75	31.46	29	51.53	202	PGW, EHis	
131	Mal Singh Wala I	Mal Singh Wala	75	29.54	29	52.45	216	Med	
132	Mal Singh Wala II	Mal Singh Wala	75	30.22	29	52.1	219	EHis, Med	
133	Mal Singh Wala III	Mal Singh Wala	75	30.04	29	52.24	209	Med	
134	Jhandonke	Jhandonke	75	21.52	29	45.15	201	EHis, Med	
135	Jhuniar I	Jhuniar (Jhunir)	75	19.58	29	48.32	194	Med	
136	Jhuniar II	Jhuniar (Jhunir)	75	22.24	29	48.29	210	EHis	
137	Danewala I	Danewala	75	23.18	29	48.38	207	EHis, Med	Possehl 1999
138	Danewala II	Danewala	75	23.48	29	48.27	198	EHar, MHar, EHis, Med	Possehl 1999
139	Danewala III	Danewala	75	23.39	29	49.09	201	Med	
140	Fatehpur	Fatehpur	75	24.06	29	46.06	203	EHis, Med	Possehl 1999; Kumar 2009; Chakrabarti and Saini 2009

EXPLORATIONS AND EXCAVATIONS

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. asl	Period	Previous reporting
141	Mofar	Mofar	75	24.32	29	47.26	201	Med	
142	Faridke	Faridke	75	26.44	29	47.58	208	Med	
143	Nandgarh	Nandgarh	75	25.15	29	48.23	206	EHar, EHis,	Possehl 1999; Kumar 2009; Chakrabarti and Saini 2009
144	Dalelwala I	Dalelwala	75	25.34	29	50.29	211	EHis	Possehl 1999
145	Dalelwala II	Dalelwala	75	24.14	29	49.53	204	Med	Possehl 1999
146	Alimpur Mandran I	Alimpur Mandran (Alampur)	75	26.09	29	50.07	207	EHis, Med	
147	Alimpur Mandran II	Alimpur Mandran (Alampur)	75	27.4	29	50.43	199	EHis	
148	Alimpur Mandran III	Alimpur Mandran (Alampur)	75	27.46	29	49.1	202	Med	
149	Uddat Saidewala	Uddat Saidewala	75	27.52	29	48.27	207	EHis	
150	Malakpur Bhimra	Malakpur Bhimra	75	28.34	29	47.55	210	EHis, Med	Kumar 2009
151	Thalwala II	Thalwala	75	31.37	29	46.03	182	EHis	
152	Thalwala III	Thalwala	75	31.33	29	46.2	200	EHis	
153	Naggal I	Naggal	75	30.19	29	46.18	207	Med	
154	Naggal II	Naggal	75	30.35	29	46.13	206	EHis, Med	
155	Naggal III	Naggal	75	30.09	29	46.11	207	EHis, Med	
156	Sardarewala	Sardarewala	75	29.12	29	46.15	216	EHis	
157	Ladhuwas I	Ladhuwas	75	28.46	29	46.5	207	EHis	
158	Ladhuwas II	Ladhuwas	75	28.03	29	47.09	204	Med	
159	Ladhuwas III	Ladhuwas	75	28.06	29	47.41	206	Med	

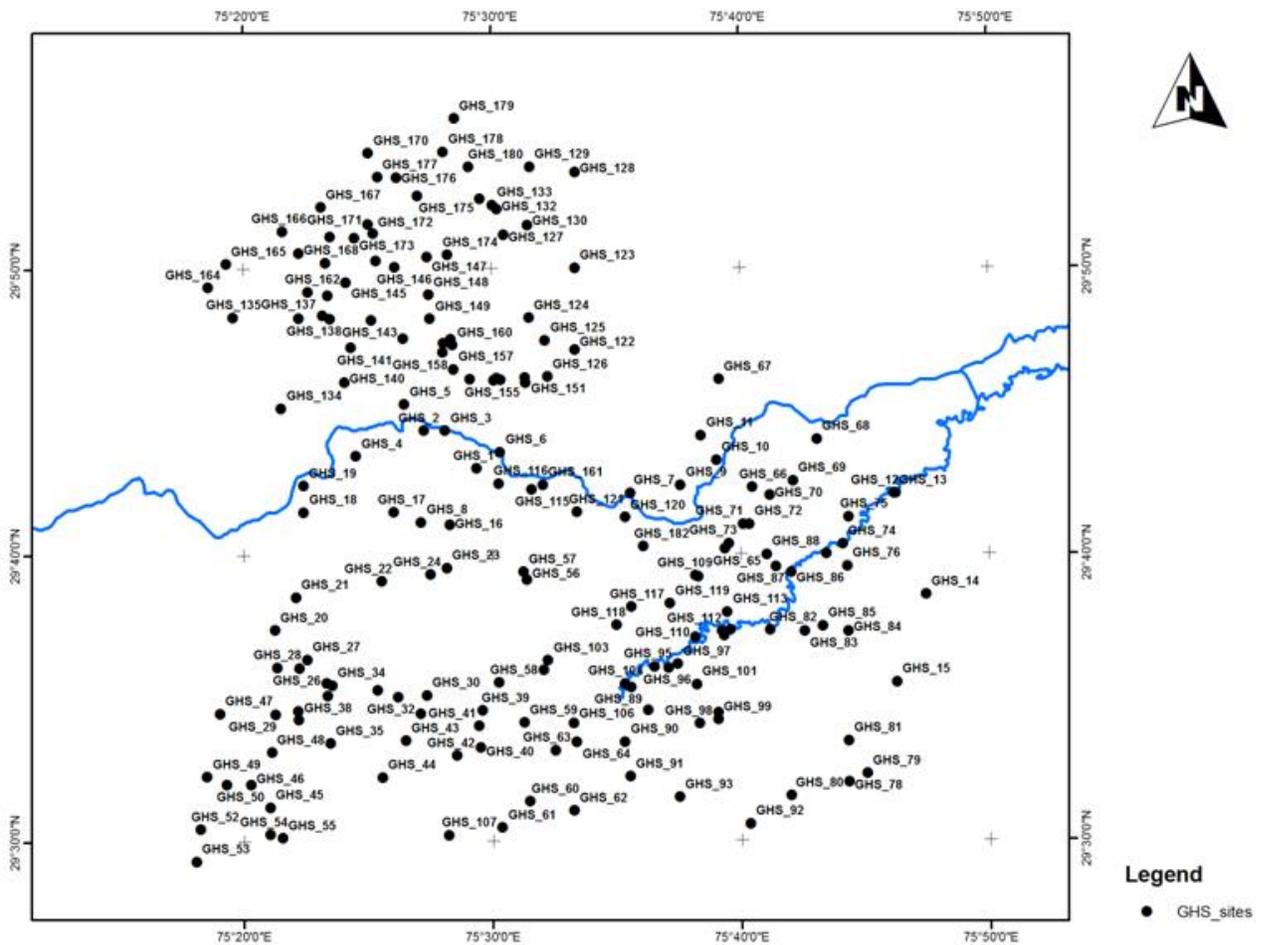
INDIAN ARCHAEOLOGY 2010-11-A REVIEW

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. a sl	Period	Previous reporting
160	Ladhuwas IV	Ladhuwas	75	28.42	29	47.35	208	EHis, Med	
161	Mirrana	Mirrana	75	32.05	29	42.46	205	PGW	Possehl 1999
162	Korwala I	Korwala	75	22.59	29	49.21	197	Med	
163	Korwala II	Korwala	75	22.23	29	50.57	210	Med	
164	Fatehgarh Shahnawali I	Fatehgarh Shahnawali	75	18.57	29	49.37	205	Med	Possehl 1999
165	Fatehgarh Shahnawali II	Fatehgarh Shahnawali	75	19.31	29	50.19	198	Med	Possehl 1999
166	Bhama Khurad	Bhama Khurad (Bhame Khurad)	75	21.57	29	51.33	200	EHis, Med	
167	Kot Dharmun	Kot Dharmun (Kot Dharmu)	75	23.13	29	52.17	199	Med	
168	Chhachhohar	Chhachhohar	75	23.32	29	50.22	203	Med	
169	Lakhmirwala	Lakhmirwala	75	23.49	29	51.13	206	EHar, MHar	Possehl 1999
170	Narayangarh	Narayangarh	75	25.05	29	54.06	209	EHar, EHis, Med	
171	Karanpur I	Karanpur (Akkanwali)	75	25.03	29	51.56	215	Med	Possehl 1999
172	Karanpur II	Karanpur (Akkanwali)	75	25.24	29	51.26	207	Med	Possehl 1999
173	Karanpur III	Karanpur (Akkanwali)	75	24.47	29	51.1	202	EHis	Possehl 1999
174	Alimpur Mandran IV	Alimpur Mandran (Alampur)	75	28.23	29	50.5	212	EHis, Med	
175	Mandhali II	Mandhali	75	27.02	29	52.56	203	Med	Kumar 2009
176	Mandhali II	Mandhali	75	26.18	29	53.21	204	Med	Kumar 2009
177	Saharan	Saharan	75	25.42	29	53.22	201	Med	
178	Pipalian	Pipalian	75	28.07	29	54.1	213	EHar	Possehl 1999
179	Barah I	Barah	75	28.52	29	55.26	206	EHar, EHis, Med	

EXPLORATIONS AND EXCAVATIONS

GHS No.	GHS Site name	Village	East Deg. Mins.		North Deg. Mins.		Elev. a sl	Period	Previous reporting
180	Barah II	Barah	75	29.09	29	53.56	205	Med	
181	Barah III	Barah	75	30.23	29	24.35	200	EHar, MHar, EHIS	
182	Ratia III	Ratia	75	36.08	29	40.3	201	Med	

Fig. 3



Distribution of sites found in relation to the course of the modern Ghaggar (above) and the Rangoi nullah (below)

11. EXCAVATIONS AT KARSOLA KHEDA, DISTRICT JIND

The site of Kasrola in District Jind was selected for excavation for the season 2010-11. The excavation work was carried out jointly by Vasant Shinde of Deccan College of Post-Graduate and Research Institute, Deemed University, Pune and P.B.S. Sengar, of the Institute of Archaeology, of the Survey assisted by Nilesh Jadhav, Aftab Hussain, Narender Parmar, Kanti Pawar, P.D. Sable, Nilanshu Kaushik, Lal Singh Mamani, Subhas, Sharmaji, Raj Bir Choudhary, Madan Lal, Bikari Nagar, Satish Naik, P.P. Joglekar, Abhayan, Ankit Agrawal, Kalyan Chakrabarty, Masters and PG Diploma students of Deccan College and PG Diploma students of Institute of Archaeology.

The village Karsola, in whose jurisdiction an archaeological site is located, falls in Julana Tehsil of District Jind. It lies about 2km slightly north-east of the Julana town and about 25km south-east of Jind, the District Headquarters. The village is well connected to Julana by metal road. It is one of the largest villages in the District and prosperous due to the presence of fertile arable land in its catchment area. Earlier exploration carried out in the catchment of the village Karsola, reported the discovery of two archaeological sites. The site that is being subjected to systematic excavation by the present authors was designated as Karsola-1 (29°09'02.9"N,76°25'36.3"E). The ceramic industries reported by them included the Painted Grey Ware (PGW), Black-Slipped ware, and Stamped pottery of the Early Historic period (Singh 1981: 86-87). Most recent explorations carried out by Tejas Garge (2011) confirmed the presence of Late Harapp-

-an pottery at the site.

The site of Karsola is located about 1.5km east of the village on the right side of the Julana-Fategarh Road. It spreads over an area of about 17 ha and stands to a height of about 5m from the surrounding ground level. Almost in the centre of the mound is located a temple of Baba Madhu Nath, which covers an area of about 1ha. The portion of the mound that is intact and in the possession of village Panchayat is around 5ha, whereas the periphery portions on all sides of the mound disturbed amongst a number of farmers of the village have been flattened completely for the agricultural purposes. The reason for the site being intact is the presence of Hanuman temple in the centre portion of the site. The detail survey of the site carried out by this team, revealed the presence of pottery of three different cultural phases namely Harappans, PGW, and early Historic (Kushana/Gupta) (Figs. 4-5). On the basis of ceramic distribution, it was presumed that the entire site was occupied during Late Harappan and PGW period whereas the Early Historic pottery was found confined towards the western half of the site. One more site (Karsola-2-29°08'8.10"N,76°25'32.2"E) in the catchment of Karsola village lies roughly 1.6km east of the village on the right side of the Julana-Fategarh Road and about 300m south of Karsola-1.

It appears to be a seasonal settlement as no habitational deposit could be encountered. The potsherds are scattered in an area of about 1 ha. A brick-kiln is located on the eastern side of the site, while the rest of the site has been levelled to the ground level and is under agriculture. The ceramic industries represented

EXPLORATIONS AND EXCAVATIONS

at this site are Red ware of the medieval times (Pl. 14).

Different types of soil families are found in and around Karsola. Inceptisols are the most dominant soils occupying about 58% part of this area, followed by Entisols (28%), Aridosols (9%), and Alfisols (2%). Fine, loamy, Typic Haplustepts are the most dominant and most productive soils found in Jind District. Soils are 43% fine loamy, 34% loamy and 23% sandy. Overall, the soils around the site are fertile, which was one of the most determinant factors for the location of this site in the Late Harappan period and occupied repeatedly until the end of 5th century CE.

The Ghaggar river basin lies mostly in the states of Haryana and Rajasthan and the site of Farmana, one of the extensive and rich Harappan sites in Haryana, flourished due to the availability of very fertile agriculture land and water within its catchment area. The site may have gained importance due to its close proximity to Rakhigarhi (40km to its northwest) and its location on the trade route to the site of Harappa playing an important role in the Harappan economy as a result of its control on trade networks. Though the site is not in the proximity of any river, but falls in the catchment area of river Chautang, a major tributary of the Ghaggar falling in the central Ghaggar Basin and resulting in a high water table for this region. Also, in this area are numerous natural or man-made lakes or wells in the vicinity of every village. It is quite likely that there were small streams close to the habitation site of Karsola as the recent studies of satellite imagery photographs have indicated. A generalized excavation plan was devised, which included a large horizontal exp-

-osure at the top of the mound, west of the temple, and three index trenches. One index trench (AX11) was established to the south of the horizontal exposure, another to the west of the temple (KX6), approximately 20m from the brick water reservoir, and a last one (LY7) to the north-east of the temple, between the main excavation area and the farmer's pit. The main excavation area consists of a horizontal exposure to the west of the temple. Given that little information was available on the surface of the mound, and one of the project's primary goals was to uncover synchronic data about Karsola's occupants' way of life during the PGW period, we attempted to expose the uppermost phase of occupation to the west of the temple. The team devised a grid of 5x5m trenches that could cover every part the mound's surface, referencing a single master site datum (located approximately 15m to the west of the temple's walls). This grid is divided into four quadrants, on to the north-west, north-east, south-west, and south-east. The trenches in each quadrant are numbered according to the quadrant in which they fall.

One of the major aims of this project was to assess Karsola Kheda's scope for providing intact archaeological contexts reflecting life during each of the periods involved in this transition. 17 adjacent 5x5m trenches were established on the highest portion of the mound where structure layouts should be best preserved and three index trenches were established on the southern (BX11), eastern (KX6), and northern (LY7) slopes of the mound. A fourth index trench was established when the southern index trench proved too disturbed by recent human activity to provide a reliable cultural sequence. The excavation revealed two-fold cultural sequence

in a deposit of 3.5m the lower 2m deposit in LY7s consisting of layers 4, 5 and 6 which belonged to Period I (Late Harappan), whereas the upper 1.5m (layers 1-3) belonged to Period II (Painted Grey Ware, (PGW). All these habitation layers are overlaying the natural silt deposit (Fig. 6). Though there is considerable amount of Early Historic (Kushana/Gupta) pottery on the surface of the settlement, no distinct horizon of this period was found in any of the Index trenches at the site. The Early Historic pottery is found mostly in the pits, emanating from the surface of the site. There is a possibility that the Early Historic occupation at the site was very small, possibly temporary in nature, and that it is not yet excavated at the site in proper stratigraphical context. These Early Historic people have dug a number of garbage and even storage pits all over the site. There appears to be a cultural gap between Late Harappan and Painted Grey Ware (PGW) at Karsola. Considering the nature of pottery at the site, it appears that the late phase of PGW is present and not the early phase which was found at Bhagwanpura. The Late Harappan phase could be dated on account of material culture and comparison with other sites to 1900 to 1500 BCE whereas the PGW could be dated between 800 to 600 BCE.

Period I (Late Harappan Culture): Though the Late Harappan occupation at the site is poor in terms of structural remains and material equipment, it may have been an important agricultural village as it is bound by very fertile arable land. The site, being in the proximity of good natural clay suitable for pottery and bricks, has played important role in the economic organization of the Late Harappan

phase in the Chautang basin. Towards the eastern periphery, a few pottery kilns have been rescued suggesting pottery manufacture as one of the major activities at the site along with agriculture. The following are some important features partially excavated in the Late Harappan phase at Karsola. In the NE quadrant of the trench, a mud structure, survived by its basal course, was partially excavated. Three mud walls visible in this trench have been partially excavated and it appears that they belonged to one house complex with a number of rooms. The wall remains have been excavated in an area of 2.5m by 2.5m and they appear to have belonged to two rooms. The main wall (Wall 1) runs in NE-SW direction and has been excavated to a length of 2.5m. This wall is 60cm broad and has survived to a thickness of 20cm towards its western end it is cut by a large PGW pit (dia. 1.90m). At its eastern end is another wall (Wall 2) running in NW-SE direction. This is exposed to a length of 40cm and its average width is 50cm. The third wall emanates from the middle of the first wall and runs in NW-SE direction. It is survived to a thickness of 25cm and is exposed to a length of 1.90m. It is 40cm broad (Pl. 15).

The trench BX11, situated to the east of AX11, was selected for excavation with a view to understanding stratigraphy of the site on the southern periphery, but the work was suspended after the discovery of furnace and water container by its side at a depth of 1.92m from the datum point. The circular furnace/hearth with a diameter of 82cm was exposed in NW quadrant at a depth of 1.92m from the datum point. It is located 2.80m to the west of eastern section and 1.03m south of the

EXPLORATIONS AND EXCAVATIONS

northern section of the trench. In its centre is a clay stump. The sides and bottom of the furnace are burnt red due to its constant use for a long period. To the south of furnace is located an elongated feature, which has 4cm thick terracotta lining at a distance of 30cm. This feature lays slightly in NE-SW direction and only small portion of the western end falls in the baulk between AX11 and BX11. The feature is exposed to a length of 3.05m and its average breadth is 55cm. There is a possibility that first the oblong channel was dug in the ground and then it was plastered with clay, which was fired *in situ*. This feature being close to the furnace can be identified as a water container. Usually near the metal working furnace a provision of water is made for quenching purposes. This evidence can be associated with copper metallurgy at the site. This is the only Harappan Culture site in the subcontinent providing this unique and different evidence of copper working. There is a possibility that the copper workshop was covered with superstructure as few post-holes were found around these features (Pl. 16).

Outside of the main excavation areas, east of the temple, was accidentally discovered a circular kiln complex with fired-red bricks. Considering the nature of the features, comparison with the data from other sites from the Ghaggar basin and the bricks associated with them, the complex can be dated to the Harappan culture. The Kiln-Complex consists of six circular features in the south-east corner of a field currently under development by farmers. They lie approximately 150m east of the temple that sit a top Karsola Kheda. They were numbered according to the order in which they were excavated. It is tempting to think of

there cluster features as a well-established Kiln Complex, and this is certainly a possible interpretation (Figs. 7-8).

In the north-east corner of the pit cut by the farmers east of the temple is a very well preserved kiln that seems to correspond to the Harappan features recovered from sites like Farmana and Girawad in the Chautang Basin. On plan, the installation consists of two superimposed “chambers” that are oriented directly north to south. The northern or “Upper Chamber” overlaps the larger “Lower Chamber” to the south. Additionally, the Lower Chamber was found at a greater depth than the Upper Chamber. In the section produced by the second step from the top of the exposure, it is clear that the Upper Chamber sits directly on top of the ash layer that fills the Lower Chamber. The maximum width from east to west in the lower chamber is 2.38m and the maximum width of the upper chamber is 2.30m. As there is abundant ash in the Lower Chamber, and only small clumps of ash in the Upper Chamber (along with the vitrified clay) it seems likely that the two chambers comprise a single composite kiln, which had a Lower Chamber for fuel and an Upper Chamber for holding the goods to be fired. The vitrified clay in the Upper Chamber is a good indication that extreme temperatures were indeed achieved within it (in excess of 1000° C), and may have been produced when clay lining the Upper Chamber’s walls melted. This may have actually caused the installation’s abandonment.

Period II (Painted Grey Ware): The PGW pottery found at Karsola is coarse and thick in section, the typical features of the later phase of the culture. It is therefore clear that there

was a gap of more than 500 years at the site between the Late Harappan and PGW occupation. The PGW phase at the site is very poor, commensurate with the evidence from most of the excavated sites in this region and the Doab. The average thickness of the PGW deposit at the site is slightly above one metre, divisible in three distinct layers. There are a few fine varieties PGW sherds in the lower level, some percolating down to the Late Harappan phase. However, that does not indicate interlocking at the site. The excavations carried out in the PGW levels at the site have produced evidence of some flimsy mud walls, cylindrical storage pits, garbage pits, flimsy circular fire-pits and circular flimsy structures.

The ceramics recovered from LY7 belong to three cultural periods reflected by a variety of wares that have been identified at other archaeological sites in the region. These three periods are as follows from earliest to latest:

- 1) Late Harappan Period
- 2) Painted Grey Ware (PGW) Period
- 3) Early Historic Period

LATE HARAPPAN POTTERY

Untreated Red Variety: This variety has rough surface and lacks any surface treatment. It is well fired, with an oxidized grey core and a medium coarse fabric. All vessels of these wares are thrown on either slow or fast wheels. Main shapes include globular pots with medium necks and out-turned flared, triangular, square, rounded and beaked rims. Very few sherds of these varieties have been

recovered from this excavation.

Red Slipped Variety: The Red Slipped Variety has a relatively fine surface with both thick and thin slips of dull to bright red. Most of the vessels are made with well levigated clay and have a medium fabric that is well fired with an oxidized grey core. These vessels are made using slow or fast wheels. The main shapes include storage jars with collared rim, pots with the undercut or drooping rims with medium or high necks, bowls and basins with carinated and concave sides and reverted rims and pedestal bases, squat shaped pots, cooking jars with the rustication on the belly, globular pots with incised designs, and dishes on stands with pedestals with undercut projections and drooping rims. A large number of this kind of sherd was recovered from LY7, indicating that the site has a significant Late Harappan Period component.

Black on Red Variety: The Red Slipped Variety has a relatively fine surface with both thick and thin slips of dull to bright red and painted motifs in black. Most of the vessels are made using well levigated clay. The main shapes are bowls and basins that are concave sided with everted, beaked, drooping undercut, rounded, or square rims and pedestal bases. Globular pots and pots with high necks, medium neck and constricted necks with rounded, square, drooping undercut, beaked, collared and flared rims have also been recovered. Vases with high necks and everted rounded, tapered rims, dishes on stands with pedestals with undercut projection and drooping rim were also recovered. Painted motifs include horizontal and vertical bands, circles, semi-circles, triangles, net pattern, wavy lines, opposite triangles, fish patterns,

EXPLORATIONS AND EXCAVATIONS

leaf motif, plant motifs hatched triangles, horizontal bands with hatches, wavy lines with vertical and cross bands (Pls. 17-18).

PAINTED GREY WARE POTTERY

The Painted Grey Ware is both plain and painted. It has a very fine fabric with painted designs and a well fired, oxidized grey core. Painted designs such as check patterns, basket patterns, groups of semi-circles, opposite triangles, plant-like motifs, horizontal lines with dots, circles with dots in centre, thick and thin bands on the rim, vertical lines, double loops, intersecting circles, dots, fond, and wavy lines are common at Karsola. Redware, untreated red variety has a medium or coarse fabrics that are medium or ill fired. The shapes include bowls, basins, jars, pots. This ware is either handmade or slow wheel thrown, decorated with incised lines, dots, mat impressions or mud appliqué designs. The pots are having high or constricted necks with flat tops (Pl. 19).

EARLY HISTORIC POTTERY

Untreated and treated varieties are found in Red Ware associated with the Early Historic phase at Karsola. The fabric is coarse and medium fired. Shapes include incurved bowls, basins; nail headed bowls, lids, external projection, rounded, square, and beaked rims of globular pots. Rang Mahal Ware is with a few exceptions, reddish or pinkish in colour and rarely is it yellow. The majority of them are wheel-turned. Only the neck and uppermost part of body of such jars was wheel turned; the rest of the body shows clear traces of painting. The features which chiefly characterize Rang

Mahal pottery is the lavishness with which potters have decorated, chiefly by painting, the various types of vessels with floral, zoomorphic and geometrical patterns. Stamped variety has red colour wash on surface with the stamped decoration. The decorations are mostly in circular, floral or sun motif patterns. The fabric is medium coarse and well-fired.

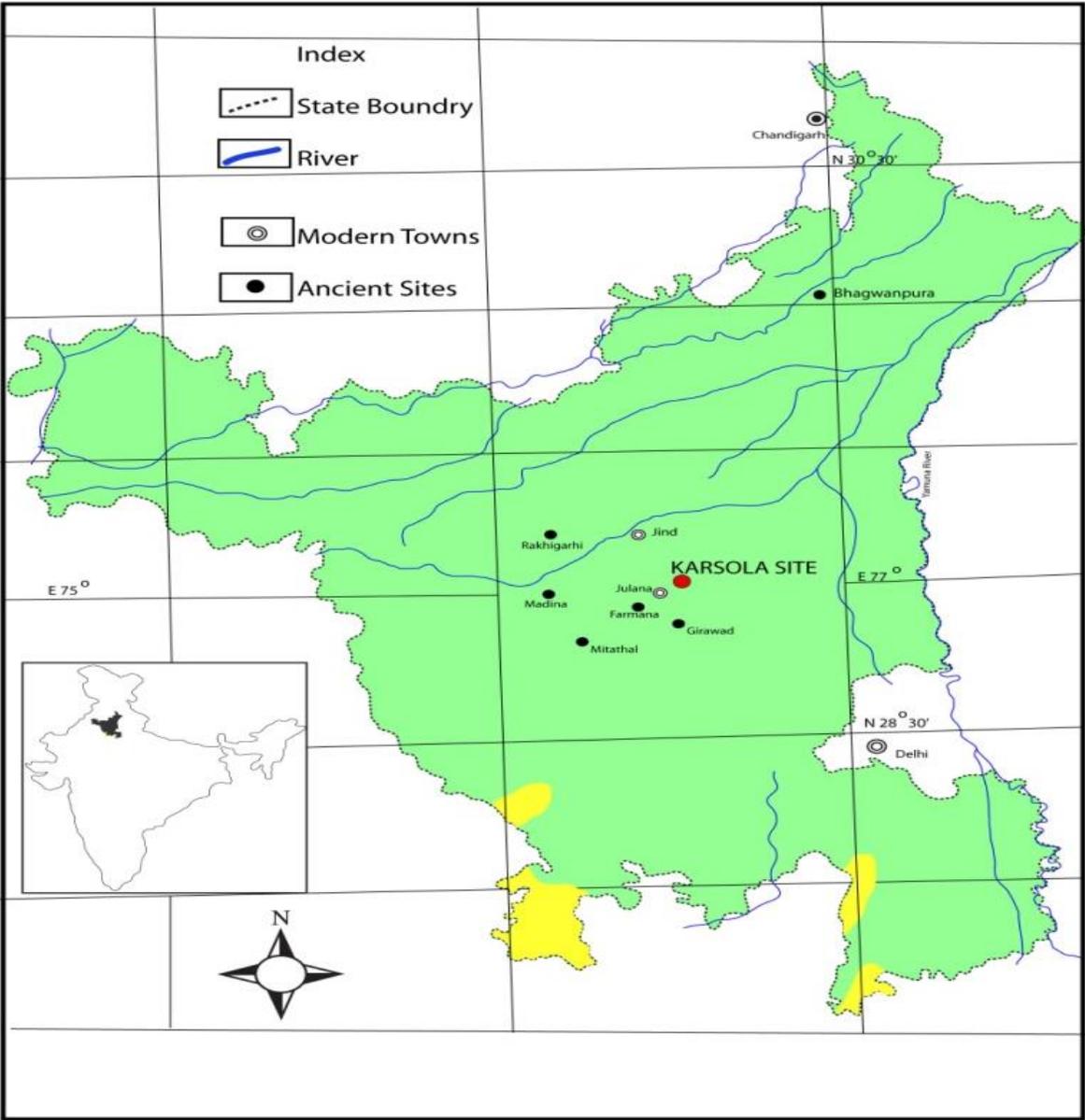
The site is not very rich in the material remains, but there is a great variety of objects recovered from the excavations. It is difficult at this stage to separate artefacts of three different periods, i.e. Late Harappan, Painted Grey Ware and Early Historic because of displacement of artefacts, both temporally and spatially, due to large-scale disturbances. The artefacts recovered from Late Harappan phase include mostly terracotta and faience bangles. The Painted Grey Ware has much larger variety of artefacts such as areca nut and *ghata*-shaped beads, seals, hubbed and plain wheels, elephants, bull, bear, ivory bangle fragment, bone decorated handles, bone points and shell beads. The Early Historic object include a clay tablet with Kushana-Gupta Brahmi letters, a hoard of 31 copper coins of Yodheya, one coin of Kushana period and glass bangles.

JHARKHAND

12. EXPLORATION IN DISTRICTS RANCHI, AND WEST SINGHBHUM

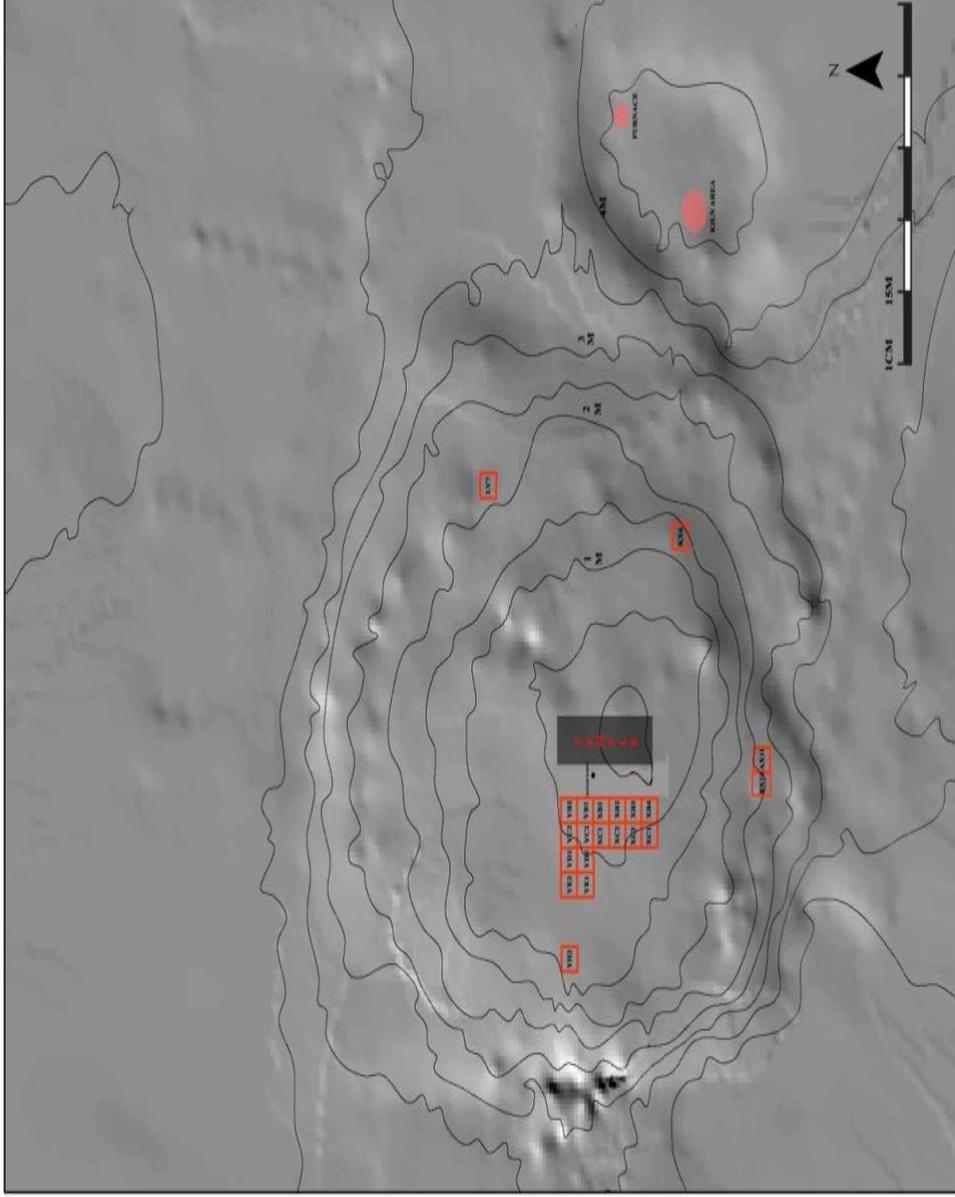
A team of Archaeological Survey of India, Ranchi Circle, Ranchi under the direction of N. G. Nishokey, Abdul Arif, Mukesh Ekka, M. K. Brahmachari, and K. K. Jha, Photographer has carried out exploration works in Districts Ranchi and West Singhbhum

Fig. 4



Map of Haryana showing location of the site of Karsola

Fig. 5

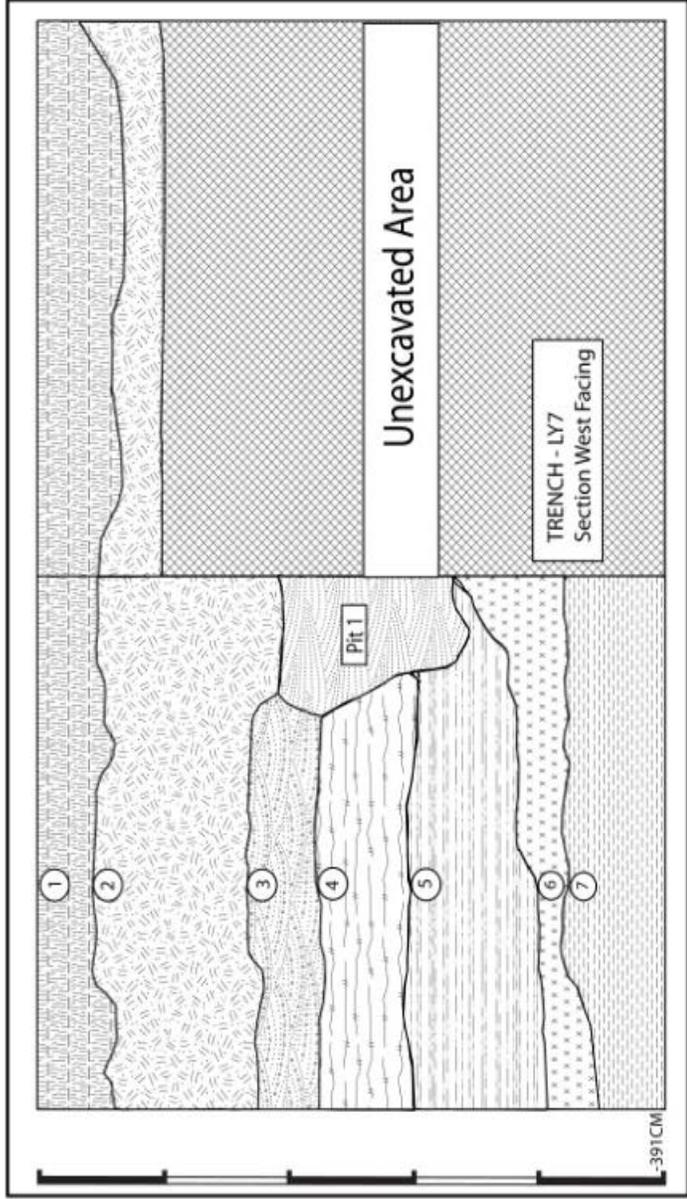


Digital Elevation Model of Karsola Kheda, with the location of trenches and modern temple marked

Plate 14**A****B**

Karsola: A and B, General view of the site from the east

Fig. 6



Section of LY7, illustrating the stratigraphic sequence

Plate 15**A**

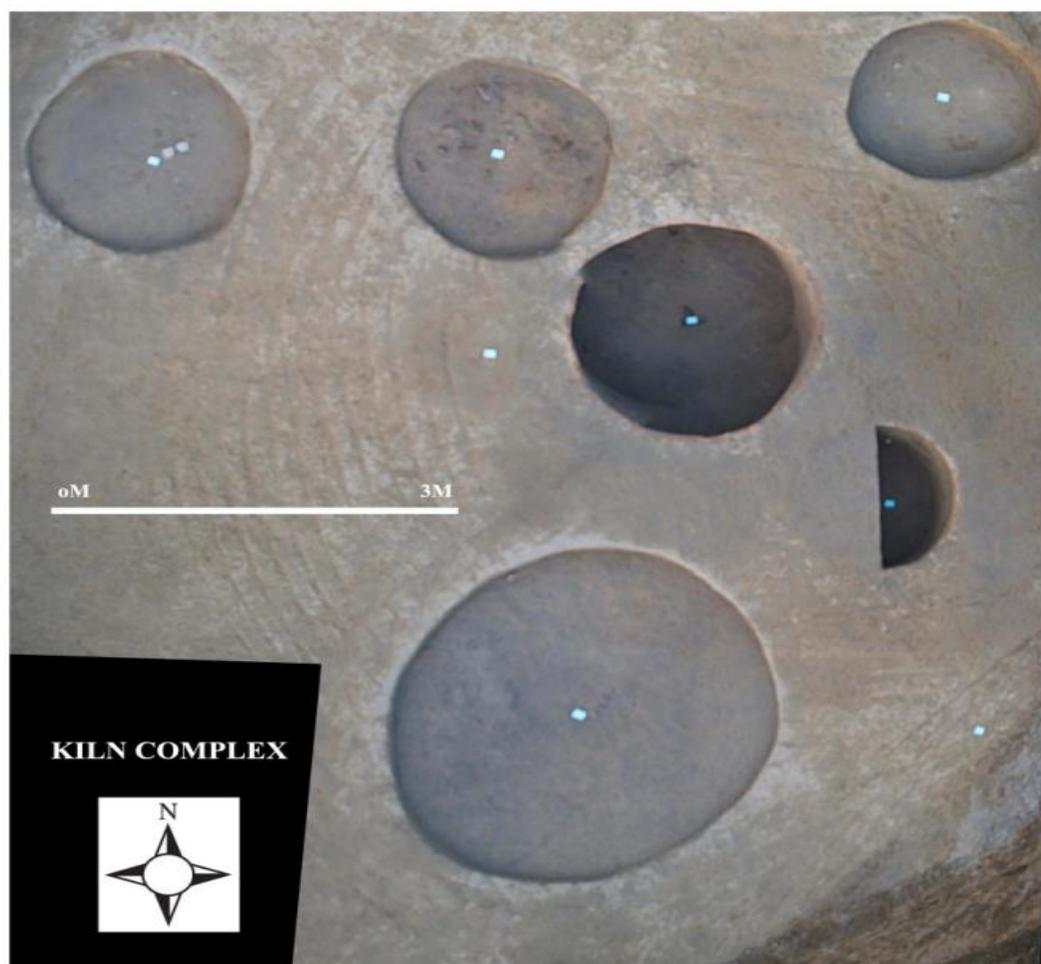


B

Karsola: A, Index trench LY7 showing stratigraphy and part of floor level of PGW period and B, trench AX 11 remains of mud-brick walls of the Late Harappan period



Karsola: A circular furnace and a water container to its south in Trench BX II

Fig. 7

Karsola: Location of six pits forming a part of a kiln complex rescued from the field

Fig. 8

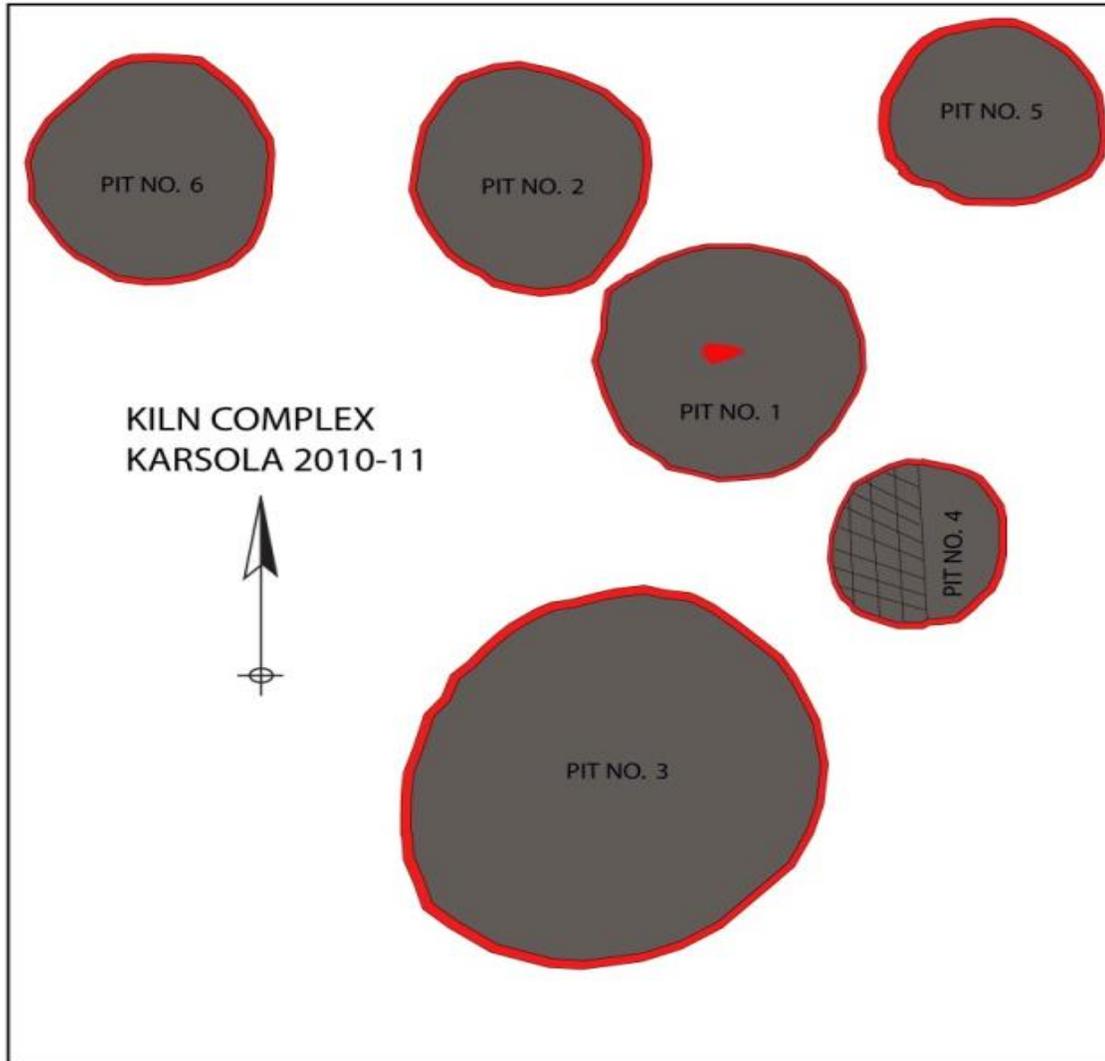
*Details of the kiln complex*

Plate 17



A



B

Karsola: A, red ware sherds, Late Harappan phase and B, red-slipped ware, Late Harappan phase

EXPLORATIONS AND EXCAVATIONS

Plate 18



A



B

Karsola: A, Black on red ware, Late Harappan phase and B, red ware

Plate 19



A



B

Karsola: A, Typical Painted Grey Ware and B, unslipped red ware, early historic

EXPLORATIONS AND EXCAVATIONS

mesolithic site at Suttiambya Garh Pithoria, District Ranchi and got the remains of Mesolithic site and has collected the microlithic tools which were scattered towards the southern side of the hill. Most of the tools are based on blade, core and flakes which are made of Chalcedony, Agate, Quartz, and Jasper.

During the course of surveying at Bhagia Beda Nala, Benisagar, District West Singhbhum a good number of Mesolithic tools were located nearby the protected ancient Shiva temple and tank at Benisagar. Most of the tools are based on blade, core and flakes which were made of jasper, chert, quartz and chalcedony.

The pottery is not fine and not well levigated. It contains grits, husks, chaff and the mixture of sand and mica. The shapes included bowls with varying profiles, vessels, lids, sharp-edged bowls etc. Handle, lugs, spouts and knobbed vessels were partly handmade and partly wheel made. Pots were thick to medium fabric and ill-fired. Core of the pots are dull reddish, blackish and occasionally grayish. Plain dull red ware pots were sometimes decorated with incised or an appliqué design including floral, petal leaf designs. Few potsherds of red ware with stamped design have been also recovered from the site. However, the Gupta Phase of Benisagar does not sound very strong economically as indicated by its material culture. During the course of scientific clearance work at the site, a few miscellaneous art objects have been found. These are made of various kinds of materials

such as stone, copper, iron and terracotta. In stone, the sculptures, and sculptural fragments of Hindu gods and goddesses, Siva-lingas, *yonipithas*, and miniature Ganesha are worthy

of mention. In copper, a few patented copper fragments, copper foils and unidentified objects were found at the site. In iron, the objects include bangles, rings, chisel, wheel, needle, sickle, dagger, knives and nails. These iron artifacts were related to domestic objects, of daily use; some were architectural tools or were agricultural implements and a few of these can be categorized as weapons. In terracotta, findings of three numbers of inscribed sealing discs are most important and remarkable discovery of this year at Benisagar.

These inscribed sealings were depicted on circular terracotta discs. Diameter of each sealing disc is about 5.5cm and its thickness is about 1.5cm. Several rubbing and threading marks appeared on the reverse of the sealing disc indicating that these sealing discs most probably were used for some special occasion or were used for performing some rituals. Language of the sealing is Sanskrit and the letters used in the inscription were of Gupta Brahmi script deciphered as “*SHRI HIRANEYA PARBHU SWAMY*” which most probably referred to Ganesha and on the basis of palaeography, it can be datable to 5th century CE. the discoveries of these sealing discs are indicative of Saiva worship.

MADHYA PRADESH

13. EXPLORATION IN TAPTI-PURNA VALLEY, DISTRICT BURHANPUR

A team from Prehistory Branch of the Survey conducted exploration in Tapti-Purna Valley (District-Burhanpur) Madhya Pradesh. The

-thic site at Sarola, Rock shelter at Naguni, Late Jorwe site at Ichhapur II, Early Historical site at Ichhapur I, and Medieval structure of random rubble masonry at Juna Jambupani.

14. EXCAVATION AT TIKODA, DISTRICT RAISEN

Prehistory Branch of the Survey conducted one month training camp at prehistoric site, Tikoda, District Raisen, under the direction of the Regional Director (Central Region) and Institute of Archaeology. The Branch made all the necessary arrangements for the trainee officers, students of the Institute of Archaeology, guest lecturers and staff. Scholars from the research institutions like North Bengal University, Siliguri, Centre for Archaeological Studies & Training of East India, Kolkata and Rock Art Society of India, Agra have also participated in the training camp.

MAHARASHTRA

15. EXCAVATION AT HIRAPUR, DISTRICT CHANDRAPUR

The Deccan College Post-graduate and Research Institute, Pune, under the direction of Kanti Kumar Anant Pawar, assisted by Ganesh Halkare, Kim Yong Jun, Pankaj Kahalekar and Akash Srinivas, carried out excavation of four megalithic structures as well as extensive exploration in the vicinity of small village Hirapur (20° 37'.30" N; 79° 31'.30" E) which is situated in the remote area of Chimur tehsil

team led by Gajanan Katade comprising Jyotiram Deshmukh, Ku. Ekta Dharkar, and N.K. Nimje, under the guidance of Nandini Bhattacharya Sahu discovered Middle Palaeolithic in District Chandrapur. The excavation and the exploration have been carried out with the

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

objectives to undertake excavation of the dolmen to understand the architectural features (construction, raw material, etc.) of the dolmens at this site which are very distinct from the known burial customs in this region and the rest of India; to understand the relationship between rock-shelters and cairn burials and the dolmens; to find out the Early Iron Age habitation in the vicinity; and whether the burial custom of the local tribals have some connection with the prevalent dolmen type of the region which is essential to understand the local contribution in *Megalithism*.

The Village Hirapur (20°37'.30"N; 79°31'.30"E) is situated 12km away from the Nagpur-Nagbhid road, near Shankarpur (Fig. 9). The site is divided in two different localities covering an area of about 10.7 ha, measured in the GPS coordinates from each direction are;

Northern point- 20° 37.476N, 79° 31.759E
906ft MSL (Mean Sea Level)

Southern point- 20° 37.286N, 79° 31.811E,
914ft MSL

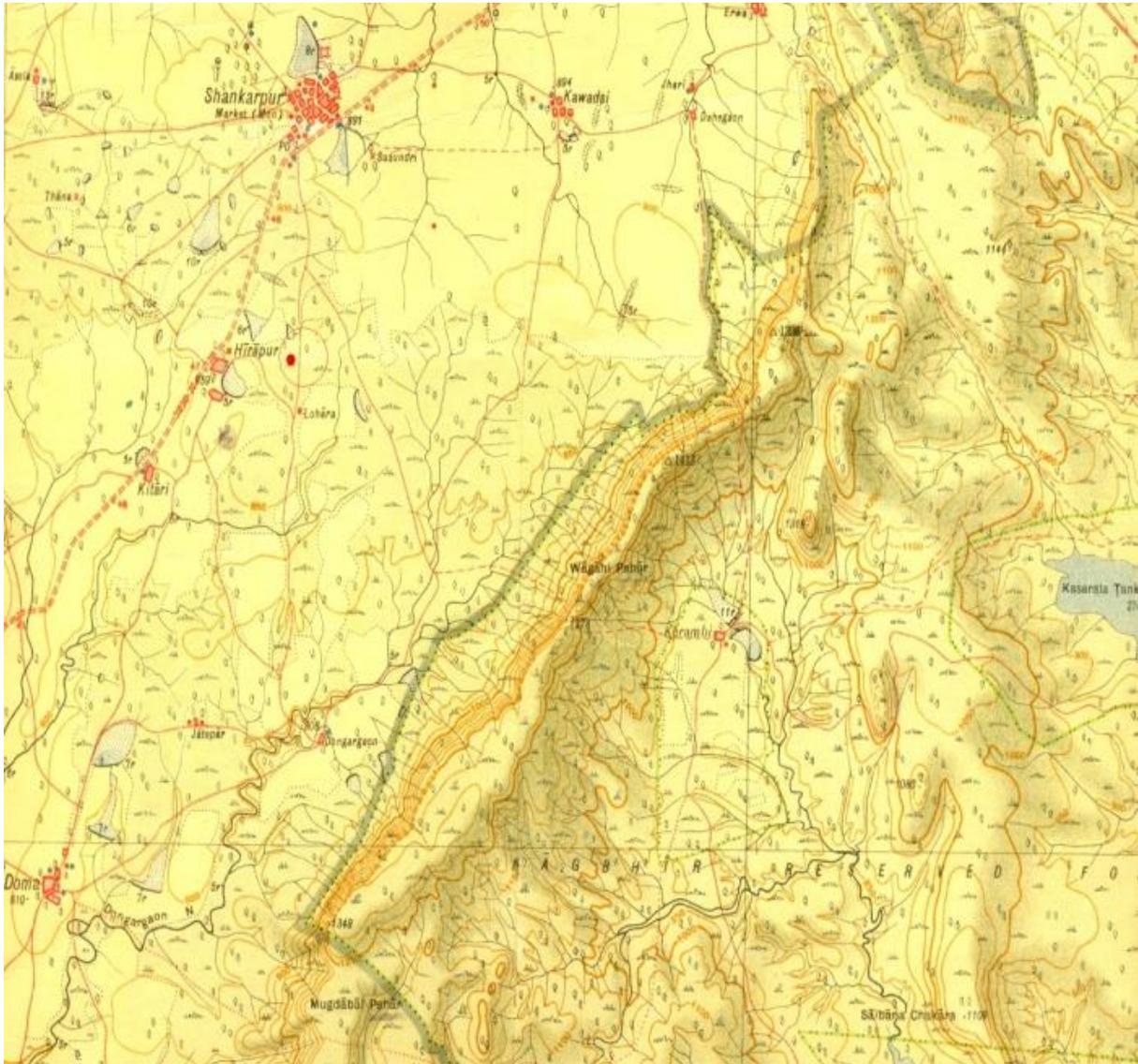
Eastern point- 20° 37.597N, 79° 32.091E, 891ft
MSL

Western point- 20° 37.373N, 79° 31E, 628ft
MSL

In the burial locality 01, the current excavation was conducted with horizontal method, covering an area of 15x15m, which was divided into 4 quadrants, which contained two ***EXPLORATIONS AND EXCAVATIONS***

dolmens and two dolmenoid cists. All the exposed megaliths belong to the dolmen and

Fig. 9



Location map of the dolmen site on toposheet

Meg. Br. 01. The distances between all the four megalithic burial structures are as follows:

Between Meg. Br.01 and Meg.Br.02: 2.67m
Between Meg.Br.01 and Meg.Br.03: 1.56m

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

Between Meg.Br.01 and Meg.Br.04: 1.39m
Between Meg.Br.02 and Meg.Br.03: 1.45m

The exposed dolmened cists in the SW quadrant are almost parallel to each other towards the south direction.

Meg. Br. 01: Megalithic burial 01 is a huge dolmen, which is intact and the largest in the region, where as the other two known by their trace remains, are towards the south-east of the Hirapur village. The huge dolmen is made out by using laterite and sandstone which is an interesting feature while comparing it with the others in the region. All the vertical slabs of the dolmens are produced out of laterite blocks; however sandstone is used only for the capstone. This dolmen is facing north, divided into two compartments which are clearly visible from the eastern side. The average thickness of the vertical laterite slabs from the northern side is 35cm and height is 1.10m. The intact structure is divided into two separate chambers, each with a separate rectangular porthole as mentioned above. Four huge laterite slabs are placed vertically, making an angle of almost 90° between each other. The porthole of the left chamber is 0.43 x 1.35m. The two chambers are separated by a laterite slab, which is not as thick as the other laterite slabs. The distance between the southern slab

dolmenoid cists types which were considered as non-sepulchral in burial typology, with each one having an individual character particularly in respect of their making and architecture. The centre of the excavation site has elevated land showing the possibility that majority of the burials could be covered under the surface.

The two other megalithic burials (possibly dolmens), one towards the west of the trench and another to the north are completely disturbed. Few remains of the laterite orthostat are visible in the western dolmen and only the capping stone is visible in the northern one.

Majority of the burials are being destroyed by cultivation and mining activity of soil, which is being used at the houses of the Hirapur villagers for plastering their walls due to the suitable texture and colour of the Laterite soil. The burial locality 01 is undulating in nature because of its continuing elevation and depression within its landscape. The divided trench is excavated in two quadrants; the SE and SW quadrants. The two excavated quadrants contain four burial structures, of which only one is intact. All the peripheral burials are east-west oriented with a slight deviation on the east. All the four excavated burial structures, within the two quadrants are catalogued number wise, of which the intact one is numbered as Meg. Br.01 (Megalithic Burial No. 01). The other two dolmened cists are numbered as Meg.Br.02 (South-west of Meg Br. 01) and Meg. Br. 03 (West of Meg. Br. 01). Meg. Br. 04 is located to the east of

and the central slab is 1.25m. The southern slab was exposed to about 1m before excavation. Its total vertical length from the foundation is 2.70m. The left chamber is exposed in section facing to east, which is excavated upto the natural soil. The total depth measured is about 1.75m, divided into 6 layers.

The porthole of the right chamber is 0.33 x 1.13m. The right chamber is not excava-

EXPLORATIONS AND EXCAVATIONS

-ted. The average thickness of the eastern slab is 35cm. This slab, exposed by the excavation is averagely measured at 70cm which has revealed the structural length of the port hole. Possibly, the left chamber is made for an elder and/or an important member of the family, whereas the right chamber could be purposefully made for another, younger or equivalent member of the family. It was clearly visible, during excavations, that the left chamber is bigger than the right one. The top of the eastern slab above the port hole, which might have fallen into the left chamber due to some unknown reason, was recovered during the excavation of the left chamber at layer number 03, at the depth of 87cm from the excavation of the left chamber of Meg. Br.01, several types of ceramic wares including typical Micaceous red ware, Micaceous black ware, red ware, stone polisher, glass bangles, copper bangle, stone celt (?), bricks having the size 8 x 16 x 32cm etc. were recovered.

Meg. Br. 02: MB2 and MB3 are excavated in the SW quadrant, exposed on all four sides on an average of 30cm from the ground level, which is 1.08m from the datum point in the north. MB2 is a single chambered dolmenoid cist with an inclined cap stone, supported from the southern direction by a laterite block. It was visible, prior to the excavation, from the north,

south and west direction, and averagely about 20cm from the eastern direction, the laterite orthostat makes an angle of 45° with its covering capstone. The measurement, from the supportive laterite block to the northern orthostat is 2.30m. The single chamber of the dolmenoid cist is exposed to about 1.20m excluding the visible measurement before excavation. During the excavation, very close

to the eastern side of the dolmenoid cist, one vertical dressed laterite slab, placed vertically into the ground, with a small passage at the centre measuring 20cm was exposed upto 40cm. It could be the passage used for offerings. From the centre of this passage, both sides of the laterite slab are broken, which could have been at the same level as that of the three other orthostat. The covering sandstone slab is oblong in shape. In the northern part of this slab, 43 cup marks can be noticed within an area of 60 x 70cm. Also, one long and complete engraved mark running north to south, measuring about 1.20m can be observed. In its southern corner, it becomes cylindrical.

The sandstone slab has been exfoliated in several places due to natural weathering.

The north-south length between the two orthostats is 60cm and the east-west length is 1.20m. This shows the geometrical and mathematical skills of the megalithic builders. The eastern side of the capstone is perfectly straight cut, similar with MB1. The present direction of the sandstone slab is NW-SE, showing that during the span of time, this capstone probably could have inclined or have moved. It could be a strong possibility that when this burial structure had been erected, in the memory of some person, this capstone

could have been horizontally placed with the support of all four orthostats, which is the typical feature of the dolmenoid cist, as observed in the other parts of this region as well as with the rest of the Indian megaliths. Very few potsherds have been recovered during the excavation of the chamber, without any bone remains or antiquities, which shows its commemorative feature.

between the joints of each of the orthostat. The eastern orthostat of MB3 is exactly parallel, in the eastern direction, with the western vertical laterite slab of MB1 and perpendicular to the southern vertical laterite slab of MB1. One heavy chunk of iron ore has been recovered from inside of the chamber of MB3. The absence of ceramic assemblage and antiquities shows that it could have been raised or constructed at the later period, for a commemo-

Meg. Br. 03: MB3 is close to the MB2, with a distance of 1.40m in the northern direction. This dolmenoid cist is the smallest burial when compared with the other excavated burials. Before excavation, only the sandstone capstone was visible, at an average thickness of 28cm. It was visible from east-west, upto 2.80m, and north-south upto 1m. This slab is possibly continued into the NW quadrant, which is not excavated in due course of time for avoiding the removal of the soil which is giving support to MB1, whose west vertical slab is very close to the capstone of the MB3.

During the course of the excavation, a very small chamber of 34 x 86cm was exposed, with its four orthostats. The total depth of 90cm was exposed within the chamber for giving relief and for knowing the base floor level of the chamber. It has also been noticed that this is a small dolmenoid cist, covered by a sandstone slab, just like MB2. The western orthostat is 94cm in length, having the thickness of 25cm. The southern orthostat is 85cm in length and 25cm thick. Interestingly, the northern orthostat also has the same dimensions. The eastern slab is 1m long, in the north-south direction and 29cm thick. It has a centre passage of 30cm and its depth from the top of the slab is 40cm. This is also an east facing dolmenoid cist, angling nearly 90°

-rative purpose. Also, it shows the possibility of the reserved nature of the burial made for a person who is in the last stage of his life, as we have seen examples of this kind from other megalithic burial sites dotted at several places in India. Getting the iron ore from such a depth again reveals the strong possibility of the presence of iron ore in the vicinity of the site.

This is somehow connected with the iron working area which has been noticed around 100m to the west from the excavated site. The complete features of MB3 will be revealed with further excavations.

Meg. Br. 04: Megalithic Burial 04 (MB4) is located to the east of MB1. It is another huge structure, exposed during the excavation upto 1.10m from the ground level. The right orthostat of MB4 is exactly perpendicular to the southern corner of the eastern slab of MB1. It is a dolmen facing the east direction, of which it was clearly visible upto the 50cm from its southern side. This structure is exposed to a level of 1.60m including its previously visible level. The structure has only one chamber, enclosed by two orthostats having a thickness of 38cm and its average length, in the E-W direction, is 2.50m. The gap between the two orthostats is 0.75m. In the eastern corner of

this burial, one horizontal slab, having the N-S length of 2m is properly placed and continues into the SE section, which is averagely exposed upto 23cm. Interestingly, at the north corner of this horizontal slab, the slab curves into the section. This single chambered megalithic structure was probably disturbed by human activity which is clearly evident by its missing capstone. The chamber itself is floored by 7 properly dressed laterite blocks, which are placed in the east-west direction, upto the west

EXPLORATIONS AND EXCAVATIONS

corner of this chamber, above the dressed stone block, a huge ceramic assemblage was placed, very close to the southern orthostat. In the same way, in the eastern corner, close to the northern orthostat, one punch marked coin, having the “Three-arch hill” symbol was placed.

This shows some sort of royal treatment to the dead buried inside the chamber. Below these placed laterite blocks, a thick deposit of laterite soil, upto 25cm thick, was provided for the support and for the strength of these heavy blocks. These dressed stones could have been the floor level for the burial because below this, not a single potsherd was discovered. In the centre of the southern slab, on its outer side, a human bone fragment was recovered, which was placed at the same depth as that of the ceramic assemblage. This burial is exposed from its eastern section to upto 4m in the east-west direction for giving relief to the adjoining structures and to observe the positions of the orthostat, as well as to maintain the stratigraphy. The northern corner of the right orthostat, the southern corner of the eastern slab of MB1 and the southern corner of the eastern slab of MB3 are exactly parallel from the eastern direction, which could be built for a specific purpose. The southern corner of the left orthostat of MB4 is again parallel with northern point of the eastern slab of MB2. In this way, the

calculative distance of the single chambered dolmen from N-S is exactly the same as that of the distance between the northern orthostat of MB2 and the southern orthostat of MB3. In this way, the location of all the burials could have been the result of proper planning and the treatment of the dead.

Towards the northern direction, from the right orthostat of MB4, a huge and unknown structure was produced by using

several dressed and semi-dressed laterite blocks.

It was exposed during the excavation to upto 1.10m, from the ground level, divided into 4 layers, divided by a thin layer of laterite soil. The exposed heavy structure continues into the northern section of the NE quadrants of B1, B2. 2.20m portion from the right orthostat was unearthed towards the northern side into B1. The east-west length of this heavy structure is 1.8m in which, three sections of semi-dressed laterite blocks are placed upon each other and curving into the NE quadrant on both the east and the west sides. The westward line of the laterite blocks, which are continuing into the northern side, has two courses of laterite blocks, of which the lower one contains three huge laterite blocks, measuring 95cm in average, whereas the upper course has 5 irregular, semi-dressed laterite blocks, varying in diameter from 65cm to 33cm. The middle line has four small laterite blocks and one huge laterite block of 90 x 125cm. The third line or the section of the structure has 3 blocks, of which maximum N-S diameter is 83cm and the minimum diameter is 41cm, having the average thickness of 40cm. Because of its continuation towards the north, as well as its complexity resulting out of its adjoining nature to MB4, it

is very hard to draw any definite conclusion. On the top of this exposed structure, ceramic assemblage was absent, indicating a non-occupational layer without any ceramics or offerings. From the east section of the SE quadrant, the structure is 1.62m, away whereas, from the eastern slab of MB1, it is 3.06m, away (Pls. 20-22).

Extensive explorations have been carried out which yielded number of interesting

evidences in the vicinity of Hirapur. The site is divided in two different localities only after the detail survey of the region. In the burial locality 01, apart from the excavated megalithic structures, twenty one new megalithic stone circles have been noticed which vary in diameter. Nearly 100m towards the west direction of the excavated area a huge quantity of iron slag has been found which possibly indicate the iron working at the site to some extent. Clear picture will reveal only after the scientific survey and the systematic excavation of this part of the site. In the burial locality 02, three menhirs have been found, of which one has cup marks on the surface of the standing stone. In the same locality similar kind of pottery which is found from the burials, is reported from the cultivated field. This could be the habitation area of the megalithic builders.

16. EXPLORATION IN KHADAKPURNA BASIN DISTRICTS BULDANA, HINGOLI, JALNA AND PARBHANI

In continuation of last year's work, ext-
INDIAN ARCHAEOLOGY 2010-11-A REVIEW

-ensive exploration in Khadakpurna basin was initiated under the direction of B. C. Deotare together with research colleagues P. D. Sable, Satish Naik, Gopal Joge and Kathare from the Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune. Exploration was taken up in Purna valley of Tapi basin during last few seasons with a view to reconstruct the environment during early historic period in this area with a view to correlate these findings with the adjacent area like Khadakpurna, a part of Godavari basin and Lonar. In this regard, extensive explorations were undertaken from the confluence region to middle reaches of Khadakpurna. Actual exploration was initiated covering a part of Parbhani, Hingoli, Jalana, Buldana and Aurangabad districts and discovered number of early historic to medieval sites in this region as listed in the following table. Majority of sites are in the state of total destruction due to building and digging activity of villagers, some are deserted and some are still occupied by the modern habitation and some of them are under cultivation too.

Details of explored sites in Khadak-Purna Basin (a part of Godavari Basin).

<i>Sr. No</i>	<i>Name of the site</i>	<i>District</i>	<i>Latitude Longitude & Altitude</i>	<i>Distance in Km & Direction</i>	<i>Cultural Remains</i>	<i>Probable Period</i>

1	Phulkalas	Parbhani	19°9'7"N; 76°56'6"E 380m	27, E-SE	Key shaped step well, red ware and black ware	Late Medieval
---	-----------	----------	--------------------------------	----------	---	---------------

EXPLORATIONS AND EXCAVATIONS

<i>Sr. No</i>	<i>Name of the site</i>	<i>District</i>	<i>Latitude Longitude & Altitude</i>	<i>Distance in Km & Direction</i>	<i>Cultural Remains</i>	<i>Probable Period</i>
2	Pandhari (Bodaki)	Parbhani	19°8'5"N; 76°56'5"E 380m	14, E-NE	Red ware and black ware, brick bats and a pieces of glass bangles, terracotta wheel, saddle querns	Early Medieval to late medieval period.
3	Navagad Jain Temple	Parbhani	19°14'5"N; 76°54'2"E 399m	17, E-S-E	Idol of Jain Tirthankar Neminath	Medieval
4	Sukhi	Parbhani	19°13'2"N; 76°57'7"E 380m	25, E-SE	Mound (Gadhi), Red ware, black ware	Late Medieval
5	Bhokarwadi	Parbhani	19°11'0"N; 76°58'7"E 380m	32, E-SE	Castle	Late Medieval
6	Pandhari	Parbhani	19°16'2"N; 76°57'6"E 380m	14, N-NW	Mound (Gadhi), red ware and black ware pottery	Medieval
7	Kumbhar Pandhari	Parbhani	19°16'2"N; 76°58'7"E 380m	17, N-NW	Black and red ware, red ware, black ware, micaceous red ware, terracotta round wheel, terracotta round lead, fragments of shell bangles, saddle querns; etc.	Early Historical
8	Yerandeshwar	Parbhani	19°17'2"N; 76°56'7"E	20, N-NW	Siddheshwar Temple	Medieval

			388m			
9	Siddheshwar	Hingoli	19°36'7"N; 76°58'7"E 405m	44, N	Historical brick manufacturing industry, red ware, black ware, piece of shell bangles etc.	Early Historical

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

<i>Sr. No</i>	<i>Name of the site</i>	<i>District</i>	<i>Latitude Longitude & Altitude</i>	<i>Distance in Km & Direction</i>	<i>Cultural Remains</i>	<i>Probable Period</i>
10	Dhegaj	Hingoli	19°37'4"N; 76°56'7"E 433m	50, N-NW	Mound (Gadhi), Red ware, black ware	Late Medieval
11	Yenoli	Parbhani	19°39'2"N; 76°42'0"E 480m	5.5, N	Pillar, sculptural remains (Nag, Rishi, Ganesha and Siva-linga etc.	Medieval
12	Mangwadi	Hingoli	19°42'2"N; 76°47'7"E 472m	34, NE	Castle	Late Medieval
13	Tandulawadi	Hingoli	19°42'2"N; 76°47'2"E 440m	28, N-NE	Mound (Gadhi), Red ware, black ware	Late Medieval
14	Palaskheda	Parbhani	19°32'7"N; 76°40'0"E 440m	12, S-SW	Black ware, red ware, along with pottery there were fragments of pillar	Late Medieval
15	Nirwadi Budruk	Parbhani	19°34'7"N; 76°31'1"E 460m	25, W-SW	Black ware and red ware, stone, structural remains	Medieval
16	Raheri	Buldana	21°1'4"N; 76°14'2"E	21, NE	Mound (Gadhi), Red ware, black ware	Late Medieval
17	Gavaliwada	Buldana	21°1'4"N; 76°14'2"E	21, NE	Sati Stone with Devnagari Inscription	Late Medieval
18	Sangvi	Buldana	19°22'4"N; 76°14'2"E	24, N-NW	Mound (Gadhi), Red ware, black ware	Late Medieval
19	Mehuna Raja	Buldana	20°2'4"N; 76°7'2"E	30, NE	Mound (Gadhi) with two tire fortification	Medieval
20	Gokulwadi	Buldana	20°2'4"N;	28, NE	Sculpture of Nandi and	Late Medieval

			76°7'2"E		Shivalinga		
21	Kumbaharzari	Buldana	20°7'5"N; 76°2'6"E	45, N-NE	Mound (Gadhi), ware, black ware	Red	Medieval
22	Harpala	Jalna	20°14'2"N; 76°2'4"E	52, NE	Mound (Gadhi), ware, black ware	Red	Early Medieval

EXPLORATIONS AND EXCAVATIONS

Plate 20



A



B

Hirapur: A and B, view of megalithic burial

Plate 21



A



B

Hirapur: A, megalithic burial and B, ceramic assemblage placed in the western corner



A



B

Hirapur: A, view of stone circle and B, iron smelting site

17. EXCAVATION AT MALLI, DISTRICT GONDIA

State department of Archaeology and Museums, Nagpur Division under Anand V. Bhojar and Virag G. Sontakke assisted by B.P. Waghade, D.P. Bokde, U.V. Bhojar carried out archaeological excavation at Malli in Tiroda Taluka of district Gondia.

The site Malli (21° 19' 221" N; 79° 54' 249" E) is located nearly 135km east of Nagpur District which is Divisional headquarters of the eastern Vidarbha region. The site is on the left bank of Chorkhambara River which is a tributary of Wainganga that originates from Chorkhambara Lake in Tiroda taluka. Striking feature of this site is the availability of habitation mound along with burials. Concentration of megalithic burials is seen in

south-eastern side of the present village. Different styles of burial having double enclosing circle, stone circle having triple enclosing circle, dolmen with / without stone circle, cist, having single enclosing circles, cists having double enclosing circles, and cists having triple enclosing circle etc. All these megalithic burial structure were constructed from laterite stone which is abundantly found in the region. For inner architecture, flat slabs of sand stone were used.

The site was proposed for excavation with objectives: To trace out the antiquity of these megalithic burials and to find out any relation or similarity with megalithic culture of Vidarbha; to find out the reasons for the concentration of large amount of burial in a specific location; to verify the possibility of habitational remains of megalithic culture at Malli; to find out the socio-economic and religious conditions of megalithic culture; and

systematically unearth the cultural remains with proper documentation and compare with other excavated site in Vidarbha.

Due to large number of burials and typological differences among them, burials at Malli have been divided in four localities. Broad description of these localities is as follows.

Locality 1: This is located very close to Malli village. It is situated between the artificial lake on the north and the rainy nulla on the south side.

Locality 2: This is located to the south of locality 1 beyond the nulla.

Locality 3: This is located in the south-eastern direction from Locality 2.

Locality 4: This locality is situated in the south-west direction from Locality 3 at a distance of 1.5km.

In total, four megalithic burials were chosen for excavation from different localities. Amongst them, Burial 1 was located in Locality 1, Burial 2 and 3 were taken from Locality 2 and Burial 4 from Locality 3. Above megalith burials were taken up for excavation to evaluate nature of deposit, types of burial architecture, clustering of burial and their comparisons etc.

Burial 1 was represented by a single stone circle at Locality 1. Total diameter of this burial from outer side was 5.70m from north to south and 5.90m from east to west. Total depth reached in Burial 1 at S-W qd. was 115cm. Total four layers were identified here with central pit. One cist made of schist stone was found in the north-eastern qd. One central pit

EXPLORATIONS AND EXCAVATIONS

was recognized in almost center portion of the burial. Neither antiquities nor faunal remains were reported here except for few post sherds of coarse red ware.

Burial 2 was a cist type of encircled with double stone circle. It was located in Locality 2. Burial 2 forms a part of cluster of five burials. This clustering gives us opportunity to see socio- economic pattern. Due to this, both these burials were chosen for excavation. Total four layers were examined in Burial 2. The depositional process was same as Burial 1. Important feature of this burial was its burial architecture. Double chamber (Cist) was unearthed in center portion of the burial during excavation. Except the cap stones all side stone were of laterite. Other than double chamber, one more cist was found in the north-eastern portion of the burial. Both the cists were excavated up to natural soil. They were without any antiquarian remains. Scanty remains of pot sherds were found here just like Burial 1.

Burial 3 is located very near to Burial 2 in the same locality. This was also a cist type of burial encircled with double enclosing circle. Four depositional layers were observed. In north-west qd of the burial one, pot containing bone fragments was found. Similar pot of faunal assemblage was also found in north-eastern portion of the burial. Bones from these pots are in brittle condition. This was the only burial which gave bone evidence from Malli.

Burial 4 was the only burial which is situated in Locality 4. This was cist type of burial encircled with triple enclosing circles. Total diameter of this Burial from outer side

was 10.70m from north to south and 10.80m, from east to west. Total depth attended in Burial 4 at s-w qd was 75cm. Total five layers were identified here. Typologically, this burial has main cist in the center with triple enclosing circles. During excavations, three small cists with north – south orientation were also found. Antiquarian remains include one small iron clamp and coarse red ware pottery. No faunal remains were reported.

Two megalithic cultural mounds were discovered in this session. Two trial-trenches were laid on habitation mound. Trench D laid on Mound 1 measures 2.50 x 2.50m, whereas Trench J was laid on Mound 2 measures 1.50 x 1.50m. Both these trenches gave evidence of megalithic cultural assemblage. Brief report of this Trial-trench excavation is given below:

Period I (Early Iron Age): Habitation site at Malli is situated on the northern side of the village. The spread of site is seen in form of two mounds which are to be seen on the bank of Chorkhambara River. To see the cultural sequence of the site a trial trench measuring 2.50 x 2.50m was laid on the Mound 1. Overall 3.15m deposit was noticed in Trench D. In all, twelve layers were identified in trench D which gave the evidence of single culture occupation i.e. megalithic period. The layers assigned to this period provide evidence of successive layers of composite ashy deposit mixed with charcoal-bits and soft clay earth. The ceramic industry was represented by Black and Red Ware and Micaceous Red Ware of medium to fine fabric which are typically megalithic recovered from Vidarbha region. Towards the upper layers the amount of black burnished ware and red slip ware increased. The shapes

include shallow- dishes, bowls, jars, basins, etc. A significant discovery of the excavation is availability of painted pottery comprising micaceous red ware with a red slip and painted in black and red ware with chocolate slip and painted in black. Designs include series of horizontal lines, check-board pattern, hatched diamond, group of vertical strokes of varying number occurring on the either side of rim both internally and externally. Few sherds of the black and red ware bore graffiti marks.

Besides pottery, evidences of hearths, post-holes and successive floor levels were also recovered during excavation presenting a picture of megalithic occupation of the site. However, due to the small area of the excavation, no antiquarian remains were reported from here. Tentatively, the megalithic period of Malli has been assigned a date between *circa* 1000 BCE to 500 BCE. All megalithic burials were counted, measured and GPS coordinates were taken to find out pattern of burials, if any. Geo-archaeological studies at Malli are carried out by Dr. Sable from Deccan Collage, Pune, which may reveal rock formation, probable source area for construction of the megalithic monuments, quarry and filling material, etc.

RAJASTHAN

18. EXCAVATIONS AT DABLI VAS CHUGTA, DISTRICT HANUMANGARH

Under the direction of R.N. Singh and C.A. Petrie in association with C.A.I. French, J. Bates, C. Lancelotti, A.K. Pandey, D. Parikh and D.I. Redhouse, the Land, Water and settlement project carried out a preliminary

geoarchaeological survey across the Ghaggar channel and excavations at the Early Harappan site at the village of Dabli vas Chugta. The site was specifically chosen because of its geographical relationship to the present courses of the ephemeral Ghaggar Rivers. This research addresses all three of the principal aims of the archaeological components of the Land, Water and Settlement Project, which are as follows:

1. Previously identified archaeological sites that have occupation dated to the Mature Harappan, Late Harappan and/or Painted Grey Ware phases, which are in close proximity to perennial and ephemeral river channels, and ideally contemporaneous sites that have been excavated;
2. To conduct excavation at a number of these sites with the specific aim of recovering evidence for palaeo-environment, subsistence behavior and absolute chronology; and
3. To assess the immediate and broader off-site landscape and environmental contexts of these sites through landscape survey, detailed geomorphological investigations and to correlate these results with the on-site evidence.

In order to gain a greater understanding of the surface and immediate subsurface geomorphology, a preliminary analysis of the environmental and landscape context of a range of archaeological sites in District Hanumangarh was carried out during the season. This saw a small team of researchers make assessments of the environmental and landscape context at Dabli vas Chugta and sev-

-eral other sites. This site margin survey work took the form of judgmentally placed test pits and hand auger profiles, as well as opportunistic findings of exposed and available sections, brick quarry pits, wells and water boreholes. At no point did this investigation intrude on land protected by the ASI. The primary objective of this work was to investigate the local soil and site-formation processes at each of these sites. At each profile loci, the stratigraphy was recorded and photographed, located and leveled in using a Leica GPS1200 differential GPS system, and old land surfaces sampled as appropriate.

Geoarchaeological survey in and around Dabli-vas Chugta revealed a consistent sequence of deposits and soils. The site area is preserved immediately below the modern plough soil, but the underlying topography quickly dips east/northeast/southeast-wards beneath alluvial deposits. Nineteen stratigraphic soil profiles were recorded from Dabli and its vicinity, and a further three profiles between Dabli and Kalibangan.

Immediately off-site to the south, east and north-east, the yellow fine sand substrate quickly dips away to depths of c. 1.5-3 m, any sign of an old land surface disappears, and great depths of silty clay alluvial material predominate instead. These silty clay alluvial deposits are invariably always below the sand levee deposits, but in a few instances, they also overlie the levee deposits. In one profile (13) to the south-east of Dabli, the sand of the levee is 'sandwiched' by silty clay alluvial deposits at a depth of about 1.3m below the modern ground surface. This suggests that there is erosion and/or reworking of the levee deposits in the past, and older and younger phases of alluvial

aggradation. Across the whole site area and its vicinity, the upper 1cm or less of modern soil cover is composed of fine sandy silt. This has probably also aggraded as a result of seasonal flood deposition in the past, but from different, slightly coarser sources. These facies changes are all probably related to the flood regime and channel migration of the Ghaggar River system. Moving south towards the major site of Kalibangan, the yellow sand substrate dips to depths of up to -10m below the modern ground surface. These profiles have very fine sandy silt upper 1-1.25m of deposits with 'heavier' silty clay beneath. Just to the west of the site there is a large area of extraction for bricks and brick factories, situated to either side of the relic/former Ghaggar floodplain. These sandy silt deposits are widely exploited for bricks, with little need for any temper additions in their manufacture. Extraction of these deposits for brick stops when the upper surface of the alluvial silty clays is reached.

Anecdotal evidence gained from conversations from several local farmers suggests that the ambient groundwater table for 'sweet' water around the village of Dabli is about 80 to 120feet (c. 26-40m) below the present ground surface. Salty water is found both above and below this level. The 'sweet' water is calcareous and varies in height/depth seasonally, responding to seasonal re-charge associated with the annual monsoonal rains. Groundwater tables are believed to be falling over the past decade, with local farmers saying that this has dropped in the order of 20-40 feet (c. 6-13m) in that time.

The Early Harappan site at Dabli vas Chugta is situated on a poorly developed and weakly alluviated soil profile. This soil is thin

and without any real horizonation, although the transition to the substrate beneath is sometimes marked by the presence of small aggregates of calcium carbonate. The buried soil profile is developed on fine sand deposits, which possibly represent either former channel bed deposits and/or a former river levee bank, on one margin of the Ghaggar floodplain area.

Ghaggar floodplain deposits appear to surround the site, but are especially prevalent and thickening to the south, and indeed a several sites between Dabli vas Chugta and Kalibangan (i.e. at Chak Jhana and Bahlol Nagar). Thus, it appears that the Harappan site is located on the margins of a substantial former floodplain. This floodplain continued to seasonally aggrade before, during and after the occupation of this site during the early-mid 3th millennium BC, depositing silty clays, presumably on a seasonal basis with annual flooding taking place within the wide Ghaggar floodplain. This slow, annual accumulation of eroded fine soil derived material would have provided a naturally replenishing and moisture retentive soil and groundwater system. But after every period of monsoonal flooding over a wide area within the confines of the Ghaggar floodplain, the area would have soon been characterised by many small-medium channel meanders and a high, near surface groundwater table, but even these channels would probably have largely dried out during the course of the next few months and the groundwater table would slowly fall before the next monsoonal replenishment.

There is consistent evidence of a major change in sediment facies occurring after the Harappan occupation at Dabli. This is the change from 'heavy' silty clay to a freely

draining very fine sandy silt. The former sediment is undoubtedly indicative of over-bank flood deposition of silt and clay rich floodwaters. This fine alluvial deposition would have occurred seasonally and most probably in still, shallow standing water. The slightly coarser material above probably reflects greater water volume and velocity as well as sandy channel bed/levee scour/erosion, which in turn reflects channel avulsion and incision taking place.

Recent village to village survey in the vicinity of Kalibangan by Vikas Pawar revealed the presence of many previously unknown settlement mounds that are close to the site, and one such site is the mound of Dabli-vas Chugta, which lies approximately 7km to the north-east of Kalibangan, and was undoubtedly once a part of the larger settlement's sustaining hinterland. Dabli-vas Chugta had not been recorded in previous reconnaissance surveys, and the material seen on the surface of the mound during a visit in April 2010 indicated that it was occupied during the Early and possibly also the Mature Harappan periods.

The main focus of the work carried out by the *Land, Water and Settlement* project in the 2011 season was the excavations at the mound site of Dabli vas Chugta and topographic and geoarchaeological site of the site and its surrounding area. The mound sits immediately to the north of the modern village of the same name. The site was selected for further investigation as the material recovered from the surface indicated that it might have been occupied contemporaneously with Kalibangan, and although this is one of the better published Indus Civilisation sites, there

are still many questions about the chronology of Indus occupation in this region and the relationship between Indus sites and the Ghaggar palaeo-channel.

A detailed topographic survey of the site was carried out using a Leica GPS1200 differential GPS system, which was also used to lay out trenches in two areas, labeled ZA6 and ZI7. The three-dimensional data generated from the topographic survey was processed using ArcGIS version 9 and ArcMAP version 9.2, and a plan of the site with 20cm contours was generated. The topographic survey showed that very little of the mound was preserved to a height of greater than 180.9m above sea level, which was the mean level of the land surface preserved on piers beneath pylons that had been quarried around. The maximum surviving elevation around the site was 182.2m above sea level, and this was largely area adjacent to the modern village. The topographic survey and the excavations described below show that virtually nothing of the original mound is currently preserved (Fig. 10). What is left of the site appears to survive as a flat oblong area of several hectares in size on the eastern side of the modern village of Dabli. The upper levels of the stratigraphy are much affected by modern plough truncation, in effect 'flattening' the archaeological deposits. In situ deposits are in the order of c. 30-50cm in thickness, with occasional pits of up to about 1.5m in depth. The northern margins of the site appear to have been quarried away for modern brick manufacture, thus lowering the ambient soil/sediment profile by about 1.5m and removing any in situ archaeology altogether. Due to the perceived level of damage to the site, an attempt to map the extent of the site on the basis of the presence/absence of ceramics

EXPLORATIONS AND EXCAVATION

on the surface was carried out. Each field boundary was walked and the presence or absence of pottery noted. Each field was then assigned a value of between zero and four to indicate the number of enclosing boundaries in which pottery was found. The result is shown in (Fig. 11). Those fields with a count of three or four were agglomerated to create a polygon denoting the surviving mound on the basis of the pottery survey. The result is shown in (Fig. 12). In addition, attempts were made to estimate the size of the site using topographic survey, Google Earth, and geoarchaeological profiles.

Trench DVC/ZA6: Excavations in Dabli vas Chugta commenced was deliberately placed at the highest part of the mound, and it was hoped that a complete sequence of the occupation preserved on the mound would be exposed. Unfortunately, following the removal of the topsoil, it was apparent that only a limited amount of archaeological material remained in this part of the site, and this was limited to pits excavated into the natural soil. It is unclear whether these pits were excavated directly into natural as the overlying deposits appear to have been completely removed during site leveling and soil removal operations by the local villagers. The uppermost levels of the four pits exposed in the trench all showed signs of disturbance from modern ploughing. All but one of these pits contained Early Harappan ceramics, while there was one pit that contained Early Historic material, indicating that there was some later re-occupation at the site.

The south section of Trench ZA6 is shown in (Figs. 13-14). A total of 18 separate stratified deposits were delineated in Trench

BRJ/ZA6, including pit fill and cut deposits, and several deposits that were actually consisted of natural soil. It is difficult to interpret these deposits, but they appear to relate to two separate phases of occupation, which could only be differentiated on the basis of the stratified material. Of the four clearly distinguishable pits that were exposed, three contained Early Harappan ceramics, while as noted above, one contained Early Historic ceramics. No structural remains were preserved anywhere in the trench.

Trench DVC/ZI7: Following the discovery that there was no primary deposits preserved in ZA6, an intensive section scraping was carried out along the field boundaries to establish whether there were actually any preserved deposits surviving at the site. Approximately 45m to the east of ZA6 an area showing signs of burning and the presence of floors was identified, and it was decided to place a trench to investigate these visible features. Initially, a small 2x2m trench was excavated to determine the depth of stratigraphy, and this was subsequently expanded into a 11 x 2 m horizontal excavation. As in trench ZA6, the deposits immediately below the modern top soil showed very clear signs of disturbance by ploughing. However, in contrast to ZA6 there was clear evidence for the preservation of archaeological deposits across the full extent of the trench. The depth of deposit throughout the trench was variable, ranging from 60 to 120 cm, slowing from west to east. This variation suggests that the archaeological deposits were preserved in this area as they were originally laid down upon an uneven ground surface.

This part of the site thus appears to have been some type of natural gully that prov-

-ed to be no major impediment to occupation. A total of 60 separate stratified deposits were delineated in Trench DVC/ZI7, and these comprise three major phases of occupation, all of which were characterized by Early Harappan ceramics. The earliest deposit revealed was a light green surface that was visible across the full extent of the trench. There were clear signs that post holes were cut into this deposit in several locations. Above this surface were several more ephemeral floor surface deposits and a large area that had been paved with irregularly laid mud-bricks of four different colors. This pavement abutted a low bund at the eastern end and a wall made of yellow mud-bricks at the western. Additional floors abutted this pavement and bund, and had clear signs of occupation activity in the form of fire places and hearths. At some point during the use of the pavement, a wall made of red-pink mud-bricks was built abutting the yellow mud-brick wall, and this later wall has a distinctively different alignment. There were also floor deposits and fill related to the use of this wall, and these were overlain by a layer of eroded and decayed mud-brick that was subsequently damaged by ploughing. An area adjacent to the trench was also subjected to detailed geo-archaeological investigation. As noted above, in Trench ZI7, a c. 15m length of *in situ* 'floor/yard' surface horizons of material survive, probably all of the Early Harappan period. Pits of variable size and depth define in its upper surface.

This surface was extensively sampled in Trench ZI7 and also in Profiles 15 and 16 beneath the adjacent field boundary bank. The main floor/floor accumulation horizon (2-6cm thick), all labeled as context 215, was sampled at 50 and 100cm intervals for both geo-chemic-

-al (pH, magnetic susceptibility and multi-element analyses) and micromorphological analyses. These analyses should give a good idea of what these contexts are comprised of, their use in life, and any post-depositional process at work since burial. Context 215 exhibited a number of discontinuous horizons beneath it, in particular a thin lens of brown to black, amorphous humic and very fine charcoal material (context 216). These 'floor and floor-like' accumulations were formed on what is believed to be an *in situ* old land surface and buried soil. This soil comprised a greyish brown fine sandy/silt loam with occasional, small and abraded pieces of pottery. It was sampled at five loci for micromorphological analysis, both on-site and immediately off-site. This is developed on a yellowish brown to yellow fine sand, which could be either channel fill or levee deposits. In many respects this is very similar to what was observed at the Harappan site of Burj in Haryana in the 2010 field season (Singh et al. 2008, 2010).

A wide range of cultural material was recovered from the excavations at Dabli vas Chugta. The most common material recovered was fragments of fired ceramic vessels of various periods, but there were also a range of other small finds recovered, including beads of various types, clay discs, grinders, and clay figurine, bangle and toy cart fragments. The pottery recovered from the excavations at Dabli vas Chugta was exclusively Early Harappan in date. In general, the material presented a range of distinct fabric types that have previously been described at Kalibangan, which is unsurprising considering the proximity of the latter site. These include examples of Kalibangan Fabrics A, B, and D (after Lal et al.

2003). There were examples of fabrics decorated with incisions, and monochrome black and bichrome black and white painting. In general the motifs were akin to those seen at Kalibangan, including flowers with tendrils, pendant lines, bands, areas of cross-hatching. Several broken but reconstruct-able vessels were also recovered (Pls. 23-24).

A total of 116 antiquities were recovered from Dabli vas Chugta, including a large number of steatite beads, which were the most common artefacts recovered. In addition, several fragments of an unusual ceramic vessel were found that had clear signs of indentations being made by a pointed object and incisions made by a finger nail. There were also several copper based metal objects, including an arrowhead reminiscent of Ganeshwar type and

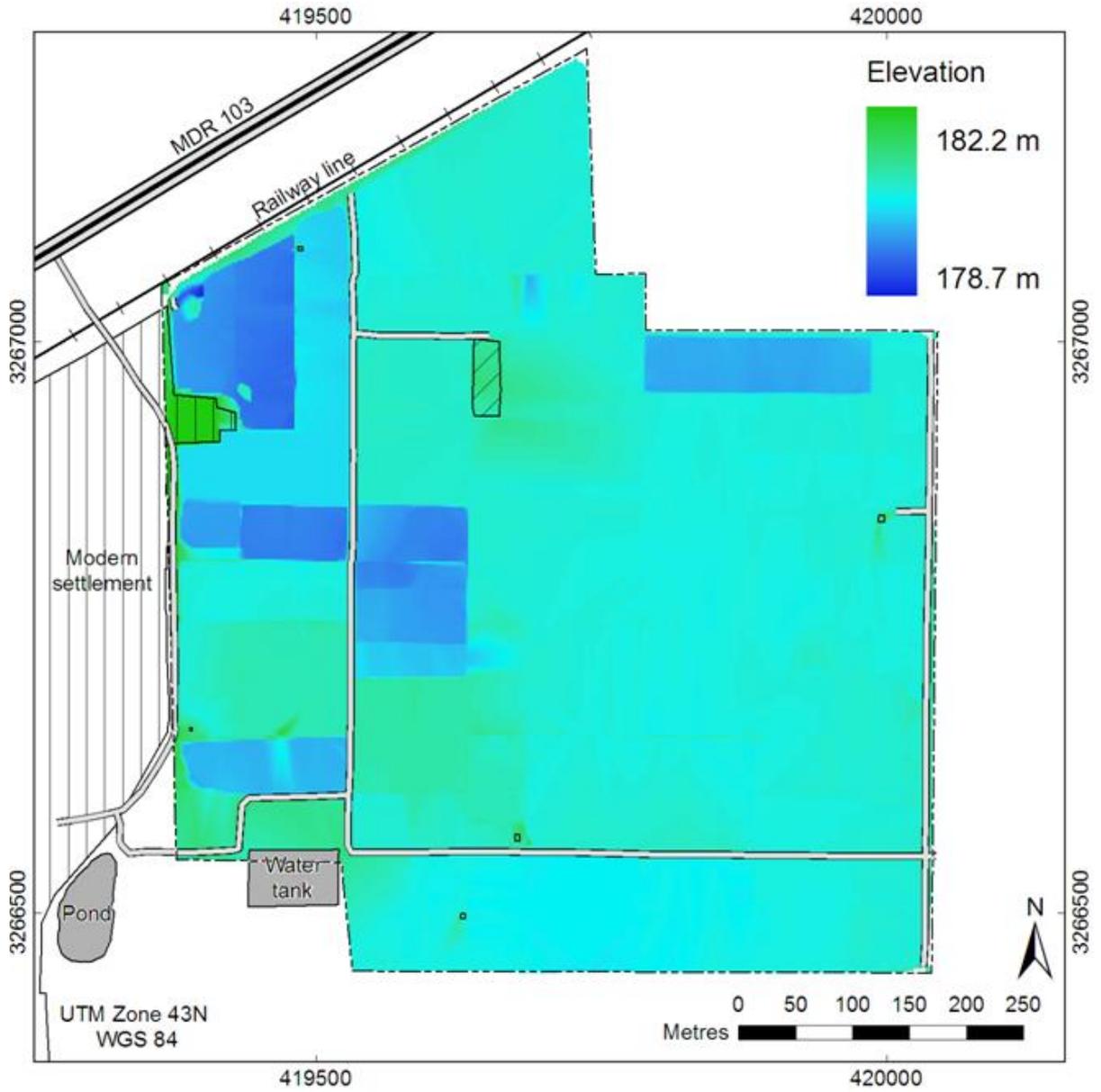
a fragment of what appears to have been a fish-hook (Pls. 25-27).

TAMIL NADU

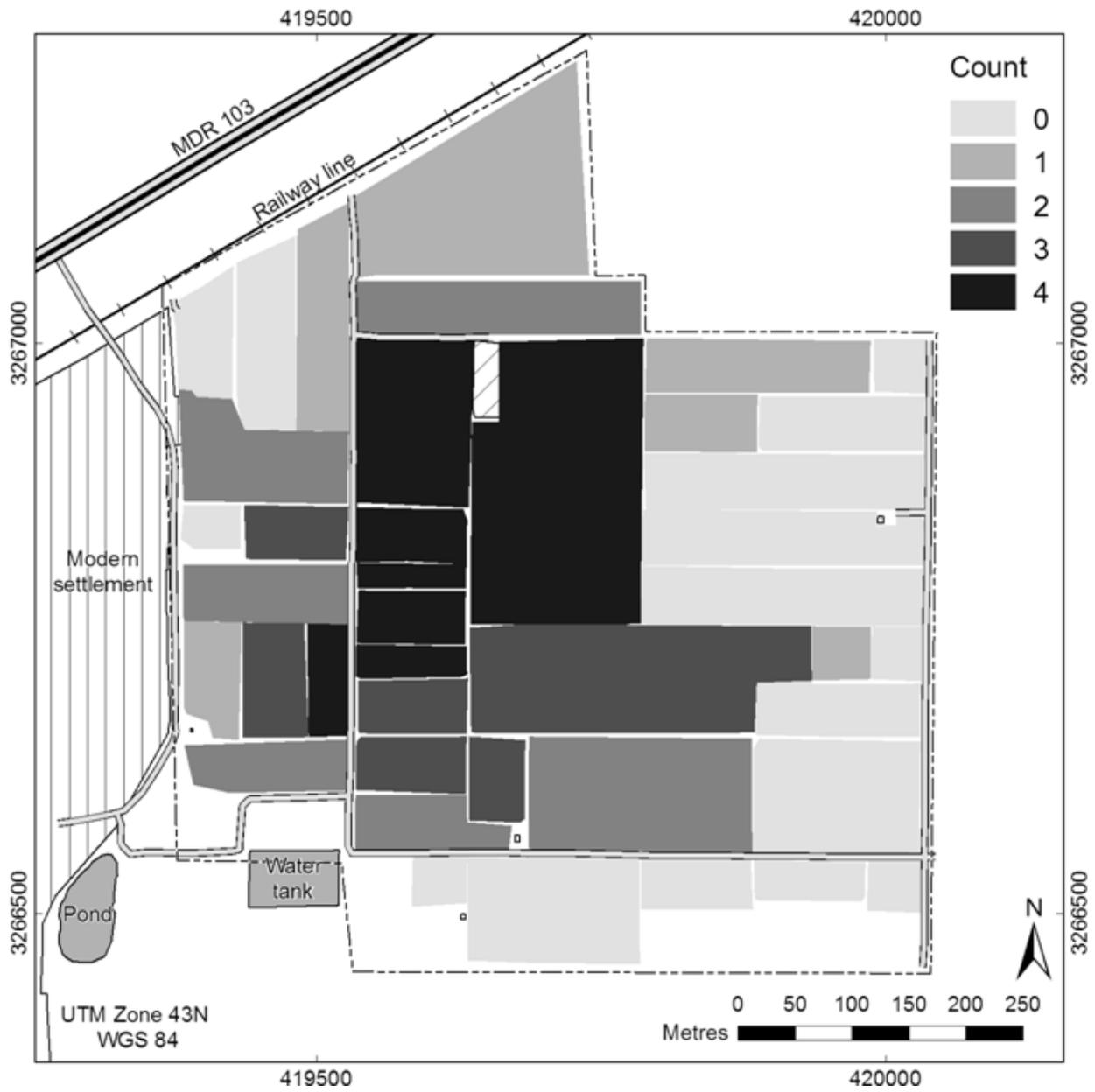
19. EXCAVATION AT ARPAKKAM DISTRICT KANCHIPURAM

Arpakkam (90° 45' N; 12° 44' E) in Kanchipuram Taluk and District is situated 14km south of the District Headquarters. It contains vestiges belonging to the religious faiths such as Buddhism, Jainism, Saivism and Vaishnavism. The preliminary survey revealed presence of burial site consisting of urn burials and habitational site. The present settlement is right on top of the habitation mound extending to 2km². On the surface of the mound, potteries like black and red ware and all black ware sherds, and a few glass beads and bangles were collected. The place

Fig. 10

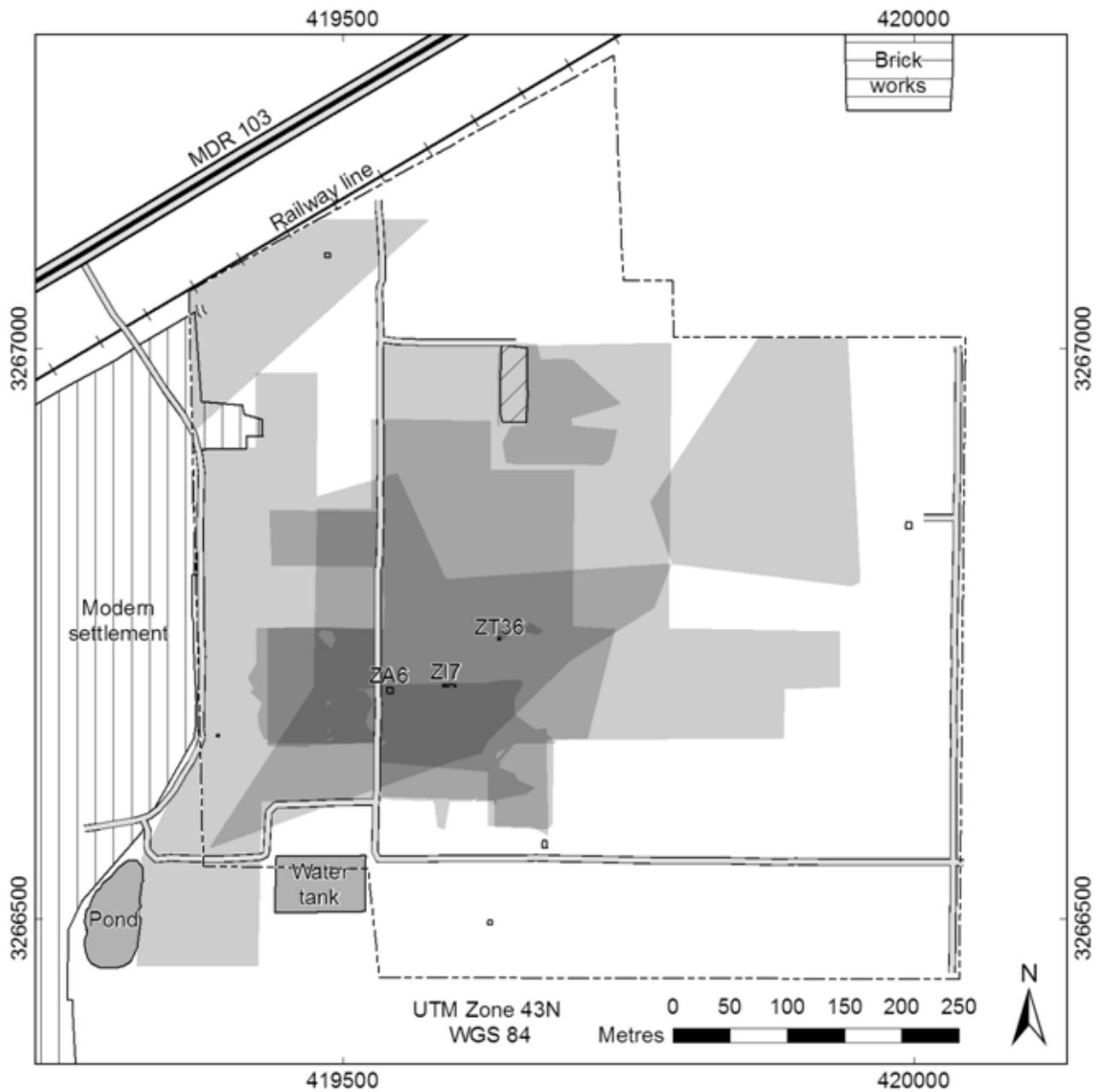


Contour plan of Dabli vas Chugta



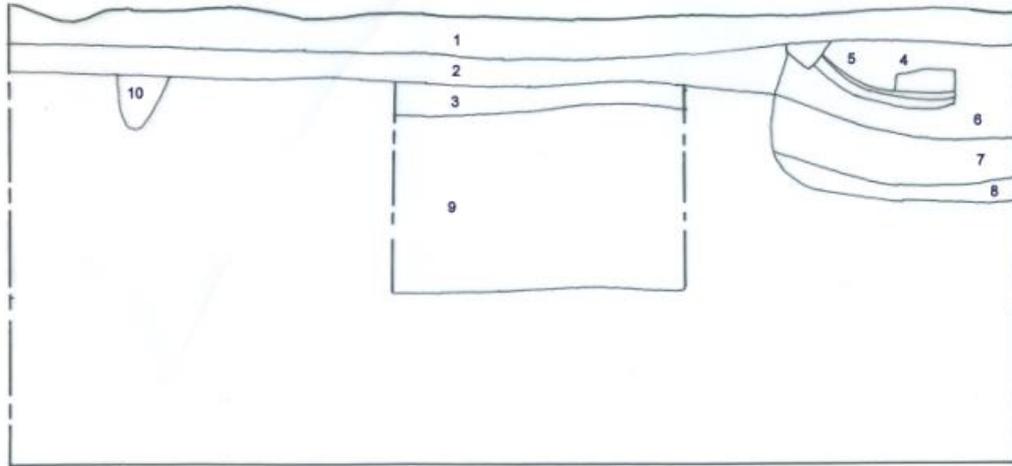
Results of the pottery survey at Dabli-vas Chugta

Fig. 12



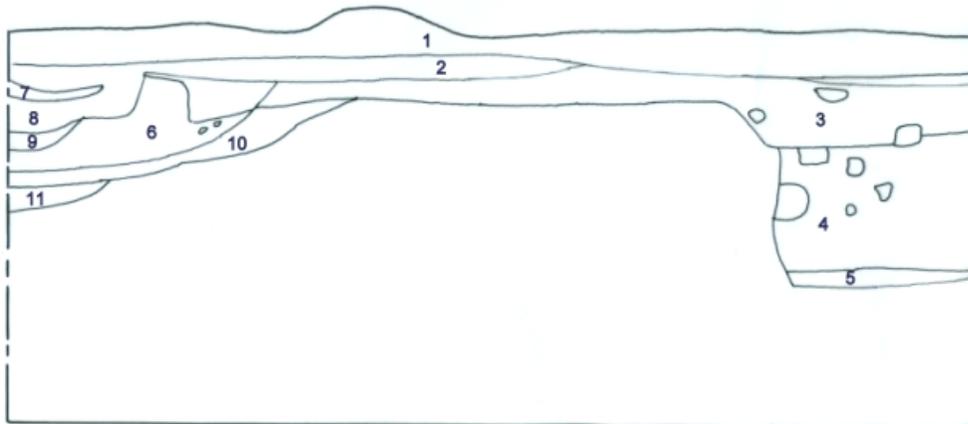
Results of the pottery survey at Dabli-vas Chugta

DABLI VAS CHUGTA - 2011
Section Looking North
Trench No. - ZA6



13

DABLI VAS CHUGTA - 2011
Section Looking East
Trench No. -ZA6



14



A



B

Dabli Vas Chugta: Early Harappan pottery

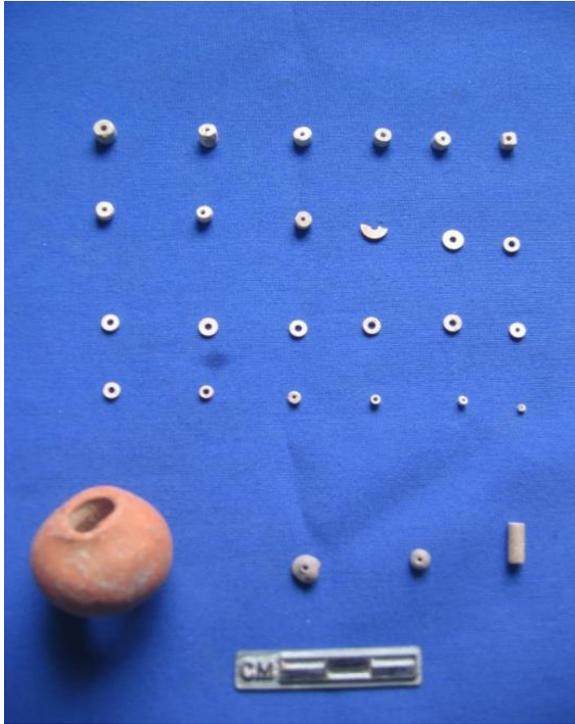


A



B

Dabli Vas Chugta: Early Harappan Potteries



A

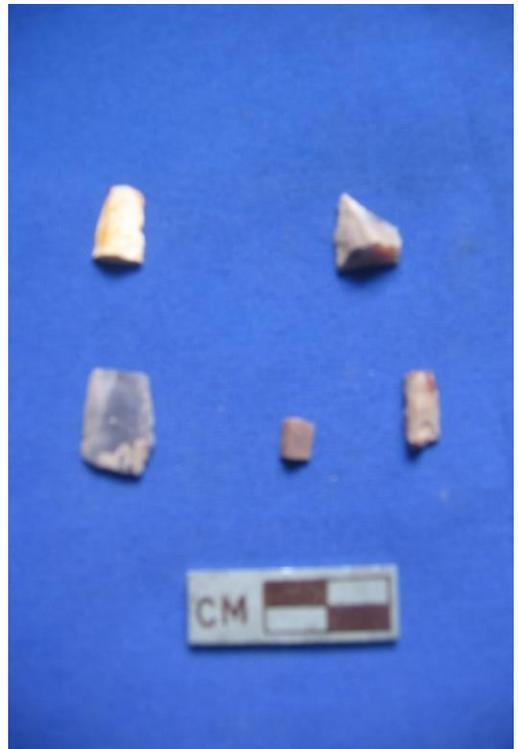


B

Dabli Vas Chugta: Beads and other artefacts



A



B

Dabli Vas Chugta: bangles and other objects

Plate 27



Dabli Vas Chugta: metal objects

EXPLORATIONS AND EXCAVATION

sourrounded by important sites like Kanchipuram, Palur and Uttiramerur. Considering the archaeological importance of the site, the Department of Ancient History and Archaeology, University of Madras, had conducted excavation under the direction of P.D. Balaji, Head in-charge and Director of the Excavation, assisted by J.Soundararajan, and M.Seran and students.

One trench (ARP-1) was laid 80m north-west of the Sri Valiswarar Temple, measuring 5m x 5m. The excavation had revealed existence of deposit up to a thickness of 3m. This cultural deposit is divided into three layers. Potteries such as black and red ware, all black ware, and red slipped, coarse red ware, portions of conical jars; terracotta objects such as ear ornaments, seals, lamps, figurines and hop scotches; and other minor antiquities such as shell bangles and semi-precious stone beads were collected in the excavation. Besides, evidences for the construction activities in the form of foundation pits, stone rubbles and brick bats were noticed in the upper level. No datable object is found in the excavation. Hence, on the basis of relative dating method, the deposit was divided into two cultural periods. i.e. Period I and Period II. The Period I represented by Layer 2 and 3 was characterized by the presence of more number of potteries such as black and red ware, all black ware and coarse red ware. Antiquities like terracotta objects such as ear ornaments, seals, figurines, shell bangles and glass beads were recorded in this

level. Large sized bricks measuring 18 x 15 x 7cm were also encountered. On the basis of the potteries and antiquities, the Period I is tentatively dated between 3rd cent BCE. 6th upto 7th century CE. The Period II represented

by layer 3 contained more number of coarse red ware potsherds. Besides, the presence of more of brick bats endorses the hectic constructional activity in this level. This level is dated between 6-7th century CE upto modern period. In this level a Jyestha Devi, was found bearing Pallava features (Pls. 28-29).

UTTAR PRADESH

20. EXCAVATION AT PAKKAKOT, DISTRICT BALLIA

The Centre of Advanced Study Department of Ancient India History, Culture & Archaeology, Banaras Hindu University conducted a limited excavation at Pakkakot, District Ballia under the directions of Sitaram Dubey, Ashok Kumar Singh & G.K. Lama associated by Santosh Kumar Singh, Arun Kumar Pandey, Barun Kumar Sinha, Ram Badan, Shiv Kumar and Shiv Shankar of the Department. The main objective of the current field season's excavation was to obtain a complete culture-sequence of the site in addition to imparting field training to the Under-Graduate and Post-Graduate Archaeology Group students of the Department.

The ancient site of Pakkakot (25° 46'13"N.; 84°0'36"E.) located on the ancient bed of Chhoti Saryu (Tons) river is situated about 16km west of the district headquarter on the Ballia-Rasara and 3km south from Sichachaur. The ancient settlement is spread over an area of more than 30 acres and the extant height of the mound from the

surrounding plain is about 12m. The main mound is covered with fortification walls and four bastions or watch towers which are almost

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

Plate 28



A



B

Arpakkam: view of the excavation

Plate 29



A

B

Arpakkam: A, antiquarian remains recovered during the excavation and B, Jyestha Devi bearing Pallava features

Period

intact. There are four mounds at Pakkakot (Mound 1, 2, 3, & 4), which extend in more than 1.5km along the old bed of the river Chhoti Saryu (Tons). Presently, the modern village of Pakkakot occupies the southern portion of the main mound (Mound 2). Sixteen trenches of 5m x 5m and 3m x 3m size were excavated on all the four mounds in different localities. Trench 9 and 14 were exposed at Mound 1, Trench 1-8 were exposed on the main mound (Mound-2), Trenches 11 & 15 were undertaken on the Mound 3 and Trench 16 was undertaken on mound 4. The excavations resulted into the documentation of the following culture – sequence:

Period I	:	Neolithic Culture
Period II	:	Chalcolithic Culture
Period III	:	NBPW
Period IV	:	Sunga – Kushana Period
Period V	:	Gupta and post- Gupta

The deposit of earliest habitation was found on Mound-1 represented by about 45cm of cultural deposit. Four trenches (9, 10, 13 and 14) of 3mx3m size were laid out on the Mound 1. This period is marked by the ceramics of cord-impressed red ware, rusticated ware and red ware. These potteries are made on slow wheel. Some of the potsherds are handmade also. Rice husk is used as degraisant, which is seen both on the surface and core of potsherds. The potsherds are generally thick in fabric though the pots of medium quality are also met with. The pots are generally ill-fired and clay used is not well levigated. Shapes are also limited in comparison to the overlying chalcolithic culture which include bowl (shallow and deep), *lota*-shaped vessels, medium sized vases, footed vessels, and a few

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

spouted vessels. The inhabitants of Period I used several methods to decorate the pottery.

The first method comprises post firing scratching by a sharp instrument which includes geometrical patterns. It is noteworthy that such post-firing scratching has already been reported from Imlidih Khurd I, Lahuradeva I and Bhunadih I. The second method of decorating pottery vessel was the appliqué method. Types of rope and chain patterns were executed on the pottery of this period. The small finds of this period include bone points and pottery discs. Due to limited excavations of this period, no precise nature of structures was traced. Fragments of reed marks and burnt clay lumps suggest that the inhabitants of this period lived in wattle-and-daub houses. Good quantities of animal bones were recovered in the process of excavation. The excavation also yielded good quantity of archaeobotanical remains. The preliminary rice, barley, pigweed, wild pea and lentil had already been cultivated in Period I. Two charcoal samples were also recovered which are under study.

Period II belongs to the chalcolithic culture and traced at Mound-1 only. These deposits were recovered in the layer (3) of trenches 9 and 14 which is light, yellowish and ashy character. It measured 60cm in thickness. These layers have yielded sherds of black-and red ware, black slipped ware, red slipped ware and red ware. The potteries are wheel made and range from fine to coarse variety. The principal types of these wares are bowls, basins, vases, storage jars, pedestalled bowls, spouted vessels and footed bowls. Ceramic industries and pottery types associated with this phase may be compared well with Chechar-

-Kutubpur, Senuwar, Chirand in Bihar and Waina, Bhunadih, Lahuradeva, Narhan, Khairadih, Agiabir, Jhusi, Tokwa, Raja-Nala Ka Tila, Malhar etc., in Uttar Pradesh. Besides the ceramic assemblage, small finds of this period include terracotta beads, bone points & beads, gamesman and pottery discs. Good quantities of animal bones were collected from the excavation. Mention may be made of pits cut in to the lower levels which disturbed the earliest deposit of Neolithic horizon. The archaeo-botanical remains of this period include rice, barley, lentil, pigweed and wild pea. The details of the archaeo-botanical remains are under process of study. Remains of Period III (NBPW) were recorded from all the mounds. The cultural deposit of this period is about 3m. The full sequence of this period was recorded in Trench 6 of Mound-2. On the basis of ceramics, this period is divided into three sub-phases (early, medieval NBPW), black slipped ware, grey ware and red ware. Among the characters, types, mention may be made of corrugated bowls, with sharpened nail-headed rim, dishes with vertical featureless rim, incurved featureless rim, lipped, basins carinated *handi*, pear-shaped vases and other variety of vases. A good number of frying pans of grey ware and red ware are the other noteworthy findings of this period. This is a new type in this period as this type of frying pans is not reported so far from the middle Ganga plain.

The inhabitants of this period lived in wattle-and-daub, houses. Mention may be made of a circular structure with post-holes along with burnt floor which was recorded in Trench 4. A furnace possibly of pottery making, was noticed nearby the structure. Rare discovery of silver mother goddess recovered

from pre-Mauryan phase (mid-phase) of this period along with a copper punch-marked coin discuss special mention. It was made by cutting the silver sheet with archaic features. This type of female figurine made by silver is not reported from any other site of India. The antiquity and artistic features of the silver figurine shows its importance. Other important finds include beads of semi-precious stones and terracottas, iron and copper objects, bone points and arrow heads, terracotta discs skin rubbers and balls. Fifteen terracotta seals and sealings and 6 coins were recovered from Period III B and III C. A large number of animal bones were collected from this period and their detailed study will supplement the data on the fauna of this period.

Period IV is marked by Sunga-Kushana pottery with sprinkler of red ware as the diagnostic type. Other important types of red ware are bowls, basins and lids. Mention may be made of recovery of lugged handled frying pans in a good quantity. These types of frying pans are not reported from any site of middle-Ganga plain. Burnt brick structures have been largely robbed by present-day inhabitants of Pakkakot. A few brick structures were noticed in Trench 6, 7 and 8. The noteworthy antiquities of this period are terracotta human and animal figurines, bone points and arrow heads, beads of semi precious stones and terracotta sealings, copper cast coins, iron and copper objects. The sealings recovered from Pakkakot belong to a special category. Some of the sealings of this period have five impressions on it.

The mound was inhabited during the Gupta period and for a few centuries in Post-Gupta time also. However, strata belonging to

these periods were found to be highly disturbed in Trench 6 excavated on the highest part of the mound. The typical antiquities of the Gupta period and characteristic pottery type are the only criteria to establish the nature of cultural deposits of these periods. The small finds of this period include human and animal figurines, beads of semi precious stone, and terracotta, seals & sealings, iron and copper objects, etc.

One terracotta sealing has been recovered from post-Gupta period. It has Gajabhiseka Mahamaya Devi standing in the centre with inscription '*Matibharadhi (karansaya)*' and below it is a depiction of *urnaghata* with legend in post-Gupta Brahmi character. The site was also inhabited during medieval period as glazed ware potteries were recovered from the surface. The deposits of this period are not available at this site now.

21. EXCAVATION AT GOKALPUR, DISTRICT BAREILLY

The ancient site of Gokalpur (28° 25' 27" N: 79° 20' 29"E) is situated on the bank of a palaeo-channel of river Shankha, a tributary of River Ramganga, on the outskirts of Bareilly City, on Bareilly-New Delhi National Highway, District Bareilly. It was discovered by Anup Ranjan Mishra of the Department of Ancient History and Culture, M.J.P. Rohilkhand University, Bareilly. The site has remained intact thanks to the presence of cremation ground on top of the mound. In the field seasons 2007-08 and 2009-10, Total Station contour survey and a 26m long section scraping were undertaken. It was clear from the section scraping that the people of Painted Grey ware (PGW) Culture were the first settle-

-rs at the site followed by the people of Northern Black Polished Ware (NBPW) Culture and Early Medieval Culture. As the section scraping did not yield satisfactory evidence of the above cultures and the area was largely disturbed, it was decided to undertake a trial-digging in the forthcoming field season.

A small trench (DZ5) of 5m x 2.5m was taken on the southern side of the intact mound to avoid the disturbed Early Medieval deposit and to reach the PGW level soon. At a depth of 2.24m natural soil was struck, which was further cut down to 2.42m. A total of six layers and three intermittent levee deposits formed the stratigraphy of this trench. Three cultural periods were identified, i.e. Period I: Painted Grey Ware Culture, Period II: Northern Black Polished Ware Culture and Period III: Early Medieval Culture. However, barring a few potteries and other remains, nothing of NBPW culture was found preserved in this trench due to anthro-pogenic activities during the Early Medieval Period. The Early Medieval Period deposit was very disturbed. The habitational deposit of PGW Culture was well-preserved.

The stratigraphy of this trench demonstrates complex processes of site formation and deformation by natural and human agencies, such as erosion and deposition of levee by the river flood, digging up of pits, leveling and construction of floors and houses, conflagration of houses, etc. Six layers can be identified in this trench. The upper three layers comprise early Medieval and NBPW periods; however, these layers are extremely disturbed due to anthropogenic activities. There are large pits which not only have disturbed the Early Medieval deposits but also have entirely destroyed the NBPW depos-

-it. Therefore the NBPW Medieval deposits but also have entirely destroyed the NBPW deposit. Therefore, the NBPW period evidences have been found in patches whose exact location is difficult to point out in this trench. However, the PGW period has remained fairly undisturbed other than a large pit that partially disturbs the upper layer in western side of the trench. There are interesting phases of natural activities preserved in this trench represented by three layers of levee deposits interspersed within the PGW deposit (Fig. 15).

Period I (Painted Grey Ware): The habitational deposit of this period is formed by layers 4, 5 and 6, each separated by levee deposit. The thickness of this deposit is about 75 to 85cm. The vertical nature of excavation and a pit of Early Medieval period have restricted the area of this culture to about 6m². Within this limited area, evidence of a conflagrated and collapsed wattle-and-daub structure was unearthed. Besides, two floor-levels were also exposed. Floors were compact and made of yellow silt. A partially preserved hearth along with a few PGW bowls was found embedded on one of the floors. The floor was burnt and yielded handful of charred organic remains including grains. Apart from these, terracotta discs, pottery discs, birdshots, a broken *matka* bead, a fragment of iron object and few bone arrowheads. Only three of them were found from the upper level of PGW deposit. Ceramic industry comprised coarse Red ware, fine Red slipped ware, painted and plain Grey ware, Black-and-Red ware, Black-coated Painted Red Ware, Black slipped ware and Perforated ware. The coarse ware comprised different types of jars, jar/pots and

EXPLORATIONS AND EXCAVATIONS

cooking pots while the fine wares constituted dining vessels, such as dishes and bowls of different types.

Period II (Northern Black Polished Ware):

A thick silt deposit seals the PGW Period and separates from that of NBPW Period. This period is identified with a layer formed of light yellowish brown clayey silt sediment that occurs in bits and pieces. The layer has been largely destroyed by the activities of Early Medieval people. Nothing substantial of this culture is collected except for a few pieces of NBPW pottery, terracotta discs and incised balls that stake claim to this period.

Period III (Early Medieval):

Due to large-scale disturbances, no break between the NBPW and Early Medieval periods could be observed. Early Medieval period represented by two upper layers which also fill a number of deep dumping pits. One of these pits dip down to the PGW period. A lot of bones complete limb bones and a skull of cattle have been collected along with enormous amount of potteries, some of which are almost complete. Some charred remains of grains have been collected. The artifacts of this period constitute discs of terracotta and pottery, beads of terracotta, stone and glass, broken terracotta figurines of Satissatta couple and an animal, bangles of terracotta and glass, fragmented iron objects and cast copper coin. The coin has figure of elephant on the obverse that faces left and has a hanging trunk bending up towards the forelegs. On the reverse, the figure is not clear. Although the coin is found at a depth of 27cm, its exact time period is yet to be ascertained. Besides, a broken lamp, terracotta wheel and sling balls have been collected from

this period. Apart from two floor levels, no structural remains have been found in this period.

The site of Gokalpur is extremely important in point of view of geo-archaeological investigation and understanding man-land relationship during PGW period. It is worth noting that three flood deposits are noted in intervals within the cultural deposit of this period. What happened to the settlement during the time of flood? Did the flood displace the people temporarily from the site or only the low-lying areas were affected by the flood? Future investigation may throw light on these questions. However, it is certain that the last flood completely obliterated the settlement and forced the inhabitants to desert the site. It is interesting that PGW pottery has been reported earlier from another site, Parsakhera, situated less than a kilometer to the north of Gokalpur. This site has been completely occupied now by a modern settlement and Bareilly-Delhi rail track runs through the site from one side. A survey by the author has failed to find any trace of ancient settlement here. However, the earliest report provides ample clue to the fact that probably the PGW people migrated to this site during the overbank spill of river Shankha.

There is no independent cultural deposit of Black-and-Red ware is found below the PGW period at Gokalpur. However, black-and-red ware is associated with the painted grey ware assemblage. The site has been quarried by the people for making bricks. Some partial remains of big storage jars of Early Medieval period are noted in the sections. A partially broken globular jar was retrieved, the mouth of which was covered by a lid. The jar contained ashy earth and from the bottom five *kauris* were recovered (Pls. 30-35).

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

22. EXPLORATION IN BLOCK RAM NAGAR, SUB-DIVISION MAU, DISTRICT CHITRAKOOT

Archaeological exploration has been conducted in Development Block, Ram Nagar, Sub-Division Mau of District Chitrakoot by Regional Archaeological Unit, Allahabad under the direction of Rakesh Tewari, Ram Naresh Pal, Regional Archaeological Officer which covered 45 villages and nearby hillocks for their important archaeological findings. During the course of exploration, sites at pre-historic early historical period, early medieval and medieval period, stone *kolhu*, several temples remains and broken sculptures of 11-12th century CE. have been brought to light.

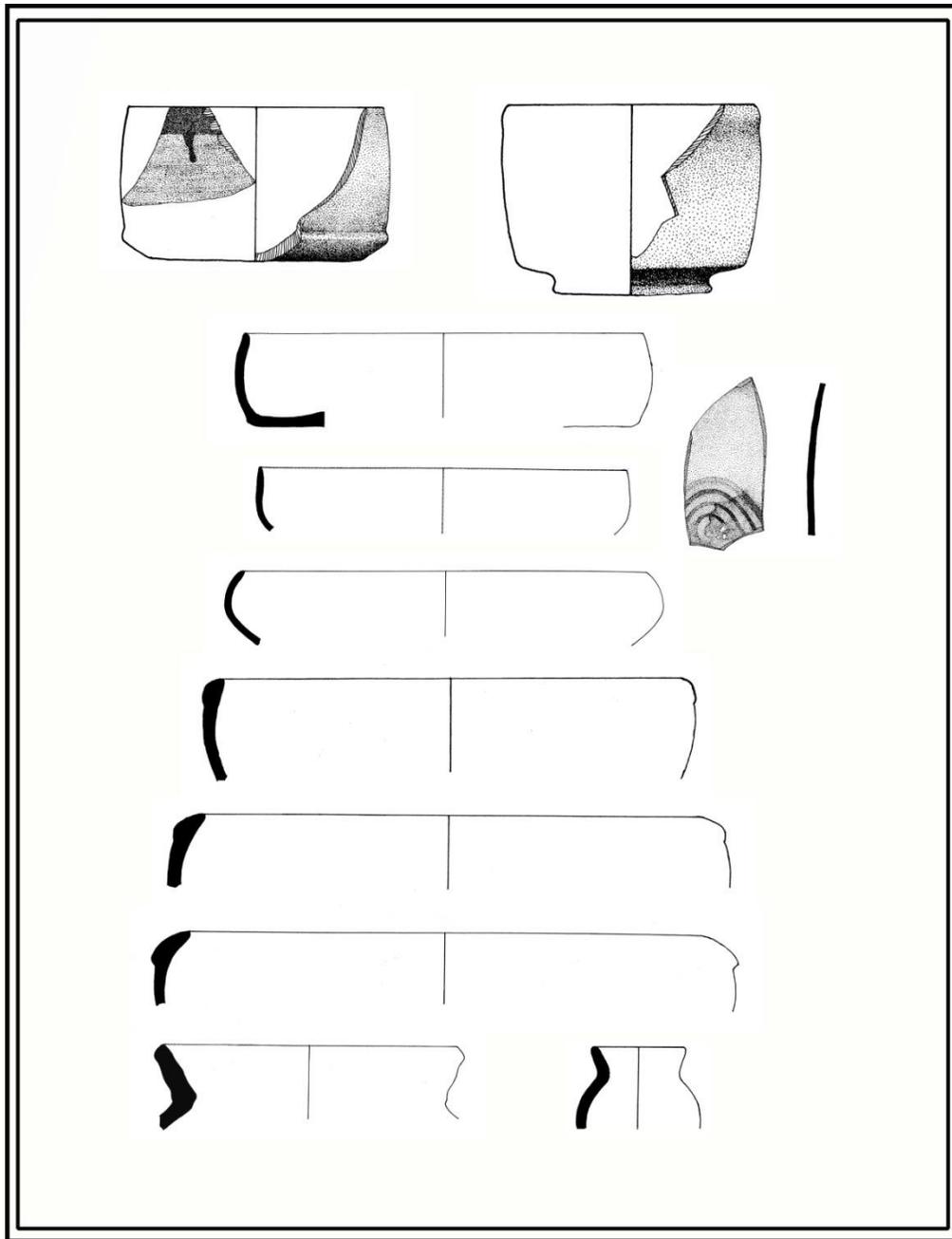
The stone tools of Upper Palaeolithic and Mesolithic period are scattered at pre-historic and archaeological sites. The collected stone tools, comprise cores, flakes, blades, ***EXPLORATIONS AND EXCAVATIONS***

bladelets and other fragments of stone. The important archaeological sites explored are Bagrehi Ki Pahari, Pandeypur Ki Pahari, Narainakhera Ki Pahari, Devsthan Ki Pahari (Bhairam Baba) Aror Ki Pahari, Dhanwa Ki Pahari, Kapuri Pahari, Kolhari Pahari, Chandidia Ki Pahari and Agurhuda Ki Pahari.

The early historical sites yielded a number of pot-sherds which are identical with popularly known Kotia culture of Vindhya region. These sites are Lohangri, Amriti Deundha, Chhotki Baria, Diwani, Jorwara, Kherwar, Akharwar, Raipura Village and Raipura Dam, Mawia Khurd, Usardih, Purwa (Purwadih) which have yielded pot sherds of Red ware and Black ware.

The important early medieval and medieval period sites are Usardih, Lauri, Devkali, Silauta, Raundha, Etaha, Devipur and

Fig. 15





A



B

Gokulpur: A, copper cast Coin and B, Satisatta terracotta figurine, early medieval



Gokalpur: Stone & terracotta beads



A



B

Gokalpur: A, terracotta ball and B, Birdshot



Gokalpur: terracotta beads



A



B

Gokalpur: A, terracotta bull and B, discs



Gokalpur: Wheel partly broken

Etwa. These sites yielded pot sherds of Red ware and stone *kolhu* were also found from the different sites.

A number of temples' remains were also encountered from the village Etaha-Devipur, Piprorh, Dewra, Purwa, Bhairum Baba, Bariya, Tenduyamofi and Uphrauli.

23. EXPLORATION IN DISTRICT MAHARAJGANJ

The Department of Ancient History, Archaeology & Culture, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur conducted archaeological exploration in the District Maharajganj under the direction of P.S. Chaturvedi assisted by I.S. Vishwakarma, S.P. Singh, D.N. Maurya and D.N. Dubey of the Department along with research scholars of archaeology Lokendra Yadav, Vinod Kumar and Akhilesh Chaube. The sites explored and surveyed to determine their archaeological importance are as under:

(1) **Puraina Dhus:** The site is situated on the left bank of Puraina Tal, 14km east of district headquarter Maharajganj and on the way to Shikarpur. It is in the shape of oval mound spread around 2000m² and surrounded by a natural ridge composed of Pleistocene geological formation. The surface-collections included a rich ceramic industry comprising corded ware, black and red ware, black slipped

ware, NBP ware, grey ware and red ware. Some artifacts of neolithic-chalcolithic culture were also reported.

(2) **Padru urf Mirganj:** The site situated on the left bank of a nala of Hirana, a tributary of the river Ghahara, 12km, and south-east of

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

Maharajganj. The ancient site is located in 400x300m with approximately 5m height, presently covered by the trees and shrubs. The surface collections show the ceramic industry of the site which includes the black and red ware, NBP ware, red ware, grey ware and other sherds. On the basis of potteries and other surface indications, it may be assumed that the area was inhabited during NBPW and Kushana period.

(3) **Bariyarpur:** The site is situated at a distance of 18km north-east of district headquarter of Maharaganj, spread over in about 500x300m area with a height of about 4m. The surface collections included the black and red ware, black slipped ware, grey ware and some red wares. The nature and occupational period have clear indications of NBPW period and Kushana period (Pl. 36-A).

(4) **Bhaisasur:** It is located in south-east of Mahrajganj at about 26km distance. The surface findings of the site included the black and red ware, NBP ware black slipped ware, red ware and grey wares. The ceramic tradition indicates the habitational phases from NBPW to Kushana period (Pl. 36-B).

(5) **Kanhaiya Baba:** It is a religious place situated in a remote forest area about 15km west from Maharajganj and 70km from Gorakhpur. The material remains on the site

indicate that the site belongs to Buddhist period and appears to be a remnant of Stupa architecture.

Regional Archaeological Unit, Jhansi of
U.P. State Archaeological Department under-

24. EXPLORATION IN DISTRICT JALAOON
EXPLORATIONS AND EXCAVATIONS

Plate 36



A



B

Views of the sites: A, from Bariyarpur and B, from Bhaisasur

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

-took village to village exploration of District Jalaon (Part-II). Suresh Kumar Dubey, Regional Archaeological Unit, (U.P. State Archaeology) Jhansi explored 40 villages and their hamlets pertaining to the Dakor Development Block and 100 villages and their hamlets pertaining to the Nadigaon Developm-

-ents Block under the direction of Rakesh Tewari, Director U.P. State Archaeological Department. The exploration revealed mounds, temples, stone sculptures, *garhi*, forts, *baoli* (stepped well and other archaeological remains from the following villages :

B&RW= Black and Red Ware, BSW= Black Slipped Ware, NBPW= Northern Black Polished Ware, RW= Red Ware

Development Block, Dakor

Village	Cultural Assemblage
Goran	Remains of stone temple of early medieval period, <i>satti-patt</i> and brick structure of late medieval period.
Makrechha	Late medieval ruins of brick built structure.
Narchha	Fragmentary pieces of stone sculptures of medieval period.
Nunsai	Fragmentary pieces of stone sculptures of medieval period.
Nunvai	Stone image of Hanuman and fragmentary pieces of stone sculptures of medieval period.
Orai	Copper Hoards (collection of personal museum in the Orai city)

Development Block, Nadigaon

Aibara	A mound with RW.
Akniba	Late medieval temple of Ram-Janaki.
Anghora	A mound with RW remains of stone temple of medieval period and a 1914 built <i>garhi</i> .
Bahavalpura	Late medieval temple.
Baroli	A <i>kolhu</i> of late medieval period.
Bavali	Decorated stone pillar fragmentary pieces of stone sculptures of medieval period, mound.
Basith	Remains of stone temple, & fragmentary pieces of stone sculptures of medieval period.
Bhagwantpura	Fragment of stone sculptures of medieval period.
Bhakrol	Mutilated stone image of Anjani- <i>mata</i> of late medieval period and a mound

	with R.W.
Bivanikhera	A mound with RW.
Budhavali	A mound with RW.
Budhera	A stone image of Nandi and Ganesh, and late medieval brick built temple.

EXPLORATIONS AND EXCAVATIONS

Village	Cultural Assemblage
Byonaraja	Remains of stone temple, fragmentary pieces of stone sculptures, and ruins of a <i>garhi</i> of late medieval period.
Chatsari	A mound with RW; fragmentary pieces of stone sculptures, image of <i>Mahishmardini</i> Durga and Hanuman of medieval period.
Davar	Remains of stone temple and mutilated stone sculptures of medieval period.
Dera Ranjeet	Ruins of <i>garhi</i> of late medieval.
Dhanja	Remains of stone temple, fragmentary pieces of stone sculptures, <i>Siva-linga</i> , and mother goddess of medieval period.
Dhorpur	Ruins of mud built <i>garhi</i> , remains of stone temple, fragmentary pieces of stone sculptures, images of Hanuman and <i>Anjani-mata</i> of medieval period.
Diha	Fragmentary pieces of stone sculptures <i>Siva-linga</i> , and <i>Ek-mukhi Siva-linga</i> of medieval period.
Engui	Remains of stone temple, mutilated stone sculptures of medieval period and ruins of a late medieval <i>garhi</i> .
Ganeshnagar	A mound with RW, remains of stone temple and mutilated stone sculptures, <i>Ek mukhi Siva-linga</i> of medieval period, ruins of late medieval <i>garhi</i> .
Ganthara	Fragmentary pieces of stone sculptures, <i>Siva-linga</i> , Hanuman of medieval period.
Gidawasa	A mound with B&RW, NBPW, remains of stone temple of medieval period.
Isuri	<i>Siva-linga</i> and fragmentary pieces of stone sculptures of medieval period.
Kailia Buzurg	A mound with B&RW, NBPW, RW; remains of stone temple and fragmentary pieces of stone sculptures of medieval period.
Kailia Khurd	A mound with medieval pottery, mutilated stone sculptures, <i>Siva-linga</i> , Hanuman, Ganesh of medieval period; ruins of a <i>garhi</i> .
Kakaroli	A mound with BSW, NBPW, RW, iron-slag; remains of a stone temple, <i>Siva-linga</i> with argha and Ganesh of Medieval period.
Kanharpura	Remains of stone temple of medieval period.
Khairawar	A mound, mutilated image of Vishnu & fragmentary pieces of stone sculptures of medieval period; late medieval temple of Ram-Janaki.
Khajuri Dera	Late medieval <i>Siva-temple</i> .
Khakal	Remans of stone temple & mutilated stone sculptures of medieval period.
Khutela	Fragmentary pieces of stone sculptures of medieval period and a <i>sati-patt</i> .
Kuanrpura	Remains of stone temple & <i>Siva-linga</i> of medieval period and a <i>sati-patta</i> .
Kudari	Remains of stone temple, mutilated stone sculptures of medieval period, late medieval temple and <i>garhi</i> of British period.
Kurcholi	<i>Parikar-khand</i> of a stone image of medieval period.

Village	Cultural Assemblage
Kurra	A mound with RW, fragmentary pieces of stone sculptures of medieval period.
Kuthonda	A <i>parikar-khand</i> of Vishnu image, <i>Ek mukhi Siva-linga</i> , remains of stone temple, <i>pancha-linga</i> , Hanuman and ruins of late medieval <i>garhi</i> .
Ladupura	<i>Siva-linga</i> & fragmentary pieces of stone sculptures of medieval period.
Lohai	Stone image of a female deity of medieval period.
Maheshpura	A mound with RW, mutilated stone image of Uma-Mahesh, fragmentary pieces of stone sculptures of medieval period.
Manpura	A mound with RW, remains of stone temple and mutilated stone sculpture of medieval period, a hundred years old Ram-Janki temple.
Mau-Mahoni	<i>Panch-linga</i> , fragmentary pieces of stone sculptures and ruins of <i>garhi</i> of medieval period.
Nadigaon	Fort, mound, old garden with boundary and structures, brick temples of late medieval period.
Navali	Fragmentary pieces of stone sculptures and remains of stone temple of medieval period and ruins of a <i>garhi</i> of late medieval period.
Pajaonian	Fragment of stone sculptures of medieval period.
Parasani	Remains of stone temple, mutilated stone sculptures and <i>Siva-linga</i> of medieval period.
Rajipura	<i>Dwar-sakha</i> of stone temple, of medieval period.
Rendhar	A mound with thick variety of RW, B&RW, NBPW; remains of stone temple and mutilated stone sculptures of medieval period and <i>kolhu</i> .
Rora	Remains of stone temple and <i>Siva-linga</i> of medieval period; <i>kolhu</i> .
Rudavali	A mound with RW, remains of stone temple and mutilated stone sculptures of medieval period.
Ruppura	A mound with B&RW, RW, iron-slag.
Sajera	Uma-Mahesh and fragmentary pieces of stone sculptures of medieval period.
Salaiya Buzurg	<i>Siva-linga</i> , fragmentary pieces of stone sculptures and an image of Hanuman of medieval period.
Sadupura	Late medieval temple of Ram-Janaki with paintings.
Sikandarpur	A mound with RW.
Sikari Buzurg	A mound comprising hammer stone, pebble artifact and RW.
Sulakhana	Remains of stone temple of medieval period and a broken sword of late medieval period.
Umari	Fragmentary pieces of stone sculptures and a <i>sati-patt</i> of medieval period.

EXPLORATIONS AND EXCAVATIONS

25. EXCAVATION AT SONIK, DISTRICT UNNAO

R.K. Srivastava assisted by K.K. Singh and Subhash Chandra Yadav of U.P. State Archaeology Department, under the general direction of Rakesh Tewari, undertook archaeological excavation at Sonik. The potsherds of black slipped, grey, red and NBP wares were reported from this site during the session 2001-2002 from this site (IAR 2000-001 : 283). Considering the small size (about 140x135m) of the site, it was supposed to be representing an ancient hamlet. The main objective of the excavation at this site was to ascertain the nature of the settlement pattern of small ancient village datable from 6th century BCE and its socio-economic condition.

The ancient site of Sonik is about 52km from Lucknow and about 2km north-west from the Lucknow-Kanpur National Highway 25. It is located on the western bank of Basaha-lake (26° 33' 26" N; 80° 33' 20" E). Eight trenches, measuring 10x10m extending over an area of about 800sq.m were laid down on the periphery and centre of the mound. The excavation conducted down to the maximum depth of about 4.05m has revealed three layers rested over the virgin soil, which may be placed under two-fold cultural periods. About 80cm thick cultural deposits characterized by the presence of red ware represent Period I. The colour of this pottery peels off if rubbed.

It is comparable with the dull red ware pottery earlier found in the archaeological excavations at Dadupur (about 35km from Sonik) in the pre-PGW deposits. Another variety of red ware (slipped and un-slipped) and black slipped ware are associated with it.

The shapes include dishes and water vessels, etc. A few bone points and terracotta discs are the noteworthy antiquities found in association of ceramic remains. The presence of charred bones indicates that the animal meat was an important component of the diet of the concerned people. About 1.35m thick sterile deposit comprising compact yellowish earth mixed with Kankar (calcareous) nodules revealed above the cultural deposit of Period I attests a habitation gap in the area subjected to excavation.

Period II is represented by a cultural deposit having a thickness of 40-75cm. It is placed above the sterile deposit. It is characterized by the appearance of NBP ware. Other associated ceramics include black slipped, black-and-red, grey and red wares. Structural remains of this period have been found in the form of burnt nodules (bearing reed, grass and split bamboo impressions), post-holes, remains of mud walls ghost walls, mud floors, bins and hearths. The earthen bins revealed from this level are smaller than those found in the pre-NBP context at the Middle Ganga Plain sites but comparatively bigger than the post-holes. Their base is rammed with *kankar* most probably in order to avoid the moisture inside the bins. The earthen hearths of three types were confined to the upper layers. Noteworthy antiquities of this period include bone arrowheads, terracotta discs, stone beads, pendants and iron objects, etc.

WEST BENGAL

26. EXCAVATION AT GARH MANDARAN, DISTRICT HOOGHLY

The Directorate of Archaeology and

Museums, Government of West Bengal, carried out excavation at Garh Mandaran (22° 52' 47" N; 87° 40' 55" E) located on the right bank of the river Amodar at a distance of about 25km south-west of Arambagh town in Hooghly district. It is approachable through good motorable road on Ghatal–Kamarpukur–Tarakeswar Route. The excavation was started with the assistance of Binoy Moni, Tarun Kanti Tarafdar, Subrata Nandi, Somnath Ghosh, Sharmila Saha, Somdatta Gan, Siharan Nandy, and a group of scholars under the guidance of Amal Roy and Prakash Chandra Maity. Evidence of brick and a laterite massive structure, decorated stone slab and huge brick bats and various antiquities prove the historical and archaeological potentiality of the site Garh Mandaran. This ancient site was developed recently by Hooghly Zilla Parishad and as a result several components have been added later on to it viz, a children park, a *mazar* known as *bara asthana* of Ismail Gazi, Garden, important city on a branch of Ganga river, almost due south of Saptagram. It is said to derive the name from Manda (bad) and *aranya* (forest). Apar Mandaran have also been interpreted as on the other side of Mandaran, the famous hill about 30 miles south of Bhagalpur.

21 trenches of 6m x 6m square were excavated in the north-south orientation to find out the stratigraphic relationship of the structure of the fort. The excavation revealed an average of 4.50m thick occupational deposit representing a single culture which can be dated to 10th to 17th century CE. According to some literary sources, it is known that the fort was constructed by Ismile Ghazi, the Commander in Chief of Hoshen Shah during 15th century CE. The period however may be

divided into three phases on the basis of structural activity, antiquity, and ceramic evidence. Period I marked as pre-phase of foundation of the outer wall running north-south laid above or in to the natural soil. The finds obtained from the deposit of this phase include buff ware, iron nail, raw iron and brickbats.

Period II is represented by the construction of the laterite stone and brick made fort along with the fort's eastern entrance, the floor of the gate and staircase of the gate. The pottery marked its appearance along with storage jar, vase, smoking objects, lamp, *handi*, etc., other findings are cannon ball, iron dowel, bangles, copper objects, iron points, terracotta ball and animal figure. The fortification wall and moat may have been constructed in the same period (Pl. 37).

Period III represents the late constructional activity on the mound of Garh Mandaran. It is a post-phase of construction of main fort represented by the addition of the brick structure which is partly exposed in the north-eastern side of the mound, grave of Ismile Gazi or Bara asthana and other modern construction. Several antiquities like modern coin, iron nail, bricks, beads, etc. have been recovered from the upper 15–25cm deposition (Pls. 38-39).

The ceramic assemblage from the fort site of Garh Mandaran consists of brick colour ware, black ware, grey ware and buff ware. Almost all the potteries are plain and wheel made. The handmade specimens are in small numbers. The clay used for manufacturing the pottery is well levigated and generally contains medium to fine grains of sand. The pottery is of

EXPLORATIONS AND EXCAVATIONS

medium to course fabric and almost is well fired. The utilitarian plain red and grey ware forming the majority is generally of thick section and medium to course in fabric and various in colours from brick red to grey. It includes deep bowl, convex sided dish, lid, basin, vessel, vase, storage jar, small jar, handi, channel spout, smoking object, etc. No knife edge bowl was found. A few sherds with grey surface have also been found. The typology is also same as that of buff ware. The bulk of pottery is plain in the form of incised and applied patterns are found on some sherds of red ware and thick buff ware also. Incised designs comprise dots, strokes, wavy, vertical, horizontal and oblique line and basket impression.

Several antiquities like terracotta bangles, glass objects, iron objects, bones, arrowheads, modern coins, terracotta animal figures, conch shell, cannon ball, terracotta lamp, iron nail, porcelain, terracotta ball, iron spearhead, iron chisel, copper ring, copper bangle and iron dowel have been found from the excavated trenches.

Plate 37



A



B

Garh Mandaran: A, Terracotta figurines and B, Sling balls



A



B

Garh Mandaran: iron implements

Plate 39



A



B

Garh Mandaran: General view of excavation

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS¹

ANDHRA PRADESH

1. BRAHMI INSCRIPTION, PHANIGIRI, DISTRICT NALGONDA

This inscription engraved on a *Buddhapada* was found in Phanigiri excavations. It is in both Prakrit and Sanskrit languages and in Brahmi characters of 3rd century CE. It records the gift of *Budhapadas* and *Ratha* to the *vihara* by Apanoti.

2. IKSHVAKU INSCRIPTION, PHANIGIRI, DISTRICT NALGONDA

This fragmentary inscription found in Phanigiri excavations is in Prakrit language and in Brahmi characters of 3rd century CE. It mentions Ikshvaku king Chamtamulamaharaja and Siritagissa and the date portion i.e., *divasam 6*.

3. TELUGU INSCRIPTION, KANAPARTI, ONGOLE TALUK, DISTRICT PRAKASAM

This inscription engraved on a loose stone is found in front of Chellamma temple, outside the village. It is dated in Saka 1243 (1321 CE.) and is in Telugu language and script. It records the exemption of all the taxes collected from the market of Kanaparti. However, it is laid down that 14th of the taxes shall be gifted to the goddess Chamundesvari,

apparently for conducting some worship by the village council (*gramamukhyulu*) (Pl. 40).

4. TELUGU CHODA INSCRIPTION, KUKATLAPALLI, DISTRICT PRAKASAM

This inscription engraved on a loose stone is in the possession of T. Kotireddy at his residence in the village. It belongs to the Telugu Choda king Manmasiddha III and dated in Saka 1171 (1249 CE.), is in Telugu language and script. It records the gift of the village Kukatlapalli as *sarvamanya* to the god Mallikarjuna of Sriparvata for conducting different rituals and services of the deity (*amgabhoga* and *ramgabhoga*). Further, it is stated that provisions were made for conducting offering and worship to the god on the occasions of *Mahasivaratri* and the following day (*Kannuma*) (Pl. 41).

5. VIJAYANAGARA INSCRIPTION, LAKKAVARAM, DISTRICT PRAKASAM

This inscription is kept in front of the Ramalingesvara temple in the village. Belonging to the Vijayanagara king Sadasivadevaraya and dated in Saka 1473 (1551 CE.), it is in Telugu language and script. It records the construction of the temple and the consecration of the deity Gopinatha at Lakkavaram by Vinnamaraju (a village accountant) son of Tataraju and grandson of

¹Information from: K.M. Bhadri, assisted by T.S. Ravishankar, N. Nanjundaswamy, C.A. Padmanabha Sastry, Jai Prakash, D.M. Nagaraju, S. Nagarjuna, S. Swaminathan, K. Kuruppaiah, S. Rajavelu, K. Munirathnam, K. Paneerselvam of the Epigraphy Branch, Mysore, Southern Zone, Chennai and Northern Zone, Lucknow.

Gowdiraju of Apastambasutra. Further, it states that he also made grant of some lands in the village for food offerings to the deity.

6. TAMIL COPPER-PLATE, TIRUPATI, DISTRICT CHITTOOR

This Copper-Plate engraved in Sanskrit language and Grantha characters of the 13th century CE is now deposited in the S.V. Museum, Tirupati, Andhra Pradesh. It contains two plates written on both the sides. From the details of the data furnished in the plates, the date of the inscription can be fixed as 5 February, 1223 CE. It records that Madila, the queen of king Ramachandra *alias* Soma made a gift of land to nineteen brahmanas by making 32 land shares on the occasion of *Ardhodaya Punyakala*. The names of the recipient brahmanas, along with their *gotras* and their fathers' names are given.

KARNATAKA

7. HERO-STONE INSCRIPTION, NAREGAL, DISTRICT HAVERI

This Kannada inscription, engraved on a hero-stone, is found lying inside the earth in a field belonging to Sri Gurappa of the village. On palaeographical grounds, the record can be assigned to 8th century CE. It records the death of a hero by name Puyyaloladommara in the course of a cattle-raid. The record also mentions the place-name Naregal.

8. HOYSALA INSCRIPTION, KUNTUR, MALAVALLI, DISTRICT MANDYA

This Kannada inscription, engraved on a hero-stone, is found erected in between Isvara

temple and Mahasati temple. This inscription dated in Saka 1255 (1333 CE.), belongs to the reign of Hoysala king Vira Ballala III, refers to the construction of Siva temple (*linga kallu*) by Malagaunda, son of Ketagaunda.

KERALA

9. CHERA INSCRIPTION, KURUMATTUR, DISTRICT ALLAPURAM

This inscription is in Sanskrit language and Grantha characters of the 9th century CE. It is found engraved on a loose stone and it states that the ruler Rajashekhara belonged to the illustrious Ikshvaku dynasty of Lord Rama. Further, he is eulogized as having ruled the country with justice and never deviated from the laws of Manu. During his righteous rule 12 brahmanas excavated a tank and also installed an image of Vishnu (Pl. 42-A).

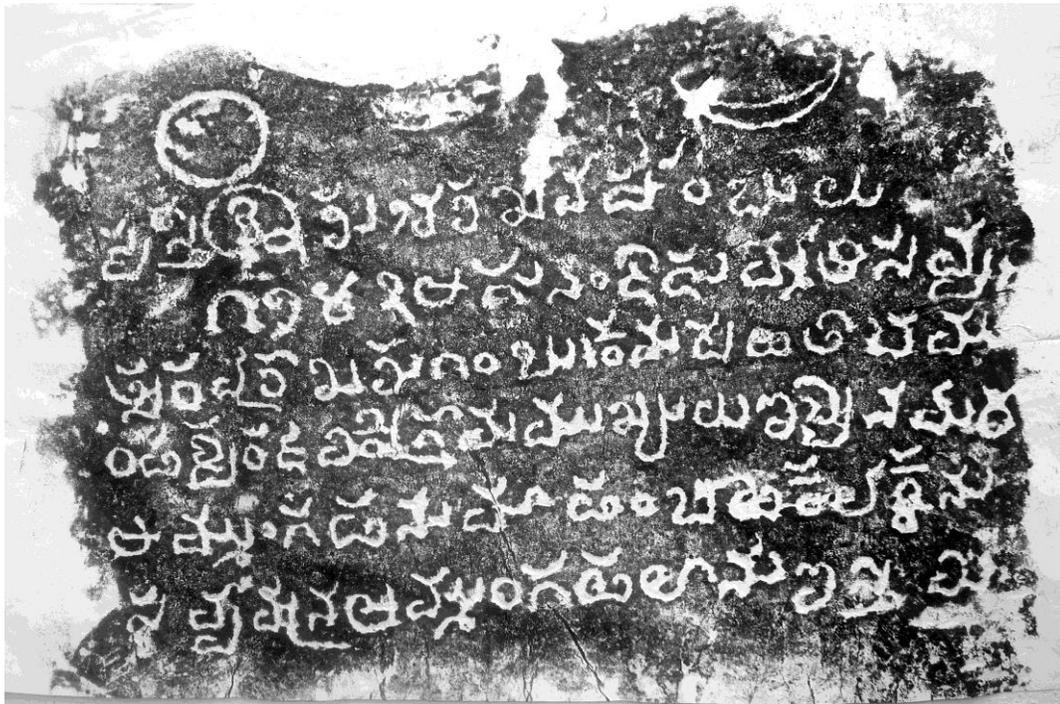
MADHYA PRADESH

10. NAGARI INSCRIPTION, SIVAPURI, DISTRICT TIKAMGARH

Engraved on the pedestal of a fragmentary seated Jaina Tirthankara image and dated [Vikrama] 1196 (1138 CE.), this inscription in Nagari characters and Sanskrit language, records the perpetual obeisance to the deity by *Sadhu* Vasala, his wife Satvini and their sons Lakshmana Padmasimha, Ralhana and Rajaramachandra for their religious merit (Pl. 42-B).

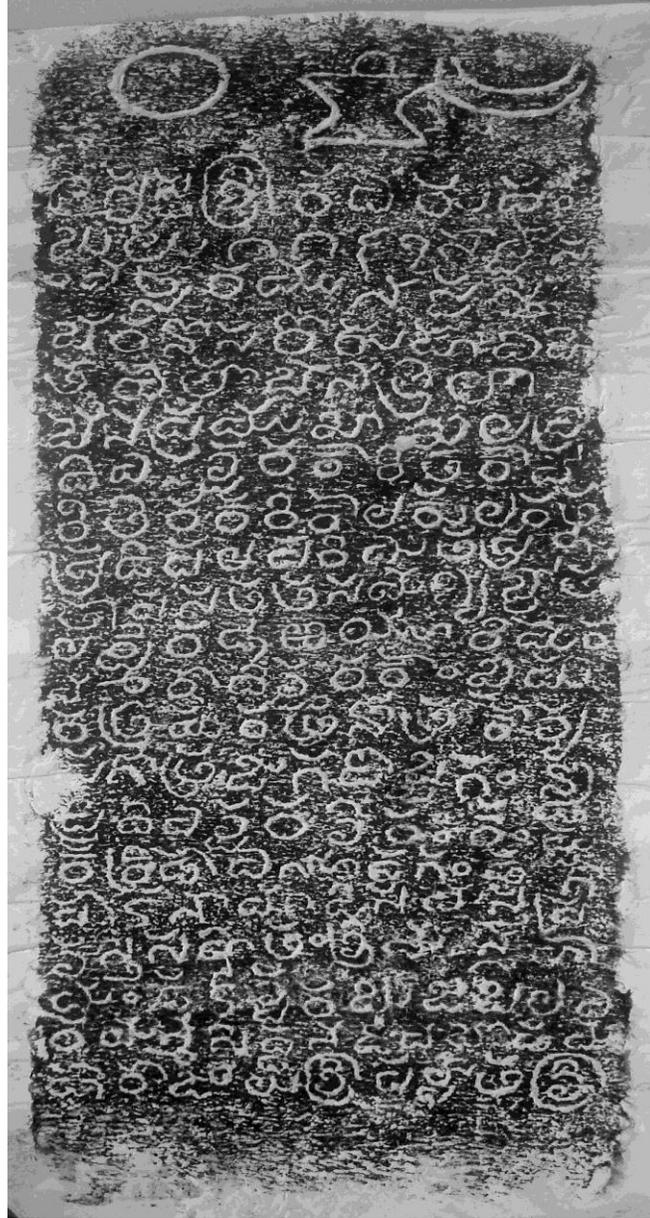
11. TWO JAINA INSCRIPTIONS, PAPAURA, DISTRICT TIKAMGARH

These two inscriptions are in Nagari



Kanaparti: Telugu inscription

Plate 41



Kukatlapalli: Telugu Choda inscription on stone slab

characters and Sanskrit language. One of the two inscriptions engraved on the pedestal of a seated Jaina Tirthankara Adinatha image in Shrine 42 and dated [Vikrama] 1883 (1826 CE.) records the installation of the Jaina image in the Jaina temple by Nathu Rama, son of Katharaya Ajita and grandson of Katharaya Umeda belonging to *Mulasamgha* Balatkaragana, Sarasvati *gachchha* and Kumdakumda charyamnaya in Papaura near the city Tikamgarh.

The second inscription engraved on the pedestal of a seated Jaina Tirthankara Neminatha image and dated [Vikrama] 1897 (1841 CE.), records the perpetual obeisance to the deity by Ajita Raya and his son Nathu Rama who belonged to the same *samgha*, *gana*, *gachchha* and *amnaya* in Papaura near Tikamgarh during the reign of *maharajadhiraja* Mahendra Bahadura Raja Tejasingha of Bundela family.

TAMIL NADU

12. CHOLA COPPER-PLATE, TIRUVINDALUR, DISTRICT NAGAI

This is the biggest copper plates' hoard ever discovered containing 85 sheets. It is engraved in Sanskrit and Tamil languages, the script being that of Grantha and Tamil respectively. It records that the Chola king Rajadhiraja I (1053 CE.) made a grant of several villages and clubbed them into one *brahmadeya* called Cholakulanarayana- chaturvedimangalam and donated it to one hundred and thirty brahmanas well-versed in Vedas and Sastras. The inscription also elaborately deals with the procedure relating to the measurement of lands in these gifted villages, also the yield of pad-

-dy and the officials who were involved in this transaction. It is also stated that the king Rajadhiraja I made this gift before proceeding to the battle at Koppam, where he engaged his enemy and was killed. But, the grant was ratified by his younger brother and successor Rajendradeva.

13. INSCRIPTION OF KONGU RULER, MALAIYADIPATTI, DISTRICT PUDUKOTTAI

This inscription in Tamil language and characters is engraved on a pillar of the cave temple of Siva facing west. It is dated in the 28th regnal year of the Kongu ruler Virarajendra (1234 CE.). It records the decision made by the *nattar* of Iranakilvirali-nadu and the *urar* of Nodiyur to fix the amount of land tax (*kadamai*) at the rate of three *kalam* from the village Kalakkudi in Kilsangili-na`u, a *devadanam* of the temple Analurisvaram-udaiya-naana in Jayasingakulakalla-valanadu.

14. TAMIL INSCRIPTION, ILUPPUR, DISTRICT TIRUCHIRAPPALLI

This 17th century inscription in Tamil language and characters is engraved on a stone slab kept inside the Vasinatharsiva temple. It records the erection of memorial stone by Amudan Konattupparaiyan Adi for the merit of a person (name lost) who sacrificed his life.

15. TAMIL INSCRIPTION, KULAVAIPATTI, DISTRICT TIRUCHIRAPPALLI

This inscription in Tamil language and characters of the 11th century CE. is found engraved on a round oil crushing stone. It records that this oil stone was carved out of a natural rock situated near a hillock by Chendan, a native of Panayur.

Plate 42



A



B

A, Kurumattur: Chera Inscription and B, Sivapuri: Nagari Inscription

16. CHOLA INSCRIPTION, DISTRICT TIRUCHIRAPALLI

This inscription in Tamil language and characters is found engraved on the south wall of the *ardha-mandapa* in Chandrasekhara temple. It is dated in the second regnal year of the king Parakesarivarman. It records that a lady Bhuti Adittapi`ari made a gift of two gardens, after purchase from two persons, to the god enshrined in the stone temple at Tiruchchendurai for conducting festivals. It is also recorded that she made this gift on the occasion of Solar eclipse.

17. CHOLA INSCRIPTION, PUTTAGALUR, DISTRICT THANJAVUR

This inscription is engraved on the back side of the image of the Dakshinamurthy at Paramasundaraisvarasvamin temple. It is a bilingual inscription in Tamil and Sanskrit languages and in Tamil and Grantha characters of 10th century CE. This inscription belongs to the Chola king Koparakesariparmar Parantaka I and it is dated in his 10th regnal year (917 CE.). It records the gift of *land two ma* for burning a perpetual lamp to the god Paramasundaradevarasvmin, by a person hailing from *Brahmadeyam* of Puttagalur village (a sub-

division) of Pampurnadu.

18. CHOLA INSCRIPTION, ARASUR, DISTRICT THANJAVUR

This inscription is engraved on the south wall of the Subbramaniya Swamin temple. It is in Tamil characters and language of the 11th century CE. This inscription belongs to the Chola king Rajaraja II and is dated in his 12th regnal year (1158 CE.). It records the gift of some *kasu* by some brahmanas for burning some perpetual lamps to the god at Kulottungacholanalur a *Devadana* village.

UTTAR PRADESH

19. TWO INSCRIPTIONS, GORAKHPUR, DISTRICT GORAKHPUR

These two fragmentary inscriptions engraved on a fragmentary stone one after another are in Siddhamatrika characters and Sanskrit language and datable to about eighth century CE. One of the two inscriptions records the Buddhist formula (*Ye dharma*, etc.) The second inscription, engraved below the Buddhist formula, records that this is a pious gift probably for the sake of the mother and the father.

ARABIC AND PERSIAN INSCRIPTIONS¹

BIHAR

20. MISCELLANEOUS INSCRIPTION, KHUSR-UPUR, DISTRICT PATNA

This interesting Persian record registers

the erection of a mosque by a lady saint who was daughter of Ibn-i Yahya, a saint, in the year AH 1305 (1887-88CE). The date is also recorded in a chronogram enjoined in the last hemistich of the metrical text.

¹Information from M Ilyas Quddusi, Director (Epigraphy), assisted by M. Yaseen Quddusi, G.S. Khwaja and M.A. Zeya of the Epigraphy Branch, Arabic and Persian Inscriptions, Nagpur, Two hundred and seven inscriptions were copied,

examined and reported on during the year under review, out of which important ones are noticed here.

The record in Persian verse from the
INDIAN ARCHAEOLOGY 2010-11-A REVIEW

21. MISCELLANEOUS INSCRIPTION, KURTHA DISTRICT PATNA

The record is in Persian verse from the façade of mosque situated on Highway 30 and registers its construction by one Imdad Ali in A.H. 1271 (A.D. 1854-55). The verses, last line of which makes a chronogram for the date, are composed by Talib. Another Persian inscription from the compound wall of the same mosque records the event of construction of this mosque by Imdad Ali in the year 1271 (1854-55 CE) written in words. It is written in Nasta'liq style.

22. MISCELLANEOUS INSCRIPTIONS, PATNA CITY, DISTRICT PATNA

The inscription copied from the façade of a mosque in Patna City registers in Persian verse erection of a mosque by Ali-un-Nisa Begum in AH 1244 (1829 CE). The text is executed in Nasta'liq style of calligraphy. Another record from Patna City is an epitaph in Persian language from a pillar of the mosque in Bhatli locality which mentions the death of one Shaikh Qadir Bakhsh in AH 1249(1834 CE). The obituary notice in Persian prose is written in Nasta'liq style.

23. EPITAPH, TAJPUR, DISTRICT PATNA

This epigraph in Persian verse records the demise of Muhammad Ali Khan, son of Haider Khan, in AH 1178 (1764-65 CE). The date is also composed in a chronogram in Arabic.

24. MISCELLANEOUS INSCRIPTION KURTHA, DISTRICT PATNA

façade of mosque situated on Highway 30 registers its construction by one Imdad Ali in AH 1271 (1854-55 CE). The verses, last line of which makes a chronogram for the date, are composed by Talib. Another Persian inscription from the compound wall of the same mosque records the event of construction of this mosque by Imdad Ali in the year 1271 (1854-55 CE) written in words. It is written in Nasta'liq style.

25. MISCELLANEOUS INSCRIPTIONS FROM PATNA CITY, DISTRICT PATNA

The inscription copied from the façade of mosque in Patna City registers in Persian verse erection of a mosque by Ali-un-Nisa Begum in AH 1244 (1829 CE). The text is executed in Nasta'liq style of calligraphy. Another record from Patna City is an epitaph in Persian language from a pillar of the mosque in Bhatli locality, which mentions the death of one Shaikh Qadir Bakhsh in AH 1249 (1834 CE). The obituary notice in Persian prose is written in Nasta'liq style.

26. EPITAPH, TAJPUR, DISTRICT PATNA

This epigraph is in Persian verse and records the demise of Muhammad Ali Khan, son of Haider Khan, in AH 1178 (1764-65 CE). The date is also composed in chronogram in Arabic.

GUJARAT

27. MUGHAL INSCRIPTION, MODASA, DISTRICT SABARKANTHA

This bi-lingual damaged stone slab fixed in a well in the Rasulpur locality registers the construction of a well during the reign of
EPIGRAPHY

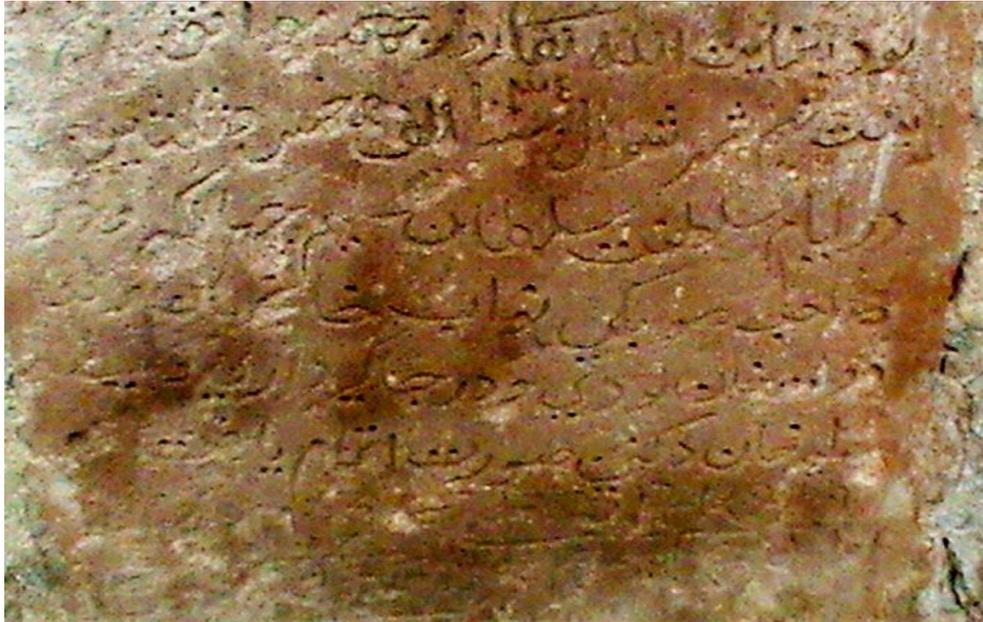
Emperor Jahangir and the governorship of Nawab Khan-i-Jahan Lodi by one Daud, son of Yusuf son of Muhammad of Bohra community. It states that the work commenced in AH 1032 (1622 CE) and completed in AH 1035 (1625 CE). It is also written in Persian and Sanskrit but the lower portion in Sanskrit is illegible for being worn out (Pl. 43-A).

UTTAR PRADESH

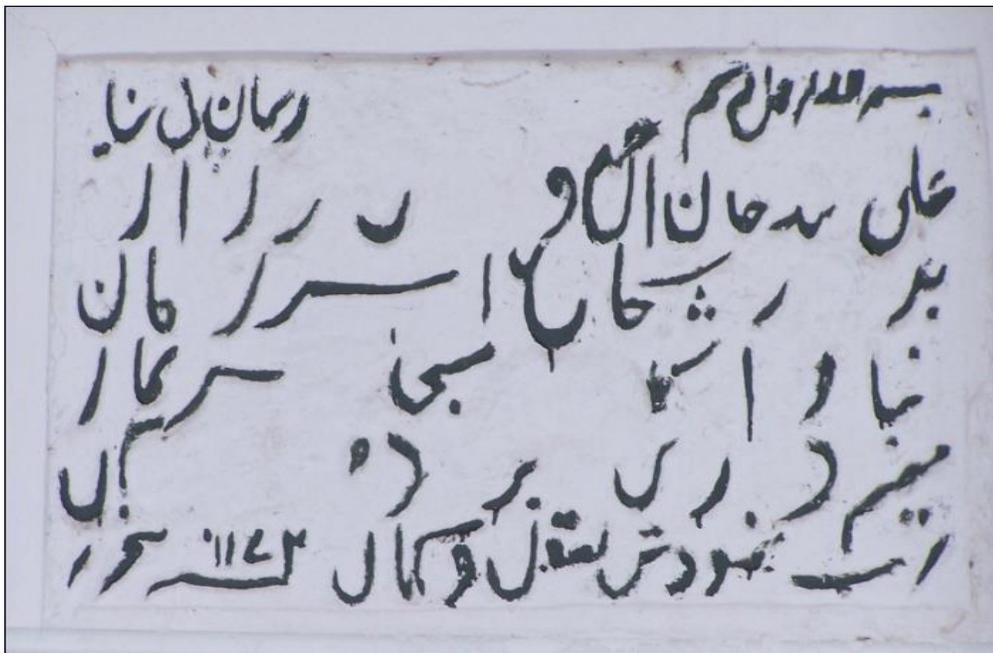
28. INSCRIPTION OF NAWAB OF AWADH, FAIZABAD, DISTRICT FAIZABAD

One obliterated but important record of the time of Nawwab Shuja-ud Daula, the Nawwab of Awadh, was copied from a mosque called *Masjid-I Khajuri* in the city. It registers the construction of a mosque by Ali Muhammad Khan, during the reign of the Nawwab, in AH 1172 (1785-59 CE). This record throws light on the building activities under the royal patronage at Faizabad, the erstwhile capital of the Awadh. The style of writing is Nasta'liq and the language of the record is metrical Persian (Pl. 43-B).

Plate 43



A



B

III. OTHER IMPORTANT DISCOVERIES

BIHAR

1. EARLY HISTORICAL SITE, KOLHUA CHAUR, DISTRICT MUZAFFARPUR

S.K. Manjul, Arvin Manjul and J.K.Tiwari of the Excavation Branch-III, the Survey discovered an early historical site at Kolhua Chaur (26° 1' 9" N; 85° 9' 23" E) near village Kolhua block Saraiya. The area of the site is approx 900 x 500m. More than 9 ring-wells were noticed at the site. The site yielded Northern Black Polished Ware, black slipped ware, grey ware and red ware.

KERALA

2. MEGALITHIC URN-BURIAL CHERUPAR-AMBA, NEAR PAANOOR, DISTRICT KANNUR

During a digging at Chakkidamkandi house compound in Cheruparamba near Panoor, a medium size ceramic pot lid was found below one foot laterite soil. It has been confirmed as a megalithic Urn-burial, by P. Rajendran, Archaeologist and Research Scientist of the University Grants Commission and S. Gregory, Head of the Department of Anthropology, Kannur University, on their visit to the site along with the students of Anthropology. On further clearance, three small bowls have been found from within the pot also. There were several uncharred human bone pieces within the pot also. However, there were no iron implements or soil within the pot. The ceramic pot and the lid are of grey ware

while the bowls have red slip outside. All of them are wheel-made and well burnt, and have perfect shape. The pot is 10cm tall with a bulge of 45cm diameter in the middle. Its mouth has a radius of 10cm and it has a pointed base at the bottom.

3. MICROLITHS FROM PANOM FOREST, DISTRICT CALICUT

During a field study undertaken in January 2010 N.K. Ramesh, a former student of Departement of Anthropology, Kannur University discovered mesolithic artefacts at Panom forest in Calicut district. Artefacts made of quartz were found nearby a stream on the surface. The implements include double shouldered points, blade flakes, single side scrapers, borer, and notched scraper. The tools are retouched from the dorsal side. Some of the implements retain pebbly cortex. The quartz pebbles must have been obtained from the nearby river bed. Similar types of tools were earlier reported from Nilambur region by P. Rajendran. The work was undertaken under the guidance and support of the Department of Anthropology and with the help of P. Rajendran, UGC Research Scientist and Archaeologist of Kerala University.

4. UPPER PALAEOLITHIC TOOLS FROM KADANTHARA RIVER BASIN, DISTRICT CALICUT

During a field study undertaken by N.K. Ramesh, a former student of Department of Anthropology at Thalassery campus of Kannur University, discovered upper

palaeolithic implements at Kadanthara River basin in Calicut District. The implements found include knife, lunate, notched scraper, spearhe-

along the side walls of the dome. The dome has semi-spherical shape with a diameter of 1m. A large number of empty pots have been found

-ad, borer-cum-scraper, blade flakes, etc. They are made of quartz, the typo-technology and morphological aspects of these materials indicate upper palaeolithic characteristics.

5. MEGALITHIC URN-BURIAL FROM MULLAN KUNNU, DISTRICT CALICUT

N.K. Ramesh former student of Department of Anthropology Kannur University reported megalithic urn-burial at Mullan Kunnu in Calicut District. It was exposed during a digging work. The rim of the pot was found at 60cm depth within the laterite soil. The pots were found apart, at the same depth. The bigger jar has the height of 4.5cm and the other of 30cm height. Both were closed with rock slabs. The large pot contained an earthen bowl and a sickle made of iron, but no human remains or charcoal was found within, while the other pot did not contain any artifact. Both the pots were filled with river sand. This kind of urn-burial has been a common feature, generally observed in different parts of Kerala.

6. MEGALITHIC LATERITE DOME FROM KARALTHERUVU, KODIYERI, DISTRICT KANNUR

S. Gregory, Head of the Department of Anthropology, Kannur University along with N.K. Ramesh a found laterite dome during a land clearing operation at Karaltheruvu near Kodyeri in Kannur District. The dome has a rectangular entrance with two framings measuring 54cm and 64cm length. The entrance has 42cm width. There is a cut pillar of 75cm height at the middle of the dome with two laterite-cut stone benches on either side,

within the dome. These include Black and Red Ware, grey ware with incised lines and black lid with a knobis significant. Some pieces of the bone remains had been found within the dome, suggesting that the dome had been used by the megalithic humans for the secondary burials of certain bone remains of the dead. Some pieces of the iron knives and of the lamp posts have also been found within the dome.

MANIPUR

7. HUMAN AND ANIMAL REMAINS, KANGLA, DISTRICT IMPHAL WEST

The State Archaeology, Manipur discovered human and animal (elephant & horse) remains, including human skull from the southern side of the innermost fort wall – the Citadel near Kangla Utra (24° 48' N and 93° 56' E). The tusk of the elephant was unearthed accidentally first, but the bones were very fragile and crumbled to dust at slight pressure. The other remains, including the mandible of horse, vertebrae of the elephant and human skull were applied with chemicals to harden the bones and removed one after another with care. The area was probably an old burial ground which may be about 400 years old.

8. BRONZE VESSELS AND PLATES, ANDRO KHUMAN, DISTRICT IMPHAL EAST

The State Archaeology, Manipur discovered three bronze plates and three bronze jars, including a spouted jar from Andro Khuman village (24°43' N and 94° 01'E),

OTHER IMPORTANT DISCOVERIES

3.9cm and 2.9cm respectively. The spouted jar is 25.5cm high, 35.5cm wide (at the middle portion) and has 35.5cm wide base, it weighs about 1.016kg and is blackish grey in colour.

The other two jars are 24.4cm and 25.7cm high, 33.1cm and 31.5cm wide (at the middle portion) and 11.2cm and 11.9cm wide at the base respectively. Their colour is also blackish grey and weight about 534gm and 540gm. The vessels are in good condition. Noteworthy shapes are incurved bowl, vases, channel spouted basin, perforated legged basin, lid with central knob and spouted pot. Other notable findings are terracotta human and animal figurines, terracotta *ghata*-shaped beads, dabber, sling balls, wheels, etc. A local villager found 19 silver punch-marked coins in a small earthen pot while procuring earth from the site for brick manufacturing. These coins have been seized by the local police and now kept in Saraiya police station. The site probably was occupied up to the late Kushana period.

UTTARAKHAND

9. INSCRIBED STONE SLAB, BAIJNATH, DISTRICT ALMORA

Dehradun circle of the survey while cleaning the area around the private house on the rear side of the group of temples at Baijnath, one inscribed stone slab measuring 53x25cm broken and missing from lower right side has been discovered. There are eight lines of inscription out of which upper four are intact and last line is completely missing since slab is

broken, while remaining three lines are partially missing. Palaeographically, the inscription is assignable to 11th century CE belonging to the Katyuris of Central Himalaya

ruling from Baijnath. Preliminary study of inscription revealed the names of kings as *Baijnath Dev Shri Kartikaypur Rajadhiraja Parambhattaraka Shri. Rambala Deva, Lakhanpala Deva... Mahipala Rai etc.* However, complete inscription is yet to be deciphered (Pl. 44).

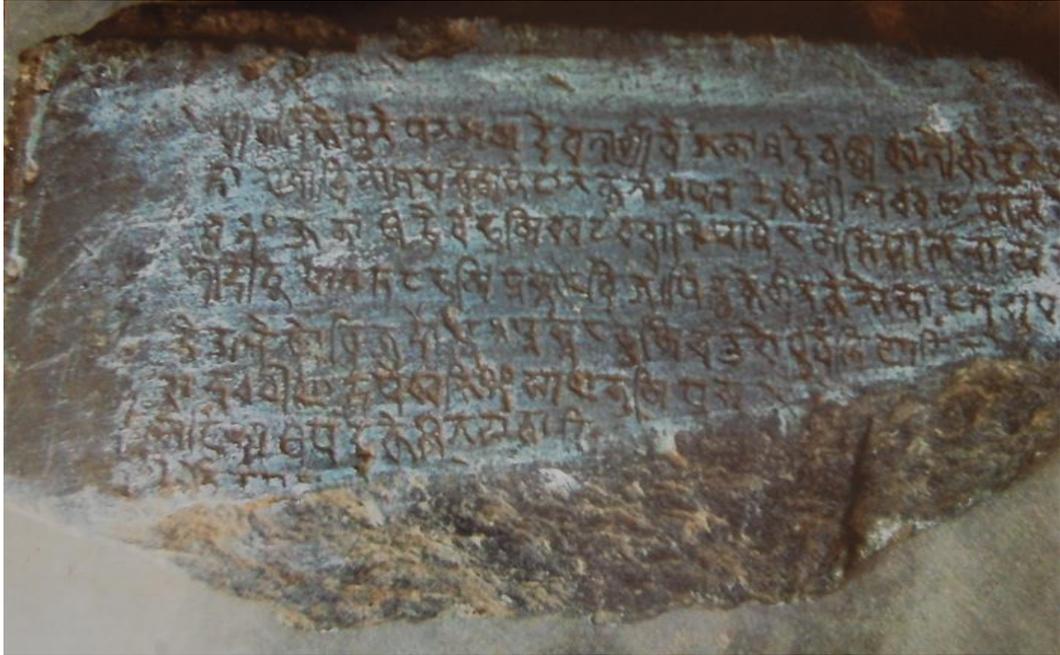
10. ANCIENT MOUND AT GALLI BASURA, DISTRICT ALMORA

Group of temples assignable to 13th -14th century CE have already been reported earlier from this site but remains of ancient mound revealing the evidences of 1st -2nd century CE had not been reported so far. The temples are built over the ancient mound. Since the area is quite fertile, the entire mound is under cultivation and about 1m cultural deposit from the top of the mound has been erased to make it level for agriculture. However, a small portion almost in the centre of the mound is left untouched on which Sun temple stands. Due to continuous ploughing, the foundations of the temple have been exposed with almost 30° tilt towards south. The discovery of a burnt brick measuring 39x26x09cm generally found here from Kushana deposit in pan-Indian context is an important finding. This was the time when the Kunindas were probably ruling in Central Himalayan region. In addition, potsherds in red ware of 1st-2nd century and later period have been found from the site also.

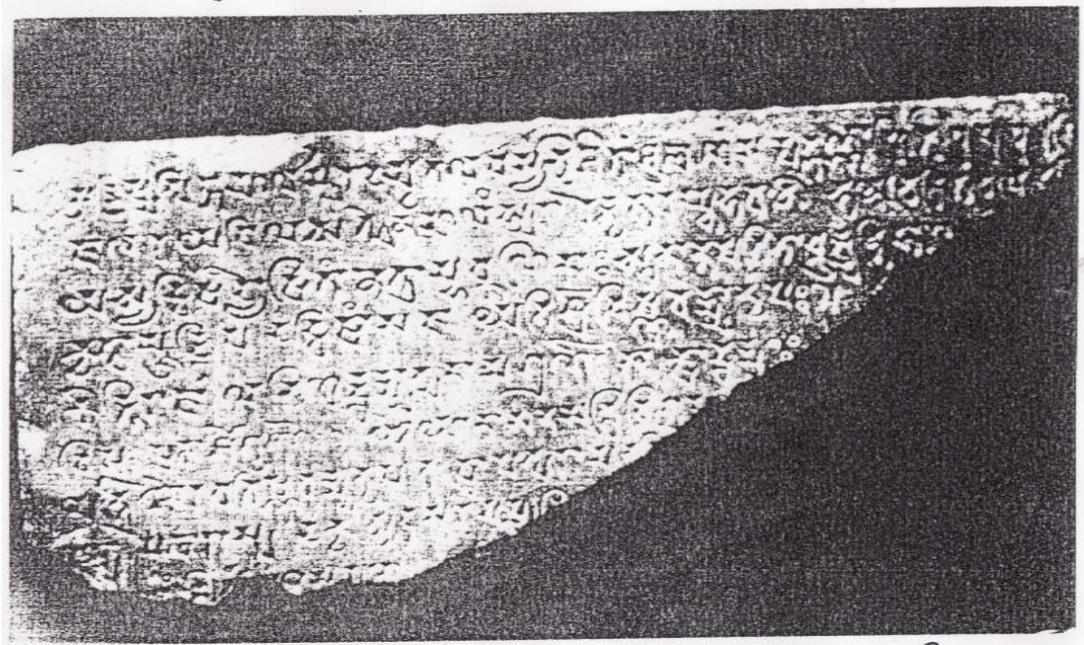
11. KOT BHRAMARI FORTRESS, PHULWARI-GUNTH, DISTRICT BAGESHWAR

Famous for the temple of goddess Bhramari, this important fortress is located on the top of the hillock in Katyur valley at a distance of about 4km from Baijnath group of

Plate 44



A



B

OTHER IMPORTANT DISCOVERIES

temples in Distt Bageshwar. This fortress is built on commanding and strategic location from where entire Katyur valley is seen. It is believed, that the Katyuris, the earliest ruling dynasty of Central Himalaya, ruled from this place after shifting their capital from Joshimath sometime in late 8th or early 9th century CE and raised their fort over the earlier structures. The existing fortress appears to have undergone continuous addition and alteration and temple of goddess Bhramari was constructed inside the fortress in recent past. There are hardly any structural remains of early period, except a few courses of stone wall on western slope of the hill. Some stone sculptures i.e. Siva in *tri-murti* form and image of *Sheshshayi* Vishnu are placed inside the temple assignable to 12th -13th century CE (Pl. 45). Some potsherds of shapeless red ware probably of post-Gupta period were also found from the site.

12. GROUP OF NAGNATH TEMPLE AT PHULWARIGUNTH, DISTRICT BAGESHWAR

About 1km below the Kot Bhramari Fortress, there is group of three temples within enclosure wall locally known as Nagnath temple dedicated to Naga sect. There are number of graves or *samadhis* just outside of boundary wall and such practices still prevail. The temples usually small in size are built on traditional architectural style comprising a small rectangular room made of stone masonry with slanting roof of stone slabs. In front of the complex, there are two life-size stone images of *dwarपालas* of late 18th century CE while in the interior, there is large number of sculptures of different periods, noteworthy among which is the image of Gaja-lakshmi probably

belonging to 9th -10th century CE. Just about 500m away, there are two life-size stone

images locally known as Radaku and Gadaku which appear to be images of yaksha or Gods of land (Pl. 46).

13. INSCRIBED STONE SLAB, MARKATESHWAR TEMPLE, MAHESH NAGAR MAHAD CHANDNIKHAL, DISTRICT CHAMOLI

RP Thapliyal of Dehradun originally resident of Mahesh Nagar informed about the discovery of this inscribed stone slabs from Markateshwar temple premises. The inscription was got deciphered from Epigraphy Branch of ASI, Mysore. This fragmentary inscription is in *Siddhmatrika* characters of 7th century CE and in Sanskrit language. The letters are deeply cut into stone slab and beautifully formed. Since the inscription is of fragmentary nature, the object of the record is lost. It belongs to the reign of the King Vishnuvarmma probably of *Paurava* dynasty (7th century CE).

14. FRAGMENTARY PILLAR INSCRIPTION FROM GOPESHWAR, DISTRICT CHAMOLI

During the course of removing debris for repair to the floor of the main temple, a fragment of inscribed pillar has been found. The inscription is in fragile condition and only a few letters are visible which read as “*Sri[man bhatta moola].....iti*”. Palaeographically, the above record is in characters of 8th – 9th century CE (Pl. 47).

15. INSCRIBED STONE BLOCK AT DHWERA-KALSI, DISTRICT DEHRADUN

One inscribed stone block measuring 46x19cm fixed on the wall of a platform in the

middle of the village Dhwera at a distance of about 10km from Kalsi in Jaunsar area of

Plate 45



A



B

Pulwarigunth: sculptures placed in Kot Bhramari Temple

132

OTHER IMPORTANT DISCOVERIES

Plate 46



Phulwarigunth: yaksha near Naganath Temple

Garhwal has been discovered during the period under review. This appears to be a Takri/Tankri inscription which originated from Sarda script and commonly remained in use from 16th century onwards in Himachal Pradesh. The inscription could not be deciphered so far and only date i.e. *Samvat* 1800 is readable (Pl. 48).

16. HOARD OF MUGHAL COINS, GUMANIWALA, RISHIKESH, DISTRICT DEHRADUN

A hoard of 146 Silver coins was found from village Gumaniwala, Rishikesh while digging foundation of a house. All coins are of similar nature and a few of them were got deciphered by Epigraphy Branch, of the Survey. It is revealed that these coins are issued by later Mughal king Farrukh Siyar, the grandson of Shah Alam I and great grandson of Aurangzeb in his 1st to 7th regnal year who ruled from AH 1124/1713 CE to AH 1131/1719 CE. These coins are minted at Shahjahanabad i.e. Delhi, the capital of Mughal India. A few coins found in the hoard are issued by later Mughal king Muhammad Shah (1719 -1748) CE (Pl. 49).

17. INSCRIPTION ON FAÇADE OF VISHNU TEMPLE KOTULI, BHARKOT, DISTRICT PITHORAGARH

A single-line inscription of 9th century AD was found on the façade of Vishnu Temple Kotuli Bharkot. Inscription is not clearly visible, however it probably reads as “*Shri Ji..tu..putras*”.

OTHER IMPORTANT DISCOVERIES

Plate 47



Gopeshwar: fragmentary pillar inscription

Plate 48



Dhwera: inscribed stone block

OTHER IMPORTANT DISCOVERIES

Plate 49



A



B

IV. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS¹

UTTAR PRADESH

1. AHICHCHHATRA, DISTRICT BAREILLY

The present report incorporates the work done on the subject at Birbal Sahani Institute of palaeobotanical, Lucknow. The excavations at Ahichchhatra were conducted by Agra Circle of the Survey under the direction of Bhuwan Vikram. Systematic floatation recovery of botanical remains from this site was put into effect jointly by Chanchala Srivastava and Anil K. Pokharia. Small sized wood charcoal pieces along with, carbonized seed and fruit remains of field crops belonging mainly to cereals, legumes/pulses of west Asian origins viz. *Hordeum vulgare* (barley), *Triticum aestivum* (bread-wheat), *Pisum arvense* (field-pea), *Lathyrus sativus* (grass pea), and *Lens culinaris* (lentil), along with indigenous *Oryza sativa* (rice), *Vigna radiata* (green gram), *Vigna mungo* (black gram), *Cajanus cajan* (pigeonpea?); amongst the millets *Echinochloa crus-galli* (barnyard / sawan), *Setaria* sp. (Italian millet), and minor crop *Coix lachryma-jobi* (job's tear), etc. A number of weeds associated with winter and summer season crops as well as wild taxa viz.

Andropogon sp (blue stem grass), *Dactyloctenium aegyptium* (crow-foot grass), *Eleusine indica* (goose grass), *Ischaemum rugosum* (dhanua), *Panicum* sp. (panicum grass), *Poa* sp. (blue or meadow grass); *Carex* sp., *Cyperus* sp. (flat sedge), *Elaeocharis* sp. (spikerush sedge), *Fimbristylis* sedge, *Scirpus* sp.; *Chenopodium* sp. (white goose foot/bathua), *Cleome* sp.(hurhur), *Commelina* sp., *Convolvulus* sp., *Polygonum barbatum*, *Sida* sp., *Trianthema* sp., *Scleria* sp., *Solanum* sp., *Anagallis arvensis* (pimpernel/jonkh-mari), *Argemone Mexicana* (Mexican thistle), *Desmodium gangeticum* (tickclover), *Indigofera hirsuta*, *Vicia* sp. (common vetch) and fruit remains of *Ficus glomerata* (gular) and *Ziziphus* sp (jujube) have been retrieved.

Ahichchhatra strategically located in the upper reaches of Middle Ganga Valley epitomizes the cultural flourish typical of the Ganga Valley. The palaeo-ethnobotanical investigations have enhanced quantitatively and added more finds thereby revealing advanced agricultural practices in this region of Ganga Plains during Chalcolithic and Early Historic time.

¹ Contributed by Chanchala Srivastava and Anil K. Pokharia of the Birbal Sahani Institute of Palaeobotany, Lucknow.

V. MUSEUMS

1. ARCHAEOLOGICAL MUSEUM, CHANDERI

New ticket counter was introduced at the entrance gateway of museum premises. Parking for vehicles near booking window at the side of outer gate of museum premises has been provided. The sign boards & direction boards of Chanderi Museum were fixed near the villages and around Chanderi at highway. A water dispenser has been installed inside the museum campus for visitors. Comfortable benches and steel chairs have been installed in museum premises. Saiva and Sakta galleries have been well furnished and opened to visitors. The open stretch of the land outside the entrance gate has been levelled for outer parking near booking window.

2. SALAR JUNG MUSEUM, HYDERABAD

The Salar Jung Museum of Hyderabad is a repository of the artistic achievements of diverse European, Asian and Far Eastern countries of the world. The major portion of this collection was acquired by Nawab Mir Yousuf Ali Khan popularly known as Salar Jung III. There are 39 galleries arranged in 40 rooms of the Museum in three blocks. The Salar Jung Museum Library includes collection of books and manuscripts acquired by the Salar Jung's family. The origin of some of the collection dates back to 1656 CE. which consists of 62,772 printed books of which 41,208 are in English, 13,027 in Urdu, 1,108 in Hindi, 1,105 in Telgu, 3,576 in Pesian, 2,588 in Arabic and 160 in Turkish languages.

The Museum has been visited by 1149722 Indian visitors and 10217 visitors from foreign during the period which also included Dr. Ram B. Yadav, President of Nepal.

The museum organized annual events which included; Summer Art Camp (10 to 22 May, 2010); Children's week and exhibition on Chacha Nehru (14 to 20 November, 2010); Death Anniversary of Nawab Mir Yousuf Ali Khan, Salarjung-III (15 May, 2010); 121st Birth Anniversary of Nawab Mir Yousuf Ali Khan Bahadur –Salar Jung – III (14 to 21 June, 2010); Museum week (8 to 14 January, 2011); Republic day: 26th January, 2011 and International Women's Day Celebrations (8 March, 2011). During the period, the Museum has organized 20 exhibitions on different festivals / occasions, some of the important exhibitions include.

Dr. Babasahed Ambedkar's Personal Belongings" (13 April, 2010); Heritage of Hyderabad by Night (17 April, 2010); Wiladat Shahzad-e-Kaunain (3 June, 2010); India's Independence (14 August, 2010); The Mahatna & Non-Violence (2 October, 2010); Virupaksha Temple Complex Hampi (20 November, 2010); Salar Jung Museum in Dewan Deodi (16 December, 2010); The Road to the Holy Land (28 December, 2010) and a

Special Exhibition on Tribal Paintings “ABHIVYAKTI” in Association with Indira Gandhi Rashtriya Manav Sangrahalaya (National Museum of Mankind) and inaugurated

University delivered the special lecture on the occasion.

During the period the Chemical Conservation Lab chemically treated 5688 130 objects. During the period, Re-organization of

-ted on (10 January, 2011).

During the period, the Museum has organized workshops “Museums of Social Harmony” on the occasion of International Museum day on 19th May, 2010.

Salar Jung Museum in association with MARKAZI MAJLIS-E-QUADRIA has organized a One Day Seminar inaugurated by Sri Syed Ahmed Pasha Quadri, M.L.A & Secretary AIMIM on 14th February, 2011. A Special exhibition and 3 day Work Shop on “Cherial Paintings” was organized on 23rd September, 2010. The Workshop was organized for 3 days from 23rd September, 2010. Six Cherial artists have given training to 85 participants who attended the work shop. The Museum organized the work shop to popularize the work shop to popularize art of Cherial Paintings as part of its educational programme.

As part of its activities, the Museum organized monthly lectures in collaboration with Historical Society of Hyderabad on every second Saturday of the month. Salar Jung Museum in association with Historical Society of Hyderabad has organized a special lecture on Banda Bairagi and the Rise of Common Man in Indian Politics on 9th October, 2010. Sri Dr. Kesavrao Jadav, formerly Associate Professor, Dept. of English, Osmania University College of Engineering, Osmania

Jade Room and Children’s Section was completed. The design work of walking Stick and Coins Galleries is in progress. Installation of CCTV Security System in the Central, Western and Eastern Blocks has been completed. Automatic Fire Alarm System has been installed in Central, Western and Eastern Blocks.

3. VICTORIA MEMORIAL HALL, KOLKATA

Survey of India (ASI) assisted the memorial in structural repair of the monument and chemical treatment of the outer marble and inner sandstone casings. ASI also assisted in cleaning of the exterior part of the building including the terraced floor, frontal carvings, panels, relief figures and statues. Repair of the stores inside the Victoria Memorial Building, exterior of Central Hall and re-surfacing of gravel road on the southern side has been completed.

4. STATE MUSEUM, LUCKNOW

During the year, the State Museum, Lucknow acquired copper hoards, copper-plate, coins of gold and silver and some other fragmenting pieces. The antiquities were handed over by U. P. State Archaeology, Lucknow. The copper-hoard was discovered from village Udaipurva of District. Oraiya and the copper plate has been acquired from Semariya District. Sonabhadra. The copper-

plate consists of 14 line inscription and according to the script this plate is dated to 7th Century CE. It is a land grant by Pandu-Verma. The coins are acquired from treasury of dist. Sonabhadra and yet to be classified (Pls. 50-51).

including painting, fixing etc in Gallery 1 of the museum has been completed museum for keeping their bag/baggage with key. Installation of security lights with all fittings around the museum building. Installation of 12 lined intercom system with modern fittings & concealed wiring in the museum. Provision for

MUSEUMS

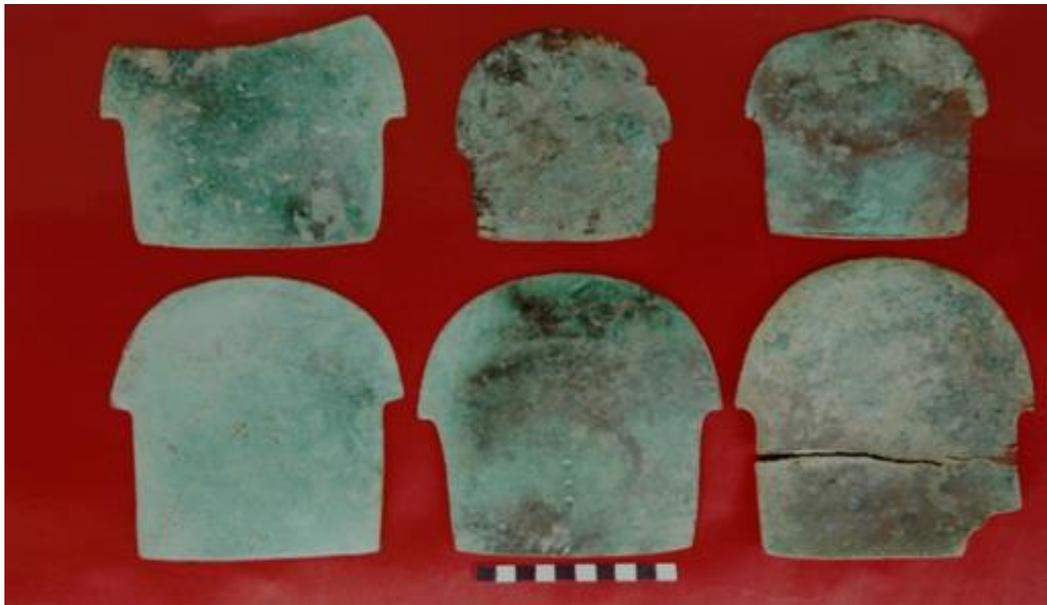
5. ARCHAEOLOGICAL MUSEUM, RATNAGIRI

During the period under review, false ceiling, camouflaged wiring, light fitting including repairing of wall putty & painting of Gallery 2, 3, 4, Office & Library room of the museum have been done.

Pigeon whole almira for visitors has been made at the entrance of the museum. Provision for door frame & Hand-held metal detector for security point of view.

Construction of separate toilet block (Gents & Ladies) with modern fittings in the museum has been done for visitors amenities. A gentle slope (ramp) for facilitating access to the physically challenged visitors including separate entry gate has been provided. Minor repairing & white washing have been done to the exterior of the museum building. Minor repairing with emulsion painting (Distemper) has been done inside of the museum building (office, library, room, store, conference, hall, guest room, etc.). Preparation & fixing of direction of signage's & resetting, repairing of trilingual main signage with steel letters. Erection of 6 nos. of high pedestals veneered with sunmica for displaying antiquities in the corridor. Trilingual labels replacing older ones in the Galleries & Corridor of the museum. Renovation of guest room, modernization of toilet, Air Condition fitting along with other necessary equipments of the museum. Construction of septic tank of the museum. Refilling of fire extinguishers for safety & security of the museum. Installation of water cooler for visitor's amenities. Work of false ceiling, electricity fitting, light fitting,

Plate 50



A



B

State Museum, Lucknow: copper hoards from Udaipurva

Plate 51



A



B

VI. ARCHITECTURAL SURVEY

BUILDING SURVEY PROJECT

The Building Survey Project of the Survey took up the study of architecture of secular heritage buildings in the city of Varanasi, during the period under direction of C.B. Mishra of Lucknow Circle assisted by P.L. Meena, Rajendra Yadav, Pradeep Kumar Pandey, S.K. Dixit, and Shri Shakeel Ahmad.

Varanasi (25° 21' N; 82° 40' E), the sacred city of Hindus, is known as Kashi which literally means the luminous of the 'City of light'. Often referred to as Benares, Varanasi is one of the oldest living cities of India. It is located at a distance of about 750km from Delhi and 128km from Allahabad. The city is bounded by river Varuna in the north and Assi in the south. The river Ganga makes a crescent shape meander flowing towards north (*Uttarayni*) and provides high cliff on the west for settlement.

The secular old buildings and *ghats* assignable to 17th-18th century AD display variations in their styles of art and architecture. These buildings were constructed under the patronage of several local chieftains having distinctive art and architectural styles viz. Raja Rajeshwara Pagoda, Rajput, Karnataka, Gothic architecture, Bengal, Maratha and wooden architecture of Nepal.

This project was intended to conduct an architectural survey of secular heritage buildings in the city of Varanasi as hitherto, no systematic architectural survey and documentation of the colonial and other secular

buildings and *havelis* including palaces/mansions and *ghats* of river Ganga in Varanasi has been done. The construction of most of the *ghats* at the bank of river Ganga was done during the period of Gahadwala rulers. During the eighteenth century, Marathas became the sole masters of the city.

They constructed several temples viz. Vishvanatha, Trilochana Swami temple, Ganesa temple of Sakshi Vinayaka and also one dedicated to Bhairava. A number of *ghats* and *havelis* were also built up during Maratha, Mughal and British periods respectively.

During the year the survey was started from south to north along the river Ganga and also in the city. There are series of *ghats* along the river starting from Assi Ghat in the south Adi Keshava in the north are having high mansions and magnificent temples. Over 30 secular buildings have been identified in Varanasi in the first field season of these three buildings located in the premises of Sampooranand Sanskrit University were thoroughly documented. These secular buildings belong to 17th-18th niche, now filled with bricks. This may be approached by stairs

from inside. Twenty eight leading steps have been provided from the main door to access *baradari*. The central cusped arch is decorated with lotus pendentives and flanked by lotus medallions on either side. The central arched entrance provides a flight of steps to access the first floor. The plain façade is flanked by an octagonal tower from either side crowned with *chhatri*. The domical ceiling of the *chhatri* is supported on eight octagonal pillars with high

while corner arches are smaller in size. The arches are decorated with cusps and lotus medallion on flanking side. A band of lotus petals are carved below the projected *chhajja*. The flat ceiling is made of long stone slabs, topped with a bold parapet wall. The interior walls of the verandah have two-rows of niches recessed in the wall made of stones in ashlar's masonry. The flanking ante-chambers chambers measure 3.60x3.60m entered through

ARCHITECTURAL SURVEY

cusped-arch openings adorned with lotus medallion on either side.

VARANASI

Chet Singh Ghat has a magnificent *baradari* in the centre and two flanking buildings having a pillared hall in the centre and antechamber on either side. The *baradari* has raised platform with twelve pillars in the centre enclosed by a pillared verandah with a portico-balcony in the centre of south-eastern face. The balcony is unique in its design embellished with fluted tapering pillars crowned by inverted lotus as capitals and palanquin type of arches (Pls. 52-53).

The *baradari* has screen wall on the corners of the verandah filled with *jali*. The flanking octagonal turrets are surmounted by beautiful octagonal cupolas supported on eight octagonal pillars. The pillars are filled with cusped arches providing the base for the domical roof. The ceiling of dome has beautiful painting of floral motif painted in red ochre colour. The ceiling of *baradari* has projected *chhajjas* on all side. Besides, *baradari* has 15m long colonnaded verandah with two ante-chambers on either side. The facing side of *baradari* has five-arched openings, being principal entrance. It is larger in the centre

a small doorway measuring 0.79m in width and 1.44m in height. Over the entrance of the chamber there are two flanking arched-niches on either side while one niche on the top (Figs. 16-17).

MANIKARNIKA GHAT AND KUNDA: This ghat is located on the northern most edge of the Varanasi on the Manikarnika Ghat. Traditions ascribe that in the beginning of the Satyuga Lord Vishnu performed penance at Anand Vana (Kashi) for 5,00,000 years to please Lord Siva, and through his *chakra*, brought into existence a pond (*Kunda*). As a result, Siva granted a boon that this *tirtha* would be the holiest of all the tirthas and those who bathe at this *tirtha*, according to religious scriptures, would get absolute salvation. The Lord Siva and Parvati bathed in the holy *Kunda* and after having a bath Lord Siva shook his head with joy and his ear-ring stone (*mani*) fell into the *kunda*. Hence, the *kunda* derived its name as Chakrapuskarni in Manikarnika *kunda*. This kshetra (area) is also known as *avimukta* or a place for complete salvation. The Manikarnika Ghat was built by Bajirao Peshwa in CE 1630. There are several temples and a *kundas* around the Manikarnika Ghat complex, viz., Manikarneshwar Mahadeva, Temple of Maheshwari Devi Manokameshwar and Siddhavinayaka built by Maharani Ahilya Bai

of Indore (CE 1785-95) and (Raja Shri Lala) (Figs. 18-19).

Madhav Singh of Amethi (1847 CE), Raja Shri Mangal Singh of Alwar State, Rajasthan (1895 CE) and Shri Rajeshwar VII (1900 CE) respectively. These temples reflect the art and architecture of 17th century CE.

146

It is located towards the right side of Sindhia Guest House and north-east of Manikarnika Ghat. Built of sand stone, this stepped *kunda* is rectangular on plan having steps on all sides leading to the bottom of *Kunda*. The longer axis of the tank has five, four and three landings platforms and shorter axis has three, two and one landing platforms after an interval of two down steps. These steps vary in width and height ranging about 18 to 32cm. In the centre is small *kunda* having straight sides of considerable depth. According to local devotees, there is a *gaumukha* shaped *pranala* in the north-eastern axis of the *kunda* which continuously flows on. There is a large drain connecting from the Ganga to fill the water during the monsoon. Besides, there are seventeen small-*lingas* placed in small niches, of which, seven *lingas* are located on the north-western side while ten on the north eastern flank of the *kunda*. Except the *panch-linga* on the north-western corner, rest others are having round *yonipitha*. A mutilated figure depicting Siva and Parvati is fixed in a niche in the centre of north-western side of *kunda*. It is flanked by Ganesa on the right and an unidentified deity on the left. There is another panel on the north-eastern arm of the *kunda* depicting three deities seated in *padmasana*. All deities are four-armed, covered with vermilion and thus attributes are unidentifiable. There is a figure of a standing devotees on the left in separate niche in front of Siva-*linga* which is identical in

shape like earlier discussed one which are fixed on the north western arm of the tank. Two images of Vishnu carved in black Basalt are of South Indian origin and placed on the north-western side of *kunda* by devotees in recent past (Pl. 54).

MANKAMESHWAR MANDIR: Abutting to

145

INDIAN ARCHAEOLOGY 2010-11-A-REVIEW

the southern edge of Manikarnika Kunda, there is a Alwar Mandir probably known as Mankameshwar Mandir. It was built by Raja Shri Mangal Singh of Alwar State (Rajasthan) in 1895 CE. Facing west, the temple is standing on 7.5m high *jagati*. The *jagati* is rectangular on plan having *sarvatobhadra*-sanctum in the centre followed by a *mandapa* and an *ardhamandapa* while another *mandapa* is added on the opposite to the main entrance provided in the east. The sanctum provided with a *pradakshinapatha* which reflects Doric style of architecture. The temple is built like a palace only giving the appearance of temple due to high *sikhara* crowned over the sanctum.

The temple is built of sandstone but in the interior of the sanctum and *pradakshinapath* white marble has been used. The *sarvatobhadra* sanctums are square on plan measuring 4.25 x 4.25m having four entrances on the cardinal directions and enshrine a Siva-*linga* in black stone. The *mandapa* is rectangular on plan measuring 4.5x9.0m while *ardhamandapa* is smaller in size having 1.5x 3.0m dimension. The interior of the *mandapa* and *pradakshinapatha* is made of white marble and their spandrels are embellished with beautiful lotus medallions. There are seven arched doorways openings. The sides of *pradakshinapatha* so as to provide proper ventilation which are presently blocked with iron mesh gates. The temple has

chess board pattern flooring design made of tiles of white marble and black stone. Over the sanctum there is a long *jangha* kind of *bhitti* raised up to *chchhadya* to support the curvilinear *sikhara*. The *sikhara* is adorned with several tiers of *urushringas*. A *baradari* supported on pillars has been constructed on the front while a room has also been added on

is shown over the *lalatabimba*. The sanctum is followed by plain vestibule covered with flat roof. Square on plan, the *mandapa* measures 4.45m x 4.45m supported on twelve *mishraka* types of pillars. The pillars are square at the base and have eight, sixteen facets upwards

ARCHITECTURAL SURVEY

the rear side of *sikhara*. Besides, there is a small courtyard and cells provided on the western edge which are being used as residence by Shri Kamal Kant Sharma. A stair case is provided on the north-west corner to approach the roof. The entire building appears like double-storied *haveli* from outside except the *sikhara* which is an imposing feature of the buildings appearing like a temple.

RATNESHWAR MAHADEV TEMPLE: Located about 5m below on the north-eastern corner of Manikarnika *Kunda*, the Ratneshwar temple was built by Rani Ahilyabai, the queen of Indore. Dedicated to Lord Siva, the temple is popularly known as Rataneshwar Mahadeva temple. Facing north, the temple consists of a sanctum, vestibule and a pillared *mandapa*. The sanctum has plain *jangha* with *bhadra*-niches are crowned by lions. The *jangha* is followed by a set moulding which *uruhshringas*. A set of mouldings separate the *sikhara* from *chhadya*, having projected pillared niche on the cardinal directions, now lying vacant. Presently, the temple is tilting towards south due to settlement of foundation and part of the *pitha* is buried under the flooring which is carried out recently. The square sanctum is entered through a *tri-shakha* doorway measuring 1.75 x 1.10m, flanked by *dwarapalas* on either side. The door lintel has plain *sakha* but crowned with a three finials is flanked by two lions. A seated figure of Ganesa

with circle on the top embellished with chain and bell decoration. The top portion of the pillar is profusely decorated with a band of inverted lotus petals, a set of mouldings and a lotus flower which support the beam. The octagonal shaft of the pillar is adorned with arched motif which is very common in Indo-Islamic and later Brahmanical temples too. The *mandapa* has cusped ceiling which are nine in number with lotus petal decoration. There is a lotus pendentive in the centre of the ceiling. The *mandapa* is crowned with *samvarna* types of roof, embellished with several miniature *amalakas* and finials. The temple is renovated in the memory of Shri Das Agrawal by his third son Moti Lal Agrawal as attested by a Devangari inscription fixed on the façade.

ASSI GHAT: This is the southernmost ghat at the bank of the Ganga in Varanasi, built at the confluence of river Assi and Ganga by Dulhin Radha Dulari Kunwari, a rincess of Sursand State of Bihar and wife of Raja Damodar Dev Narain Singh of Chainpur State. The land was purchased from Kashiraj Prabhu Narain Singh in 1903. This is the site of an old temple which was known as Assi Sangameshwara where princess Kunwari of Sursand built this *panchayatana* temple dedicated to Vishnu and Lakshmi. The *ghat* is usual on plan having long and broad wide descending steps on the front i.e. east leading to the water and a temple on the back (west). The temple stands on high

square *jagati* on the western edge of the ghat approached by a flight of steps facing south. The high *jagati* and temple is made of buff colour sandstone, which is locally available across the river. The *jagati* is 3.40m high having 0.80m high parapet wall filled with latt-

-ice pattern. Facing east, temple is *panchayatana* on plan, consists of an octagonal santum in the centre and four subsidiary shrines at the corners. The sanctum has pillared *mandapa* on the front, having five *toranas* like entrances which are embellished with lotus pendentives. The main sanctum is *sarvatobhadra* having double-arched entrance alike *torana* on cardinal directions, enshrines Vaisnavite image known as Assi Madhava. The north eastern miniature shrine is having *Sivalinga* in the sanctum encased by marble slabs. The *makara-vahini* Ganga is painted over as *lalatbimba* on the entrance of the shrine. The miniature shrine on the north-western corner depicts a figure of Narasimha while. The building is double storied in elevation, pierced with arched main entrances, four on either side of the main portico, adorned with bands of floral designs. The first floor is clearly separated by a projected *chhajja* supported on brackets which are decorated with lotus pendentives. The octagonal corner towers are hollow from inside provided with three windows on the outer wall and an entrance from the verandah. The windows have arched outline flanked by Gothic pillars and lined with small projection around the arch. The space between two brackets is filled with a square band having different motifs in the centre which include star with lotus, *swastika* with floral ends, lotus medallions, etc. Another band of creeper is shown above the panel in stucco.

The first floor of the façade is identical to the ground floor in design except the arches over the portico having narrow arched openings separated with slender stone pillars and circular opening above the pillar (Pls. 55-56).

There is a projected balcony on the first floor supported on two slender identical pillars

INDIAN ARCHAEOLOGY 2010-11-A-REVIEW

like those of on the ground and first floor over the portico. It has two trefoil-arched projected balconies surmounted by an embellished arch with floral design in stucco. The spandrels of the arches in the balcony are usually plain except a lotus medallion. A similar accurate pattern repeated along the projected *chhajja* of the first floor over the octagonal corner towers. The combination of pillars and arches on the first floor façade adds to its beauty considerably. The building is entered through a lofty arched entrance provided in the centre behind the portico. The main entrance of the building is flanked by circular tapering pillars in Gothic style. The spandrel of cusped-arch is profusely decorated with floral designs in stucco. There is spacious verandah on the either side of the entrance providing ample space to access to the corner octagonal rooms. Besides, there are two doors each on the west and north of which the latter connects the kitchen servant quarter areas. Behind the verandah there are large specious rooms and halls on both the floors. There is a pair of staircase from the inner verandah leading to access the first floor. The building has jack-arched ceilings supported on MS girders. The building has a large rectangular courtyard in the centre and residential cell with cloistered verandah on all four sides.

Each cell has an entrance and a window on the opposite wall. Each window has

separated eave over the window to avoid the rain water from outside. A passage connects the second courtyard which is smaller in size, also having a series of cells all around and an open space in the centre. The rooms have a wooden doorway in the centre and small window on the opposite wall. The inner walls are plastered with lime while exterior has flush

ARCHITECTURAL SURVEY

pointing. There is another small set of rooms on the north-west corner of the building apparently an out house for servants. The building has a set of toilet block and bathrooms in the centre of eastern wing (Figs. 20-24).

TEMPLE SURVEY, NORTHERN REGION

In continuation of previous years' work on the project entitled Architectural Survey of Kachchhapaghata Temples at Thoban, district Ashok nagar & Surwaya, Terahi, Mahua, Rannod, District Shivpuri Madhya Pradesh, further survey was undertaken under the direction of K. Lourdusamy assisted by M.C. Joshi, S.K. Bajpai, A. Vyas, L.K. Bhagchandani, S.K. Srivastava, and K.R. Malviya, Altogether, forty-eight temples of Kachchhapaghata period have been documented.

1. TEMPLES OF THOBAN, DISTRICT ASHOK NAGAR: The village Thoban is situated at a distance of about 20km south-west of Chanderi which preserves various Hindu and Jaina temples including a Baradari along the river Lilut. The temples are made of red and grey sand stone without any binding mortar. The area of the study is divided into five divisions 3: Kuti Area Complex; Kuti Extension; Gargaj Area; Village Thoban; Sitamarhi Group.

The temples are small *mandapika* type and consisting of *garbhagraha*, and *antarala* inside and a porch composed of two front pillars and two pilasters in the rear. In most cases they are raised upon a low *pitha*. They have low height and many of them are in ruined condition. River goddess Ganga-Yamuna are shown in the *pedya* of the doorway along with doorsill which preserves

central *mandrake* with *Udadhikumaras* on both side and fighting scene of lion & elephant on the cardinal ends. *Vedibandha* of the temple comprise *khura*, *kumbha*, *kalasha* and *kapota* mouldings. In most cases, the *sikhara* is missing. The Kuti area temples complex has two rows of shrines in front of *Baradari* facing each other with open space at the centre. Both the rows have been erected on eastern and western flank having two and three temples respectively. They are almost similar in size and shape. On plan, they are *panchratha* consisting of a *garbhagriha* and an *antarala* inside with a pillared roofed *mandapa* in front. From inside, the *garbhagriha* is normally square and the *antarala* is of rectangular shape.

Siva temple (THB-6D) facing west is located in eastern flank next to the temple THB-6C. Square in plan, it consists of *garbhagriha*, and *antarala* inside and *mandapa*. Presently, the *mandapa* portion is completely ruined and the roof is fallen down. The chamber of the *garbhagriha* has plain walls which are made with stone slabs on northern and southern side. The doorway is very simple having Nataraja on the *lalata* flanked by the figures of Brahma on the right and Vishnu on the left. The recesses are empty and *dwar-sakhas* are also very plain except *puspasakha*. River goddesses are shown at the *pedyas* canopied by Naga devotees.

The doorsill in not visible due to fallen roof of the *mandapa adhisthana* is consisting of *khura*, *kumbha*, *kalasha* and *kapota* mouldings. The walls of the temple do not

possess heavy projections rather consisting of plain pilasters having pot and seated Balrama in *lalitasana* holding *hala* (plough) in his right hand. He is canopied by snake hood. Besides,

Plate 52



A



B

Varanasi: A, front view and B, close up of the facade of Chet Singh Ghat



A



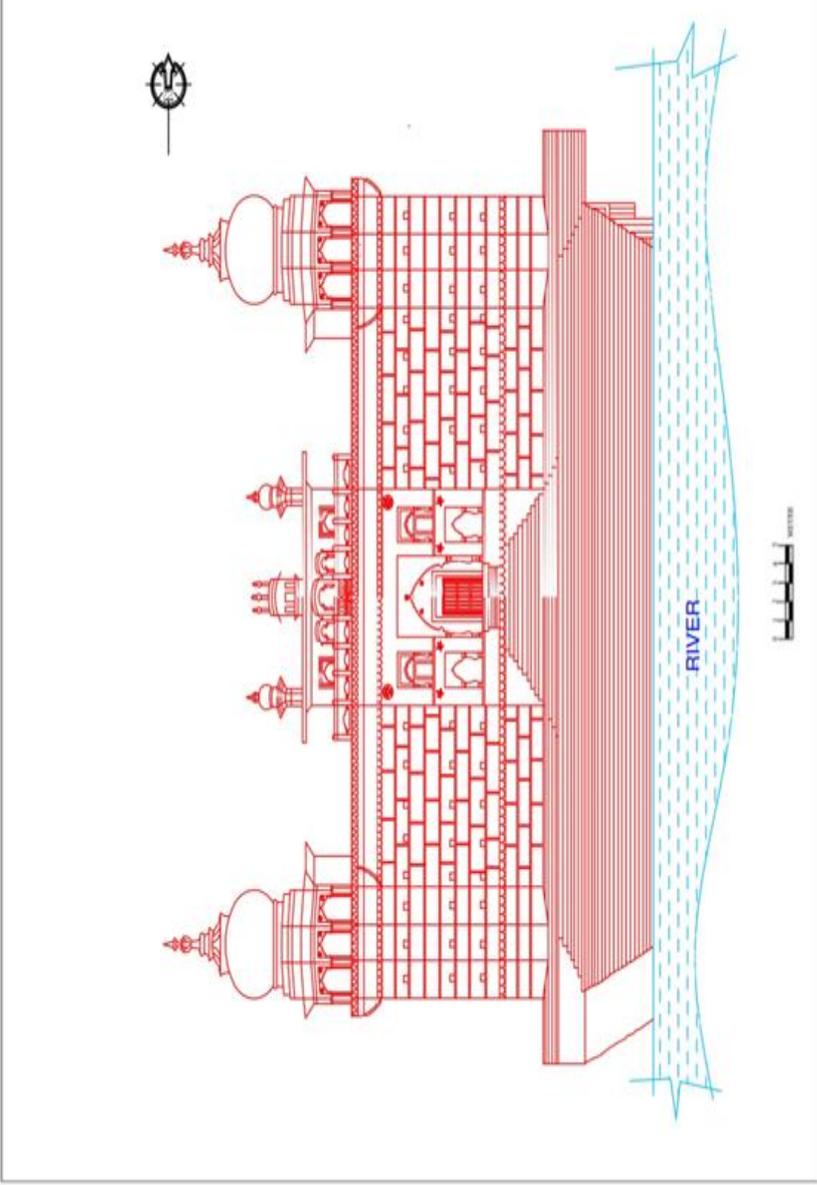
B

Varanasi: Baradari at Chet Singh Ghat

151

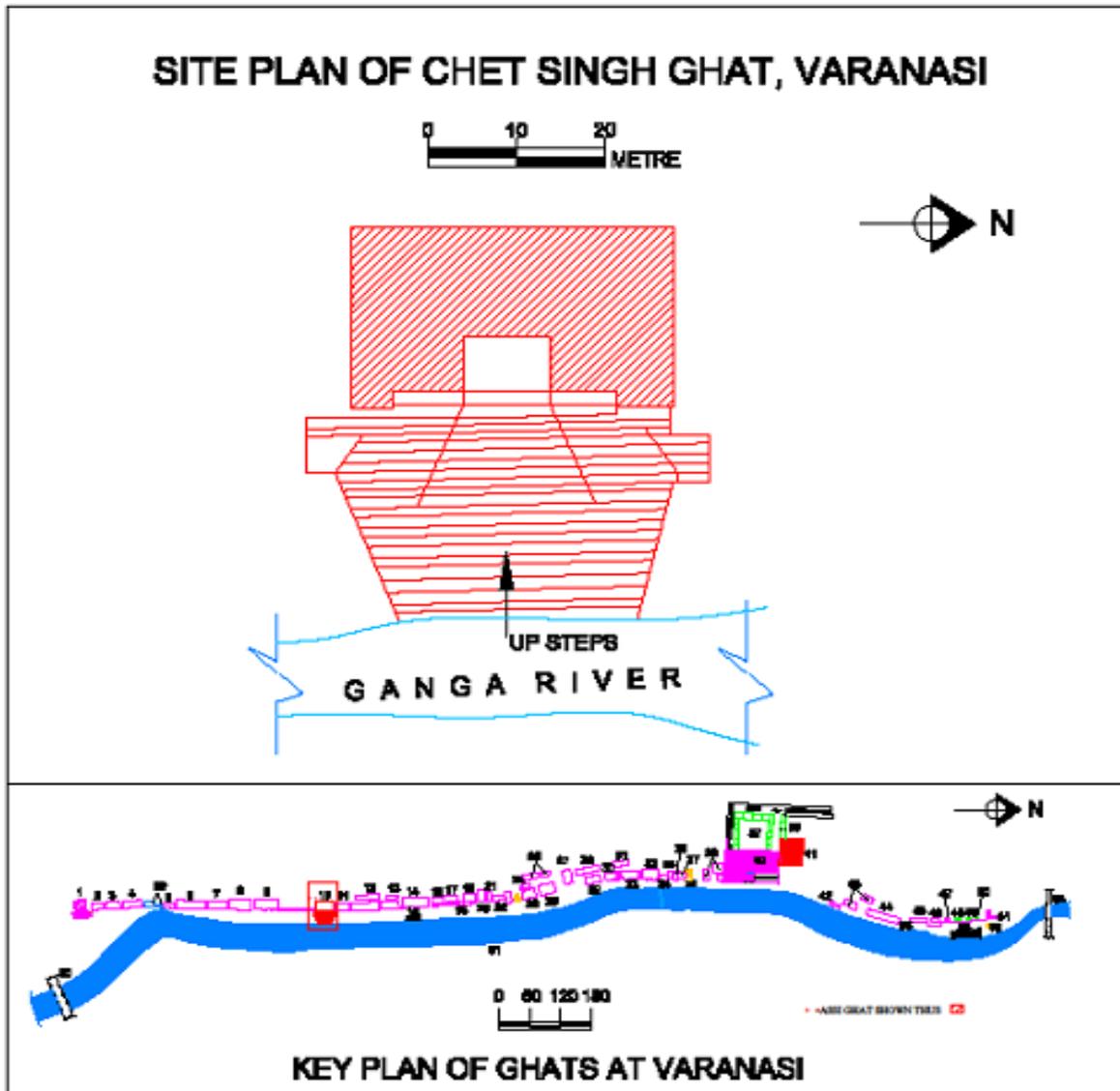
INDIAN ARCHAEOLOGY 2010-11-A-REVIEW

Fig. 16



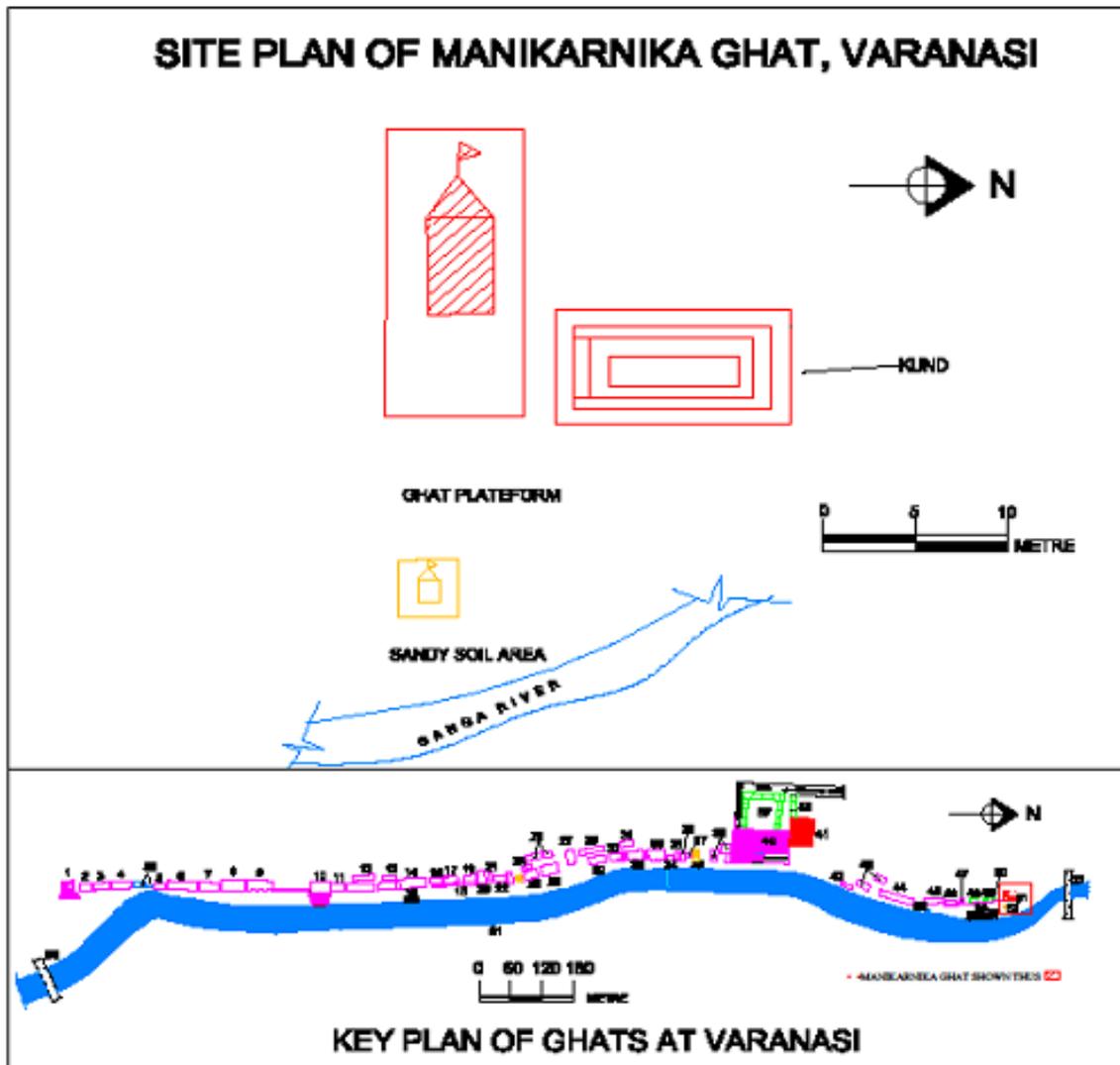
Varanasi: front elevation of Chet Singh Ghat

Fig. 17



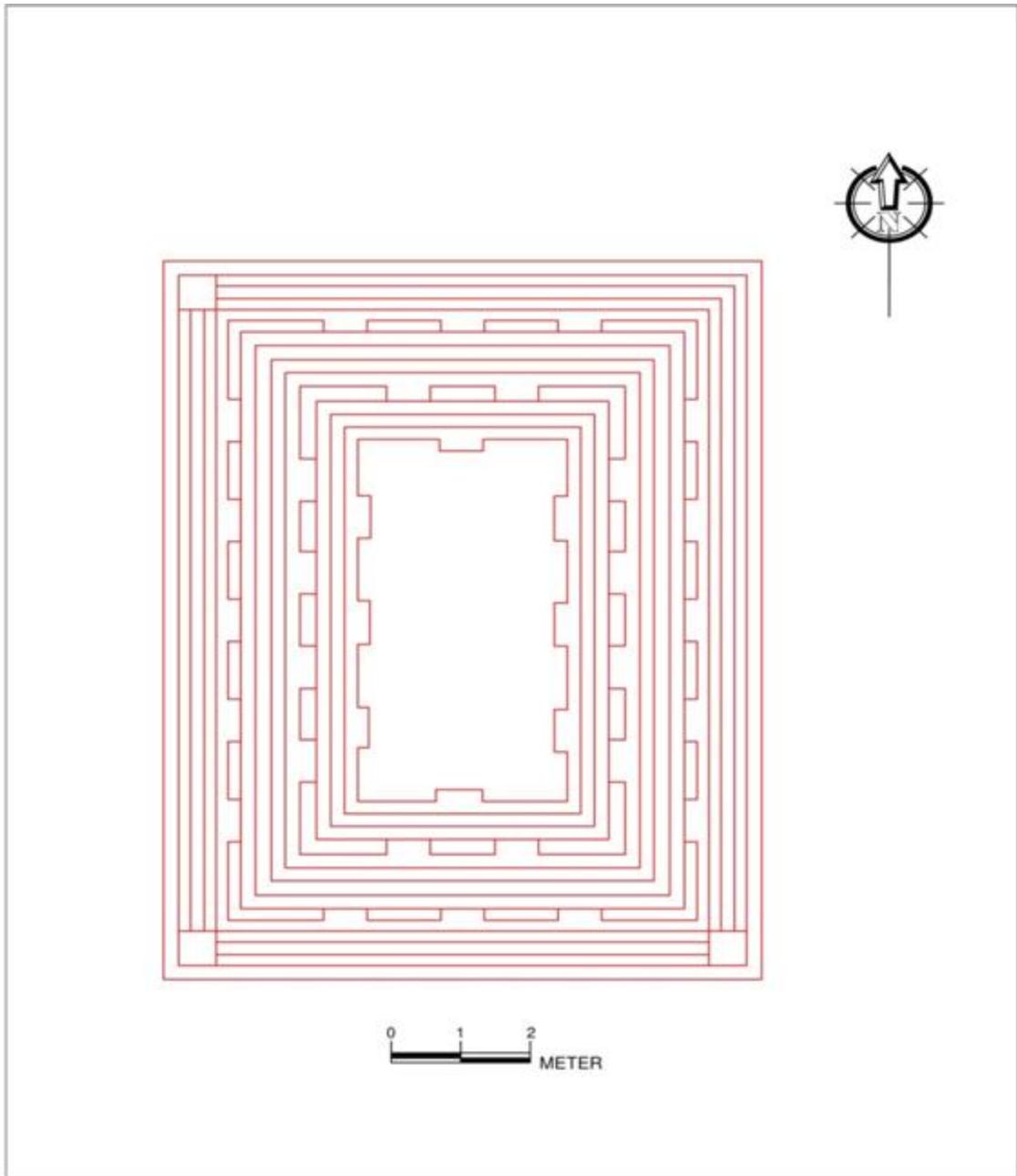
Varanasi: Site plan of Chet Singh Ghat and key plan of the Ghats

Fig. 18



Varanasi: Site plan of Manikarnika Ghat and key plan of the Ghats

Fig. 19



Plan of Manikarnika Kund, Varanasi

Plate 54



Varanasi: north elevation of Alwar Mandir at Manikarnika Kund



Varanasi: General view of Assi Mahadava Temple at Assi Ghat

Plate 56



Varanasi: Mahendravati Guest House

Fig. 20

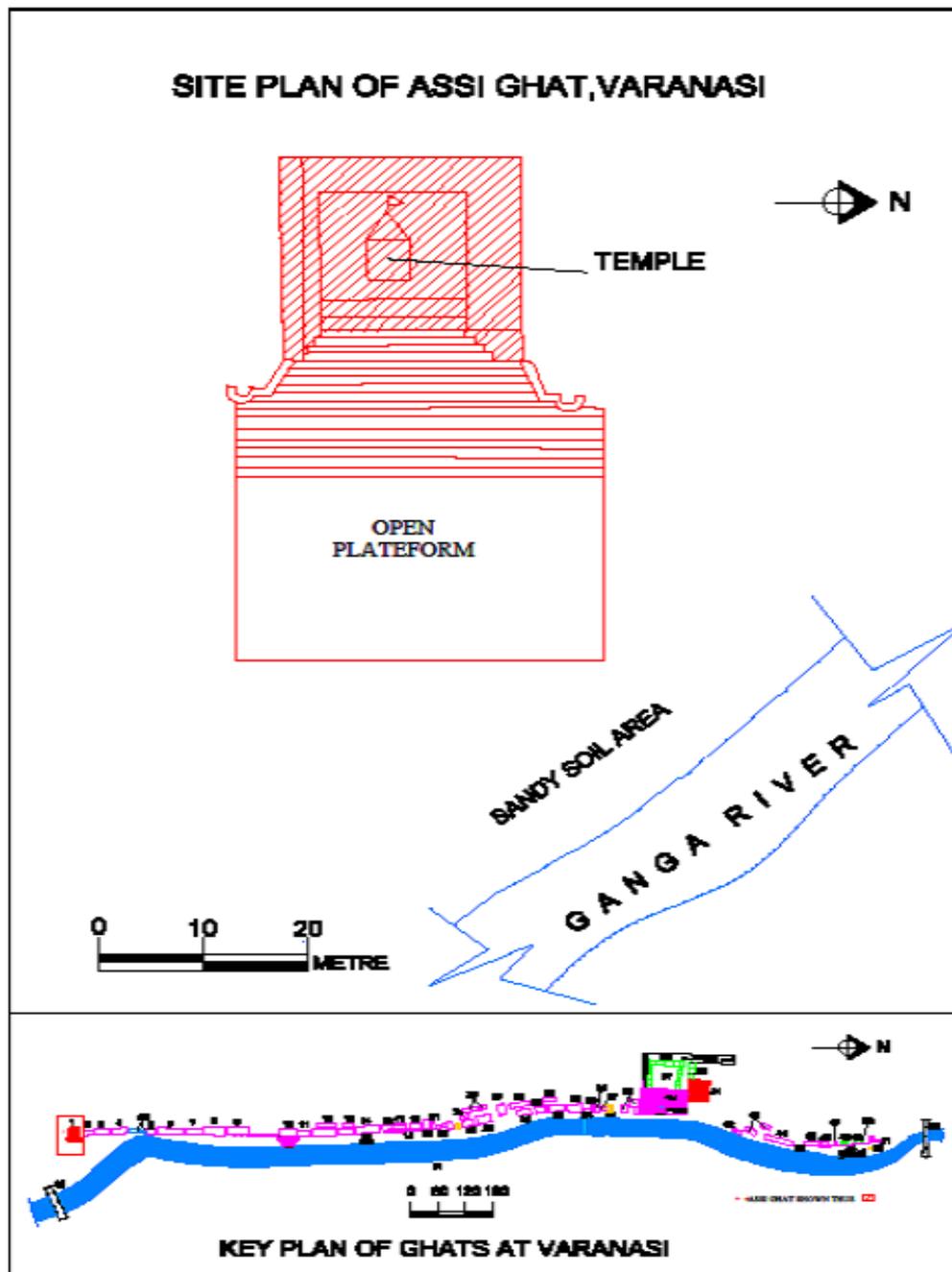
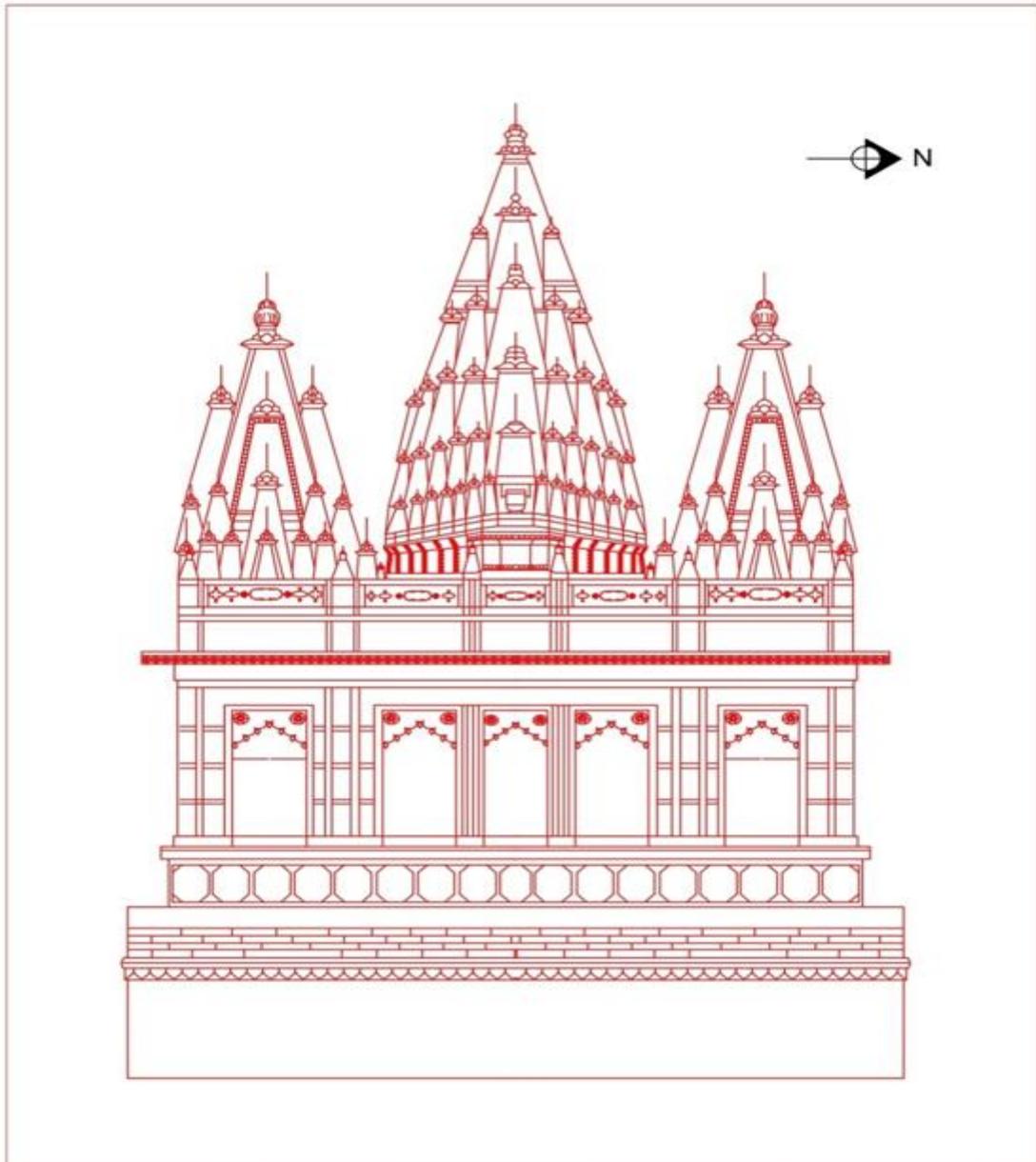
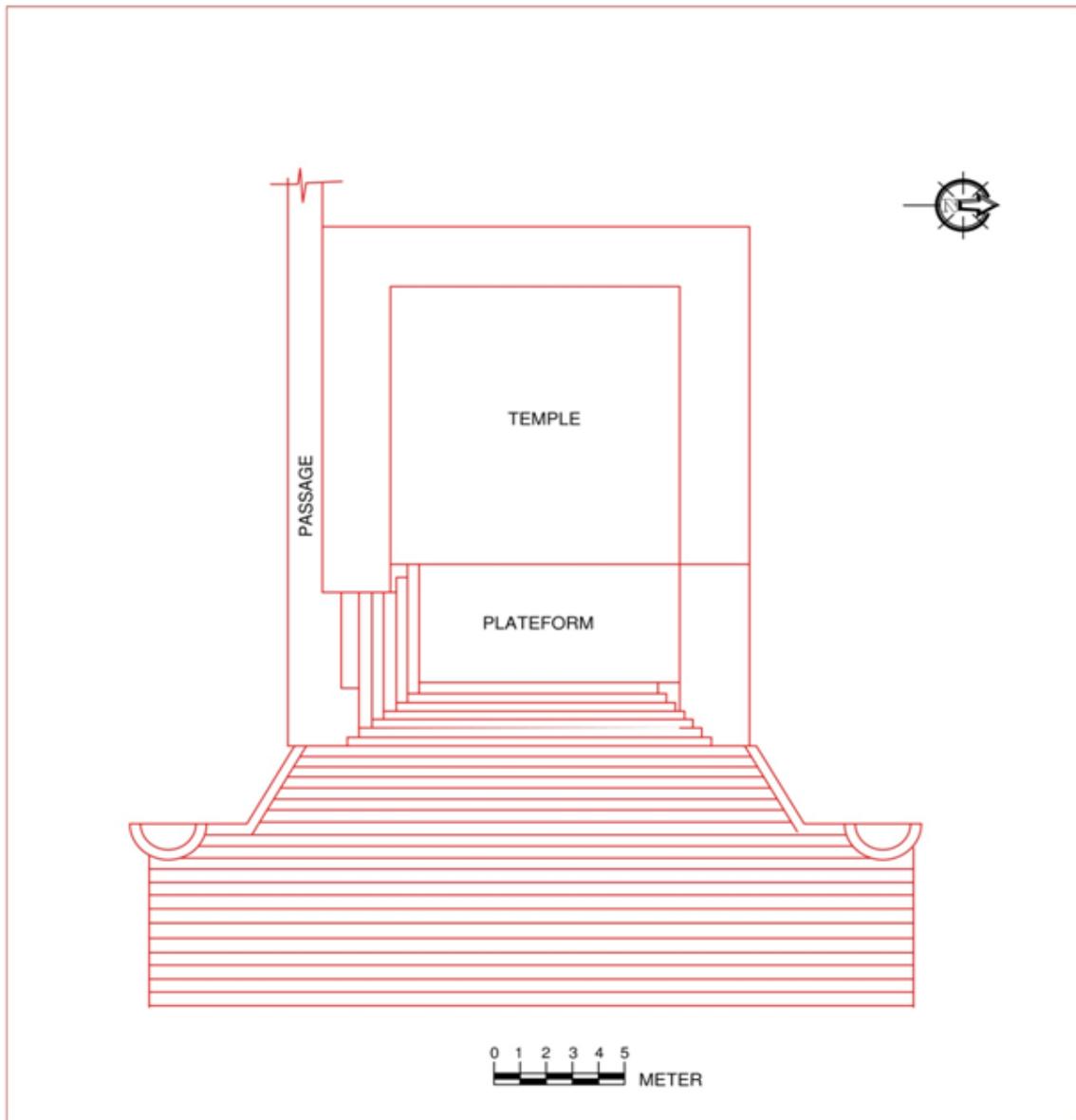


Fig. 21



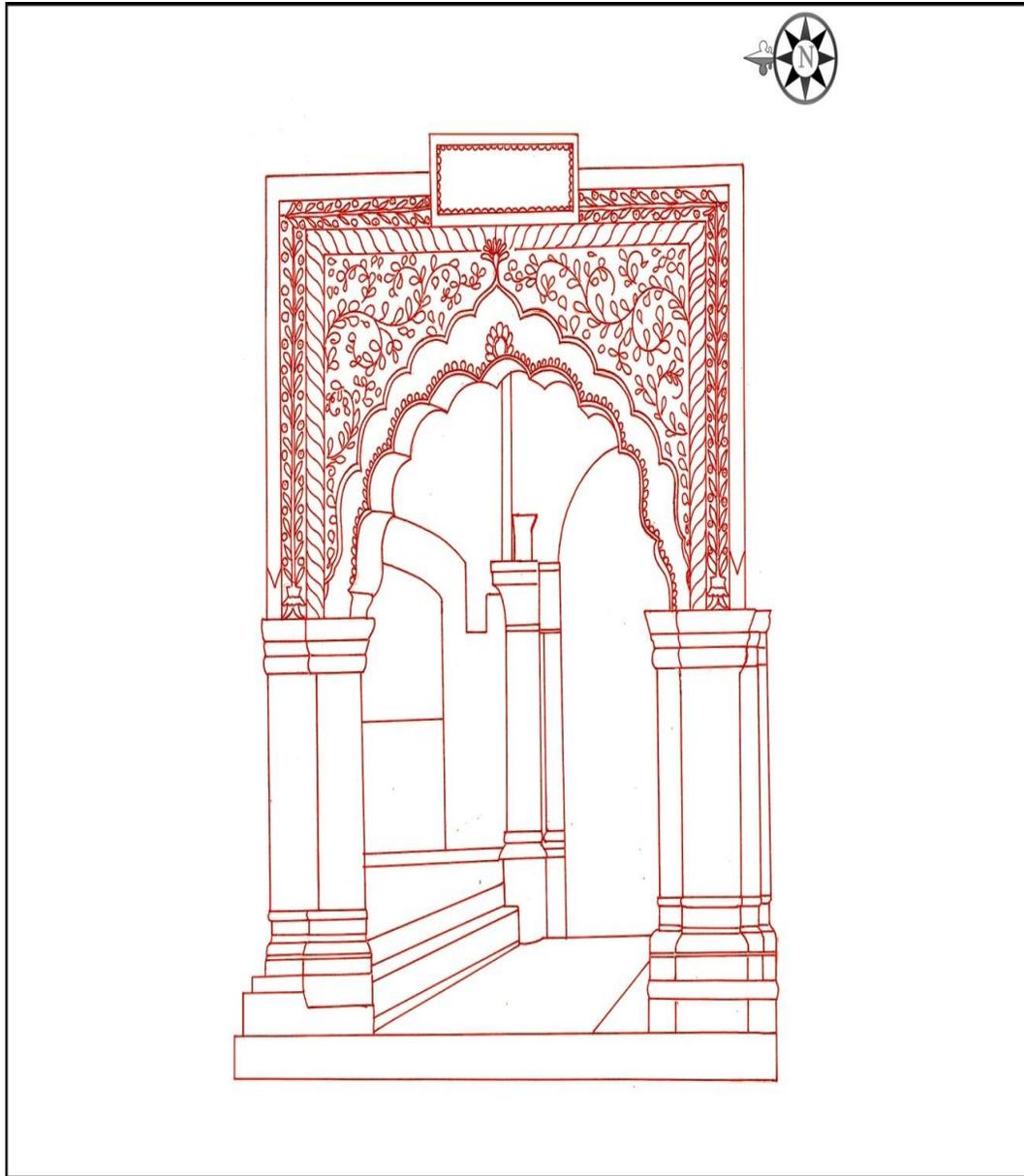
Varanasi: front elevation of Assi Mahadev Temple, Assi Ghat

Fig. 22



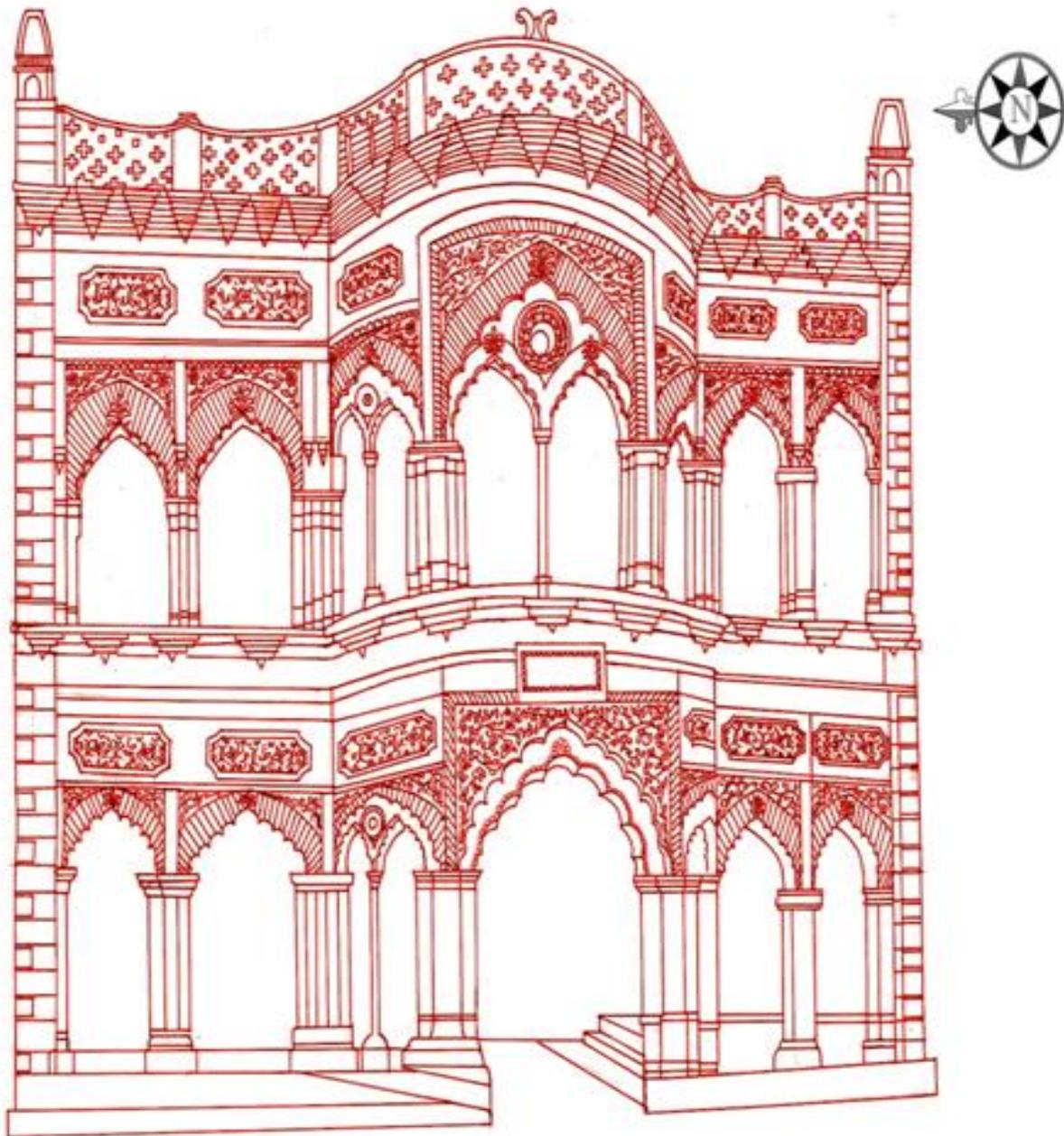
Varanasi: Plan of Assi Mahadev Temple, Assi Ghat

Fig. 23



Varanasi: Elevation of Main Entrance of Mahendravi Guest House

Fig. 24



Varanasi: front elevation of Mahendravi Guest House

female attendants on either side are accompanying him. The lower left recesses is shown with Rama with bow and arrow also shown with female attendants. Interestingly, the upper row of recesses is adorned with seated *saptamatrikas*. *panchasakha* doorway is consisting of *puspasakha*, *manavsakha*, *devsakha*, and *vyalaskha*. *devsakha* shows the panels of Ganesha with his consort. Besides, some human figures are also depicted in this *sakha*. At the *pedya*, river goddesses are shown canopied by snake hood and the faces are badly chopped off. Door-sill is shown with a sculptural panel at the centre which depicts a defaced due. Door entrance is provided with a beautiful *chandrasila* decorated with lotus design. Unlike other temples, the *mandapa* of this temple is provided with high *kakshasanas* on both sides. The roof is supported on four dwarf pillars and two pilasters at the rear with low height. The pillars of the southern side are missing. There is a unique combination of *bhadra* and fluted pillar which bear figures of *dwarapalas* of which some are mutilated. The central pillars are fluted at the middle. The capitals are adorned with four load-bearers (*bharavaha*). The architraves of the *mandapa* are having three rows of *pattikas* (mouldings) consisting of stenciled leaf pattern, diamond and spearheads and the last one being *simhamukhas*.

The ceiling is plain and the floor has been badly vandalized. The temple stands upon a high platform which now becomes unproportionate due to human and natural vandalism. It stands on a plain *bhitta* surmounted by a decorated *jadyakumbha*

which is supporting the mouldings of *vedibadha*.

As far as the decoration of the *jangha* is concerned the sculptures are shown in double registers; the figures of upper rows are smaller in size. *Bhadra* niches are preserving the figures of Bhu-Varaha on the south, seated Vishnu on the west while the figure in northern *bhadra* niche is missing. *bratirathas* are plain and without decoration. However, the *karnas* are adorned with *dikpalas*. *Bhadra* niches are canopied by prominent *chhadya* of *chaitya-udgama*. *Kapili* walls of northern and southern sides possess the figures of *Gajasursamhara* and seated Ganesa respectively. The dwarf wall of the *mandapa* from the exterior is adorned with short pilasters bearing stenciled decoration in floral pattern. The *sikhara* of the temple is missing.

A group of temples known as Sithamarhi is consisted of 15 temples both small and large located 2km south of village Thoban. The complex seems to have been a centre of Saiva religious practices. Out of fifteen temples, fourteen are positioned within a temple-complex while one temple is standing separately on the northern side of main temple complex about 500m away. The complex consists of a main large temple dedicated to lord Siva at the centre surrounded by 13 small *mandapika* types of shrines all dedicated to Saiva cult. Some of the shrines are in ruinous state.

The main **Siva Temple** (THB I/A) facing west looks quite gigantic. It consists of *garbhagriha*, an *antarala*, *sabhamandapa* and

a *mukhamandapa*. *Garbhagriha* is rectangular in plan and preserves a *Siva-linga* inside with a circular *yoni-pitha*. Walls from the inner side are plain and made of huge vertical stone slabs both dressed and undressed. Ceiling of the

southern sides are in good state of preservation. They are of Parvati and Siva on north, Surya and Siva on east while Nataraja is shown on the southern side. The exterior face of *sikhara* is fallen off leaving the inner core intact.

ARCHITECTURAL SURVEY

garbhagriha is embellished with full blown lotus. However, it is crumbled in many parts. The *lalata* is adorned with seated figure of lord Siva. Both the cardinal points of door lintel are occupied by the figures of Brahma and Vishnu. In the recesses, standing images of deities/sadhys are shown with *abhay mudra* holding a *kamadalu* in left hand. All the figures are smaller in size. The top of architrave shows central figure of goddess Parvati flanked by Brahmani and Vaishnavi on cardinal points, while recesses are depicted with seated female deities. *Panchasakha* doorway is adorned with *patrasakha*, *puspasakha*, *stambhasakha*, *puspasakha* and *patrasakha*. River goddesses are shown at the base along with their attendants. Naga devotees are canopying the river goddesses. The central *mandaraka* of door sill is replaced with fighting scene of elephant and lion. The *antarala* is very attractive in terms of its ceiling supported by beautiful pillars decorated with three lotus medallions. In the *antarala* the pillars at the base are adorned with lord *Ganesha* and *Saiva-ganas* while left pillar seems to be figure of male god supposed to be of Surya as he holds a kind of lotus flower. *Antarala* has figure of male god supposed to be of Surya as he holds a kind of lotus.

Sabhamandapa is further preceded by a *mukhamandapa*. A huge figure of seated Nandi is placed at the centre facing the lord. As far as the elevation of the temples is concerned, the projections are badly damaged. However, *bhadra* images on northern, eastern and

2. TEMPLES OF GARHI, SURWAYA, DISTRICT SHIVPURI: Surwaya (ancient Sarawati-Pattana) has a group of Siva temples forming the earliest temples of Kachchhapaghata style and a Matha within a late medieval Garhi. Surwaya is a small village on the Jhansi-Shivpuri road, about 20km away from east of Shivpuri. It was an important town in medieval period. It is presently marked for its archaeological and historical remains. There is a Garhi preserving a Hindu Saiva monastery and three Siva temples. The roof of the monastery is added with miniature *sarvatobhadra* on top. The Garhi is approachable through a series of three entrances having Mughal arches. It is enclosed by a rampart wall and dried up moat all around.

Temple 1 facing west is raised upon a low *bhita* over which *vedibandha* comprising *khura*, *kumbha*, *kalasha* and *kapota* mouldings rest. Interestingly, the *adhithana* part is comparatively high having sculptures in the projected niches. But, sculptures on *bhadra* niches are completely missing in the temple. A remarkable feature of this temple is representation of miniature sculpture niches on all projections at the *adhithana* mouldings. The figures are of mainly Saiva cult. The *mandapa* of this temple is very exquisitely embellished with ornamentation and door *sakhas* are carved with scrolls, *nagapasa*, and mithunas flanked on both sides by *Vyalas* and lotus creepers. The base of the jambs depicts Ganga-Yamuna flanked by Saiva door-guardians. The *lalata* displays Vishnu seated

over flying Garuda, while the lintel ends show Brahma-Brahmani and Siva-Parvati. The architrave of the doorway depicts figures of Navagrahas, Virabhadra and Karttikeya in a dancing pose. Besides, representations of

Lakshmi-Narayana and Ganesa with Vignesvari are also noticed. The skill of the Kachchhapaghata sculptures can be seen in the ornamentation of pillars and pilasters of this temple porch. These are shown with *ghatapallava* bases of capitals and fluted sixteen-sided shafts with chain-and-bell designs suspended on each fluting and portraits of Saiva ascetics on the cardinal facets. The capital shows with other decoration and crowned by at lantean brackets. The entire portion of *mandapa* beams and architrave is also embellished with exquisite designs and figures and musicians. The ceiling is equally ornate with two concentric rows of coffered cusps and *vidyadharas* friezes. Thus, the Surwaya temples though smaller in size, show highly ornate designs of the Kachchhapaghata style of temple architecture. Presently, in the temple, a Siva-linga is placed inside the *garbhagriha* but on the basis of Vishnu figure on *lalata*, this temple probably was dedicated to lord Vishnu originally.

3. TEMPLES AT TERAHI, DISTRICT SHIVPURI: Terahi, anciently known as Therambhi, is a village located about 8km south-east of Rannod and about 75km from Shivpuri. There is a beautiful temple popularly known as Mohajamata which has richly carved *torana*, or gateway. The temple facing east preserves *Mahisasurmardini* in the *garbhagriha* which appears to be of later edition. The doorway of the sanctum is adorned with five *sakhas* including *patra*, *vyala*, *mithuna*, *Vyala*, and *pusa*. Figures of Vaishnavi

riding Garuda on *lalata* and Brahma and Mahesvari at the terminal ends, and the *matrikas* appear in the recesses. The *mandapa*

is consisted of two front pillars and two pilasters at the back. The pillars have fluted sixteen-sided shaft, the former carved with chain-bell design on the cardinal flutings and the latter adorned with relief of swirling vegetable scrolls. The temple stands upon a *padmapitha* followed by *vedibandha* decorated with miniature niches having figures of ganas or diamond-cut design on the *kumbha* moulding and the *kalasa* moulding replaced by *vasantapattika* on the *bhadra* and the *kapili*. The *jangha* is shown with the sculptures in two registers except on the *pratirathas* which show the usual *surasundaris*. In most cases, the upper row has figures of ferocious and erotic goblins, who are associates of goddess Kali. The *bhadra* niches are presently empty but the *kapili* niches bear the images of Varahi (south) and Kaumari (north). The temple *sikhara* is missing. The uniqueness of this temple lies in the sculptures which are carved according to the *tantric* iconographical details. They are mostly ferocious, vulgar and depicted in nude form, exposing the skeleton form of human body in the act of eating the human bones and other part of stomach. Eyes and the male phallus part is shown exaggerated and the female *yonis*-part is depicted wide open which indicate the prevailing impact of *tantrism* during 10-11th century CE.

VII. PRESERVATION OF MONUMENTS

MONUMENTS OF NATIONAL IMPORTANCE

AURANGABAD CIRCLE MAHARASHTRA

1. DAULATABAD FORT, DISTRICT AURANGABAD

Rang Mahal is the only exclusive example of carved wooden work in Daulatabad Fort. The simple woodwork used in combination with stone and stucco work gives the structure its royal grandeur, but unfortunately roofs had collapsed due to presence of dead load. The restoration work of Rang Mahal was carried out which included replacing of missing wooden pillars, brackets, lintels and beams as per the evidences available. The erection of pillars, beams, lintels, etc, was completed in south-eastern, south-western, and eastern rooms and the remaining work is in progress.

2. BIBI-KA-MAQBARA, AURANGABAD, DISTRICT AURANGABAD

The work of construction of UCR stone masonry in cement mortar and providing plaster to coping, providing pointing to dwarf wall at rear side of Baradari at Bibi-ka-Maqbara, was completed along with repairs to Hathi Hauz and adjoining structures. The work of raking out the damaged and pulverized lime

plaster over the main mausoleum is in progress along with pointing the joints of the main dome

with lime mortar. The work of raking out the damaged and pulverised lime plaster over the main mausoleum along the north- east minaret and south- east minaret is in progress along with re-plastering the exposed surface in fresh lime mortar and applying a thin coat of fine lime plaster. The repairs to the main mausoleum of Bibi-ka-Maqbara have been initiated. The pulverized and peeling out lime plaster of lower western side masjid was removed and re-plastered with fresh lime mortar by applying sunla finishing. The construction of boundary wall to the archaeological area to the east of Bibi-Ka-Maqbara was completed. The existing damaged chain-link fencing towards the western side of the office building was removed and construction of boundary wall with UCR stone masonry in cement mortar with 1:5 ratio using hard trap stone, was taken up which is in progress (Pls. 57-59).

3. MALIK AMBAR TOMB, KHULDABAD, DISTRICT AURANGABAD

The work of removal of deteriorated, pulverized lime plaster over the main dome and replastering with fresh lime plaster along with removal of disintegrated stone slabs over the

platform and replacing them with new ones is in progress.

4. TOMB OF NIZAM AHMED SHAH, AHMEDNAGAR, DISTRICT AHMEDNAGAR

The tomb of Nizam Ahmed Shah is located towards north-western side of Ahmednagar city and is enclosed by a high enclosure wall. Many portions of this wall were found fallen down due to the presence of trees and vegetation. The lime-plastered dome was found pulverized and decayed at many places. The step well to the south-east of the tomb, and within the enclosure wall, was also found damaged and the steps were out of plumb due to the presence of large trees. After dismantling the damaged portion of compound wall, the work of reconstruction of CR stone masonry wall using three line dressed stones fixed in lime mortar including core filling compacting curing, etc. was completed. After removing the damaged and pulverized old joints of the dome, the work of re-plastering the exposed surface with fresh lime mortar in 1:3 ratio including curing was completed. The laying of stone slab pavement around the main tomb (Pl. 60) and the reconstruction of damaged flight of steps including recess pointing of enclosure wall in lime mortar is also in progress (Pl. 61).

5. DHOKESHWAR CAVE, DHOKESHWAR TAKLI, DISTRICT AHMEDNAGAR

i. The work of construction of the retaining wall along with the core filling was completed (Pl. 62). **ii.** After leveling, the work of fixing the dressed stones over the pathway in front of caves was completed. **iii.** In addition to above, the work of removing debris of small

temple near steps and cleaning the surrounding area for exposing the original layout of the temple is also progress. The damaged undulating existing old steps leading to cave
INDIAN ARCHAEOLOGY 2010-11-A REVIEW

temple along with providing and laying base for foundation of the same is in progress.

6. MALLIKARJUNA TEMPLE, KARJAT, DISTRICT AHMEDNAGAR

The work of providing and laying dressed stone flooring around the temple to protect the plinth is in progress. The work of reconstruction of damaged and fallen veneering (southern side) and compound wall using old as well as fresh stones, along with plastering to the concreted portion is in progress.

7. OLD TEMPLE AT KOKAMTHAN, DISTRICT AHMEDNAGAR

To expose the original floor level, the removal of accumulated earth over the existing floor is in progress.

8. ASADGAD FORT, AKOLA, DISTRICT AKOLA

The fortification wall of the fort locally known as Asadgadh was found fallen along the main arterial roads of the city and was blocking the easy movement of the traffic. The fallen stone members were collected and stacked properly so as to undertake the reconstruction of the fallen portion of the fortification wall. The work is under progress.

9. NARNALA FORT, AKOT, DISTRICT AKOLA

The work of construction of lime grinding platform for preparation of lime mortar is in progress.

13. GHRISHNESHWAR TEMPLE, ELLORA, DISTRICT AURANGABAD

The work of providing dressed stone slab flooring in trap stone around the temple was completed along with pointing of walls of step well and the work of removing the debris

PRESERVATION OF MONUMENTS

10. BALAPUR FORT, BALAPUR, DISTRICT AKOLA

The work of removing the fallen stone members of fortification wall and bastions and stacking them for reuse at the site along with the earthwork is in progress. The lime slaking tank was constructed for preparation of lime mortar.

11. LAL KHAN'S TOMB, AMNER, DISTRICT AMRAVATI

The work of resetting the damaged platform adjoining to Lal Khan's Tomb was completed (Pl. 63). Various synthetic colours applied by the locals over the ancient plaster was carefully removed and fresh plaster along with proper finishing over it including matching with original surface was carried out.

12. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

The reconstruction work of fallen and dilapidated parapet wall along the road leading from upper portion of cave 16 to the Khuldabad Rest House and above the caves 5-16 was taken up in previous year. The work of construction of parapet wall in UCR stone masonry above caves 5-16 along with providing of coping over the wall was completed.

on the eastern side of *prakara wall* was also completed (Pl. 64).

14. GROUP OF MONUMENTS AT PAUNI, DISTRICT BHANDARA

The work of reconstruction of the existing old damaged flight of steps, along with the retaining wall was completed. The work of laying dressed stone flooring near entrance gate is in progress.

15. PAPAHARESHWAR TEMPLE AT LONAR, DISTRICT BULDHANA

i. The work of resetting the dislodged stone member of the small temple situated to the north-west of Papaharshwar Temple and also in eastern face of the tank near Papaharshwar Temple was completed (Pl. 65). The work of removal of existing cement concrete over the roof of Papaharshwar Temple is in progress.

16. GAIMUKH TEMPLE, LONAR, DISTRICT BULDHANA

The existing steps leading to Kumareswar Temple from Gaimukh Temple are dilapidated and fallen at many places along with the retaining wall. The damaged steps and out of plumb retaining wall were carefully dismantled and being restored using old as well

as fresh stones, whenever necessary, by providing concrete base along with the construction of parapet wall. Work is in progress (Pl. 66). The construction of cause way by providing Hume pipe and fixing stone slab over the flooring on top surface of the culverts in progress. The work of providing the pedestrian foot bridge at the end of the stepped

pathway is also in progress.

17. BALLARSHA FORT, BALLARPUR, DISTRICT CHANDRAPUR

The work of restoration of missing veneering of northern side fortification wall using dressed sandstone along with the core filling in hard rubble stone is in progress.

18. FORT WALL, CHANDRAPUR, DISTRICT CHANDRAPUR

The work of reconstruction of fallen portion of fortification wall near Tulja Bhawani Temple and Anchaleshwar Temple along with veneering and core filling is in progress.

19. PROVIDING CHAIN LINK FENCING TO MAHADEV TEMPLE, MAHADWARI, DISTRICT CHANDRAPUR

The work of providing dwarf wall in UCR masonry and providing chain link fencing over the dwarf wall was completed.

20. MARKANDA DEO TEMPLE, MARKANDA, DISTRICT GADCHIROLI

The work of dismantling out of plumb wall of a sub-shrine known as Adishakti Temple was taken up for proper resetting.

21. MONUMENTS IN PADAMPUR, GONDIA, DISTRICT GONDIA

Earth work for boundary wall around the remains of the temple located to south of the village Ganeshpur was completed while the same work in respect of the remains of the temple north-west of the village Padampur is in progress. The remains of brick wall and two

INDIAN ARCHAEOLOGY 2010-11-A REVIEW

Siva-lingas were unearthed during digging for foundation at the temple.

22. CHANGDEO TEMPLE, CHANGDEO, DISTRICT JALGAON

Removing the existing dead plaster and providing lime plaster to structure is in progress. The work of construction and repairs to the miscellaneous structures to the north of the temples is being carried out. In addition to above, the work of removing debris and cleaning the surrounding area for exposing the original floor level of the temple is also in progress.

23. ANCIENT BUDDHIST REMAINS COMPRISING MONASTERY, STUPA, ROCK CUT INSCRIPTION, MANSAR AND KHAIRI DISTRICT, NAGPUR

The wild vegetation over the excavated brick structures was removed.

24. PANDAVLENA CAVES, PATHARDI, DISTRICT NASIK

Laying of stone slab flooring over the plain cement concrete bed to drain out the rain water from in front of Caves 1 to 22 including reconstruction of damaged steps / pathways leading to the caves is in progress.

BHOPAL CIRCLE
MADHYA PRADESH

**25. KARAN TEMPLE, AMARKANTAKA,
DISTRICT ANUPPUR**
PRESERVATION OF MONUMENTS

The conservation work in ashlar stone masonry of the platform wall was taken up at the monument. The old dislodged and pulveriz-

Plate 57



A



B

Aurangabad: A, Main dome of Bibi-Ka-Maqbara during and B, after repairs

Plate 58



A

B

Aurangabad: A, Bibi-ka-Maqbara before and B, after repairing of the north-east minar



A



B

Aurangabad: A, Bibi-ka-Maqbara before and B, after repairing of the south-east minar



A



B

Ahmednagar: A, Tomb of Nizam Ahmed Shah before and B, after conservation



A



B

Ahmednagar: A, stepped well of Tomb of Nizam Ahmed Shah before and B, after repairing



A



B

Dhokeshwar Cave: A, before, and B, after the reconstruction of retaining wall



A



B

Ambner: A, before and B, after conservation of platform of Lal Khan's Tomb



A



B

Ellora: A, before and B, after repairing of stone slab flooring at Ghrishneshwar Temple



A



B

Lonar: A, before and B, after conservation of Tank near Papaharshwar Temple



A



B

Lonar: A, before and B, after providing steps from Gaimukh to Kumareshwar Temple

26. PATALESHWAR, TEMPLE, AMARKANTAKA, DISTRICT ANNUPUR

Security flood light around the temple was provided. Pointing on CR masonry wall in lime mortar and stone flooring on base of lime concrete around apron was taken.

27. SHIV TEMPLE, AMARKANTAKA, DISTRICT ANNUPUR

M.S. grill on a dwarf wall was provided around the temple and sculpture shed.

28. BADAL MAHAL, CHANDERI, DISTRICT ASHOK NAGAR

The broken and missing kangooras of the fortification wall in CR stone masonry have been reproduced in lime mortar as per evidence available on the western side. The work of water-tightening over the fortification wall by providing lime concrete is ongoing. Recessed pointing work of fortification wall in lime mortar has been completed. Besides, the work of clearing accumulated debris around the monument and within the *baoli* was undertaken.

29. BADA MADARSA, CHANDERI, DISTRICT ASHOK NAGAR

Recessed pointing work with ashlar stone masonry inside the monument has been completed while the work on its outer periphery is ongoing. Flag stone flooring was provided at its frontal pathway. Structural repairs were also carried out at the monument.

The work of RR stone and CR stone masonry in lime mortar is being continued. 80% work of resetting of ashlar stone masonry

at the north-east corner of the monument has been completed.

30. CHANDERI FORT, CHANDERI, DISTRICT ASHOK NAGAR

Scientific clearance work was carried out in order to find out the remains of ancient pathway along present approach road. Settled debris and vegetation growth were removed from the premises of the fort.

31. GROUP OF TEMPLES AND MONASTERY AT KADWAHA, DISTRICT ASHOK NAGAR

The works of excavating and laying of concrete for the consolidation of foundation of the Temple 2 to 7 located at Talab were taken up and completed. The work of RR stone masonry and pointing of CR stone masonry is in progress.

32. KOSHAK MAHAL, CHANDERI, DISTRICT ASHOK NAGAR

The architectural members of ashlar stone masonry on the north – east corner has been lowered down and reset and the same is in progress. The bulged wall in north-west of Koshak Mahal had developed a crack, which was reset and its broken balconies repaired. The work of providing flag stone flooring around the monument as apron has been completed. Lime concrete on roof was provided to prevent seepage of water. In addition to it, pointing work was carried out at various locations within the monument where ever required.

33. KAMLAPATI PALACE, BHOPAL, DISTRICT BHOPAL

During the period under review an interpretation centre was set up at Kamplapati Palace, Bhopal. Repair of *lakhauri* brick masonry and conservation of fountain, CR stone masonry at missing part of compound wall and the work of replacement of old broken *chhajja* and bracket were carried out as per the original pattern. The old loose dead plaster was removed and replastered with special lime mortar. Besides, accumulated debris was removed from the structural remains of Pachakki.

34. ASIRGARH FORT, DISTRICT BURHANPUR

The work of brick masonry and lime plaster on wall of the fort was taken up. Colonial structures were repaired for adaptive use as a store room. Drinking water facility was provided for the visitors.

35. MONUMENT OF MAHAL GULERA AT BURHANPUR, DISTRICT BURHANPUR

The R.R. stone masonry work of dome of pavilion and the work of providing lime plaster were carried out at the monument during the period under review.

36. SHAHNUMA TOMB, DISTRICT BURHANPUR

Lime concrete was provided over the broken and dislodged stones/walls after removing the dead, decayed and pulverized loose plaster. R.R. stone pitching work over the lime concrete bedding and R.R. stone masonry

completed. Besides, Vegetational growth and debris were cleared from the monument.

37. SHIV TEMPLE AT ASIRGARH FORT, DISTRICT BURHANPUR

Pointing, plastering and underpinning works were carried out at the Shiv temple at Asirgarh fort. Dry stone pitching work of approach path, leading to the temple is partly completed. In addition to it, the work of vegetation clearance and removal of debris were also taken up.

38. TOMB OF ADILSHAH, DISTRICT BURHANPUR

Plastering, underpinning and R.R. stone masonry works were carried out at the tomb besides the work of clearing vegetation growth.

39. EXCAVATED SITE BIJAMANDAL AT KHAJURAHO, DISTRICT CHHATARPUR

The work of detailed drawing, documentation, landscaping, conservation concept plan and conditional mapping were taken up at site.

40. LALGUAN MAHADEO TEMPLE, KHAJURAHO, DISTRICT CHHATAPUR

The work of providing MS grill to the compound wall of the temple was carried out during this period.

PRESERVATION OF MONUMENTS

41. SHIV SAGA LAKE AT KHAJURAHO, DISTRICT CHHATARPUR

work have partly been completed. Drinking water facility for visitors was provided. GI pipe line work for transportation of water has been

The work of cleaning the vegetation of the lake was taken up which is still in progress.

42. VAMANA AND JAVARI TEMPLES AT KHAJURAH, DISTRICT CHHATAPUR

Construction of boundary wall to the south-east portion of the acquired land of the temples was taken up during the period under review. The work of fixing MS grill over this boundary wall is in progress.

43. DEOGARH FORT, DEOGARH, DISTRICT CHHINDWARA

To the rear side of Chandi Mandir, RR masonry wall was provided to the missing fortification. Lime concrete flooring was provided at various sites inside the fort wall. The work of recess pointing and brick masonry with lime mortar was carried out at different places of fort wall.

44. RANI MAHAL AT SINGORGARH FORT, DISTRICT DAMOH

A pipe-line has been laid from water tank to the top of the fort for providing water supply in two stages through diesel engine for conservation work. The works of maintenance and repair of pathway leading to the top of the fort and C.R. stone masonry work of the palace wall in lime mortar are in progress.

45. RANGMAHAL PALACE, HATA, DISTRICT DAMOH

The wall of the palace was plastered with lime surkhi after removing the old dead

pointing to the south of palace and front wall and CR masonry work are on going.

46. SHIV TEMPLE AT NOHTA, DISTRICT DAMOH

Stone flooring pathway and CR stone compound wall along with MS grill were provided around the temple.

47. SHIV TEMPLE, KODAL, DISTRICT DAMOH

Structural repairs including stone slab flooring, pillars, beams, ashlar stone masonry were carried out at the monument during the period under review.

48. SHIV TEMPLE AT SAKHAR, DISTRICT DAMOH

Ashlar stone masonry was provided at different places of the monument. Heavy stone slabs of roof were fixed during the period under review. The work of excavating foundation for construction of dwarf wall is in progress.

49. SIDDESHWAR TEMPLE AT NEMAWAR, DEWAS

The work of raking out the joints from the temple including removal of old dead mortar between the stone of *sikhara* and carved stones of the veneering was done carefully. The work of water-tightening of the temple is in progress.

plaster. The other works including lime concrete flooring, fixing of stone beams,

50. ASHARFI MAHAL, MANDU, DISTRICT DHAR

The work of removing debris and *in situ* conservation was carried out from the north of Asharfi Mahal during the period under review.

51. TOMB OF MOHD. GHAUS, HAZIRA, DISTRICT GWALIOR

The existing pathway around the tomb was repaired through edging and raising it to a higher level. Besides, lime concrete in the pathway around the lawn and monument was provided.

52. EXCAVATED SITE AT PAWAYA, DISTRICT GWALIOR

The works of underpinning with ancient bricks in lime mortar and providing lime concrete is in progress.

53. ROCK SHELTERS AT ADAMGARH, DISTRICT HOSHANGABAD

Providing and fixing of GI chain-link fencing with RCC pole has been carried out in the protected land and around 1750RM area has been fenced. The work is in progress.

54. TRIPUR SUNDARI TEMPLE, TEWAR, DISTRICT JABALPUR

Concrete and CR masonry work was carried out at the temple for stabilizing the foundation and to stop further erosion of soil. In addition to it, MS pipe railing has been fixed at the upper side of the slope for safety of the visitors. CR stone masonry retaining wall was constructed at the temple.

After removing the old broken weathered *chahija* stone & bracket from the lintel level of outside wall of the Math, dressed sand stone slabs were provided. In addition to it, brick masonry with lime mortar was provided to the first floor of Tapsi Math. The work of providing lime plaster over the outer surface of the Math is in progress.

56. VISHNU VARAH TEMPLE AT KARITALAI, DISTRICT KATNI

Ashlar stone masonry work at missing part of *jagati* up to plinth level of the temple is in progress.

57. CHOUBARA DERA NO.1, UN, DISTRICT KHARGONE

Damaged and missing architectural members of the sanctum, platform and ceiling of the temple were replaced with new members to strengthen the structure. R.R. stone masonry and pointing work was also carried out at this temple. The work of ashlar stone masonry towards west, north and south of sanctum is in progress.

58. MAHAKALESHWAR TEMPLE UN, DISTRICT KHARGONE

Compound wall has been provided to the east, north and south of the temple for the safety and security of the monument. In addition to it, MS grill and MS gate were provided to the east of the monument. RCC pillar work was taken up to the river side of the compound wall.

55. TAPSI MATH AT BILHARI, DISTRICT KATNI

59. SCULPTURE SHED AT UN, DISTRICT KHARGONE

The work of removing the old red sand stone flooring from the eastern side and re-fixing them after having dressed on both side of the pathway along with pointing work was taken up and completed. The work of CR masonry in compound wall on eastern side of the shed is in progress.

60. DHONDA MATH, DISTRICT MORENA

Stone slab flooring was provided on all exposed surfaces of the Math. The work of recessed pointing with lime mortar and providing of lime concrete in base was carried out during this period. In addition to it, R.R. stone filling and ashlar stone masonry work was carried out in the platform.

61. EKETESHWAR MAHADEO TEMPLE AT MITAOLI, DISTRICT MORENA

R.R. masonry work below the foundation, RCC beam, slabs and CR stone masonry work for dwarf wall were carried out at the monument. The work of recess-pointing is going on.

62. GROUP OF TEMPLES, BATESAR, DISTRICT MORENA

The fallen architectural members including beams, pillars and stone slabs have been documented and re-arranged in original alignment with old and new stones with stainless steel clamps. The dislodged portion of the temple has been carefully lowered down and lifted properly for resetting work. The

carefully and fixing them as per original pattern. To the south of the temple, lime concrete was provided. The work of providing stone slab flooring on the platform of the temple is in progress. Scientific clearance was carried out to the southern side of the temple. Ashlar stone masonry work was carried out and jointing, mending and clamping works were carried out in the complex to strengthen various structures. Recessed pointing on the wall and steps of *baoli* is in progress.

63. GARHI AT PADAOLI, DISTRICT MORENA

After dismantling out of plumb R.R. masonry wall of Garhi, RR masonry wall with lime mortar was provided. The work of laying lime concrete on the roof of the *baoli*, after removing the old decayed one is ongoing. Besides, C.R. stone masonry work, fixing of MS grill and recess pointing work were also taken up during this period.

64. KAMANMATH TEMPLE, SUHANAIA, DISTRICT MORENA

CR stone masonry work of boundary wall was taken up at the temple above which 50mm thick coping was provided. MS grill was provided to the boundary wall for safety and security of the monument. The work of recess pointing on CR masonry wall and edging on outer side of platform were carried out during this period. Concrete in the base of apron was laid over which stone slab flooring was provided.

Bhuteshwar temple was restored by resetting of stones and lowering down structural members

65. CHOUMUKHNATH TEMPLE AT NACHNA, DISTRICT PANNA

Dwarf compound wall has been provided to the east of sculpture shed and south of the temple. The excavation work of foundation from entrance gate to the temple for providing lime concrete on pathway was carried out during this period.

66. TEMPLE 2 AJAYGARH FORT, DISTRICT PANNA

Ashlar stone masonry of fine chisel dressed blocks were fixed in the platform wall with copper clamps on western and northern side of the temple. The work of providing core masonry with RR stone is in progress.

67. ASI COLONY AT SANCHI, DISTRICT RAISEN

The work of spreading murrum and consolidate it with hand roller was carried out at different places inside and outside of the auditorium by first laying a geo-net to separate the original fabric, at open area of shelter 1 and 2, at parking area and on the pathway leading to the auditorium. The work of constructing toilet block is in progress. The work up to the plinth level is completed. An information board (0.9x1.20m and 0.9x0.6m) consisting of MS pipe and sheet duly painted was fixed on base of concrete block near the rock shelter known as auditorium.

68. BUDDHIST STUPA AT SONARI, DISTRICT RAISEN

Stone pitching work was carried out on base of lime concrete with collection of stones

69. BUDDHIST REMAINS AT SANCHI, DISTRICT RAISEN

The work of water-tightening of monastery No. 51 was carried out during the period under review. Special repair work such as excavating and cleaning along side the stairway leading to the stupa was carried out for the purpose of draining water. The work of laying lime inside the cells is in progress.

70. BUDDHIST STUPA AT SATDHARA, DISTRICT RAISEN

The open trench around the Stupa 1 has been filled up with R.R. stone boulders. Accumulated debris was removed from the area around staircase and platform wall.

71. RAISEN FORT, DISTRICT RAISEN

Stone pitching work, bastion repair work and dry masonry work near Garhi gate were carried out at Raisen fort. The dry stone masonry wall connected to the Garhi gate was raised up to the existing level and joined with the original wall.

72. SHIV TEMPLE, BHOJPUR, DISTRICT RAISEN

The work of stone flooring of the publication counter in fine chisel dressed steps with cement mortar has been completed. The wood work is in progress. The work of recess pointing to the south of platform wall was carried out after removing the old, decayed mortar from the joints. The loose architectural

availale near the site. The work of approach road leading to the stupa is in progress.

fragments lying on top of the temple have been lowered down one by one carefully and placed

on the ground for safety. Vinyl flooring was provided inside the interpretation centre.

73. BUDDHIST STUPA AND MONASTRY AT BARHAT, DISTRICT REWA

The work of fixing GI chain-link fencing and fixing angle iron post to the west of the site is in progress.

74. BUDDHIST STUPA AND REMAINS AT BHARHUT, DISTRICT SATNA

The work of providing barbed wire fencing with angle iron post was carried out around Buddhist stupa and remains, Bharhut. The work of providing illumination around the sculpture shed is in progress. The demarcated land has been protected and the work of providing and fixing land marking posts of RCC is progress. Drinking water facility is being provided at the monument.

75. SHIV TEMPLE BHUMRA, DISTRICT SATNA

Stone flooring on pathway of the temple on base of lime concrete is in progress. The electric pole within the premises was fixed on north and south side for providing security light in the area. GI pipe fitting from bore well to staff quarters and sculpture-shed is in progress.

76. GAURGHAMAR FORT, DISTRICT SAGAR

Brick masonry work on eastern side of the fort wall is in progress. Besides,

fort was removed and the work of de-silting the *baoli* is in progress.

77. RAHATGARH FORT, SAGAR, DISTRICT SAGAR

CR stone masonry work on eastern wall and stone flooring work on the roof were carried out during the period under review.

78. BUDDHIST STUPA AT PANGORARIA, DISTRICT SEHORE

The surface wall of the stupa was exposed carefully by sorting out serviceable stones for re-use and disposing of unserviceable materials from the site. After properly documenting the stones of bulged out of plumb CR masonry platform wall, it was dismantled and foundation of the platform wall was leveled for further masonry work. The staircases were repaired by using and resetting old stones available at the site with lime mortar.

79. VIRATESHEAR TEMPLE, SOHAGPUR, DISTRICT SHAHDOL

After removing the barbed wire fencing, dwarf compound wall along with MS grill in CR masonry has been provided for the safety and security of the monument.

80. SURWAYA GARHI, DISTRICT SHIVPURI

The work of laying and fixing cut stone of beam, pillar and walls in ashlar masonry with SS clamps and mortar structure, was carried out at Garhi as per original lime concrete-

accumulated debris on the southern side of the

-te along with stone slab flooring was provided in the adjacent structures. The work of recess pointing on inner and outer façade of the monastery wall and repairing of *chhajja* were also carried out during this period.

81. BARA KHAMDI AT UDAIPUR, DISTRICT VIDISHA

The CR masonry work of wall of the demarcated acquired land along with fixing of angle iron post for chain-link fencing was carried out during the period under review.

82. INTERPRETATION CENTRE AT UDAIGIRI, DISTRICT VIDISHA

The leveling and dressing of approach road is completed. The work of culvert for drainage of water is completed.

BHUBANESHWAR CIRCLE

ODISHA

83. NILAMADHABA AND SIDDHESVARA TEMPLES, GANDHARADI, DISTRICT BOUDH

In continuation of previous year's work, the structural repair to the damaged platform of the temple has been partially completed by providing new dressed sand stone blocks as per the original. The construction of dwarf boundary wall with M.S. Grill around the protected area has been completed (Pl. 67).

84. BARABATI FORT, CUTTACK, DISTRICT CUTTACK

In continuation to previous year's work the restoration work of eastern side moat wall (inner portion) was taken up by way of replac-

-ing decayed stone blocks with new dressed laterite stone blocks with traditional lime mortar which is in progress.

85. KEDARESVARA TEMPLE, CHOUDWAR, DISTRICT CUTTACK

The restoration work of the compound wall is in progress.

86. ANCIENT SITE, BANESWARNASI, DISTRICT CUTTACK

The restoration work of the main temple at Baneswarnasi was taken up by way of removing the decayed bricks (which were provided by the local kings before independence) with the khondalite stones as per the original. The work is in progress.

87. CHANDRASEKHAR JEW TEMPLE, KAPILAS, DISTRICT DHENKANAL

In continuation of previous year's work the restoration of damaged, missing sand stone steps leading to the temple was further taken up which is in progress.

88. KANAKESVARA MAHADEVA TEMPLE, KUALO, DISTRICT DHENKANAL

In continuation of previous works the structural repair to the exposed compound wall was can further taken up. Resetting of the original architectural members was under takenup by providing the new carved khondalite stones in traditional lime mortar where they were missing. Laying out of the khondalite stone flooring around the temple is in progress.

**89. GANGADHARASVAMI TEMPLE, KOTAK-
-OLLA, DISTRICT GANJAM**

The restoration work of the kitchen and repairing of courtyard is in progress.

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

In continuation of previous year's works the restoration work of brick walls of the shrine-complex has been completed. The conservation work of the dilapidated stone-paved floor in front of the monastery of Udayagiri -2 was taken up by replacing the decayed stones with the new dressed khondalite in traditional lime mortar. The work is in progress (Pl. 68).

**91. JAGANNATHA TEMPLE, JAJPUR,
DISTRICT JAJPUR**

In continuation of previous year's works the restoration work of the compound wall remained in progress. Resetting of khondalite stone flooring over the platform in front of the temple has been completed (Pl. 69).

**92. TRILOCHANESVARA TEMPLE COMPLEX,
JAJPUR TOWN, DISTRICT JAJPUR**

The restoration work of the sub-shrine near to the temple has been completed.

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

In continuation of previous year's works the repair work of the ancient steps was taken up by replacing the decayed stones with new ones in traditional lime mortar as per the

archaeological norms. Renovation of staff quarter is in progress.

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

The sand stone flooring on the western side of the temple was executed in traditional lime mortar and the work is in progress. The restoration work of the sub-shrine is in progress (Pl. 70).

**95. ANANTAVASUDEVA TEMPLE, BHUBANES-
-WAR, DISTRICT KHURDA**

In continuation of previous year's work the sand stone flooring was provided around the temple in traditional lime mortar to protect the seepage of rain water to the foundation of the temple and for the easy movement of the visitors. The restoration work of the sub-shrine is in progress.

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

The restoration and pointing work of the tank is in progress. The restoration work of the dilapidated small shrines around the tank was taken up by resetting the architectural member to their original position. The decayed one and the missing parts of the temple were replaced with the new dressed sand stones as per the original. The work is in progress (Pl. 71).

**97. BRAHMESVARA TEMPLE, BHUBANES-
-WAR, DISTRICT KHURDA**

The work of providing sand stone flooring around the temple was taken up with

traditional lime mortar which is in progress (Pl. 72).

98. MAKARESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

The fixing of MS grill on the compound wall and water-tightening of *sikhara* by pointing has been completed.

99. DAKSHYAPRAJAPATI TEMPLE, BANPUR, DISTRICT KHURDA

The repair work of the damaged floor was taken up by replacing the decayed blocks with new dressed laterite blocks as per the original. The work is in progress.

100. ANCIENT SITE, HARIPURGARH, DISTRICT MAYURBHANJ

In continuation of previous year's work the structural repair to the brick structures was further taken up by way of pointing and replacing the decayed bricks with new strong bricks found during the excavation with traditional lime *surkhi* mortar as per the original. Construction of dwarf wall with M.S. grill has been completed (Pls. 73-75).

101. LORD JAGANNATHA TEMPLE, PURI, DISTRICT PURI

Repair to the *garbhagriha* was taken up during the Rathayatra from 13th to 21st July, 2010, when the presiding deities were shifted to *Srigundicha* temple on the recommendation of the Technical Expert Committee and Temple Administration.

102. SUN TEMPLE, KONARK, DISTRICT PURI

The pointing work of the *adhithana* portion of the main temple is in progress.



A



B

Nilamadhava and Siddhesvara Temple, Gandharadi: south-west side: A, before and B, after conservation

Plate 68



A



B

*Excavated Buddhist site, Udayagiri-2: A, before conservation
and B, after conservation*



A



B

Trilochanesvara Temple Complex, Jajpur town: A, before and B, during the dismantling of the sub-shrine

Plate 70



A



B

Lord Lingaraj Temple, Bhubaneswar: A, before and B, after conservation



A



B

Sahasralinga Tank, Bhubaneswar: A, before and B, after conservation

Plate 72



A



B

Brahmesvara Temple, Bhubaneswar: A, before and B, after conservation



A



B

Ancient site, Haripurgarh: A, before and B, after conservation

Plate 74



A



B

Ancient site, Haripurgarh: A, before and B, after conservation



A



B

Ancient site, Haripurgarh: A, before and B, after conservation

CHANDIGARH CIRCLE

HARYANA

**103. ANCIENT SITE, NAURANGABAD,
DISTRICT BHIWANI**

M.S. grill-fencing over dwarf wall in the brick masonry has been provided.

**104. SURAJ KUND, MASONRY TANK,
LAKKARPUR, DISTRICT FARIDABAD**

A dwarf wall with chain-link fencing on remaining portion has been provided.

**105. ANANGPUR DAM, FARIDABAD, DISTRICT
FARIDABAD**

The dark ashlar stone masonry on the step has been provided.

**106. FERUZ SHAH KI LAT, FATEHBAD
DISTRICT HISSAR**

Restoration of enclosure wall with *lakhauri* bricks was taken up.

**107. ANCIENT MOUND, AGROHA, DISTRICT
HISSAR**

Concreting, tile brick masonry and grill-fencing work was undertaken and provided pathway in brick-on-edge.

**108. RUINED QILA PRITHVI RAJ CHAUHAN'S
FORT, HANSI, DISTRICT HISSAR**

Provided M.S. grill fencing over dwarf wall, besides undertaking *lakhauri* brick masonry, concreting and edging, etc.

**109. EUROPEAN SOLDIERS GRAVE, KARNAL,
DISTRICT KARNAL**

Restoration of graves with tile brick masonry was undertaken.

**110. KUSHANA STUPA, ASANDH, DISTRICT
KARNAL**

M.S. grill-fencing was provided over the dwarf wall to fence the ASI land around the stupa.

**111. SHEIKH CHILLI'S TOMB, THANESAR,
DISTRICT KURUSHETRA**

The works of restoration of north side bastion, brick tile masonry, stitching of cracks, pointing, repair of steps and grill-fencing over dwarf wall in the front side have been undertaken.

**112. HARSH KA TILLA, THANESAR, DISTRICT
KURUKSHETRA**

Repair of dwarf wall was carried out over which a grill-fencing was provided.

**113. NABHA HOUSE, THANESAR, DISTRICT
KURUKSHETRA**

The repair works included providing wooden baton planks, laying of lime concreting and tile work.

**114. ANCIENT SITE AMIN, DISTRICT
KURUKSHETRA**

Provided grill-fencing over dwarf wall to enhance the security.

PRESERVATION OF MONUMENTS

115. OBELISK COMMEMORATING THIRD BATTLE OF PANIPAT, PANIPAT, DISTRICT PANIPAT

Red sand stone flooring, concreting rubble masonry work and grill-fencing was carried out besides providing pathway in tile brick-on-edge for smooth movement of tourist/visitors.

116. KABULI BAGH MOSQUE, PANIPAT, DISTRICT PANIPAT

Provided pathway in tile brick-on-edge was for smooth movement of tourist visitors and a grill-fencing was provided over the dwarf wall to enhance the security.

117. ANCIENT SITE KHOKRAKOT, DISTRICT ROHTAK

The works including concreting, tile brick masonry and grill-fencing, besides providing pathway in brick-on-edge, were carried out at the site.

118. KHWAJA KHIZIR'S TOMB, SONEPAT, DISTRICT SONIPAT

Provided brick masonry flooring around the complex, and *burjies* were repaired.

119. ADI BADRI COMPLEX, YAMUNANAGAR, DISTRICT YAMUNANAGAR

Red sand stone flooring was provided in the complex.

PUNJAB

120. MACHIGARH AND HAMMAM BUILDING, COMPANY BAGH, AMRITSAR, DISTRICT AMRITSAR

Works of wooden roof, removal of cement plaster, lime plastering, tile brick masonry, fixing of wooden doors and windows were taken up.

121. GATEWAYS OF SARAI, AMANAT KHAN, DISTRICT AMRITSAR

Work of restoration and repair of *burjies*, cells, side walls, debris clearance, *lakhauri* brick masonry flooring, tile brick on edge were carried out.

122. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA

The works including grill-fencing over dwarf wall on NE, and NW sides, restoration of main pathways, grill-fencing in inner and outer area, development of parking outer side of entrance gate, were carried out.

123. ANARKALI BARADARI, BATALA, DISTRICT GURDASPUR

Structural repairs / stabilization of foundation has been completed.

124. AAM KHAS BAGH, SIRHIND, DISTRICT FATEHGARH SAHIB

Removal of vegetational growth, taking out loose, decayed, and damaged old brick masonry, concreting work, plastering, brick-on-edge flooring, brick tiles, lime surkhi mortar, pointing, etc. were carried out.

125. ANCIENT SITE, BUDDHIST STUPA, SANGHOL, DISTRICT FATEHGARH SAHIB

The works carried out including providing wooden roof on remaining portion, parking, grill-fencing over dwarf wall on remain-

-ing portion were taken up.

126. DAKHNI SARAI, NAKODAR, DISTRICT JALANDHAR

The works including *lakhauri* brick masonry, concreting, edging of ornamental plaster, M.S. grill fencing over dwarf wall pathway were carried out.

127. NUR MAHAL SARAI, NOORMAHAL, DISTRICT JALANDHAR

The works including *lakhauri* brick masonry in arches, niches, cornice, ornamental plastering, concreting, tile brick on edge of apron, brick on edge pathway over lime concrete were taken up.

128. ANCIENT SITE, SUNET, DISTRICT LUDHIANA

Grill-fencing over dwarf wall was provided on remaining portion.

129. MOTI MAHAL, QUILA MUBARIK, DISTRICT PATIALA

The works including providing 1st class Salwood setting of different sizes in roofs, deodar wooden planking on the roofs. 1st class Salwood door frames and 50mm thick paneled doors. Besides, laying of lime concreting in roofs, rooms etc. 50mm thick lime *surkhi* plastic 1:1:1 (1 lime 1 *surkhi* 1 sand), applying pointing of joints in 1:1:1 of *lakhauri* brick masonry was taken up.

130. ANCIENT SITE, NALAGARH, KOTHL, DISTRICT ROOPNAGAR

The works of providing wooden roof on remaining portion, parking and grill-fencing over dwarf wall on remaining portion were carried out.

CHENNAI CIRCLE

TAMIL NADU

131. CLIVE'S HOUSE, FORT ST. GEORGE, CHENNAI

The work of removing the decayed wooden members and providing new ones in the first floor has been completed. The work of relaying the damaged flooring on the western side of Clive's House has been completed. The work of providing light weight roof over elevated chimney on western side of the building has been completed.

132. FORT AND RAMPART WALLS, FORT ST. GEORGE, CHENNAI

The dead/damaged plaster of moat wall of the inner side on the eastern side was removed and replastered. Gates have been provided for the entrances to the cells in the fortification walls on the northern side.

133. BLOCK No. XXVI/2, FORT MUSEUM, CHENNAI

The damaged teak wood joists were carefully dismantled and removed and replaced with new teak wood joists as per original in gallery 8.

134. MEGALITHIC CISTS AND CAIRNS, PONMAR, DISTRICT KANCHIPURAM

Fencing was provided on the northern and eastern side of the site.

135. FIVE RATHAS, MAMALLAPURAM, DISTRICT KANCHIPURAM

The work of providing pathway from Five Rathas to ticket counter and providing side grill-fencing for the approach to Five Rathas monuments has been completed.

136. MEGALITHIC CISTS AND CAIRNS, MANAMAI, DISTRICT KANCHIPURAM

Fencing was provided around the protected site.

137. SHRI VENKATESAPERUMAL TEMPLE, THIRUMUKKUDAL, DISTRICT KANCHIPURAM

Fencing around the monument has been completed. The work of leveling the ground surface and laying garden on the southern and eastern side of the temple has been completed.

138. ROCK-CUT CAVES, NARASAMANGALAM, DISTRICT KANCHIPURAM

The work of providing fencing around the monument has been completed.

139. DOLMEN, UTTIRAMERUR, DISTRICT KANCHIPURAM

The work of providing fencing around the protected site has been completed.

140. FORT AND TEMPLES, THIRUMAYAM, DISTRICT PUDUKKOTTAI

The work of conserving the eastern side of fortification wall has been completed (Pl. 76). The work of removing the dead / decayed plaster from the merlons and plastering the same has been completed.

141. SIVA TEMPLE, AMMANKURICHI, DISTRICT PUDUKKOTTAI

The work of water-tightening of the *vasantha mandapa* of the Siva temple and work of conserving the *mandapa* for housing the *ratha* have been completed (Pls. 77-78). The work of pointing the *prakara* wall has been completed.

142. SIKKANATHASWAMY TEMPLE, KUDUMI-YANMALAI, DISTRICT PUDUKKOTTAI

The work of conserving the *madapalli* has been completed. The work of water-tightening the *mandapa* of the Anjaneya shrine and *madapalli* has been completed. The work of conserving north side of thousand pillared *mandapa* and *yagasalai* of the temple has been completed.

143. ROCK CUT SIVA TEMPLE, KADAMBARKOVIL, NARTAMALAI, DISTRICT PUDUKKOTTAI

The work of conserving the corridor ceiling slabs on the southern and eastern side has been completed. The work of water-tightening on the east, south and west side of the corridor *mandapa* has been completed (Pl. 79). A stone apron has been provided around the Amman shrine and the main shrine. The work of conserving the southern and eastern corridor and *Tirumadil* has been completed.

144. SIVAGANGA LITTLE FORT ENCLOSING THE GREAT TEMPLE, THANJAVUR, DISTRICT THANJAVUR

The work of water-tightening the upper surface of upper rampart wall after strengthening is being carried out. The work of conserving the north entrance arched roof and water-tightening the terrace has been completed.

**145. SRI MURUGUNATHASWAMY TEMPLE,
THIRUMURUGANPOONDI, DISTRICT TIRUPPUR**

The work of applying colour wash to the *prakara* wall of Balasubramanya Temple, front *mandapa* and *madapalli* has been completed. The work of removing the old damaged plaster and replastering as per original in the *madapalli* of the temple has been completed.

**146. SVAYAMBUNATHAR TEMPLE, KILPUT-
TUR, DISTRICT TIRUVANNAMALAI**

The work of providing fencing around the protected area has been completed.

**147. FORT AND LOWER MOAT WALL,
VELLORE, DISTRICT VELLORE**

The work of conserving the breached out and fallen lower moat wall and brick platform on the northern side of the fort is in progress. The work of providing low level grill fence on the south-east corner of the Fort has been completed. The broken/sunken cuddappah flooring slabs in the old session court building inside the fort was removed and re-laid as per original.

**148. PATALESWARA TEMPLE, BRAHMA-
-DESAM, DISTRICT VILLUPURAM**

The works of removing the fallen/bulged out veneering stones and resetting with old stone as per the old clues and designs in the *mukhamandapa*, front *mandapa* and *tirumadil* of the temple have been completed (Pl. 80).

149. FORT, GINGEE, DISTRICT VILLUPURAM

The work of conserving the moat wall and work of providing fencing in the Krishnagiri fort have been completed. The work of water-tightening the top of moat wall of the Krishnagiri fort has been completed. The work of conserving the *prakara* wall on the north/east side of the Siva temple has been completed (Pl. 81).

**150. SRI AZHAGIYA NARASIMHA PERUMAL
TEMPLE, ENNAYIRAM, DISTRICT VILLUPURAM**

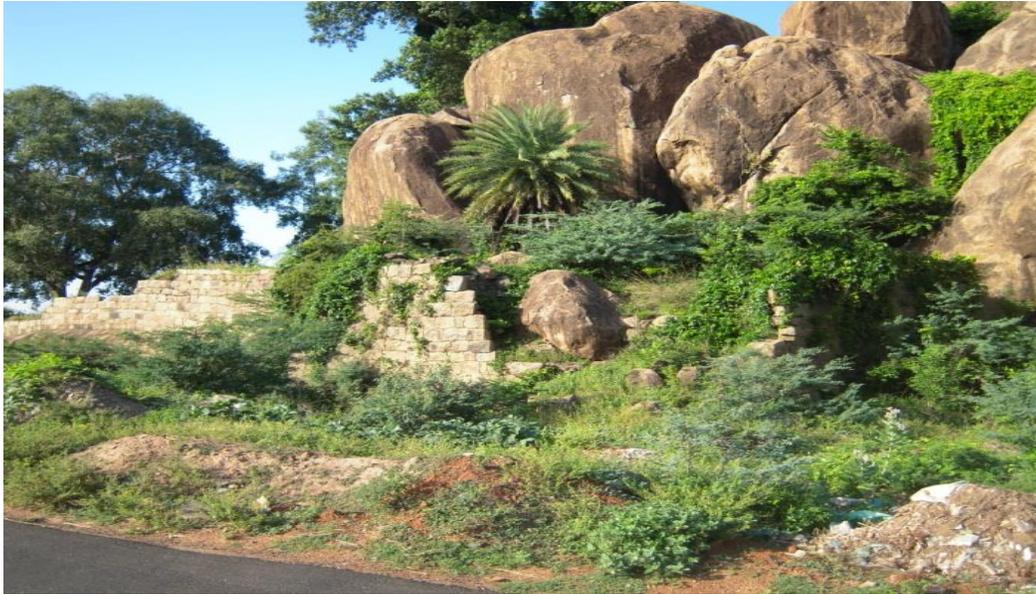
The work of providing fencing on the north and east corner in the Azhagiya Narasimha Perumal temple has been completed.

**151. APATHSAHAYESVARA TEMPLE, SEND-
-AMANGALAM, DISTRICT VILLUPURAM**

The work of conserving the *Tirumadil* and the structural members like pillar and pillar- capital, beams, ceiling slabs of corridor on the northern side has been completed. The work of water-tightening the terrace has been completed.

**152. TIRUMALAI NAYAK'S PALACE,
SRIVILLIPUTTUR, DISTRICT VIRUDHUNAGAR**

The work of removing the accretionary walls in the palace has been completed. The work of removing the damaged stone flooring and resetting of stone flooring in the entrance of the palace and replacing the damaged roofing tiles as per original has been completed (Pl. 82).



A



B

Fort and Temples, Thirumayam: A, before and B, after conservation

Plate 77



A



B

Siva Temple, Ammankurichi: A, before and B, after conservation



A



B

Siva Temple, Ammankurichi: A, before and B, after conservation

Plate 79



A



B

Rock cut Siva Temple, Kadambarkovil: A, before and B, after conservation



A



B

Pataleswara Temple, Brahmadesam: A, before and B, after conservation

Plate 81



A



B

Fort, Gingee: A, before and B, after conservation



A



B

Tirumalai Nayak's Palace, Srivilliputtur: A, before and B, after conservation

153. SUN TEMPLE, KATARMAL, DISTRICT ALMORA

The original entrance of the temple complex on the eastern side was buried long back and a small gate was in use to enter in the temple premises from rear side. The original entrance was revived by way of exposing buried steps in the east and all seven steps leading to raised platform of temple were exposed.

However, exposed steps were found in dilapidated condition and most of the stone blocks used in original steps were broken in the pieces. Therefore, new stone blocks were fixed in place of damaged one matching to the original fabric of the structure. In addition, retaining wall which had collapsed during the heavy rains was also taken for repair and work is in progress. During the course of digging of foundation of retaining wall, a headless stone image of Sun datable to 10th-11th century CE was also recovered (Pl. 83).

154. GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA

Stone lintel of Jagnath temple was repaired by way of retrofitting technique during the period under review. This stone lintel measuring 2.00x0.45x0.60m was broken almost in the centre and an iron girder was provided for support to this broken lintel. There was minor bulging in the centre of the stone beam and tendency was increasing constantly. Since such a huge stone block was not available in the vicinity, hence there was no

option to make it strengthened and repair in its original location. Services of Perfect Tooling and Packaging Company, Jamshedpur in collaboration with Cintic International Limited India, New Delhi, having expertise in retrofitting technique was taken to repair this lintel. While executing the work, coring with the help of diamond core vibration free drilling machine was made in order to minimize the effect of vibration on other components of temple and remaining shrines in premises. 65mm diamond core drill bit of 500 and 1000mm in length was used for coring and four stainless steel bars of 32mm and 304 grad, 2 in longitudinal and 2 in cardinal direction were inserted across the stone lintel and subsequently standard presets grout confirming of D.I.N. standards with 10mm injection tube for grout in flow in to the anchor was provided to make the bars solid and strengthened. After completion of the work, the additional support of iron-girder has now been removed. In addition, miniature shrines near Mrityunjaya temple were also repaired in continuation of previous year works and floor around the Jagnath temple have been conserved by way of replacing broken stone slabs and providing new wherever missing.

155. DANDESHWAR TEMPLE, JAGESHWAR, DISTRICT ALMORA

Remaining work of boundary wall was completed and front of the temple complex was leveled by earth filling and made presentable.

156. MANIYAN GROUP OF TEMPLE, DWARAHAT, DISTRICT ALMORA

Remaining work of retaining wall in order to prevent the land sliding on the hill side



A



B

Sun Temple, Katarmal: A, during and B, after conservation

INDIAN ARCHAEOLOGY 2010-11-A-REVIEW

was completed.

157. CHANDPUR GARHI FORT, DISTRICT CHAMOLI

In continuation of last year work, repairs to exposed structures were taken up. The fallen and bulged out structures were repaired with stone masonry available at the site. In addition, stone floor between both the enclosures built on the top of the hill was re-laid by way of taking out broken stone slabs and providing with new one, wherever missing, in traditional mortar matching to the original fabric of the structure (Pl. 84).

158. RUDRANATH, GOPINATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI

In continuation to the previous years work, repairs to the floor around main shrine were taken up by way of taking out damaged and chipped out stone slabs and providing with new one matching to the original. Interior of the temple was in dilapidated condition as number of the stone blocks had either fallen down or had gone out of plumb probably due to earth quake which was not noted in the past. Hence, it was essential to attend this work without further delay. While repairing the same, the available and usable stone blocks were re-fixed in their original place. Out of plumb stone members were removed and reset again in rich traditional mortar. Both vertical and horizontal cracks were filled up and water-tightened.

159. ASOKAN ROCK EDICT, KALSI, DISTRICT DEHRADUN

Entrance of the rock edict was made presentable by way of providing stone slab and apron all around the shade. In addition, ramp for physically challenged visitors have also been provided. The Cultural Notice Board has been replaced by new revised one.

160. EXCAVATED SITE, GOVISHANA MOUND KASHIPUR, DISTRICT UDHAM SINGH NAGAR

The excavated structures were also taken-up for repair during the period under review. The dead mortar was removed and bricks were re-laid in their original position in traditional mortar.

DELHI CIRCLE

DELHI

161. AJMERI GATE, DELHI

The MS railing at the top of dwarf wall was fixed to protect the area.

162. FORTIFICATION WALL, DARIYA GANJ, DELHI

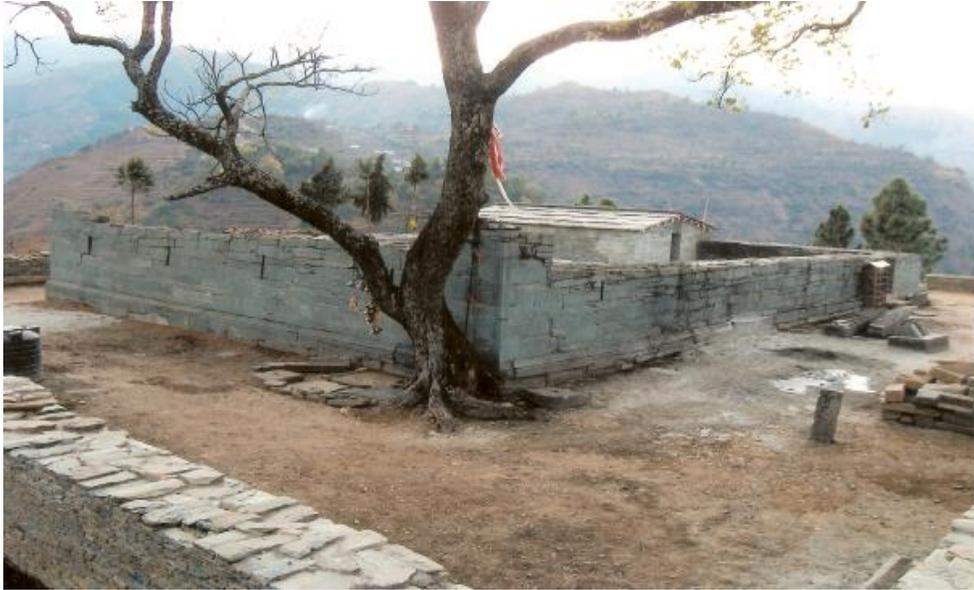
Pointing work of stone masonry with lime mortar was taken up.

163. ASOKAN PILLAR, DELHI

RR masonry work at the platform is in progress.

164. KOTLA FIRUZ SHAH, BELA ROAD, DELHI

Pointing and re-plasting of the fortifica-



A



B

Chanderpur Garhi Fort, Chamoli: A, before and B, after flooring work

-tion wall were attended. Drinking water facility has been provided for the visitors at the monument.

165. LOTHIAN CEMETERY, DELHI

Lime plaster work is in progress.

166. PURANA QILA COMPLEX, DELHI

Underpinning of RR masonry and pointing work from closed cells (Dholavira Section) to Talaki Gate were undertaken and same are in progress. MS railing was fixed at lake area. Drinking water facility has been provided to the visitors.

167. RED FORT, DELHI

Lime plaster work of outer façade of *Naubat Khana* is completed. Red sand stone flooring was also repaired and upgraded. Lime plaster and concrete work were applied on the terrace and dome at *Chatta Bazar* Lavatory block has been upgraded. Water proofing treatment was taken-up on the roof of colonial Building A-3 and A-4 and wooden railing was provided. Apart from this, removal of brick work of the partition wall and lime concrete work of first and second floor of these buildings is completed. Dismantling of modern structures, located inside Red Fort, is in progress. Construction of toilet at *Chatta Bazar* and B1 building are in progress.

168. SALIM GARH FORT, DELHI

Broken brackets were replaced with new ones matching with the original.

169. TRIPOLIA GATE, DELHI

Replacement of broken and missing red sand stone of arch and lime plaster works are in progress.

170. WAZIRABAD MOSQUE, DELHI

The conservation work comprising RR masonry and pointing of mosque has been completed.

171. ADILABAD FORT, NEW DELHI

Damaged portion of the main entrance gate was repaired. Apart from this, underpinning to RR masonry and the pointing of joints of stone masonry with lime mortar on the western and southern side walls were completed.

172. CHHOTE KHAN, BADE KHAN AND BHURE KHAN TOMB, NEW DELHI

The work of providing MS railing over dwarf wall was taken up to secure the area.

173. CHOR MINAR, NEW DELHI

MS railing on the dwarf wall is being provided to secure the area. The work is in progress.

174. HUMANYUN'S TOMB, NEW DELHI

Pointing work in RR masonry in the lower portion of outer boundary wall is in progress. Dismantling work of red sand stone flooring on the northern side of upper platform

to maintain conformity with the original is in progress. Up gradation of toilet blocks and drinking water facilities for the visitors are in progress. Fixing of wooden door in the western and southern side cells in collaboration with Aga Khan Trust, is in progress.

175. LAL GUMBAD, NEW DELHI

Red sandstone flooring and pathway inside the monument was undertaken.

176. NAJAF KHAN TOMB, NEW DELHI

Pointing and re-plastering works of the western wall and southern sides of enclosure wall were attended.

177. PIR GHAIB, NEW DELHI

MS railing was provided to secure the monument.

178. QILA RAI PITHORA, NEW DELHI

The fallen fortification wall between Bastion 14 & 15 was restored by providing RR stone masonry in lime mortar.

179. QUTB COMPLEX, NEW DELHI

Laying of lime concrete around Alai Minar and in front of Madrasa was completed and pointing work of Alai Minar is in progress.

180. SHISH MAHAL, NEW DELHI

RR Masonry work and removal of vegetation from the area of Shish Mahal are in progress.

181. SAFDARJUNG TOMB, NEW DELHI

The plastering & pointing works of the enclosure wall on the north and east wall and corners were taken up, which are in progress.

182. SIRI FORT WALL, NEW DELHI

The work of RR masonry to repair the wall and bastions of Siri Fort Wall near museum building from Gargi collage to August Kranti Marg was completed.

183. TUGHLAQABAD FORT, NEW DELHI

The repair to the damaged portion of the wall of Fort, opposite Kaya Maya temple were undertaken by way of pointing and lime mortar as per the original.

184. UNKNOWN TOMB, J.L. NEHRU STADIUM, NEW DELHI

Work of the RR stone masonry, lime concreting and plastering were attended. The fallen tomb has been restored completely.

DHARWAD CIRCLE

KARNATAKA

185. GUMBAZ, BIJAPUR, DISTRICT BIJAPUR

The scientific clearance work was carried out under an ASI – NCF – Nauras Trust Project entitled “*Revitalization of the Deccan Sultanate Gardens at Gol Gumbaz and Ibrahim Rouza, Bijapur*”. The scientific clearance work at Gol Gumbaz Complex began with the objective to observe the ancient water management system during the Deccan Sultanate period at Bijapur. It has revealed fabulous evidence regarding water management system at Gol Gumbaz. The com-

-plex has received water from three main sources i.e. Begum Talab (4.8km south of GGC); *Khandak* or Water Tank 28 (65m southwest of GGC); and Masa Bavadi (185m north of GGC). The most of the observations in the archival references were confirmed through scientific clearance work. The complex has received water from Begum Talab to Water Tank 17, which has been established partially through the evidence of feeder channels towards south of Water Tank 17. But due to the Sapota plantation and water logging in the south western part of the complex, there was a hindrance in establishing the connection between Begum Talab and Water Tank 17. But this observation is supported through the archival references.

The next source of water received by the complex is from the *Khandak*, which is situated on the southwestern side of the complex. There are two water tanks which lift the water i.e. Water Tank 6 and 18. At Due to the disturbance at the site it was not feasible to establish the connection at Water Tank 18 whereas Water Tank 6 lifted the water from *Khandak* and distribute to Water Tank 7. At the north eastern part of the complex, water was lifted from Masa Bavadi and disturbed to Water Tank 10. It seems to be very significant feature of engineering at this juncture where water has travelled almost 185m without any lift. Water Tank 10 collects the water and distributes to Water Tank 11, 12, 13, 13A, 14, 15 and 15A. The water from Masa Bavadi has concentrated only on the eastern part of the complex, which has established through scientific clearance work. These three water sources only give the outer dimensions of the water management system whereas there are intricate inner dimensions within the complex.

One of them is Water Tank 7 of which only the bottom portion. Water Tank 7 plays a vital role on the western side of Gol Gumbaz Complex, as it functions as a tank-cum-distributor, which received water from Water Tanks 6 and 17 and supplied water to Water Tank 2 via Water Tank 23. It is also connected to feeder channels running from Water Tank 17 to Water Tank 9. The position of Water Tank 16 seems to be very important in the complex. It receives water from Water Tank 17 and distributes to Water Tank 8 and then to Water Tank 21 (which is the main fountain within the complex). Water Tank 17 is also an important feature in the complex as it distributes water to Water Tank 16, 7 and 9, which further supplied water to Water Tanks 16 – 8 – 21, Water Tank 7 – 23 – 2, Water Tank 9 – 19 and 9 – 21. Overall, Water Tank 17 covered the major portion of the water bodies within the complex. A junction was observed between Water Tank 20 – 21 – 27, which shows the alignment towards Water Tank 21 – 20 – 27. Due to the disturbance at the site, this junction could not be exposed completely. Water Tank 3 and 4, which had been marked in the previous survey as water tanks, but during the clearance work, they were identified as a trough or water storing structure. The purpose of this structure is meant for domestic use or for providing water to the animals. Some feeling previously identified as Water Tank turned out to be remains of other structures Water Tank 1 marked in previous survey as water tank could not be established. Water Tank 5 was found to be remains of a gateway. Water Tank 22 has been identified as a well and had no connection with the water supply system. Water Tank 24 was identified in archival reference as a fountain but during clearance work, fountain line could not be found. Water Tank 25 was identified in

archival reference as recharge pit but during clearance work, it could not be established.

186. IBRAHIM ROUZA COMPLEX, BIJAPUR, DISTRICT BIJAPUR

The scientific clearance work at Ibrahim Rouza complex began with the objective to observe the ancient water management system during the Deccan Sultanate period at Bijapur. The monument is situated in low lying area in a trough-like formation, which can be easily flooded during the seasonal rains. One of the peculiar features around the monument is the formation of the natural *nullah* on the northern side of the monument, which can divert the seasonal water to the tank or to the monument in a controlled fashion. This feature has been observed through the archival references, though not established during clearance work. Only evidence of bringing water to the complex is through Mantapa Baoli or Structure 1, which is situated 85m west of the monument. This observation has been established through evidence of feeder-channels running towards the monument. The monument has received water from Structure 1 to Structure 2 and further it moved to Structure 3. Structure 3 has formed a junction which received water from Structure 2 and distributed to Structure 4 and Structure 5. Structure 4 further distributes the water to Structure 6. It has also been revealed that Structure 5 has an underground tank adjacent to it on the north. Structure 6 has been identified as a water storing structure for animals. Structure 7 is a fountain within the monument although it is yet to be established. Structure 8 is a stepped-well located to the south of the monument within the complex, but it has not revealed any connection with the monument. Structure 9 is a well situated on the south eastern corner outside the complex, which has revealed

channel running towards the ancient toilet block of the monument. Structure 10 is a unique structure within the complex identified as a circular tank made of stone with mud plaster and the bottom paved with stone pebbles. Structures 11, 12 and 13 were identified as ancient pathways within the complex.

187. FORT WALL AT MEGUTI TEMPLE, AIHOLE, DISTRICT BAGALKOT

The dismantled fallen fort wall and inner retaining wall has been reconstructed in dry masonry and mud mortar as per the original and providing flooring using sand stone slabs in front of the Jaina temple.

188. GALAGANATH GROUP OF TEMPLE, AIHOLE, DISTRICT BAGALKOT

The compound wall has been constructed around the group of temple with stone masonry and fixing angels using existing materials.

189. BASAVANNA OR ARALIBASAPPA TEMPLE, AIHOLE, DISTRICT BAGALKOT

The out of plumb portion of the sub-shrine has been dismantled and reconstructed by using new stone blocks to the missing portion over firm concrete bed as per the original and providing sand stone flooring around the sub-shrine.

190. RAMESHWAR TEMPLE, BEVOOR, DISTRICT BAGALKOT

Broken beams of the temple were replaced by new ones and the compound

wall has been constructed with sand stone slabs with providing MS grill over it.

191. HUCHAPPAYYA TEMPLE, AIHOLE, DISTRICT BAGALKOT

The out of plumb portion of the fort wall has been dismantled and reconstructed by using new stone blocks as per the original.

192. BHUVARAHA TEMPLE, HALASI, DISTRICT BELGAUM

The sunken veneering wall of the main temple was reconstructed as per the original.

193. GROUP OF MONUMENTS, HALASI, DISTRICT BELGAUM

Earth work for leveling the undulated area in front and rear side of Kalmeshwara temple was under taken. The compound wall was constructed round the Suvarneshwar temple with proper earth work and laying CC bed.

194. HAZAR KHOTRI, BIDAR, DISTRICT BIDAR

Fresh lime plaster was provided with coloured enamel paint and a grill and diamond mesh was fixed.

195. GAGAN MAHAL, BIDAR, DISTRICT BIDAR

Fresh lime plasters and lime mortar concrete for bed was provided.

196. ALI BARID, IBRAHIM BARID AND AMIR BARID, BIDAR, DISTRICT BIDAR

Earth work excavation and providing and laying lime mortar concrete for bed was taken up.

197. MADARASA OF MAHMUD GAWAN, BIDAR, DISTRICT BIDAR

Out of plumb portion of fallen stone masonry wall and merlons were carefully removed and re-constructed after providing lime mortar concrete bed. MS grill and diamond mesh was provided.

198. ARQILLA AT BIJAPUR, DISTRICT BIJAPUR

Conservation work at the monument included debris clearance, excavation and construction of missing portion of ancient wall with arches using C.R. rubble stone, lime plastering of the wall, arches surface and preparation of moulded cornice and pointing to the stone masonry joints to the existing ancient wall.

199. MECCA MOSQUE AT BIJAPUR, DISTRICT BIJAPUR

Repair works included removing the dead lime plaster over the leaky roof and dome, grouting for the roof of *dalans* and mosque and providing lime plastering to the wall surface.

200. GATES, WALLS, CITY & CITADEL BIJAPUR, DISTRICT BIJAPUR

The ancient barrier *draft* fallen wall & de-salted random style dressed stone masonry wall was carefully removed and reconstructed with random style size stone masonry work as per the original using trap / granite stone block.

Pointing to the fortification wall using lime mortar was also undertaken.

201. VEERBHADRESHWARA TEMPLE, HANGAL, DISTRICT HAVERI

Repair works including providing and fixing *hara* stones for missing portion using schist stone block around the monument and re-setting veneering wall using schist stone block and undulated interior stone flooring were taken up at the monument.

202. GALGESHWARA TEMPLE, GALAGANATHA, DISTRICT HAVERI

Existing undulated steps to the main temple were re-constructed using available schist and granite stone. A Pathway using schist stone over CC bed was also provided.

203. SOMESWARA TEMPLE, HARLAHALLI, DISTRICT HAVERI

Construction of dwarf compound wall using rubble and cement mortar with fixing MS grill over it has been completed. Dismantling of sunken sub-shrine stones and re-fixing the same was taken-up. For better ambience, a lawn has been developed using sand, red soil, compost, grass and suitable plants.

204. TARKESWARA TEMPLE, HANGAL, DISTRICT HAVERI

The works of providing and fixing outer veneering wall using schist stone block, water-tightening the roof with lime concrete and lime mortar and paving schist stone apron around the sub-shrine were taken up at the monument.

205. BILLESHWARA TEMPLE, HANGAL, DISTRICT HAVERI

Restoration of missing portion of porch using schist stone block was undertaken beside, a rubble masonry wall for landscaping the area to prevent sliding of earth.

206. KADAMBESHWAR TEMPLE, RATTIHALLI, DISTRICT HAVERI

Missing portions were restored using schist stone block. Schist stone paving and curbing was provided all around the monument. Rubble masonry partition wall of *mandapa* was removed to maintain original character. For better ambience, a lawn has been developed using sand, red soil, compost, grass and suitable plants.

207. MUKTESHWAR TEMPLE, CHAUDADANAPUR, DISTRICT HAVERI

Construction of dwarf compound wall using rubble and cement mortar with fixing MS grill over it was undertaken. For better ambience, a lawn has been developed using sand, red soil, compost, grass and suitable plants.

208. NAGARESHWARA TEMPLE, BANKAPUR, DISTRICT HAVERI

The roof was water-tightened with lime concrete and lime mortar after removing the dead lime concrete and plaster.

209. MADHUKESHWAR TEMPLE, BANAVASI, DISTRICT UTTARA-KANNADA

Construction of compound wall in the premises of museum building using laterite cements mortar was taken up. A lawn using sand, red soil, compost, grass and suitable plants was also developed.

GOA CIRCLE

GOA

210. SE' CATHEDRAL, OLD GOA

The sunken and leaky roof of Blessed Sacrament has been repaired by replacing decayed wooden members with new ones. The exterior of Se'Cathedral has been painted with water proof paint (Pls. 85-86).

211. CHURCH AND CONVENT OF ST. FRANCIS OF ASSISI, OLD GOA

The decayed window has been replaced with new ones as per original. The exterior of the church has been applied with a coat of paint. The doors and windows have also been painted (Pl. 87).

212. CHAPEL OF ST. CAJETAN CHURCH, OLD GOA

The sunken roof due to broken beams of main altar, have been repaired by replacing decayed wooden members with new ones. The exterior of the church has been painted (Pl. 88).

213. BASILICA OF BOM JESUS, OLD GOA

The damaged asbestos roofing sheet of the main hall of the church has been replaced

with new ones. The roof of quadrangle which was leaking has been repaired by replacing decayed wooden members wherever required. The quadrangle portion has been white washed (Pl. 89).

214. FORTIFICATION WALL OF AUGUADA FORTRESS LOWER, CANDOLIM

The undulated pathway towards circular bastion has been provided with laterite stone paving over firm concrete bed. The pathway has been neatly pointed.

215. MAHADEV TEMPLE, TAMBDISURLA

The leaky roof has been water-tightened. The stone joints of the temple have been pointed. As security measure the dwarf wall with grills has been provided all around the monument with suitable gate (Pl. 90).

216. CHURCH OF OUR LADY OF ROSARY, OLD GOA

Steps and paving have been provided in laterite stones and pointing has been attended. Compound wall is constructed in laterite stone masonry with grills over it (Pls. 91-92).

217. CHURCH OF ST. AUGUSTINE, OLD GOA

Construction of the dislodged/sunken entrance steps and the wall in laterite stone masonry is in progress. The construction of missing wall in the sacristy closet (N1) is in progress, and water-tightening of the exposed masonry structures to avoid damage to the walls is also in progress. Pointing the existing flooring at 1st cloister (M) is in progress (Pls. 93-94).



A



B

Se' Cathedral: A, during and B, after repairs of the roof of Blessed Sacrament

Plate 86



A



B

Se' Cathedral: A, before and B, after exterior painting



A



B

Church and Convent of St. Francis of Assisi: A, before and B, exterior painting

Plate 88



A



B

Chapel of St. Cajetan Church: A, before and B, exterior painting



A



B

Basilica of Bom Jesus: A, during and B, after conservation

Plate 90



A



B

Mahadev Temple: A, before and B, after water-tighting of roof



A



B

*Church of Our Lady of Rosary: A, before
and B, after providing steps and compound wall*

Plate 92



A



B

Church of Our Lady of Rosary: A, before and B, after fencing



A



B

*St. Augustine Church complex: A, approach to the convent before
and B, after the work*

Plate 94



A



B

St. Augustine Church complex: A, Provincial Chapel Sacristy Closer before and B, after the work

PRESERVATION OF MONUMENTS

GUWAHATI CIRCLE

ASSAM

218. ANCIENT CAVES, JOGIGHOPA, DISTRICT BOINGAIGAON

Construction of PCC approach pathway for the visitors and RR stone drainage system to drain out the rain water have been completed.

219. IDGAH AT RANGAMATI HILL, DISTRICT DHUBRI

Lime concrete flooring to the courtyard, raising the height of the compound wall and fixing of MS railing over it have been completed (Pl. 95).

220. SRI SURYAPAHAR RUINS, DISTRICT GOALPARA

Works of re-setting of missing bricks including pointing, water-tightening and lime concrete apron around the excavated structures have been completed (Pl. 96).

221. SIVADOL AT NEGHRITING, DISTRICT GOLAGHAT

Lime-*surkhi* plastering to the monument, lime-*surkhi* finishing to the *mandapa* and pointing, repairing and re-setting of the ancient steps have been completed (Pls. 97-98).

222. SRI SRI HAYAGRIVA MADHAVA TEMPLE, HAJO, DISTRICT KAMRUP

Construction of PCC approach road at the western side, construction of brick parapet wall at the western stair case, construction of

PCC platform for seating arrangement of visitors and painting to the wooden structures of *natya mandapa* are in progress.

223. SRI SRI KAMESWAR TEMPLE, HAJO, DISTRICT KAMRUP

Lime-*surkhi* plastering to the *mukha-mandapa*, construction of RR stone retaining wall on the southern side of the monument to stop soil erosion, construction of PCC approach pathway including providing brick breast wall on both sides and providing of tree rounds for seating arrangements of visitors have been completed.

224. SRI SRI KEDAR TEMPLE, HAJO, DISTRICT KAMRUP

Construction of stone retaining wall on the western side of the monument to check soil erosion, providing of brick breast wall for the safety of the ancient drain, provision of apron over PCC bed at the western side of the temple and construction of tree rounds for sitting arrangements of the visitors have been completed.

225. ROCK-CUT FIGURES, KAMAKHYA HILL, GUWAHATI, DISTRICT KAMRUP

Construction of dwarf wall and fixing of chain-link fencing over it, providing of PCC approach road including steps and fixing of MS grill gate and cattle proof gate at the entrance have been completed (Pl. 99).

226. GHANASHYAM'S HOUSE AT JOYSAGAR, DISTRICT SIVASAGAR

Work for raising the height of the dwarf wall and fixing of MS grill railing over it and

water-tightening to the main structure has been completed.

227. KARENGHAR TALATALGHARAT JOY-SAGAR, DISTRICT SIVASAGAR

Works of lime concrete flooring and lime-*surkhi* plastering to the monument have been completed.

228. GOLAGHAT AT JOYSAGAR, DISTRICT SIVASAGAR

Lime-*surkhi* plastering to the exterior of the monument, lime concreting to the floor and roof of the monument and repairing & pointing to the compound wall and existing brick-on-edge pathway have been completed (Pl. 100).

229. GROUP OF FOUR MAIDAMS AT CHARAIDEO, DISTRICT SIVASAGAR

Construction of retaining wall in the excavated *maidam* to check soil erosion has been undertaken.

230. RANGHAR PAVILION AT JOYSAGAR, DISTRICT SIVASAGAR

Pointing to the ancient brick-on-edge pathway and restoration of the ancient boundary wall have been undertaken.

231. DEVIDOL AT GAURISAGAR, DISTRICT SIVASAGAR

Repairing and restoration of ancient compound wall have been carried out.

232. VISHNUDOL AT GAURISAGAR, DISTRICT SIVASAGAR

Repairing and restoration of ancient compound wall have been undertaken.

233. MOUND AND RUINS OF THE STONE TEMPLE AT DAH-PARBATIA, DISTRICT SONITPUR

Vegetation clearance inside the monument has been carried out. Plastering to the dwarf wall after raking out the joints and providing of RCC pillars and fixing of MS grill over it have been completed.

234. RUINS, SINGRI HILLS, DISTRICT SONITPUR

Height of the compound wall with RCC pillars in the western portion of the site has been raised.

235. DHANDI TEMPLE, N.C KAMDAYAL, DISTRICT SONITPUR

Restoration of the ancient brick structures with lime-*surkhi* mortar and laying of brick-on-edge pathway up to the top fallen part of the temple have been completed.

236. MASONRY REMAINS OF BAMUNI HILL, TEZPUR, DISTRICT SONITPUR

Construction of PCC approach road and providing of retaining wall have been undertaken.

TRIPURA

**237. BHUBANESWARI TEMPLE, RADHAKISHO-
-REPUR, DISTRICT SOUTH TRIPURA**

Lime concrete flooring after removing the damaged one & plastering of the retaining wall have been completed.

**238. THAKURANI TILLA, PASCHIM PILAK,
DISTRICT SOUTH TRIPURA**

Fitting & fixing of MS grill railing over the dwarf wall by providing RCC pillars have been completed.

**239. ANCIENT REMAINS AT BOXANAGAR,
DISTRICT WEST TRIPURA**

Restoration of the newly exposed brick structures including pointing and water-tightening is in progress (Pl. 101).

**240. ROCK-CUT SCULPTURES AT UNAKOTI,
DISTRICT NORTH TRIPURA**

Work for construction of RR stone masonry retaining wall, repairing of brick steps and mending of sculptures is in progress.

**HYDERABAD CIRCLE
ANDHRA PRADESH**

**241. SWAYAMBHU TEMPLE COMPLEX IN
WARANGAL FORT, DISTRICT WARANGAL,**

In continuation of previous year's work the Hyderabad Circle resumed the work at the open and elevated area lying in front of the eastern *torana* clearance with prime objective

to bring forth the hidden archaeological remains and historical facts about the establishment since the area is undisturbed and never attempted before for any such studies.

The digs conducted in the Trench P-8, P-9, V-4, V-5, V-6, V-7, V-8 have exposed the structural remains of houses with *in situ* sherd, well, rubble and lime plastered floorings, broken walls, etc. These remains of houses are extending towards southern direction and may be brought forth in further probes. The evidence suggests that there might have been a row of residences. An interesting find of this season's probe is the remains of a squarish brick fire-altar constructed near the eastern entrance of the temple located behind the Rama temple.

**242. PATTRAPPA TEMPLE AT HILL FORT
RATNAGIRI, DISTRICT ANANTAPUR**

The collapsed rampart wall attached to the bastion near Pattrappa Temple at Ratnagiri Fort has been reconstructed as per original with the available original stones in lime mortar (Pl. 102).

**243. SHRI PARASURAMESHWARA SWAMY
TEMPLE, GUDIMALLAM, DISTRICT CHITTOOR**

Dressed stone apron and pathways have been provided at Shri Parasurameshwara Swamy Temple (Pl. 103).

**244. SUBRAMANYA TEMPLE, LOWER FORT,
CHANDRAGIRI, DISTRICT CHITTOOR**

Damaged outer stone *prakara* wall of Subramanya Temple was restored (Pl. 104).

Plate 95



A



B

Idgah: A, before and B, after conservation



A



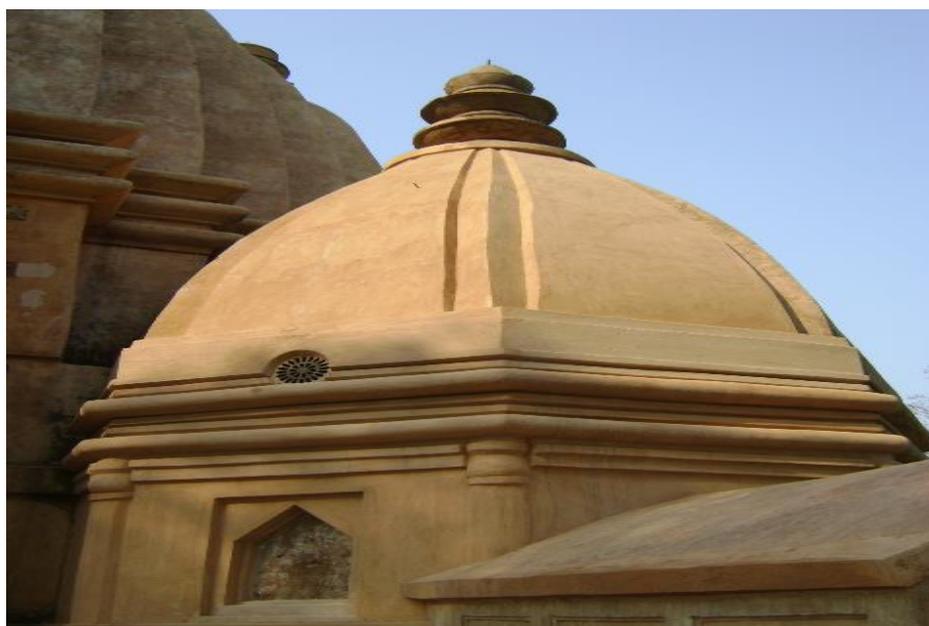
B

Sri Suryapahar Ruins: A, before and B, after conservation

Plate 97



A



B

Sivadol: A, before and B, after conservation



A



B

Sivadol: A, before and B, after conservation

Plate 99



A



B

Rock-cut figures, Kamakhya Hill: A, before and B, after conservation



A



B

Golaghat at Joysagar: A, before and B, after conservation

Plate 101



A



B

Ancient Remains at Boxanagar: A, before and B, after conservation



A



B

Rampart wall, near Pattrappa Temple at Ratnagiri Fort: A, before and B, after conservation

Plate 103



A



B

Sri Parasurameshwara Swamy Temple, Gudimallam: A, before and B, after conservation



A



B

Subramanya Temple, Lower Fort, Chandragiri: A, before and B, after conservation

245. KONERU, LOWER FORT, CHANDRAGIRI, DISTRICT CHITTOOR

The silt and debris of the tank (*koneru*) located to the north-western side of the Rajamaharaj was got removed and cleaned.

246. RANI MAHAL, LOWER FORT, CHANDRAGIRI, DISTRICT CHITTOOR

Outer surfaces of the palace *gopuras*, *chajjas* of Rani Mahal were resoted with lime mortar as per original (Pl. 105).

247. RAJA MAHAL, LOWER FORT, CHANDRAGIRI, DISTRICT CHITTOOR

The uneven area in front of the Raja Mahal was laid with dressed stone pathways (Pl. 106).

248. UPPER FORT, CHANDRAGIRI, DISTRICT CHITTOOR

Approach pathway and steps were provided to upper fort at Chandragiri.

249. CONSERVATION OF WESTERN GATE ENTRANCE, LOWER FORT, CHANDRAGIRI, DISTRICT CHITTOOR

A breach in the Western Gate Entrance of Lower Fort was restored to its original condition.

250. SOUTHERN SIDE FORTIFICATION WALL, LOWER FORT, CHANDRAGIRI, DISTRICT CHITTOOR

The Breach 12 & 13 at southern side fortification walls, of Lower Fort, Chandragiri was restored.

251. SRI KAMALA SAMBAVESWARA SWAMY TEMPLE, PUSHAGIRI, DISTRICT YSR KADAPA

Removed the dilapidated lime concrete over the roof of *mandapas*, replaced the delayed stone beams and slabs attended pointing to the roof stone joints.

252. MANDAPA TOWARDS S-W CORNER OF GREAT MOSQUE, GANDIKOTA, DISTRICT YSR KADAPA

Removed the dilapidated lime concrete over the roof and replaced stone slabs and beams, carried out pointing to the roof stone slabs joints, and provided brick jelly lime concrete over the roof slab. Provided stone flooring inside the *mandapa* and apron around (Pl. 107).

253. MAHA STUPA AND OTHER STRUCTURES ON HILL TOP, KODAVALI EAST, DISTRICT GODAVARI

Water-tightening the brick cells and restoration of the disturbed/fallen dressed stone veneering walls with available stone in lime mortar was carried out.

254. NAVA BRAHMA GROUP OF TEMPLES, ALAMPUR, DISTRICT MAHABOOB NAGAR

Fallen walls were restored using available old material at Nava Brahma Group of Temples at Alampur (Pls. 108-109).

255. ABDUL WAHAB KHAN TOMB, KURNOOL, DISTRICT KURNOOL

After thorough clearance of debris and vegetation, approach to cellar of Hawa Mahal was provided and a flood protection wall was constructed to avert any damage to the structure.

PRESERVATION OF MONUMENTS

256. KONDA REDDY BURZ, KURNOOL, DISTRICT KURNOOL

Dressed stone approach pathway was provided to main entrance.

257. ROCK CUT CAVES ON HILL TOP, GUNTUPALLI, DISTRICT WEST GODAVARI

Iron grills over dwarf wall were provided and pathway from stone stupa to side group of caves completed.

258. BANDAR FORT OF MACHILIPATNAM, DISTRICT KRISHNA

Iron grill fencing was provided over dwarf wall of Belfry Compound and fort. Country wood rafters, beams were provided at missing places in the west side and east side verandah of custom office.

259. KALYANA MANDAPA OF THOUSAND PILLAR TEMPLE, HANUMAKONDA, DISTRICT WARANGAL

As part of the ongoing major conservation and restoration of *Kalyana Mandapa* of Rudreswara Temple and in continuation of previous years work, the removed architectural members of the structure were re-fixed and reconstructed up to the *pradakshinapatha* portion of *Kalyana Mandapa* (Pl. 110).

JAIPUR CIRCLE RAJASTHAN

260. ANCIENT SITE BHANGARH, DISTRICT ALWAR

R. R stone masonry work of missing

R.R stone masonry work of missing dome of Palace Complex is completed. Three massive M.S iron gates were provided at Gopinath temple. Fixing of Slogan boards, Cultural text, Protection Notice Board, etc. is completed (Pl. 111). In continuation of previous year's work exposing of buried old structures and their restoration as per original from main gate to Johari Bazar is in progress (Pl. 112).

261. SIVA TEMPLE, NEELKANTH, DISTRICT ALWAR

In continuation of previous year's work approach pathway has been provided from Nougaja to Batak-ki-Deori. Re-setting of ancient wall and restoring the same with new stones where ever missing is in progress. Wooden doors, M.S iron grill to newly constructed sculpture shed, have been provided. Besides, cultural and protection notice boards and slogan boards have been provided.

262. AKBARI MASJID AT AJMER, DISTRICT JAIPUR

Re-plastering work in lime mortar was completed. Flag stone flooring towards the front side of prayer hall has also been completed (Pl. 113).

263. ANCIENT RUINS AND STRUCTURAL REMAINS, KRISHNA VILAS, DISTRICT BARAN

Scientific clearance around the Siva temple (Dher) to find the original base of temple and the resetting of the stone member as per original is completed. Some sculptures were retrieved during the clearance which were documented and shifted to store. The scientific debris clearance from Radha Krishan temple revealed sculptures which were documented and

Plate 105



A



B

Rani Mahal, Lower Fort, Chandragiri: A, before and B, after conservation



A



B

Raja Mahal, Lower Fort, Chandragiri: A, before and B, after conservation

Plate 107



A



B

Mandapa towards s-w corner of Great Mosque at Gandikota: A, before and B, after repairs



A



B

*Nava Brahma Group of Temples Alampur: A, before
and B, after conservation*

Plate 109



A



B

Nava Brahma Group of Temples, Alampur: A, before and B, after conservation



A



B

Kalyana Mandapa of Thousand Pillar Temple, Hanumakonda: A, during and B, after conservation

Plate 111



A



B

Palace Complex, Bhangarh: A, before and B, after conservation



A



B

Johari bazaar, Bhangarh: A, before and B, after exposing the buried structures

Plate 113



A



B

Akbari Masjid, Jaipur: A, before and B, after restoring

PRESERVATION OF MONUMENTS

shifted to store. Wooden gate has been provided to the temple.

264. RUINS OF TEMPLE, ATRU, DISTRICT BARAN (PLAN)

Gadgach Temple: Masonry pathway of 2m width with masonry pedestal for display of architectural member along both side of dwarf wall has been provided. Valuable sculptures have been shifted to the sculpture shed.

R.R. masonry wall with grill panel has been provided around Ganesa the temple complex. Extension and development work of old sculpture shed is in progress.

Construction of masonry wall around the Phool Dhera temple and fixing the grill panel work is in progress.

265. SIVA TEMPLE AND RUINS AT ARTHUNA, DISTRICT BANSWARA

Extension of sculpture shed for displaying the sculptures and restoration work of out of plumb portion of *sikhara*, *jangha* and missing *mandapa* of the Khanda Dera temple have been completed. Work of approach pathway is also complete. A dwarf wall with iron grill over it around the Mandaleswara temple has been constructed and restoration of dislodged plinth portion of platform and steps by providing new ones at missing has been completed. Work of providing flag stone apron around temple is also complete. M.S grills-fencing over dwarf wall was also been provided at Temple 3. Cultural text board, protection notice boards, signages and slogans boards have been installed at vantage points.

266. BHARATPUR FORT, DISTRICT BHARATPUR

Restoration work of Bastion 21 and 22 by way of underpinning, pointing and water-tightening, etc. was completed. The fallen stone-railings of both sides of Zanana-Mardana *ghats* of the moat were exposed through cleaning and re-set at their original place. The steps of *ghat* were also restored per original (Pls. 114-115).

267. LAL MAHAL, ROOPWAS, DISTRICT BHARATPUR

Old and decayed sand stone flooring was removed and new one was provided as per original in the Mahal complex. Dismantling of bulged out portion & resetting of the same near pavilion of the complex as per original was completed. Work of providing *chhajja* of sand stone where ever missing in combination mortar with the support of stain less steel at the store room of palace complex is in progress. Slogan board has been installed in brick masonry (Pl. 116).

268. DEEG PALACES, DEEG, DISTRICT BHARATPUR

The missing stones and brackets, with floral design and mouldings of Nand Bhawan have been provided and the broken part of *chhajja* stone of guard room has been mended with the help of copper dowels matching them as per the original. The work of providing missing pieces of the highly ornamental buff sandstone hanging has been completed. Replacement of missing pieces of fountain in the complex as per original was completed by

inserting copper pipe in vertical holes of fountains. Red sand stone as per original was provided at the ancient open well and overhead tank at Deeg palace, Deeg. The work of providing the dressed plain *chhajja* stone near Keshav-Bhawan (Baradari) as per original is in progress. In continuation of previous year's work re-setting of tilted & damaged Guard room in front of Gopal-Bhawan has been completed. Re-setting work of missing balcony in the left room of Kishan-Bhawan has been completed. Providing & fixing of matching Sal-wood *choukhat* in show case for publications near Singh Pol gate is also completed. Work of providing dwarf wall around the Deeg palace in R.R. stone masonry & brick masonry wall etc. has been completed. Signages and prohibited / regulated marker in stones have been fixed around the Deeg palace.

269. CHITTAURGARH FORT, CHITTAURGARH, DISTRICT CHITTAURGARH

Re-setting of the out of plumb steps of Sukhadiya tank is in progress. Restoration work of stone masonry wall at northern and eastern side has been completed. Restoration of decade and missing wall Ratan Singh Palace in lime mortar of north and east side with water-tightening and pointing was completed as per original. Dismantling of damaged and decayed plaster from surface of the wall and dome was taken up and fresh lime plaster is being done. The work is in progress.

270. RUTHI RANI MAHAL, MENAL, DISTRICT CHITTAURGARH

Restoration of *prakara* wall was completed while re-setting of old pillar, brackets, beams and front *kakshasana* at Ruthi

Ruthi Mahal is in progress.

271. GROUP OF TEMPLES, BADOLI, DISTRICT CHITTAURGARH

Notification boards, regulated and prohibited area marker stones have been installed around the monument complex.

272. BHATNER FORT, HANUMANGARH, DISTRICT HANUMANGARH

In continuation of previous year's work restoration work of fortification wall between Bastions 12 & 13 with old and new *lakhauri* bricks and tiles has been completed. Recessed pointing work between Bastions 12 & 13 is also completed. Repair of old drain inside the Bhatner fort is completed as per original. Construction of brick masonry pathway in side the fort towards the south-western side was also completed (Pls. 117-119).

273. ANCIENT SITE, KALIBANGAN, DISTRICT HANUMANGARH

Construction of brick masonry compound wall on the northern side of the museum was completed.

274. JAISALMER FORT, JAISALMER, DISTRICT JAISALMER

Conservation and restoration work of pitching near taxi stand was completed. Restoration work of providing stone pavement/flooring of exterior platform of Suraj Pol Gate is completed. Signages (sand stone board 100m, 200m, slogan board, cultural notice board, and vitreous enamel protection board have been provided.

PRESERVATION OF MONUMENTS

275. KUMBHALGARH FORT, DISTRICT RAJASMAND

In continuation of previous year's work restoration work of *baori* and surrounding area was resumed and is in progress. The restoration work of reservoir with steps and flag stone as per original was completed. Signages including cultural notice board, protection notice board, slogans in stone have been displayed at vantage points.

276. RANTHAMBOR FORT, DISTRICT SAWAI MADHOPUR

In continuation of previous year's work repair of Sat Pol gate was resumed and was completed by providing R.R. stone masonry pathway from this gate to outer side gate. Continuations of previous year's work the re-plastering in lime-surkhi mortar and restoration of chgajja of Raghunath Temple have been completed. M.S. grill gates in all openings have also been fixed for safety and security.

277. HATHI BHATA KHEDA, DISTRICT TONK

Construction of compound wall in R.R. stone masonry at west side of the site with M.S. angle gate and path way from road to main site is in progress.

278. SAS-BAHU TEMPLE, NAGDA DISTRICT UDAIPUR

Toilet block was constructed for the convenience of tourists.

**MUMBAI CIRCLE
MAHARASHTRA**

279. BARAD CAVES, BARAD

Removal of thick vegetation in and around the caves and debris inside the caves and cistern was removed. The G.I pipe railing on the front side has been provided.

280. JOGESHWARI CAVES, MUMBAI

In continuation of previous year's work, the damaged pillars of the main caves have been repaired with its original design. The water cistern and drainage filled up with debris has been desilted and repaired and provided with proper slope. The work of providing and fixing the bat proof mesh was completed (Pls. 120-121).

281. KANHERI CAVES, MUMBAI

The parapet wall to the water cistern over the caves was constructed to stop the flow of muddy rain water and other garbage into the cistern. The dressed stone steps and approach pathway to the caves are provided. The work of conservation of miniature stupas at art gallery are in progress.

282. MANDAPESHWAR CAVES, MUMBAI

In continuation of previous year's work, the debris accumulated over the caves are cleared and exposed structures including small cells has been restored up to its original level and as per its existing original material. The work of water-tightening of already existed structures was also done (Pl. 122).

283. JANJIRA FORT, AT JANJIRA DISTRICT MURUD

The hidden structures near the open tank at Janjira Fort are exposed. Beside that many ancient structures inside fort are cleared

Plate 114



B

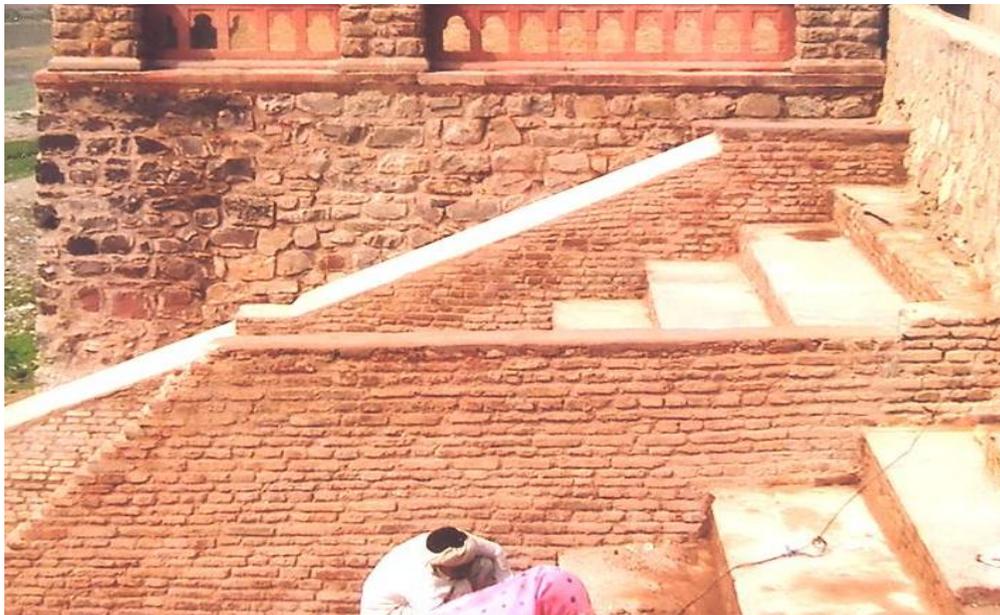


A

Bastion 21-21 Bharatpur fort, Bharatpur: A, before and B, after conservation



A



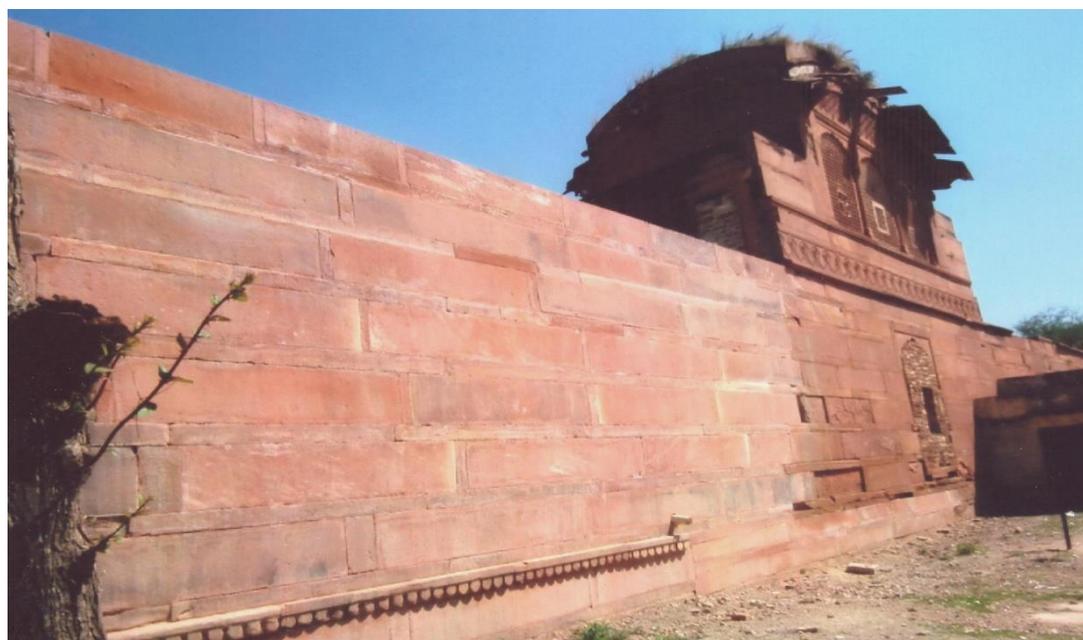
B

Zanana- Mardana ghats at Moat wall, Bharatpur: A, before and B, after conservation

Plate 116



A



B

Lal Mahal Roopwas, Bharatpur: A, before and B, after conservation



A



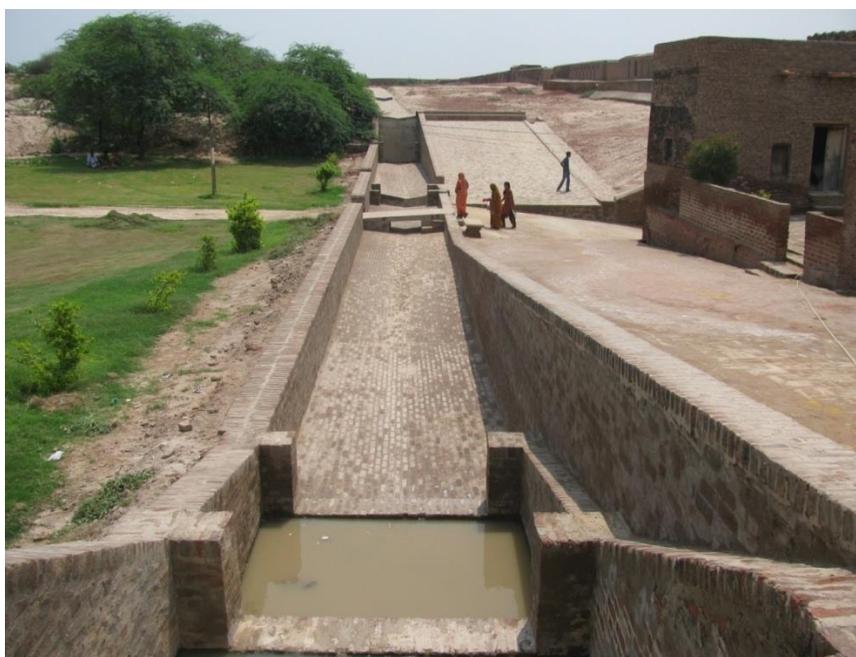
B

Bhatner Fort, Hanumangarh: A, before and B, after conservation of Bastion 12 & 13

Plate 118



A



B

Bhatner Fort, Hanumangarh: A, before and B, after repairs to drains



A



B

Bhatner Fort, Hanumangarh: A, before and B, after providing pathway

Plate 120



B



A

Jogeshwari Cave: A, before and B, after conservation



B

A

Jogeshwari Cave: A, before and B, after conservation

Plate 122



A



B

Mandapeshwar Caves: A, before and B, during conservation

PRESERVATION OF MONUMENTS

from the debris and restored with original material up to its original height (Pls. 123-124).

284. AMBA-AMBICA GROUP OF CAVES, JUNNAR CAVES, JUNNAR, DISTRICT PUNE

The vegetation and bushes have been removed from the top and around the caves and the front side area of caves has been leveled after clearance of debris. The parapet wall is provided on front on to stop the flow of earth along with rain water. The entire ancient rock cut water cistern has been desalted (Pl. 125).

285. BHAJA CAVES, DISTRICT PUNE

There is an exposed fourteen rock-cut stupas of varying dimensions. The existing roof of stupas which was damaged due to rusting replaced with new one. The existing undulated and disturbed UCR stone pavement of pathway has been removed and provided with new pathways. The work of parapet wall either side of pathways to guard the edge of the steps and safety of visitors is in progress.

286. HABSHI GUMBAD AT HAPUSBAUGH, DISTRICT PUNE

The plaster of exterior and interior surface of the dome is completed. The outer moulding parts of dome including lotus petal design, cornices and minarets, which was damaged due to dampness and moistures, has been repaired in original material and plaster (Pls. 126-127).

287. TULJA GROUP OF CAVES, JUNNAR CAVES, JUNNAR, DISTRICT PUNE

The damaged rock path leading from main cave towards the left side caves has been

restored along with step pathway leading to the main caves (Pl. 128).

288. KOLABA FORT, NEAR GANESH TEMPLE, DISTRICT RAIGAD

There was numbers of structures buried in debris at the right side of the main pathway from main entrance to the Ganesh temple at Kolaba fort. These structures are cleared from debris and restored up to its original level (Pls. 129-130).

289. KONDANE CAVES, DISTRICT RAIGAD

The internal parts of the stupa including and ceilings were restored after clearance of boulders and debris. The works of restoration of pillars are still in progress (Pl. 131).

290. KORLAI FORT, DISTRICT RAIGAD

The breached portion of the fortification wall including the bastion at eastern side of the Korlai fort which was covered with tree and thorny bushes are removed from trees and bushes. The work is in progress.

291. KORLAI FORT, NEAR CHURCH, DISTRICT RAIGAD

The stone flooring inside the church has been provided as per original pattern. The internal and external plaster is provided to the walls of main Church. The works of repairs of steps towards eastern side of main entrance are still in progress (Pls. 132-133).

292. WADA OF DANCING GIRL, DISTRICT RAIGAD

The monument very badly covered with vegetation and debris and affected with huge cracks is cleaned and restored by water-tightening at the walls, roof and ceiling. The damaged pillars are restored and flooring is provided matching with original one. This work is in progress (Pl. 134).

293. SATKHANI BURAJ, DISTRICT RAIGAD

In continuation of previous year's work, the huge cracks developed at various place of structure are stitched and water-tightened after clearing of vegetation growth. This work is in progress.

294. SINDHUDURG FORT AT MALVAN, DISTRICT

The damaged pavement of the rampart has been repaired including leveling of the top surface. The restoration of fortification wall at south-east side is in progress (Pl. 135).

295. DOUBLE SHRINE TEMPLE AT VELAPUR, DISTRICT SOLAPUR

The old tank in front of the monument was filled up with debris and filths. Its embankment wall was damaged and fallen. The same tank has been cleaned and desilted and embankment wall is restored with CR masonry (Pl. 136).

296. JAKHINWADI CAVES, DISTRICT SATARA

The caves and the cisterns are cleared from the debris. The pillars of the Cave 2 to 16 are restored (Pls. 137-139).

297. ARNALA FORT, ARNALA, DISTRICT THANE

Restoration of rampart of southern side fort wall and fallen breaches of structure with stone masonry work has been completed (Pl. 140).

298. CAMARA TOWN HALL, DISTRICT THANE

Restoration of fallen breached structure and water-tightening to give the strength to the structure was done. Stone flooring with trap stone has been provided (Pl. 141).

299. STUPA AT NALASOPARA, DISTRICT THANE

The miniature stupas buried at the south side of the main stupa are cleared from debris and vegetation and thereafter restored in original mud mortar.

RANCHI CIRCLE

JHARKHAND

300. BENISAGAR, DISTRICT WEST SINGHBHUM

In continuation of the last year's work, the scientific clearance work at Benisagar continued in towards the southern and eastern portion of the mound which is situated towards the eastern side of ancient Benisagar tank. Benisagar or Benusagar (21° 59' 02" N, 85° 53' 39" E), is situated on the border of Jharkhand and Odisha in west Singhbhum District of Jharkhand. It is located about 85km towards south from Chaibasa 17km towards north from Benisagar.

PRESERVATION OF MONUMENTS

During the clearance of the southern portion of the mound, the previous year's exposed ancient boundary wall of the main temple was found continuing further towards the eastern side of the mound. Besides this boundary wall, the excavation works on the south-eastern side has yielded the remains of residential structures. In the residential complex the brick-paved floor of a kitchen along with some domestic iron objects have been found. The size of the kitchen is about 7.00x2.50m and connected to the main room. The dimension of the main room is about 7.00x7.10m. The most interesting feature of this room is that a drain 80cm long and 30cm in breadth is running across towards the eastern side of the room. Towards the northern side of the room and kitchen there had been provided two entrance gates from which open towards north on the main passage. The width of the passage is 2.30m running west to east.

Besides the exposition of the residential complex, the clearance work has been taken towards the extreme eastern side of the modern boundary wall and has been yielded the remains of a plinth of an ancient temple. The temple is facing towards west and has been built on a raised platform with flight of two steps. It consists of sanctum provided with a plain pedestal devoid of any deity. On the basis of architectural pattern and other details of the available materials of the temple, it can be assignable to *circa* 5th – 6th century CE.

Plate 123

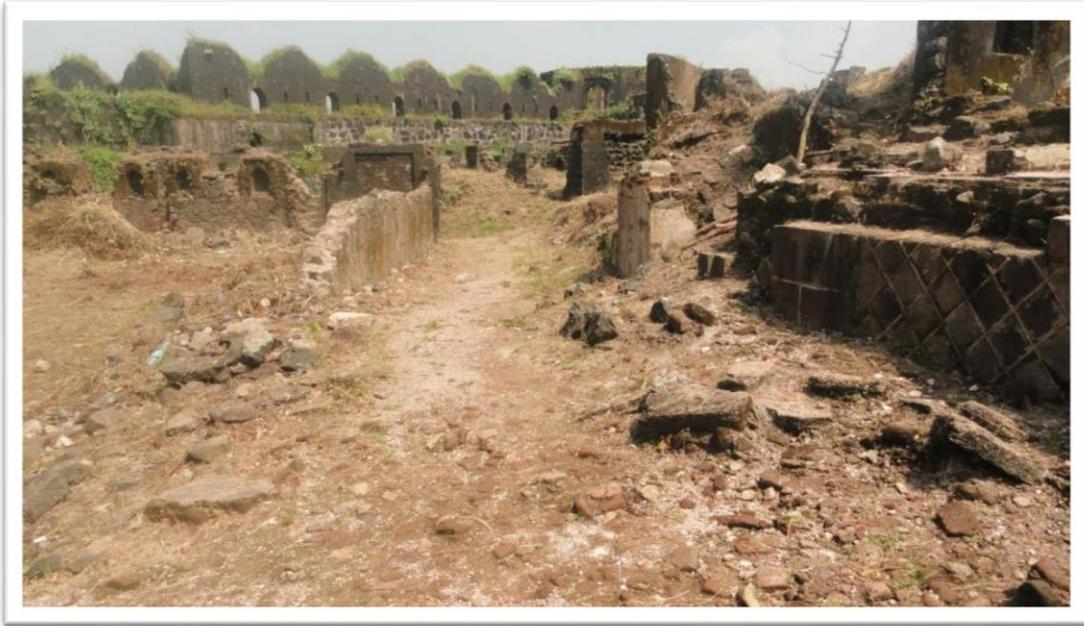


A



B

Janjira Fort: A, before and B, after exposing the structures



A



B

Janjira Fort: A, before and B, after exposing the structures

Plate 125

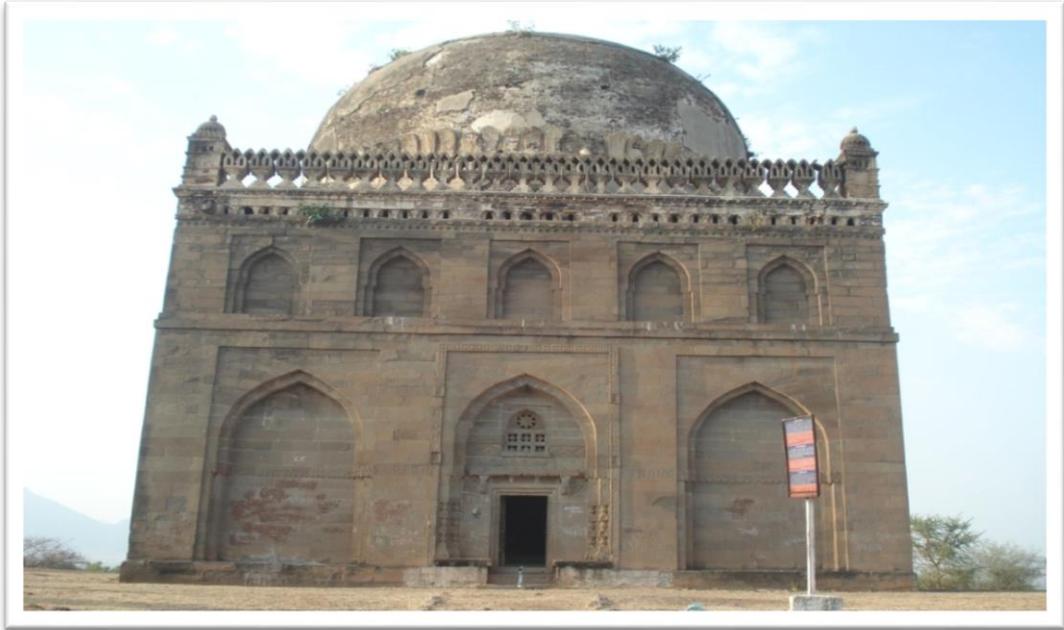


A



B

Amba- Ambica Caves: A, before and B, after conservation



A



B

Habshi Gumbad: A, before and B, during conservation

Plate 127

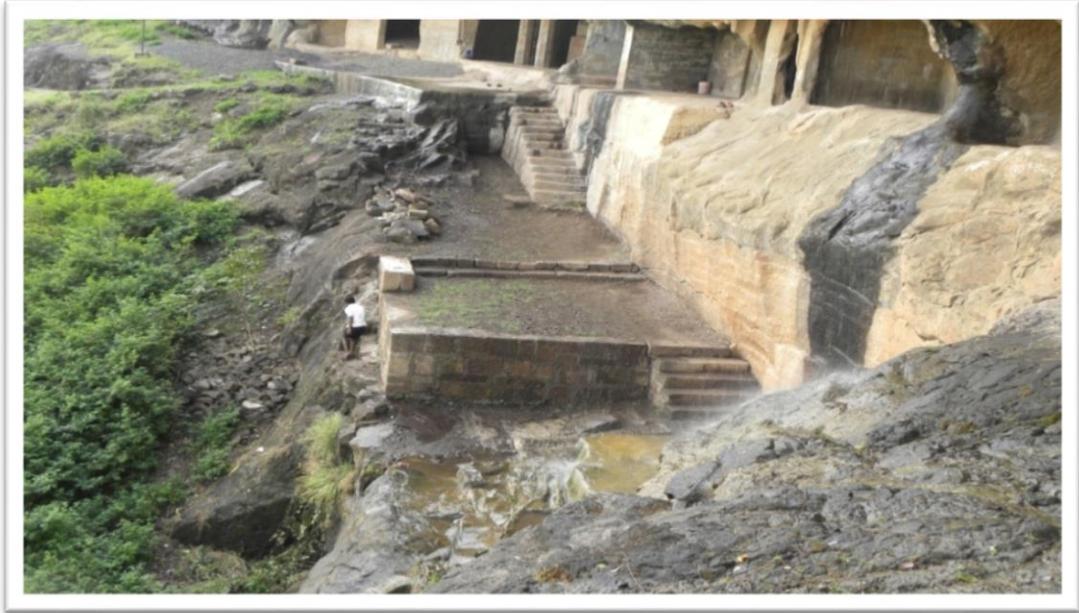


A



B

Habshi Gumbad: A, before and B, after conservation



A



B

Tulja Caves: A, before and B, after conservation

Plate 129



A



B

Kolaba Fort: A, before and B, after conservation



A



B

Kolaba Fort: A, before and B, after conservation

Plate 131



A



B

Kondane Caves: A, before and B, after conservation



A



B

Korlai Fort: A, before and B, after conservation

Plate 133



A



B

Korlai Fort Church: A, before and B, during conservation



A



B

Wada of Dancing Girl: A, before and B, after conservation

Plate 135



A



B

Sindhudurg fort, Malvan: A, before and B, after conservation



A



B

Nachanicha Mahal, Velapur: A, before and B, during conservation

Plate 137



A



B

Jakhinwadi Caves: A, before and B, after conservation



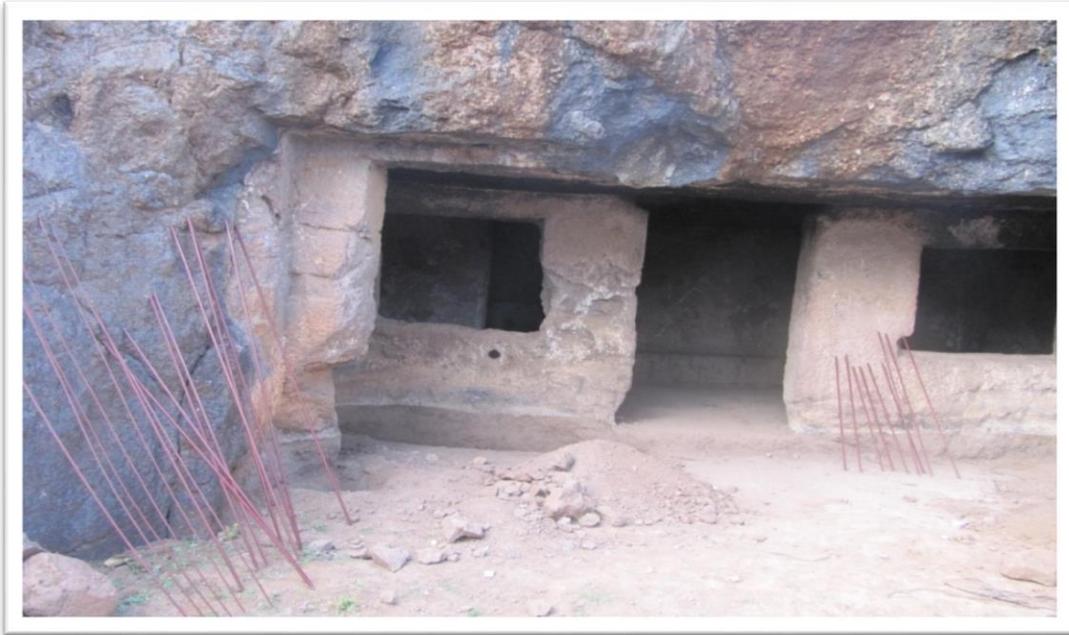
A



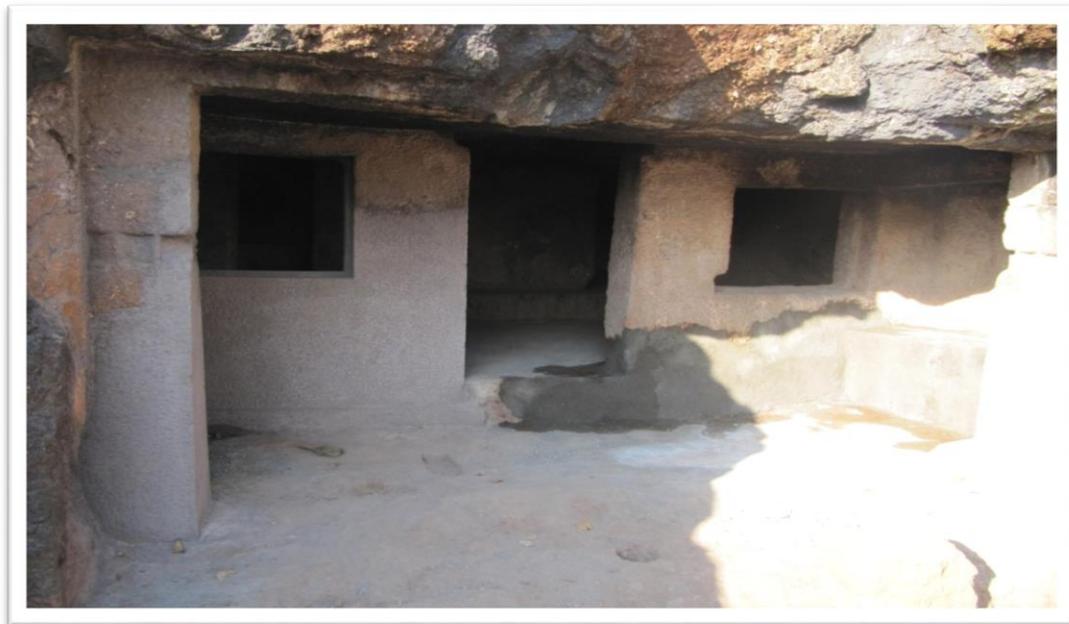
B

Jakhinwadi Caves: A, before and B, after conservation

Plate 139

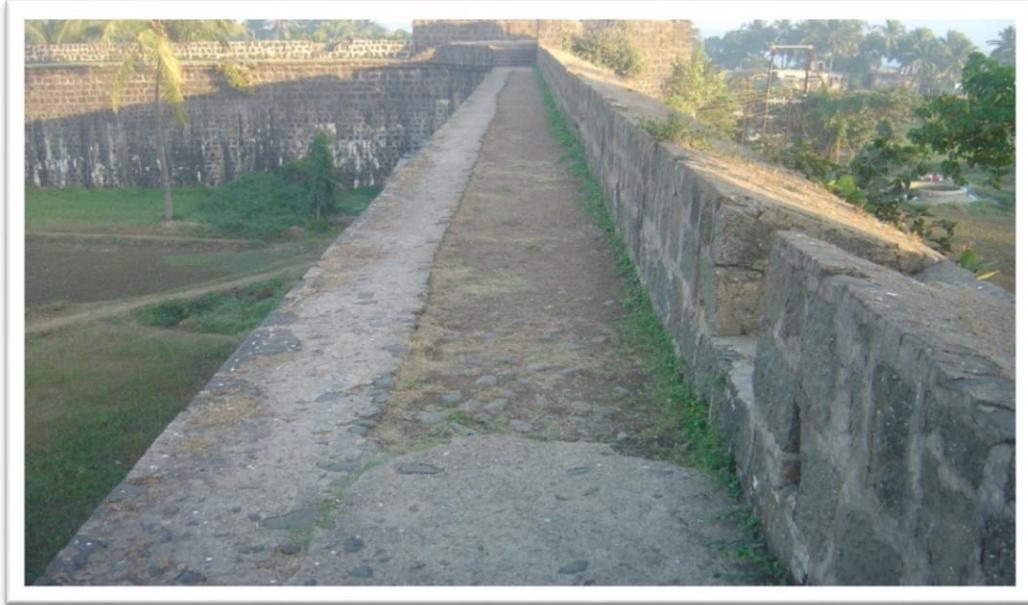


A



B

Jakhinwadi Caves: A, before and B, after conservation



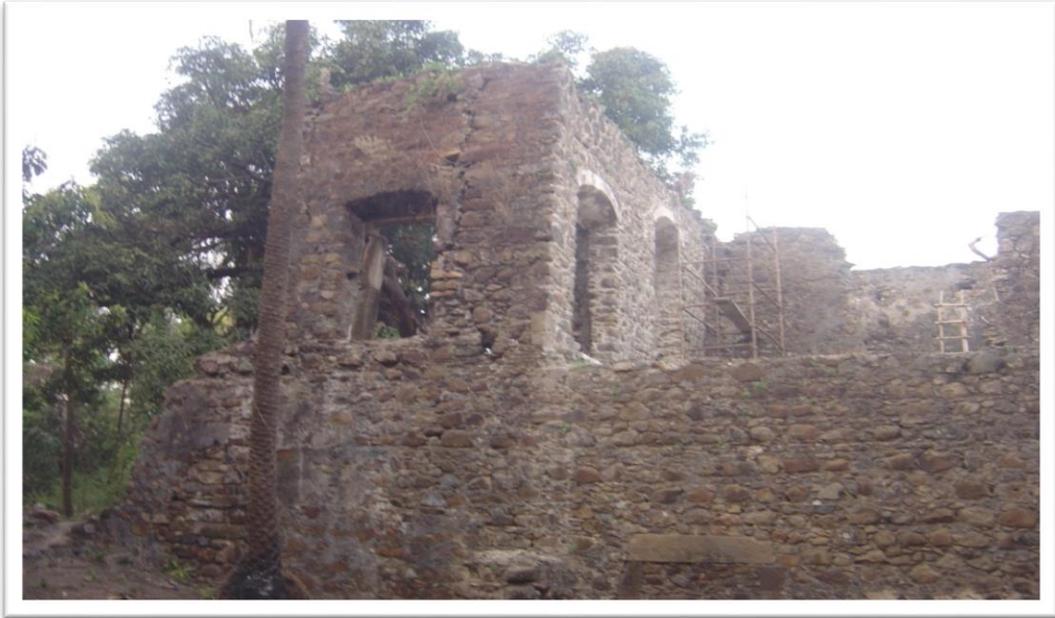
A



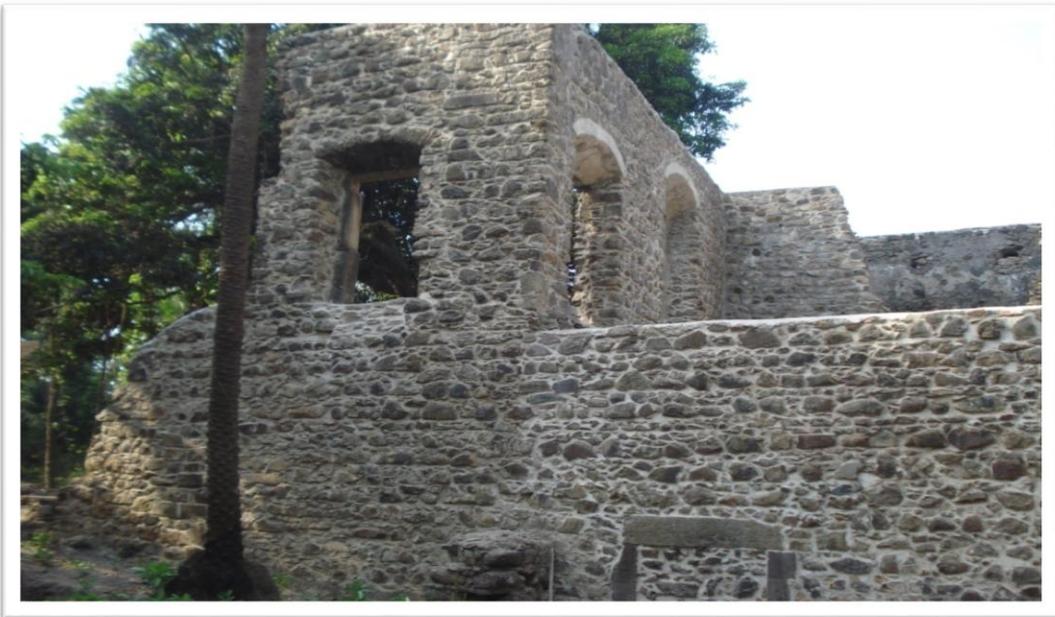
B

Arnala Fort: A, before and B, after conservation

Plate 141



A



B

Camara Town Hall: A, before and B, after conservation

VIII. ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS

ANDHRA PRADESH

1. SRI VEERABHADRA SWAMY TEMPLE, LEPAKSHI, DISTRICT ANANTAPUR

This temple is having murals executed on lime ground with granite slabs. The main conservation problem was accumulation of dust, dirt, soot, cobwebs, insect nests, etc. on the paintings. Superficial dust, dirt, insect nests, cobwebs, lime, oil stains, greasy matter, settled dust, etc. from the pillars and painted surface were removed carefully using sable hair brushes. The soot and ingrained dust was removed by using a mixture of 2 – ethoxy ethanol, toluene (Sulphur Free) and tri-ethanolamine in the ratio of 2:2:0.5. The prepared mixture was applied to the surface with the help of filter paper. After ensuring that the filter paper has absorbed the loosened accretions on it, the filter paper was slowly removed by moistening it with mixture of methanol and isopropanol. Then the surface was further cleaned with the mixture of methanol and isopropanol with cotton swabs. Work is in progress.

2. TRIKOTEWARA AND BHEEMESWARA TEMPLE, PUSHPAGIRI, DISTRICT CUDDAPAH

The chemical treatment and preservation work was taken up for the removal of lime, oil stains, greasy matter, settled dust, dirt, water marks and bat-excreta etc. and accretions from the pillar, ceiling and

walls of the interiors and lime, red ochre, iron stains on the exterior and interior of *mandapa* surface. Micro-vegetational growth along with dust and dirt were removed using 2-3% solution of liquid ammonia mixed with non-ionic liquid detergent followed by gentle brushing with nylon brushes. Lime accretions and red ochre from the stone sculptures were removed by using aqueous solutions of acetic acid with 2-3% dilution. Brushing with nylon brushes in between helps in dissolving the lime deposit from the surface. Iron stains were removed by using 5% oxalic acid solutions in aqueous medium. Remnant of acids, if any, was neutralized with dilute ammonia solution followed by thorough wash with plenty of plain water and left the whole surface to become dry. All the treated and dried surfaces were given a coat of 2% solution of sodium pentachlorophenate in aqueous medium as fungicide and a silicone based water repellent Wacker BS 290 in Mineral Turpentine Oil as a preservative coat. The work is in progress.

This temple also had some conservation problem on *prakara* wall and other structures. The conservation problems included removal of lime, red ochre, oil stains, settled dust, etc., from the pillars and walls of *prakara* wall. Micro-vegetational growth was removed by using a mixture of 3% liquid ammonia and non-ionic detergent followed by gentle brushing with nylon brushes of different sizes and shapes. Lime and red ochre coats were removed chemico-mechanically by using 3-5%

solution of glacial acetic acid in aqueous medium, followed by thorough wash with plenty of plain water. The work has been completed. Exterior wall of the temple and other structures were taken up for the chemical treatment work during the period under review. The conservation problems included removal of lime, red ochre, oil stains, settled dust, etc., accretions from the pillars and walls of the temple. Micro-vegetational growth was removed using a mixture of 3% liquid ammonia and non-ionic detergent followed by gentle brushing with nylon brushes. Lime coats and red ochre coats were removed chemico-mechanically by using 3-5% solution of glacial acetic acid in aqueous medium, followed by thorough wash with plenty of plain water. The work is in progress.

3. SHRI VISHWANATH SWAMY TEMPLE, SIVAPALLI, DISTRICT CUDDAPAH

This Temple is made of shale with the members of slate. Being the living one, the conservation problems included removal of lime, oil stains, greasy matter, settled dust, dirt, water marks and bat-excreta, etc., accretions from the pillars, ceiling walls of the interiors and lime, red ochre, iron stains on the exterior and interior of *mandapa* surface. Micro-vegetational growth along with dust and dirt were removed using 2-3% solution of liquid ammonia mixed with nonionic liquid detergent followed by gentle brushing with different nylon brushes. Lime accretions and red ochre from the stone sculpture were removed by using aqueous solutions of acetic acid with 2-3% solution. Brushing with nylon brushes in between helped in dissolving the lime deposit from the surface. Iron stains were removed by using 5% oxalic acid solutions in

aqueous medium. Remnant of acids was neutralized with dilute ammonia solution followed by thorough wash with plenty of plain water and left the whole surface to become dry. All the treated and dried surfaces were given a coat of 2% solution of sodium pentachlorophenate in aqueous medium as fungicidal treatment and a silicone based water repellent Wacker BS 290 in Mineral Turpentine Oil in 1:15 ratio as a preservative coat. The work is in progress.

ASSAM

4. GAURI SAGAR GROUP OF SHRINES, GAURISAGAR, DISTRICT SIBSAGAR

Partly stone and lime-plastered exterior of the Gaurisagar group of shrines was taken up for chemical treatment and preservation during the period under review, for eradication of micro-biological growth, dirt, dust and birds' droppings, etc. All the superficial accretions were chemically cleaned using aqueous ammonia and teepol mixture. The surface so cleaned and dried, was subjected to fungicidal treatment with dilute aqueous 2% sodium pentachlorophenate solution followed by application of two coats of silicone based Wacker BS-290 in Oil wet on wet to make the surface water repellent. The loose and fragile surface was strengthened with an ethyl silicate based Wacker OH-100.

5. AHOM PLACE, GAHGAON, DISTRICT SIBSAGAR

Brick built and lime-plastered Ahom Palace was subjected to scientific treatment and preservation to eradicate accretionary deposits like micro-biological growth, dirt, dust and

bird-excreta. The surface was cleaned using aqueous ammonia and non-ionic detergent mixture. The surface so cleaned and dried were then given fungicidal treatment with 5% santobrite solution followed by application of silicone based Wacker BS-290 in double coat (1:14) to impart water repellency to the surface.

6. TALATAL GHAR, JOYSAGAR, DISTRICT SIBSAGAR

Lime-plastered brick house having several storeys called Talatal Ghar at Joysagar was subjected to scientific treatment and preservation during the period under review, to eradicate the accretionary deposits like micro-biological growth dirt, dust and birds droppings, using 2 to 5% aqueous ammonia solution and teepol mixture. Fungicidal treatment was given to arrest re-growth with 5% santobrite solution followed by water repellency treatment with silicone based Wacker BS-290 in double coat. The work has been completed.

BIHAR

7. VIKRAM SHILA MAHAVIHARA, ANTICHAK, DISTRICT BHAGALPUR

The brick built main stupa having terracotta decoration at plinth level was subjected to scientific and preservation of fragile terracotta images. The micro-vegetational growth shrubs, dirt, dust and bird-excreta were removed with the help of dil Ammonia and non-ionic detergent mixture. Fungicidal treatment was carried out using 5% aqueous santobrite solution followed by consolidation of terracotta images with an ethyl silicate based Wacker-OH-100 and making the

entire cleaned surface water repellent by application of two coats (wet on wet) of silicone based Wacker BS-290 in Mineral Turpentine Oil(1:14). The work is in progress.

8. MAHABODHI MAHAVIHARA, BODH-GAYA, DISTRICT GAYA

Sandstone votive stupas at Bodhgaya Temple complex were taken up for scientific conservation of votive stupas during the period under review, for eradication of accretionary deposits like micro-biological growth, dirt, dust bird-excreta, and smoke using aqueous ammonia solution and non-ionic detergent and for removal of wax deposition organic solvents were used. The surface so cleaned was given fungicidal treatment with single coat of 5% solution of santobrite followed by application of silicone based Wacker BS-290 in Mineral Turpentine Oil (1:14) double coat (wet on wet).

9. MONASTERY COMPLEX 4 AND 5, NALANDA, DISTRICT NALANDA

In continuation to previous year's work, the Monastery Complex 4 and 5 at Nalanda were subjected to conservation treatment and preservation. The micro-vegetational growth, birds' droppings etc. were removed using aqueous solution of ammonia and non-ionic detergent followed by fungicidal spray using 5% solution of santobrite over the dried surface. Application of two coats (wet on wet) of silicone based Wacker BS-290 in Mineral Turpentine Oil (1:14) was given to make the surface water repellent.

10. MONASTERY COMPLEX 9, NALANDA, DISTRICT NALANDA

Conservation treatment and preservation work of the Monastery Complex 9 was undertaken first time during the period under review. Accretionary deposits like micro-biological growth, dirt, dust bird-excreta etc. were removed with the help of non-ionic detergent and aqueous ammonia solution. The surface so cleaned was subjected to fungicidal treatment using 5% aqueous sodium pentachlorophenate solution to arrest re-growth followed by application of a silicone based Wacker BS-290 in MTO (1:14 ratio). Two coats were applied over the cleaned and dried surface to protect the surface against bio-deterioration.

CHHATTISGARH

11. CHANDRADITYA TEMPLE, BARSOOR, DISTRICT DANTEWADA

Exterior as well as interior portion of the monument was taken up for scientific conservation. Before conservation, details of sculptures and carvings on exterior portion of the monument were not clearly visible due to dust, dirt deposition and dried micro-vegetational growth. Interior portion (*Garbhagriha* and *sabha mandapa*) was affected due to smoke and soot deposition while sculpture was also found to be in fragile and deteriorated condition. Some lime remains were also present in the exterior surface of vertical wall. Micro-vegetational growth including dust and dirt accretions etc. were cleaned by using 2% aqueous ammonia solution mixed with non-ionic detergent on its outer wall as well as in the *garbhagriha*. Lime remains were removed by chemico-mechanical

means by using 1-2% acetic acid and further its neutralization by dilute ammonia solution. The consolidation of fragile stone surface was carried out using an ethyl silicate based stone strengthener Wacker OH100 on dried surface. Solution of aqueous 2% sodium pentachlorophenate was given as fungicidal treatment to arrest further growth of micro-vegetation. Finally, Wacker BS 290 with dilution was applied on dried stone surface as the preservative.

12. MAHADEV TEMPLE, BASTAR, DISTRICT BASTAR

Exterior as well as interior portion of the monument was taken up for scientific conservation work. Details of exterior portion of monument was not clearly visible due to deposition of dust, dirt and dried micro-vegetational growth while interior portion become blackish due to deposition of oily and greasy material. Some lime splashes were also present on the specific part of the monument. Beautiful sculptures and carvings were also in deteriorated condition due to dissolution of mineral components of sandstone. Micro-vegetational growth including dust and dirt accretions, etc. were cleaned by using 2% aqueous ammonia solution mixed with non-ionic detergent on its outer wall as well as in the *garbhagriha*. Lime residues were removed by chemico-mechanical means using 2% acetic acid and further its neutralization by ammonia solution. Chemical treatment was followed by consolidation of fragile stone surface with ethyl silicate based stone strengthener Wacker-OH100. Fungicidal solution of aqueous 2% sodium pentachlorophenate was applied over the cleaned and dried surface. Finally, a silicone based water repellent Wacker-BS 290 with dilution of Mineral Turpentine Oil has

has been applied on dried stone surface as the preservative. The work is in progress.

13. BUDH VIHAR, SIRPUR, DISTRICT MAHASAMUND

Door jamb and the surrounding sculptures of Budh Vihar have been taken up for scientific conservation work. These sculptures are much deteriorated and in fragile condition due to environmental impact and were buried beneath the ground for many years before their excavation. Micro-vegetational growth including dust and dirt, etc. were cleaned by using 2% aqueous ammonia solution mixed with non-ionic detergent on door jamb and sculptures nearby. Consolidation of fragile stone surface was carried out with an ethyl silicate based stone strengthener Wacker-OH100. Fungicidal solution of aqueous 2% sodium pentachlorophenate applied out to arrest the re-growth of micro-vegetation. The work is in progress.

14. MAHADEV TEMPLE, NARAYANPUR, DISTRICT RAIPUR

Exterior as well as interior portion of the monument was taken up for scientific conservation work. Aesthetic beauty of the monument was affected due to deposition of dust, dirt and dried micro-vegetational growth. Sandstone sculptures kept inside the sculpture-shed had also lost their strength due to leaching of mineral components from their stone fabrics. Superficial dust, dirt and micro-vegetational growth were removed by using soft tooth/coir brushes. The work is in progress.

DELHI

15. ALAI DARWAZA, QUTUB COMPLEX, MEHRAULI

The chemical treatment and preservation work to Alai Darwaza (Interior) was taken up during the period under review. The interior surface of the dome and four walls were affected with thick layer of dust, dirt, soot, bird-excreta, cobweb and other atmospheric pollutants. The dome and four walls of the monument are of sandstone having intricate carving and all the four walls have marble *jalis* with hard accretions. The sandstone surface was extremely fragile and flaking at many places. The chemical treatment of sandstone/ marble surface was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from sandstone/marble surface using fuller's earth with 1-3% sodium carbonate as additive. Flaking and scaling surface to sandstone was consolidated with an ethyl silicate based stone strengthener. OH-100 stone strengthener (OH-100) was mixed with sandstone powder to fill up the minor cracks adjoining the sandstone surface (pointing work).

16. HAUZ KHAS COMPLEX, NEW DELHI

The chemical treatment and preservation work to Hauz Khas complex was taken up for the removal of superficially adherent dusts, dirt, and smoke and soot pollutants. The conservation problem was mainly on lime plaster / sandstone / quartzite /

marble surface. The entire surface of the monument was affected with tremendous growth of micro-vegetation along with thick layer of dust, dirt, soot, bird-excreta and other atmospheric pollutants. The painted surface at the interior of dome was also taken up for restoration work. The chemical treatment of lime plaster / sandstone / quartzite / marble surfaces was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Painted surface at the interior of dome was treated with organic solvents and preserved with 1% PVA solution in Toluene. Lime plaster surface was subjected to bleaching powder treatment to remove microvegetation etc. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from sandstone/marble surface using fuller's earth with 1-3% sodium carbonate. After clay pack treatment/fungicide sodium pentachlorophenate was applied on exterior surface and finally preserved with a coating of a silicone based Wacker BS-290 diluted in MTO as water repellent on exterior lime plaster and stone surface. The work has been completed.

17. WAZIRPUR KA GUMBAD, MUNIRKA, NEW DELHI

The chemical treatment and preservation of Wazirpur Ka Gumbad, which is made of lime plastered sandstone/quartzite surface was undertaken for the removal of dust, dirt, soot and other pollutants. The lime plaster surface of the tomb of main drum and dome was affected with enormous growth of micro-vegetation. The chemical treatment of sandstone and lime plaster structure was carried out with a mixture of 3% ammonia

solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dust, dirt, smoke and soot pollutants. Lime plaster surface was subjected to bleaching powder treatment. After chemical treatment, fungicide sodium pentachlorophenate was applied all over the surfaces except marble, and finally preserved with a coating of a silicone based Wacker BS – 290 diluted in MTO as water repellent on lime plaster and stone surface. The work has been completed.

18. SAWAN PAVILIAN, RED FORT, DELHI

The chemical treatment and preservation work of Sawan Pavilian; Red Fort was taken up during the period under review. The interior walls were affected with thick layer of dust, dirt, soot, bird-excreta, cobwebs, tarry matter and other atmospheric pollutants, while the exterior lime plaster and stone surface were affected with thick layers of micro-vegetational growth.

The chemical treatment of marble/sandstone/lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from marble surface using fuller's earth with 1-3% sodium carbonate as additive. Fungicide sodium pentachlorophenate was applied on lime plaster and sandstone surface to prevent further fungal attack and finally preserved with a coating of a silicone based Wacker BS- 290 diluted in MTO as water repellent on lime plaster and stone surface.

19. NAUBAT KHANA, RED FORT, DELHI

The restoration work of exposing the hidden paintings (i.e. removal of lime wash) and preservation of exposed paintings at Naubat Khana, Red Fort was taken up 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 these paintings, thick coat of lime wash was removed using glacial acetic acid as well as by mechanical means. The work is in progress.

20. SHAH BURJ, RED FORT, DELHI

The chemical treatment and preservation work of Shah Burj, Red Fort was undertaken during the period under review. The interior walls were affected with thick layer of dust, dirt, soot, bird-excreta, cobwebs, tarry matter and other atmospheric pollutants while the exterior lime plaster and stone surface were affected with thick layers of micro-vegetational growth. The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dust, dirt, smoke and soot pollutants. Lime plaster surface was subjected to bleaching powder treatment. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from marble surface using fuller's earth with 1-3% sodium carbonate. After clay pack treatment, fungicide sodium pentachlorophenate was applied on exterior surface and finally preserved with a coating of a silicone based Wacker BS – 290 diluted in MTO as water repellent on exterior

lime plaster and stone surface. The work is in progress.

21. BHADON PAVILIAN, RED FORT, DELHI

The Chemical treatment and preservation work of Bhadon Pavilion, Red Fort, was undertaken during the period under review. The interior walls were affected with thick layer of dust, dirt, soot, bird-excreta, cobwebs, tarry matter and other atmospheric pollutants while the exterior stone surface was affected with thick layers of micro-vegetational growth. The chemical treatment of marble/sandstone/*lakhauri* brick surface was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from marble surface using fuller's earth with 1-3% sodium carbonate. After clay pack treatment, fungicide sodium pentachlorophenate was applied on sandstone/*lakhauri* brick surface and then it was finally preserved with a coating of a silicone based Wacker BS–290 diluted in MTO as water repellent on stone surface. The work is in progress.

22. QUWWATUL - ISLAM MOSQUE, QUTB COMPLEX, NEW DELHI

The chemical treatment and preservation of Quwwatul Islam Mosque, Qutub complex was taken up during the period under review. The entire surface of the monument was affected with tremendous growth of micro-vegetation along with thick layer of dust, dirt, soot, bird-excreta and other atmospheric pollutants. The chemical treatment

of limestone/quartzite/lime plaster surface is executed with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Exterior lime plaster surface was subjected to bleaching powder treatment and iron stain marks from the stone surface were removed with oxalic acid. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from quartzite/lime stone surface using fuller's earth with 1-3% sodium carbonate. Fungicide sodium pentachlorophenate was applied on exterior surface and finally preserved with a coating of a silicone based Wacker BS-290 diluted in MTO as water repellent on exterior lime plaster and stone surface. The work is in progress.

23. RAMPART WALL UNDER FLAG-MAST, RED FORT, DELHI

The chemical treatment of Rampart wall under Flag-mast, Red Fort, facing Chandani Chowk was executed during the period under review. The sandstone surface was covered with superficial deposition of dust, dirt, soot, and other accretions due to atmospheric and vehicular pollution and calcareous deposits. A 3% aqueous solution of ammonia and Rankleen Neutral was used for chemical cleaning work. Calcareous deposits were removed using dilute acetic acid on affected areas followed by thorough washing with water. Finials (9 No's.) were received from Delhi circle and treated chemically in the office laboratory. The finials were cleaned and retouched by using golden powder in varnish. Two elephants at Hathi Gate were cleaned with liquid ammonia and Rankleen Neutral for removal of dust, dirt and stains of bird-excreta

etc. Cracks in the teeth etc. were treated and filled by using araldite. Finally, a fine coat of colour in thinner was applied on the elephant surface. The huge brass gate at entrance to the Meena Bazaar was covered with thick layer of dust and dirt at different places and had blackened due to atmospheric effects. The lower surface of brass gate having red spots due to visitors spit. The treatment of the brass gate was carried out by using 3-5% alkaline solution of sodium potassium tartarate (Rochelle salt) and then it was preserved by using dilute solution of lacquer varnish in thinner.

24. BEGUMPURI MOSQUE, DELHI

The chemical treatment and preservation work of Begumpuri Mosque was taken up during the period under review. The lime plaster surface was affected by the deposition of dust, dirt, soot and other pollutants. The lime plaster surface of the drum and dome was affected with enormous growth of micro-vegetation. The chemical treatment of lime plaster structure was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Lime plaster surface was subjected to bleaching powder treatment. After chemical treatment, fungicide sodium pentachlorophenate was applied all over the exterior surface and finally preserved with a coating of a silicone based Wacker BS-290 diluted in MTO as water repellent on lime plaster surface.

25. WAZIRPUR KA GUMBAD COMPLEX, R.K. PURAM, NEW DELHI

The chemical treatment and preserva-

-tion of a tomb at Wazirpur Ka Gumbad complex, R.K. Puram was taken up during the period under review. The entire surface was affected by the deposition of dust, dirt, soot, human vandalism, bird-excreta and other pollutants. Likewise, the lime plaster surface of the structure and the lower walls are affected with enormous growth of micro-vegetations. The chemical treatment of sandstone and lime plaster structure was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dust, dirt, smokes and soot pollutants. 1-2% of tree killer (Glycophgate) diluted in water is used for the removal of plant weeds. Lime plaster surface is subjected to bleaching powder treatment. After chemical treatment fungicide sodium pentachlorophenate was applied all over the surfaces except marble surface and finally preserved with a coating of a silicone based water BS – 290 diluted in MTO as water repellent on lime plaster and sandstone surface.

26. MOHMMADI WALI MOSQUE, SIRI FORT, NEW DELHI

The chemical treatment and preservation work was taken up for the removal of dust, dirt, soot and other pollutants from sandstone surface and micro-vegetational growth from the lime plaster surface. The chemical treatment of sandstone and lime plaster structure was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Lime plaster surface was subjected to bleaching powder treatment. Painted area on the interior was cleaned with mixture of organic solvents. After chemical

treatment fungicide sodium pentachlorophenate was applied all over the exterior surface and finally preserved with a coating of a silicone based Wacker BS–290 diluted in MTO as water repellent on lime plaster and stone surface.

27. KASHMERE GATE, DELHI

The chemical treatment and preservation work was taken up of Kashmere Gate for the removal of dust, dirt, soot, other pollutants and micro-vegetational growth from the entire surface (sandstone/brick surface, lime plaster). The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dust, dirt, smokes and soot pollutants. Lime plaster surface was subjected to bleaching powder treatment. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from stone surface using fuller's earth with 1-3% sodium carbonate. After clay pack treatment, fungicide sodium pentachlorophenate was applied on exterior stone and lime plaster surfaces and finally preserved with a coating of a silicone based Wacker BS–290 diluted in MTO as water repellent on stone and lime plaster surface.

28. AJMERI GATE, DELHI

The chemical treatment and preservation work to Ajmeri Gate was undertaken during the period under review. The entire surface was affected by the thick layers of micro-vegetational growth along with

deposition of dust, dirt, soot and other pollutants. The sandstone surface was extremely fragile and flaking was observed at many places. The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dust, dirt, smokes and soot pollutants. Sandstone with flaking, scaling and exfoliating surface was consolidated with an ethyl silicate based stone strengthener OH-100. After chemical treatment fungicide sodium pentachlorophenate was applied all over the surfaces and finally the chemically treated area was preserved with a coating of a silicone based Wacker BS- 290 diluted in MTO as water repellent.

29. DELHI GATE, DELHI

The chemical treatment and preservation work of Delhi Gate was undertaken during the period under review. The surface was affected by the deposition of dust, dirt, soot and other pollutants. The lime plaster surface was affected with enormous growth of micro vegetation. The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 5% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dust, dirt, smokes and soot pollutants. Lime plaster surface was subjected to bleaching powder treatment and stain marks were also removed with oxalic acid. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from interior stone surface using fuller's earth with 1-3% sodium carbonate.

After clay pack, fungicide sodium pentachlorophenate was applied all over the surfaces and finally preserved with a coating of a silicone based Wacker BS- 290 diluted in MTO as water repellent on stone and lime plaster surface.

30. KHOONI DARWAZA, DELHI

The chemical treatment and preservation work of Khooni Darwaza was undertaken during the period under review. The surface was affected by the deposition of dust, dirt, soot and other pollutants. The sandstone /quartzite/lime plaster surface was affected with enormous growth of micro vegetation along with thick layers of dust, dirt, soot and stain marks, etc. The chemical treatment of sandstone/quartzite/lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% Rankleen Neutral (non-ionic detergent) for the removal of superficially adherent dust, dirt, smoke and soot pollutants. Clay pack treatment was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from interior stone surface using fuller's earth with 1-3% sodium carbonate. After clay pack treatment fungicide sodium pentachlorophenate was applied on sandstone and lime plaster surfaces to prevent further fungal attack and finally preserved with a coating of a silicone based Wacker BS- 290 diluted in MTO as water repellent on stone and lime plaster surface.

DAMAN & DIU

31. SAINT PAUL CHURCH, DIU

The scientific conservation and preserv-

-ation work of wooden structures was taken up during the period under review. The conservation problems included the removal of old preservative, which was covered with dust, bird droppings, etc. Due to the humid and saline atmosphere, the old preservative became sticky and dust and dirt, adhered on to the carvings. The presence of saline moisture induces deterioration of wood. Removal of superficial dust, dirt etc. from surface was carried out using soft brushes. Partial removal of the old preservative and unwanted accretions from the wood was carried out using mixture of organic solvents i.e. mixture of toluene, triethanolamine, mixture of methanol, 2-ethoxy ethanol, diacetone alcohol, with the aid of soft brushes and cotton swabs. Work is in progress.

GOA

32. BASILICA OF BOM JESUS, VELHA GOA

The scientific conservation work was taken up for gilded wooden altars and sculptures suffering with severe termite activities. The cellulose present in wood served as the food for termites, hence the work of fumigation for entire church was taken up during the period under review. The fumigation was carried out with ethnocide gas (mixture of carbon-di-oxide and ethylene oxide in 9:1 proportion) ethoxide gas giving the exposure of 36 hours. Since the church is having a tiled roof, the false ceiling was also prepared to avoid any leakage of gas. Efficacy of fumigation was checked by keeping the Agar dish for measurement of insect count before and after fumigation.

GUJARAT

33. MAC MURDO BUILDING, DISTRICT ANJAR

The paintings were found to be badly affected due to seepage of rain water from the roof top as well as by capillary action. As a result, peeling and powdering of paint layer was observed. Most of the paintings of the east wall are missing due to moisture and salt effect. The work of restoration of paintings on north, west and south walls were resumed during the period under review. Conservation measures involved chemical cleaning, fixing, filleting colour re-integration and preservation. Cleaning of paintings and removal of dust, dirt and other accretions from the painted layer were carried out by using organic solvents such as methanol, ethoxyethanol, diacetone alcohol, butylacetate, triethanolamine, toluene, turpentine and butyl amine. Work is in progress.

34. JAMI MASJID, PARSIVAD, DISTRICT BHARUCH

In continuation to previous year's work, the exterior sandstone surface of Jami Masjid was taken up for chemical treatment and preservation. The growth of micro-vegetation occurred on the surface of exterior walls and *chhajja* coupled with deposition of dust and dirt. A blackish layer was formed on the surface due to dried micro-vegetational growth. In some parts, the sandstone walls and domes had deteriorated due to variation in temperature, humidity and other atmospheric vagaries. Removal of micro-vegetational growth and unwanted accretion from the stone surface were carried out by using 2-3% ammonia solution and 1% non-ionic detergent in 3:1 ratio followed by brushing with soft nylon brushes, and thorough washing with plenty of plain water. Filling of minor cracks were also attended to by using lime mortar paste. The pulverized stone part of monument was consolidated with Wacker OH-100, an ethyl silicone based stone strengthener

and left for few days. Fungicidal treatment was given by using 2% solution of sodium pentachlorophenate in water to arrest further growth of micro-vegetation. Finally, water repellent coating was applied with Wacker BS-290 as preservative.

35. RATNESWAR OLD TEMPLE, RATANPUR, DISTRICT GODHRA

The treatment and preservation work of this temple was taken up during the period under review. The temple was affected with growth of micro-vegetation, dust and dirt. Stones of walls, pillars and sculptures were deteriorated due to atmospheric vagaries like variation in temperature, humidity, rains, etc. Removal of micro-vegetational growth and other accretions from the stone surface was carried out using 2-3% ammonia solution and 1% non-ionic detergent with the aid of soft nylon brushes followed by thorough washing with plenty of plain water. Deteriorated and pulverized stone areas were consolidated with an ethyl silicone based Wacker OH-100. Fungicidal treatment was given by spraying of 2% solution of sodium pentachlorophenate in aqueous medium. Finally, Wacker BS-290 was applied on the cleaned and dry surface as water repellent coat.

36. JASMAL NATHJI MAHADEV TEMPLE, ASODA, DISTRICT MEHSANA

In continuation to previous year's work, the scientific conservation work was taken up to remove the extensive micro-vegetational growth along with dust, dirt, and lime coat, sooty and oily stains. Carvings were concealed under these accretions. The exterior walls of the temple were highly eroded due to weather-

-ing effects. Micro-vegetational growth and other superficial accretions were removed by using 2-3% ammonia and 1% non-ionic detergents in water in 3:1 ratio with the help of soft nylon brushes. Removal of lime coats from the surface was carried out by chemico-mechanical means using 1-2% solution of acetic acid followed by thorough washing with plenty of plain water. Deteriorated and pulverized stone areas were consolidated with an ethyl silicone based Wacker OH 100. Fungicidal treatment was given by spraying 2% sodium pentachlorophenate in aqueous medium on the clean surface. Finally, Wacker 290 in was applied on exterior surface as water repellent coat.

37. JAMI MASJID, PAVAGARH DISTRICT PANCHMAHAL, GODHARA

The work of chemical treatment and preservation was continued during this year. Jami Masjid was covered with dust and dirt, accretion of bats' excreta, hand grime, water seepage marks and micro-vegetational growth. The old lime plaster became fragile and at several portions, flaking was observed. The sandstone of pillars, walls and interior of domes were deteriorated due to the bats' activity, seepage of water and other weather effects. Dust and dirt along with micro-vegetational growth was removed by using 2-3% ammonia and 1% non ionic detergents in 3:1 ratio, with the soft nylon brushes. Stone surface affected with bats' excreta was treated with ammonium bicarbonate, and ammonium carbonate solution in paper pulp. Pulverized stone surface at several places was treated with an ethyl silicone based Wacker OH-100. Finally on dried surface silicone based Wacker BS-290 in was applied on exterior surface as water repellent coat.

38. JAIN TEMPLE, PAVAGARH, DISTRICT PANCHMAHAL GODHARA

In continuation to previous year's work, out of the group of four Jain temples, one temple i.e. Chandra Prabhu Jain temple was under taken for chemical treatment and preservation work during the period under review. This temple is built of sandstone. The conservation problems included micro-vegetational growth, dust and dirt, grime, oil bound distempers, thick lime coats etc. At several places, the temple surface had deteriorated due to weathering effect. Micro-vegetational growth and other superficial accretions were removed by using mixture of 2-3% ammonia and 1% non ionic detergent in water with the help soft nylon brushes. Hard thick lime coats and oil bound distempers from the surface were removed by chemico-mechanical means by using 2-3 % acetic acid solution in water. The work is progress.

39. LALIGATE, PAVAGARH, DISTRICT PANCHMAHAL GODHARA

This temple is built of sandstone. The growth of micro-vegetation along with dust and dirt was observed on bastion walls and pathway wall surface. A blackish layer and in some portion white patches were formed on the interior surface of the cells due to deposition of the bats' excreta. The stone is deteriorated due to bats' activity, seepage of water, variation in temperature and other atmospheric vagaries. Micro-vegetational growth along with dust, dirt were removed by using 2-3% ammonia solution and 1% non-ionic detergent in water with the help of soft nylon brushes. Stone surface affected with bats' excreta was treated with sodium bicarbonate, sodium carbonate,

EDTA in Carboxy Methyl Cellulose and cleaned with solution of citric acid and oxalic acid. Finally, the cleaned area was treated with ammonia solution and non-ionic detergent solutions. The entire treated area was thoroughly washed with plenty of plain water in order to remove any traces of acidic/ basic ions adhered to the stone surface. The deteriorated and fragile stone parts of the walls were consolidated with Wacker OH-100, an ethyl silicate based stone strengthener and left for few days. Fungicidal treatment was given by spraying 2% solution of sodium pentachlorophenate in water. Finally, on dried surface, a silicone based Wacker BS-290 was applied on the exterior surface as water repellent.

HARYANA

40. JAL MAHAL, NARNAUL, DISTRICT MAHENDRAGARH

Chemical conservation work of entrance gate and platform of Jal Mahal, Narnaul was taken up during the period under review. The entrance gate, walls and platform were badly affected with micro-vegetational growth along with dust and dirt, etc. These accretions were giving shabby look to the monument as well as deteriorating the structure by their harmful secretion. All these superficial accretions and micro-vegetational growth were removed with suitable chemicals followed by application of fungicide over stone and plastered surface of the monument. Ethyl silicate based stone strengthener was used for consolidating the deteriorated, weathered and weak stone of the monument. The treated surface was given silane and siloxane based water repellent treatment.

**41. SHEIKH CHILLI'S TOMB, THANESAR,
DISTRICT KURUKSHETRA**

The outer portion of the monument made of marble and sandstone was taken up for scientific conservation during the period. Preliminary arrangements were made to commence the work during the period.

HIMACHAL PRADESH

**42. RUINED FORT, KANGRA, DISTRICT
KANGRA**

The entire area of Jaina temple and its surrounding structures was taken up for consolidation, treatment and preservation during the period. The stone surface was chemically treated using aqueous solution of ammonia and non-ionic detergent to eradicate the enormous biological growth and other accretions. The weathered stone surface was consolidated with ethyl silicate based stone strengthener. The fungicidal treatment was given to the treated and dried stone surface using aqueous solution of sodium pentachlorophenate followed by silane and siloxane based water repellent treatment.

**43. CHAMUNDA DEVI TEMPLE, CHAMBA,
DISTRICT CHAMBA**

Scientific conservation work on the monument was taken up for consolidation, treatment and preservation. The stone surface was thickly covered with micro-vegetational growth and other accretions causing the deterioration of the stone. The chemical treatment was carried out for removal of micro-vegetational growth and other accretions using aqueous solution of ammonia and wetting

agent. The deteriorated and weathered stone surface was consolidated with ethyl silicate based stone strengthener. The treated and dried stone surface was given fungicidal treatment using aqueous solution of sodium pentachlorophenate followed by silane and siloxane based water repellent treatment.

**44. NARBADESHWAR TEMPLE, TIRA
SUJANPUR, DISTRICT HAMIRPUR**

Compound wall including the entrance gate of the monument was taken up for consolidation, treatment and preservation during the period. The stone surface was thickly covered with micro-vegetational growth and other accretions causing the deterioration of the stone. The chemical treatment was carried out for removal of micro-vegetational growth and other accretions using aqueous solution of ammonia and wetting agent. The deteriorated and weathered stone surface was consolidated with ethyl silicate based stone strengthener. The treated and dried stone surface was given fungicidal treatment using aqueous solution of sodium pentachlorophenate followed by silane and siloxane based water repellent treatment.

**45. SIDHNATH TEMPLE, BAIJNATH,
DISTRICT KANGRA**

The entire exterior and interior portion of the monument was taken up for consolidation, treatment and preservation during the period. Outer portion of the monument was covered with dust, dirt, micro-organism and thick layer of lime wash and the inner portion with smoke, soot and hard lime wash layer. The hard lime wash layer was removed using aqueous solution of glacial

acetic acid by physico-chemical method and other accretions were removed using aqueous solution of ammonia and non-ionic detergent. The weathered stone surface was consolidated with ethyl silicate based stone strengthener. The fungicidal treatment was given to the treated and dried stone surface using aqueous solution of sodium pentachlorophenate followed by silane and siloxane based water repellent treatment.

46. BAIJNATH TEMPLE COMPLEX, BAIJNATH, DISTRICT KANGRA

Scientific conservation work of compound and surrounding walls of the Baijnath temple complex was taken up during the period. The stone surface was thickly covered with micro-vegetational growth and other ingrained accretions causing the deterioration of the stone. The chemical treatment was carried out for removal of micro-vegetational growth and other accretions using aqueous solution of ammonia and wetting agent. The deteriorated and weathered stone surface was consolidated with ethyl silicate based stone strengthener. The treated and dried stone surface was given fungicidal treatment using aqueous solution of sodium pentachlorophenate followed by silane and siloxane based water repellent treatment.

KARNATAKA

47. SUMMER PALACE, DARIYA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA

The painted area was undertaken for dusting, i.e. removal of superficial accretion like dust, dirt, cobwebs, insects' nest, etc. Various types of soft brushes, feather duster,

vaccum cleaner in slow mode were used for the purpose. Mud pockets were first softened with organic chemicals and there after removed slowly with scalpels. Cracks and crevices in the roof were filled with sealant. Total roof was consolidated with an ethyl silicate based stone strengthener Wacker OH 100. Finally, water repellent (Wacker SMK 1311) diluted with water was applied in two coats wet on wet basis. Summer Palace of Tipu Sultan at Daruya Daulat Bagh is full of paintings over the wooden ceiling as well as lime-plastered walls. Canvas fixed to the wooden ceiling was loosened in many places due to ageing. Scientific conservation was carried out using different organic solvents like ethanol, cellosolve, tri-ethanol amine, di-butyl phthalate, butyl lactate, etc. Old preservative coating was removed with toluene (sulphur free). Oil of turpentine was used as colour restrainer. Gaps between the teak wood planks were filled with saw dust mixed in animal glue, bees' wax and sodium pentachlorophenate. Loose canvas was refixed to wooden ceiling with animal glue and bees' wax mixture after adding sodium pentachlorophenate to repel insect attack in future. Mending work was also attended by fixing the missing areas using above mixture. Texture white was coated three times in succession. Minimum colour re-integration work was carried out to give a symmetrical look to the ceiling. (Pl. 142).

48. JAINA TEMPLES AND INSCRIPTIONS, MULLUR, DISTRICT COORG

The ancient monument, consisting of three temples named Shanthinatha Temple, Paraswanatha temple, Chandranatha Temple and Inscriptions is located in Mullur, Coorg. There are at least 10 inscriptions in Mullur that

throw light on Jainism which was prevalent in the area. The temples are made of granite stones. The exterior stone surface of the temples was covered with dust, dirt and thick micro-vegetational growth due to heavy rainfall in this area. In the interior area, stone surfaces were having old lime coats. The general cleaning was carried out using liquid ammonia and non-ionic detergent with 3-5% dilution in water. Aqueous acetic acid (2-3%) was used for the removal of lime and red ochre accretions, followed by neutralization treatment with dilute ammonia solution. To arrest the re-growth, application of 2% aq. solution of sodium pentachlorophenate was applied over the dried surface. Finally, a silane, siloxane based emulsion Wacker SMK 1311 in potable water (1:12 respectively) was applied as water repellent in two coats (wet-on-wet basis).

49. SOUMYA KESAVA TEMPLE NAGAMANGALA, DISTRICT MANDYA

Soumyakesava temple is a massive structure of 12th century CE built out of chloritic schist stone and granite. The monument was covered with thick lime coats and micro-vegetational growth in the exterior parts. The general cleaning was carried out using ammonia and non-ionic detergent with 3-5% dilution in water. Aqueous acetic acid (2-3%) was used for the removal of lime and red ochre accretions, followed by neutralization with dilute ammonia solution. Minimum quantity of 2% oxalic acid in water was used for the removal of hard red ochre accretions in some areas. Oily and sooty accretions were removed by clay pack method using Fullers' earth mixed with sodium carbonate and bicarbonate mixture packing on stone. The

cleaned and dried surface was given fungicidal treatment using 2% aq. sodium pentachlorophenate. Finally, a silane, siloxane based emulsion Wacker SMK 1311 in potable water (1:12 respectively) was applied as water repellent in two coats (wet-on-wet basis) over the exterior surface only.

50. NAMBINARAYANA TEMPLE, THONNUR, DISTRICT MANDYA

This temple is constructed of granite stone and dedicated to Lord Vishnu. The outer surface of the temple was covered with dust, dirt and thick micro-vegetational growth. The interior of the temple was covered with thick coats of soot, oily accretions as it is a living monument. Loose sculptures inside the temple were also covered with oil and other materials. Many areas of the outer as well as inner surface were covered with thick lime coats and red ochre. General cleaning was carried out using dilute ammonia solution and non-ionic detergent mixed together (2-3%). Lime accretion and red ochre was removed using 2-3% dilute acetic acid solution followed by neutralization with dilute ammonia solution to counter acidic act. Finally, the area was thoroughly washed with plain water. The weak areas were given strengthening with an ethyl silicate based stone strengthener Wacker OH-100 for consolidation. 2% aqueous solution of sodium pentachlorophenate was sprayed all over the cleaned surface as a fungicide. Finally, silicone based water repellent Wacker SMK-1311 diluted in potable water was coated all over the exterior cleaned surface in two coats wet on wet basis.

51. SRIKANTESWARA TEMPLE, NANJANGUD, DISTRICT MYSORE

The scientific conservation of interior surface of Srikanteswara Temple was carried out during the period under review. The work is in progress.

52. ANANTHA PADMANABHA TEMPLE, KARKALA, DISTRICT UDUPI

Ananta Padmanabha temple devoted to Lord Vishnu is said to be built as early as 16th century. In the *garbhagriha*, an idol of Vishnu is depicted in a reclining position over the serpent Ananta or Adi Sesha. The temple is made of granite stone. In the *vimana*, there are some wooden sculptures and the door-jamb is also having typical wooden carvings. The stone surface of the temple had thick growth of micro-vegetation in exterior surface and oily accretion, dust, dirt, etc. in interior surface. The general cleaning was executed using liquor ammonia and non-ionic detergent with a dilution of 3-5%. The lime accretions were removed using 2-3% solution of acetic acid in water followed by neutralized with 3-5 soln of ammonia. Oily and soot accretions were removed by clay pack method using Fullers' earth, sodium carbonate and bicarbonate mixture. Wooden areas were treated with 2 ethoxy ethanol, turpentine, toluene (Sulphur free), methanol, morpholine, etc. to remove dust, dirt, soot, etc. and preserved using the coating of linseed oil and turpentine oil. Finally, the cleaned stone parts in the exterior surface were given fungicidal coat with 2% aqueous sodium pentachlorophenate and subsequently preserved using a silicone based water repellent – Wacker SMK – 1311 diluted with potable water two coats (wet-on-basis).

53. MAHADEVA TEMPLE, ITTAGI, DISTRICT KOPPAL

Exterior portion of the monument has been taken up for scientific conservation work. The exterior surface of main temple has very fine carvings. The exterior of this monument is affected by blackness due to environmental effect including dust and dirt along with micro-vegetational growth. The brownish spots have also been visible here and there which seems to be caused due to internal weathering of the stone structure. Micro-vegetational growth including dust and dirt accretion etc. were cleaned by using 2% aqueous ammonia solution mixed with non-ionic detergent on its outer wall. On dried surface, fungicidal treatment was given by using aqueous solution of 2% sodium pentachlorophenate to arrest the further growth of micro-vegetation. Finally, a silicone based water repellent Wacker SMK 1311 with dilution of distilled water was applied on dried stone surface as preservative.

KERALA

54. MATTANCHERRY PALACE, MATTANCHERRY, DISTRICT ERNAKULAM

Old preservative coat, dust, dirt, etc. were removed by using organic solvents like toluene, diacetone alcohol, tri-ethanolamine, 2-ethoxy ethanol, morpholine and turpentine oil. The bulging portion was fixed with polyvinyl acetate. The cavities and flaked portions were filled with casein-lime mixture. Colour matching was done wherever required. Finally, 1% solution of PVA in toluene was applied as preservative.

Plate 142



A



B

Summer Palace Daria Daulat Bagh, Srirangapatna: A, before and B, after restoration of painting

55. ST. ANGELO FORT, DISTRICT KANNUR

The exterior fort walls of the bastions of north-east corner, north-west corner and the wall in between these two bastions was covered with a thick layer of dust, dirt, lichens and other micro-vegetation. The exterior fort walls were first cleaned with a solution of 3:1 mixture of ammonia and non-ionic detergent to remove the surface accretion, particularly the micro-vegetation. This was followed by thorough washing. A uniform coat of 2% sodium pentachlorophenate solution- a fungicide- was applied. Finally, two coats of Wacker BS290 (wet-on-wet) diluted with MTO were applied as preservative/water-repellent.

56. SRI BAKTAVATSALA TEMPLE, CHERAN-MAHADEVI, DISTRICT TIRUNELVELI

The temple was covered with micro-vegetation and accumulated dust. As the temple is a living monument, the usual worship with frequent use of oil lamps has left soot deposits, especially on the interior walls of the main shrine. The lime coated parts were treated with 5% acetic acid solution to remove the lime. This area, along with dust and soot covered parts was then cleaned with a solution of 3:1 ammonia and non-ionic detergent mixture, which would neutralize any remaining acid and cleanse the surface. It was then washed down with water. Then, 2% sodium pentachlorophenate solution was applied as fungicide on the treated parts. The whole area was then preserved with two coats of B.S.290 (wet-on-wet) diluted with MTO which acts as a water repellent, discouraging a fresh spurt of growth.

57. SRI PARASURAMA TEMPLE, THIRUVALLAM, DISTRICT THIRUVANANTHAPURAM

The granite compound wall in the west and north side of the temple was covered with micro-vegetational growth, thick lime coat, dust and dirt. In order to improve the strength of stone and bring back its original appearance, the conservation and preservation of the temple has been done as follows: Lime coats were removed chemico-mechanically using 5% solution of acetic acid and washed thoroughly with water. Micro-vegetational growth, dust, dirt, etc. were removed by a 1:3 mixture of non-ionic detergent and ammonia solution followed by thorough washing. After that, dry fungicide was applied done by spraying 2% aqueous sodium pentachlorophenate solution. Finally, two coats of Wacker BS – 290 (wet-on-wet) diluted with MTO were applied as preservative/water repellent.

MADHYA PRADESH

58. CHITRAGUPTA TEMPLE, KHAJURAH, DISTRICT CHHATARPUR

The temple was covered with thick deposition of micro-vegetational growth which imparted it a black appearance. Moreover, this biological accretion was harmful for the stone surface which is full of beautiful sculptures and carvings. The scientific conservation work was carried out to remove dust, dirt and dried biological growth from the surface of the monument. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of plain water. The cleaned and dried surface was then given fungicidal treatment using 2% sodium pentachlorophenate solution to check further growth of micro-organisms. Finally, silicone based water repellent in suitable concentration was applied

over the dried exterior surface of the monument for imparting hydrophobic properties to the surface.

59. JAGDAMBI TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

In continuation to the last year's work, scientific conservation work was taken up on the remaining parts of the monument. The sandstone temple was covered with thick deposition of micro-vegetational growth which imparted it a black appearance. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of plain water. The cleaned and dried surface was then given fungicidal treatment using 2% sodium pentachlorophenate solution to check further growth of micro-organisms. Finally, silicone based water repellent in suitable concentration was applied over the dried exterior surface of the monument for imparting hydrophobic properties to the surface.

60. BEER SINGH DEO PALACE, DISTRICT DATIA

In continuation to last year's work, scientific conservation work was taken up on the remaining parts of the monument. The sandstone and lime-plastered big and small *chhatris* on the Vth floor were having thick deposition of micro-vegetational growth. The scientific conservation work was carried out to remove dust, dirt and dried biological growth from the surface of the monument. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of

plain water. The cleaned and dried surface was then given fungicidal treatment using 2% sodium pentachlorophenate solution to check further growth of micro-organisms. Finally, silicone based water repellent in suitable concentration was applied over the dried exterior surface of the monument for imparting hydrophobic properties to the surface. The work is in progress.

61. SIDDHESHWAR TEMPLE, NEMAWAR, DISTRICT DEWAS

In continuation to last year's work, scientific conservation work was taken up on the remaining parts of the monument. The sandstone temple was covered with thick deposition of micro-vegetational growth which imparted it a black appearance. Moreover, this biological accretion was harmful for the stone surface which is full of beautiful sculptures and carvings. The lower portion of *sikhara* was showing signs of erosion. The scientific conservation work was carried out to remove dust, dirt and dried biological growth from the surface of the monument. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of plain water. The cleaned and dried surface was then given fungicidal treatment using 2% sodium pentachlorophenate solution to check further growth of micro-organisms. Finally, silicone based water repellent in suitable concentration was applied over the dried exterior surface of the monument for imparting hydrophobic properties to the surface.

62. VIRATESHWAR TEMPLE, SOHAGPUR, DISTRICT SHAHDOL

In continuation to last year's work,

scientific conservation work was taken up on the remaining parts of the monument. The sandstone exterior walls of the monument were covered with thick deposition of dust, dirt and dried micro-vegetational growth. This was enhancing the process of decay and deterioration of the stone. The middle portion of *sikhara* was eroded to an alarming stage. The scientific conservation work was carried out to remove dust, dirt and dried biological growth from the surface of the monument. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of plain water. The cleaned and dried surface was then given fungicidal treatment using 2% sodium pentachlorophenate solution to check further growth of micro-organisms. Finally, silicone based water repellent in suitable concentration was applied over the dried exterior surface of the monument for imparting hydrophobic properties to the surface.

63. BAJ BAHADUR PALACE, MANDU, DISTRICT DHAR

The lime stone and lime-plastered exterior walls of the monument were covered with thick deposition of dust, dirt and dried micro-vegetational growth. This was enhancing the process of decay and deterioration of the stone. The lime-plastered portion of the monument had also become pale and black due to the deposition of accretions. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of plain water. The cleaned and dried surface was then given fungicidal treatment using 2% sodium

Pentachlorophenate solution to check further growth of micro-organisms. Finally, silicone based water repellent in suitable concentration was applied over the dried exterior surface of the monument for imparting hydrophobic properties to the surface.

64. DARIYA KHAN TOMB, MANDU, DISTRICT DHAR

The sandstone exterior walls of the monument were covered with thick deposition of dust, dirt and dried micro-biological growth. This was enhancing the process of decay and deterioration of the stone. The scientific conservation work was carried out to remove dust, dirt and dried biological growth from the surface of the monument by using aqueous ammonia solution and non-ionic detergent mixture in 3:1 ratio followed by thorough washing with plenty of water. On dried surfaces, fungicidal treatment was given using 2% sodium pentachlorophenate solution. Finally, hydrophobic treatment was given using silicone based water repellent Wacker BS-290 diluted in MTO to impart water repellency to the stone surface.

65. KARAN GROUP OF TEMPLES, DISTRICT AMARKANTAK

The scientific conservation work was taken up in order to remove micro-vegetational growth and other superficial accretions like dust and dirt, which were causing decay to the stone surface. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of plain water. The cleaned and dried surface was then given fungicidal treat-

-ment using 2% sodium pentachlorophenate solution to check further growth of micro-organisms. Finally, hydrophobic treatment was given using silicone based water repellent Wacker BS-290 diluted in MTO to impart water repellency to the stone surface.

66. GARHI PADAVALI, DISTRICT GWALIOR

The exterior sandstone surface of the monument was covered with thick deposition of dust, dirt and dried micro-vegetational growth which were causing decay to the stone surface. The superficial accretions were removed with the help of soft nylon brushes using 3:1 ratio of liquid ammonia and non-ionic detergent followed by thorough washing with plenty of plain water. The cleaned and dried surface was then given fungicidal treatment using 2% sodium pentachlorophenate solution to check further growth of micro-organisms. Finally, hydrophobic treatment was given using silicone based water repellent Wacker BS-290 diluted in MTO to impart water repellency to the stone surface.

MAHARASHTRA

67. AJANTA CAVES, AJANTA DISTRICT AURANGABAD

Removal of dust and dirt was carried out on routine basis from the surface of paintings and sculpture with soft feather brushes, paint brushes, and hog hair brushes. In order to control the insect activities and to save the painted/unpainted plaster from any damage 2% pyrethrum extract in kerosene is being sprayed fortnightly only on the unpainted portion of the caves. The temperature and humidity levels have been monitored and recorded periodically

in a number of caves in order to study the effects of micro-climatic changes on the painted surface inside the caves.

Consolidation of damaged painted plaster was carried out by way of fixing of bulgings and filleting of broken ends of paintings in Cave 1, 6, 11, 17, and 26. Plaster close in composition to ancient plaster was prepared using mixture of lime, marble powder, shell powder and water in appropriate ratio. This mixture was used to fill up gaps, lacuna etc. in the painting as well as for edging work. For fixing of bulging in the plaster, lime and casein mixture was used with good results. The work is in progress.

Chemical cleaning and consolidation of stone surface of Cave 3, 4, 24 and 25 was taken up for the removal of micro-vegetation, bat-excreta and mud-streaks. Consolidation of highly weathered and weakened stone sample was carried out using an ethyl silicate based stone strengthener. Wet paper pulp with chemical additives was applied to remove hard brown or black patches of bats' excrement on the stone surface. Finally, a silicone based Wacker BS-290 solution in MTO was applied as a water repellent. The work is in progress.

Removal of extraneous deposits including dark varnish coats applied in the past on painted surface from Cave 1, 2, 7, 9, 11 and 19 was carried out. The old darkened PVA coating on paintings of Cave 19 was removed up to 60 – 70 % with the help of sulphur free toluene, di-butyl phthalate and acetone mixture. The world famous paintings of Mahayana at Cave 7, 9 and 19 were taken up for chemical conservation. In order to remove the layers of hard accretions, old preservatives

and soot, etc., a two-component system of organic solvents mixtures were used. Loose grains of white and other pigments on the surface, which were about to fall, were fixed back properly. A 0.5% solution of PVA in toluene was used for preservation of well-dried and treated painted surface.

Consolidation of stone sculptures in Cave 1 and 26 was carried out using an ethyl silicate based (Wacker OH-100). For mending work of damaged plaster of sculptures, hydrated lime mixed with stone powder of different microns, brick powder, *kaudi* powder, quartz powder, ochre colour, and gravels in appropriate ratio was applied in the major and minor cracks. In cases where the depth of the cavity is too long, two or more layers of lime mixture in different proportions were applied to avoid formation of any cracks on the outer surface. When surface was completely dried, Wacker BS-290 solution mixed were applied as a preservative coating.

68. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

The wall paintings inside the Ganesh Leni cave and Cave 22, 25, 32 and 33 of Ellora Caves, which were found to be getting detached from the plaster, were strengthened and secured to the ground by way of fixing and filleting using compatible retouching materials. Work is in progress.

In Cave 22, the work of chemical conservation involved, removal of dust, dirt, birds' droppings, and micro-vegetational growth from its exterior surfaces. The work also included removal of calcareous deposits, bats' excreta, etc. from sculptures inside the

cave. The conservation treatment consisted of cleaning using ammonia solution and liquid non-ionic detergent; fungicidal treatment with sodium pentachloro-phenate (2% solution); consolidation treatment with ethyl silicate based Wacker OH-100; hydrophobic treatment with Wacker BS-290 diluted in 1:14 a silicone compound.

69. PITALKHORA GROUP OF CAVES, KANNAD TALUKA, DISTRICT AURANGABAD

The work of mending damaged sculptures was carried out. The small elephant figure and a big elephant figure carved near entrance door of Cave 4, in advanced state of deterioration were strengthened and consolidated by using epoxy resin and stainless steel bar.

A sculpture carved on the door-jamb with weight over 20 tons having developed multiple cracks and cleavages, was also subjected to consolidation treatment to address the problem of powdering of stone material and grouting the cracks in the carved slab.

70. BIBI - KA - MAQBARA, AURANGABAD DISTRICT AURANGABAD

The main dome and side wall built of marble stone and stucco lime plaster were taken up for the removal of superficial accretions like dust, dirt, birds' droppings and micro-vegetational growth. Bulging and flaking of stucco plaster at some places were also observed. Removal of superficial accretions was carried out with the help of 2 to 3% aq. sol. of ammonia + 1% non-ionic detergent with soft brushing followed by thorough washing with copious volume of

water. A thin paste of calcium hypochlorite was applied on fragile stucco lime plaster followed by thorough washing with copious volume of water. 2% aqueous solution of sodium pentachlorophenate was applied on cleaned stucco plaster. Three coats of silicone based water repellent Wacker BS - 290 was applied diluted MTO as preservative.

The perforated lime-plastered brick wall around the main structure was also under taken for the removal of dust, dirt, bird-excreta and micro-vegetational growth. Perforated walls had become very fragile at places and even loosen plaster had fallen at places. Superficial accretions like dust, dirt and bird-excreta etc. was removed with gentle brushing followed by application of a thin paste of calcium hypochlorite which was left it over night and then removed with soft nylon brushes followed by thorough washing with copious volume of water. 2% aq. solution of sodium pentachlorophenate was applied on the cleaned perforated wall. Three coats of a silicone based water repellent Wacker BS-290 have been applied diluted with MTO as preservative on cleaned dried areas.

71. MAHAKALI TEMPLE, DISTRICT CHANDRAPUR

The scientific conservation of mural paintings executed on the lime plaster was undertaken for the removal of accumulation of thick layer of dust, dirt, bird-excreta, oily smoke and other similar superficial accretions on paintings. Superficial accretions were removed with the help of mixture of suitable organic solvents like di-acetone alcohol, acetone, toluene, n-hexane, ethyl methyl ketone, and cello solve, etc. The work is in progress.

72. CHANGDEO TEMPLE, MUKTAI NAGAR, DISTRICT JALGAON

Changdeo temple is having beautiful carvings, geometrical designs, human figures and other sculptures. Previously, a thick coat of lime has already been applied on the inner walls of the temple. Nearly 2–3% of acetic acid solution was used for removing the lime applied on the walls inside the temple for exposing the original features. After complete removal of lime wash, the surface was left to dry for some days. Main *garbhagriha* is covered by thick deposition of soot because of use of incense sticks, camphor, oil-lamps etc. by devotees. Chemical treatment was carried out using mixture of organic solvents in proper ratio. *Mandapa* verandah pillars and beams were covered by blackish micro-vegetational growth, soot and thick accretions, dust, dirt, lime coats, etc. Chemical cleaning of the thick black and sooty accretions were removed with the help of mixture of organic solvents and finally to remove the adhered accretions. It was treated with ammonia-labklin solution (non-ionic-detergent) using nylon brushes and coir scrubbing brushes. When surface was completely dried, a silicone based Wacker 290 solution diluted in MTO was applied as a preservative on the cleaned and dried surface, which acts as a water repellent.

73. SANGAMESHWAR TEMPLE, DISTRICT JALGAON

Before consolidation, the entire south wall of temple was chemically treated by using ammonia and non-ionic detergent solution for eradication of dust and micro-vegetational growth. The weak cemented mortar was removed with utmost precaution and replaced by epoxy resin mixed with same stone powder

by inserting proper stainless steel pin. The completely weathered stone blocks were consolidated by ethyl silicate. Finally, the south wall of temple was preserved by applying two coats of water repellent Wacker BS 290 mixed. The main door-frame of the *garbhagriha* is having columns of sculptures on both the sides holding different types of musical instruments. These small sculptures were weathered badly. At the bottom of door, there are figures holding *kalash* in hand which had weathered due to daily pouring of water by devotees. All these sculptures were consolidated by using an ethyl silicate based stone strengthener Wacker OH 100. The big vertical crack on the west wall of *ardha-mandapa* was filled by epoxy resin after inserting steel pin. Similarly, five small temples above the door with four small elephants having multiple cracks in trunks was consolidated with an ethyl silicate based Wacker OH 100. After consolidation same area was preserved by applying two coats of water repellent Wacker BS 290 diluted MTO. The work is in progress.

74. GAIMUKH TEMPLE, DISTRICT LONAR

The carved out stone surface of this temple was taken up for the scientific removal of dust, dirt, bird-excreta, and thick growth of micro-vegetation and deposition of calcareous matters on exterior areas. First, superficial dust and dirt, etc. was removed with the gentle soft brushing. After that cemented dust, dirt, bird-excreta and micro-vegetational growth was removed using 2 to 3% aq. solution of ammonia + 1% aq. solution of non-ionic detergent and gentle brushing with soft nylon brushes followed by thorough washing with copious volume of water. Application of 2% aq. solution of sodium pentachlorophenate was

given on cleaned and dried areas. Application of silicone based water repellent Wacker BS - 290 diluted in MTO was given on cleaned and dried stone areas.

75. JOGESHWARI CAVES, DISTRICT MUMBAI

The chemical conservation work was taken up for the removal of calcareous matter, dust, dirt and other superficial accretions from this rock-cut cave having sculptures. There were a lot of bats' activities in the shrine. Deposit of calcareous matter of bats' urine in the interior areas was also observed. Interior areas were cleaned with 2 to 3% aq. solution of ammonia + 1% non-ionic detergent + 1% ammonium bi carbonate with gentle brushing followed by thorough washing with copious volume of water. The interior is now almost free from bats at present. The work is in progress.

76. SHANIWARWADA, PUNE DISTRICT PUNE

Thick growth of micro-vegetation was observed on exterior areas of stone/brick wall and old tarry varnish on wooden door. Superficial dust, dirt, birds' dropping etc. were removed by gentle brushing. After this, cemented dust, dirt, birds droppings, and micro-vegetational growth, etc. on stone/brick wall were removed with the help of 2% to 3% aq. Solution of ammonia + 1% non-ionic detergent and gentle brushing with nylon soft brushes followed by thorough washing with copious volume of water. Application of an ethyl silicate based Wacker OH-100 was given for consolidation of fragile stone surface. Application of 2% aq. solution of sodium

pentachlorophenate was given on cleaned areas of stone/brick wall as fungicidal treatment. Application of Wacker BS-290 diluted was given as preservative coat on cleaned and dried exterior areas of stone/brick walls. For the removal of tarry accretions from wooden door, organic solvents like methanol, acetone and toluene, etc. were used in appropriate proportion. Wood preservative in dilute condition was applied on cleaned and dried wooden door.

ODISHA

77. EXCAVATED BUDDHIST SITE, LALITGIRI, DISTRICT CUTTACK

Due to heavy rainfall and high humidity, the monastery was covered with micro-vegetational growth, which obscured its natural look (Pl. 143). The chemical treatment and preservation work was carried out to remove micro-vegetational growth, dust, dirt, etc. using 2% liquid ammonia solution and non-ionic detergent by soft brushing. Fungicidal treatment of stone was carried out by spraying 2% aqueous sodium pentachlorophenate solution. Finally, two coats of Wacker BS – 290 (wet-on-wet) diluted with MTO was applied as preservative/water repellent.

78. ASOKAN EDICT, JAUGADA, DISTRICT GANJAM

The rock was scantily covered with micro-vegetational growth, which obscures its natural look. The monument was previously treated chemically (three decades back) with a preservative poly methyl metha acrylate, the stains of which were on the surface of the

monument required a special treatment. In order to remove the old polymeric material (PMMA) from the surface, sulphur-free toluene was used. Micro-vegetational growth was removed by 2% liquid ammonia solution. The dust, dirt, etc. was removed by non-ionic detergent with the help of soft brushing. Fungicidal treatment of stone surfaces was carried out by spraying 2% aqueous sodium pentachlorophenate solution for arresting further quick micro-vegetational growth. Finally, two coats of a silicone based water repellent Wacker BS – 290 (wet-on-wet) diluted with MTO was applied as preservative/water repellent on rock surface.

79. RATNAGIRI MONASTERY, DISTRICT JAJPUR

The excavated monastery has no roof and thus both interior and exterior parts are exposed to weather. The chemical treatment and preservation work was carried out to remove superficial accretionary deposits, dust, and dirt and micro-vegetational growth. The micro-vegetational growth was removed by 2% liquid ammonia solution. The dust, dirt, etc. was removed by non-ionic detergent by soft brushing. To strengthen the old fragile stone, an ethyl silicate based stone strengthener Wacker OH – 100 was applied as consolidant. Fungicidal treatment of stone was carried out by spraying 2% aqueous sodium pentachlorophenate solution for arresting further micro-vegetational growth. Finally, two coats of Wacker BS – 290 (wet-on-wet) diluted with MTO was applied as water repellent.

80. TRILOCHANESWAR TEMPLE, DISTRICT JAJPUR

The temple and sub-shrines are of plastered surface except part of vertical wall of *vimana* which were either not plastered or deplastered in the past. Patches of previously applied red ochre was noticed also. The scientific conservation work was undertaken to remove the superficial accretions like dust, dirt, micro-vegetational growth, patches of red ochre and to strengthen the weak, fragile stone. The dust, dirt, excretion, etc. were removed by water with soft brushing. The removal of micro-vegetational growth was carried out using the mixture of 2% liquid ammonia and non-ionic detergent solution.

In order to prevent the deterioration and to give strength to the age old stones, an ethyl silicone based Wacker OH – 100 were used as strengthener (for stone surface of *vimana* only). To arrest further micro-vegetational growth, 2% sodium pentachlorophenate solution was sprayed over the surface after 15 days of the application of stone strengtheners. To make the stone surface water repellent, a silicone based Wacker BS – 290 was applied in two coats (wet-on-wet) on the stone surface. Wacker SMK-1311 was applied in two coats (wet-on-wet) diluted in MTO with water on the plastered surface.

81. BRAHMESWAR TEMPLE, DISTRICT KHURDA

Due to heavy rainfall and high humidity, the temples and the boundary wall were covered with micro-vegetational growth. The scientific conservation and preservation

work was carried out to remove micro-vegetational growth using 2% aqueous ammonia solution. The dust, dirt, etc. were removed by non-ionic detergent using soft brushing manually. Fungicidal application was given by spraying 2% aqueous sodium pentachlorophenate solution for arresting further micro-vegetational growth. Finally, two coats of Wacker BS – 290 (wet-on-wet) diluted with MTO were applied as water repellent.

82. MUKTESWAR AND SIDDHESWAR GROUP OF TEMPLES, DISTRICT KHURDA

This temple is built of sandstone in ashlar masonry. The scientific conservation work was taken up to remove the micro-vegetational growth and other superficial accretionary deposits from the exterior surface of the monument. The micro-vegetational growth was removed by 2% aqueous ammonia solution and the dust, dirt, etc. were removed by non-ionic detergent using soft brushes. Over the dried and cleaned surface, fungicidal application was given by spraying 2% aqueous sodium pentachlorophenate solution for arresting further micro-vegetational growth. Finally two coats of a silicone based water repellent Wacker BS – 290 (wet-on-wet) diluted with MTO was applied as water repellent.

PUNJAB

83. RAM BAGH GATE, AMRITSAR, DISTRICT AMRITSAR

Scientific conservation work on the monument was taken up for the removal of superficial accretionary deposits like micro-

Plate 143



A



B

Excavated Buddhist Site, Lalitgiri: A, before and B, after conservation

vegetational growth, dust, dirt, etc. and consolidation of weathered stone surface. The plastered and stone surface of the monument was chemically treated with aqueous solution of ammonia and wetting agent. The deteriorated and weathered stone surface of the baradari of the monument was consolidated with ethyl silicate based stone strengthener. The treated and dried stone surface was given fungicidal treatment using aqueous solution of sodium pentachlorophenate followed by silane and siloxane based water repellent treatment. The work is in progress.

84. HAJI JAMAL TOMB, NAKODAR, DISTRICT JALANDHAR

The lime-plastered of interior portion of the tomb, covered with dust, dirt and other accretions, was taken up for scientific conservation work during the period under review. The plastered surface was chemically treated with slurry of bleaching powder and the stone surface with aqueous solution of ammonia and non-ionic detergent. The major and minor cracks over the lime-plastered surface were also filled up with putty made up of lime, pop and adhesive. The painted area in interior portion of the tomb was chemically treated by using different organic solvents and preserved with 1% PVA solution in toluene. Eventually, the silane and siloxane based water repellent treatment was given to the dried lime-plastered surface of the monument.

85. MUHAMMAD MOMIN'S TOMB, NAKODAR, DISTRICT JALANDHAR

The lime-plastered interior portion of the tomb, which was covered with dust, dirt and other accretions, was taken up for chemical treatment during the period under review. The

plastered surface was chemically treated with slurry of bleaching powder and the stone surface with aqueous solution of ammonia and non-ionic detergent. The major and minor cracks over the lime-plastered surface were also filled up with putty made up of lime, pop and adhesive. The painted area in interior portion of the tomb was chemically treated by using different organic solvents and preserved with 1% PVA solution in toluene. Finally, the silane and siloxane based water repellent treatment was given to the cleaned and dried lime-plastered surface of the monument.

86. QILA MUBARAK, PATIALA, DISTRICT PATIALA

The wall-paintings of Rang Mahal were suffering from multiple problems like loss of colours and pigments, development of cracks, bulging and flaking, etc. The painted plaster surface was consolidated followed by chemical treatment of the beautiful paintings using judiciously different organic solvents viz. methanol, 2 ethoxyethanol, triethanolamine, turpentine oil, dibutylphthalate etc. and their mixture. Colour re-integration work was carried out by the artist, wherever required. The consolidated, chemically treated and re-integrated painted surface was preserved with very thin coat of solution in toluene (Pl. 144).

RAJASTHAN

87. LAL MASJID TIZARA, DISTRICT ALWAR

In continuation to the previous year's work, the scientific conservation work was taken up for the removal of micro-vegetational growth, dust, dirt, etc. and to strengthen the fragile and weak stone surface. The entire surface of the mosque was thoroughly cleaned

Plate 144



A



B

Qila Mubarak, Patiala: A, before and B, after restoration of paintings

by slightly alkaline water [using ammonia solution] and the non-ionic detergent with the aid of the soft nylon bristle brushes so as to eradicate the thick deposits of birds' excrements, deposits of dead and living micro-vegetational growth, dust, dirt, etc. from the surface. The cleaned and dried surface was then sprayed with the 4% aqueous solution of the sodium pentachlorophenate to sustain fungicidal action, followed by the consolidation of the plaster and the building blocks of the monument, wherever necessary, by the application of an ethyl silicate based stone strengthener [Wacker OH 100]. Finally, the entire surface was imparted water repellency by the application of silicone based water repellent [Wacker BS 290] suitably diluted with MTO.

88. AKBARI JHARJHIRI, BAYANA DISTRICT BHARATPUR

In continuation to the previous year's (2009-2010) work, the scientific conservation work was taken up for the removal of micro-vegetational growth, dust, dirt, etc. and to strengthen the fragile and weak stone surface. The surface area under consideration was subjected to chemical cleaning using the slightly alkaline water and non-ionic detergent with the aid of soft nylon bristle brushes. The cleaned surface was then sprayed with 4% aqueous solution of the sodium pentachlorophenate to sustain fungicidal action. The dried surface was then consolidated by using an ethyl silicate based stone strengthener [Wacker OH 100]. Finally, the surface was imparted water repellency by the application of silicone based water repellent [Wacker BS 290] suitably diluted with MTO. The work has been completed.

89. CHITTAURGARH FORT, CHITTAURGARH

In continuation to the previous year's (2009-2010) work, the scientific conservation work was taken up for the removal of micro-vegetational growth, dust, dirt, etc. and to strengthen the fragile and weak stone surface. Stable, portion of Kumbha Mahal and Padmini Mahal. The exterior surface of the monuments was subjected to chemical cleaning using the slightly subjected to chemical cleaning using the slightly alkaline water and non-ionic detergent with the aid of soft nylon bristle brushes. The cleaned surface was then sprayed with 4% aqueous solution of the sodium pentachlorophenate for sustained fungicidal action. The dried surface was then consolidated by using an ethyl silicate based stone strengthener [Wacker OH 100]. Finally, the surface was imparted water repellency by the application of silicone based water repellent [Wacker BS 290] suitably diluted with MTO. The work is in progress (Pl. 145).

Exterior surface of the west wall from bastion on south west corner to the third bastion and the walls of the chambers in western and northern portion of the Ratan Singh Palace. The chemical treatment and preservation work of the above-mentioned portions of the Rana Ratan Singh Palace was taken up during the period under review. The entire surface was subjected to cleaning for the removal of accretions with aid of soft nylon bristle brushes using water made slightly alkaline by ammonia solution and non-ionic detergent. The cleaned surface was applied with 4% aqueous solution of sodium pentachlorophenate by spraying sustained fungicidal action. The dried surface was then strengthened by the repeated application of an

ethyl silicate based stone strengthener [Wacker OH 100], wherever necessary. The surface was then applied with silicone based water repellent [Wacker BS 290] in suitable concentration, to impart water repellency to the surface.

90. CHAND BAORI, ABANERI, DISTRICT DAUSA

In continuation of the previous year's work, the chemical treatment and preservation of the remaining area of the Chand Baori was undertaken during the period under review. The steps were cleaned chemico-mechanically with the aid of soft bristle brushes using slightly alkaline water [using ammonia solution] and non-ionic detergent so as to remove all the surface deposits of dust, dirt and micro-vegetational growth. The cleaned surface was then given fungicidal treatment by the application of 4% aqueous solution of sodium pentachlorophenate. The dried surface was then consolidated using Wacker OH 100, an ethyl silicate based stone strengthener, followed by the hydrophobic treatment, by the application of silicone based water repellent Wacker BS 290, suitably diluted with MTO all over the cleaned, consolidated and dried surface. (Pl. 146).

91. KUMBHALGARH FORT, DISTRICT RAJSAMAND

In continuation to the previous year's work, the scientific conservation work was taken up for the removal of micro-vegetational growth, dust, dirt, etc. and to strengthen the fragile and weak stone surface of Fort Wall [Interior portion] and Shrines between Kheda Devi Temple and Vijay Pole. The surface of the wall was cleaned chemico-mechanically by

using non-ionic detergent and slightly alkaline water using ammonia solution, with the aid of soft nylon bristle brushes to eradicate the deposits of dust, dirt dead and living biological growth, followed by spraying of 4% aqueous solution of sodium pentachlorophenate for the fungicidal action. The surface was then consolidated using an ethyl silicate based stone strengthener [Wacker OH 100] wherever necessary. Finally, silicone based water repellent [Wacker BS 290] suitably diluted in MTO was applied over the entire cleaned dried and consolidated surface so as to impart the water repellency to the surface.

In continuation to the previous year's work, the scientific conservation work of Pitaliya Shah Temple was taken up for the removal of micro-vegetational growth, dust, dirt etc. and to strengthen the fragile and weak stone surface. The surface area was carefully cleaned with the aid of soft nylon bristle brushes using non-ionic detergent and ammonia solution, so as to remove all unwanted surface deposits such as dead/living micro-vegetational growth, dust, dirt, birds' excrement, etc. The cleaned surface was sprayed with 4% aqueous solution of the sodium pentachlorophenate for sustained fungicidal action. Surface was then consolidated wherever necessary, by using Wacker OH 100, an ethyl silicate based stone strengthener. Finally, the surface was subjected to hydrophobic treatment by the application of silicone based water repellent Wacker BS 290, suitably diluted with MTO all over the cleaned, consolidated and dried surface. In continuation to the previous year's work, the scientific conservation work of Gole Rao Temple 9 and 10 was taken up for the removal of micro-vegetational growth, dust, dirt etc. and to stren-

-gthen the fragile and weak stone surface. The surface accretions were eradicated by using non-ionic detergent and ammonia solution with the help of soft bristle nylon brushes. The cleaned surface was then sprayed with 4% aqueous solution of the sodium pentachlorophenate for sustained fungicidal action. The dried surface was then consolidated by using an ethyl silicate based stone strengthener [Wacker OH 100]. Finally, the surface was imparted water repellency by the application of silicone based water repellent [Wacker BS 290] suitably diluted with MTO.

TAMIL NADU

92. SRIMURUGANATHA SWAMY TEMPLE, THIRMURUGANPOONDI, DISTRICT COIMBATORE

Sri Muruganatha swamy temple at Thirumuruganpoondi is built of granite blocks and stucco *vimana*. In order to strengthen the deteriorated stone surface of minor side, one coat of an ethyl silicate based Wacker OH – 100 as stone strengthener was applied over the fragile and loose portions and it was left for 15 days for proper polymerization. When the stone was subjected to complete stone analysis, it has been found that Silica is 62% followed by Alumina 14.83% Calcium 7% Sodium 3.4%, Potassium 3% and magnesium 1.8%. In *gopurams*, the granite is covered with stucco layer. Micro-vegetational growth over the stucco surface along with deposition of dust and dirt was giving an ugly appearance to the monument. In order to scientifically conserve the stucco layer and the stone layer, micro-vegetational growth, dust, dirt and other accretionary deposits were removed using non-ionic detergent and ammonia solution. Sodium pentachlorophenate solution was

applied as fungicidal coating over the dried and cleaned surface. Finally, on the dried surface, preservative coating/water repellent coating was given using silane, siloxane based water repellent Wacker SMK 1311 in water. For removing the oil accretions and other greasy matters from the sculptures and other structures, 5% aqueous solution of Ammonium carbonate and bi-carbonate was used and to remove the lime wash and red ochre colour on the walls and pillars. 2% Acetic acid solution was used followed by treatment with non-ionic detergent and ammonia solution.

93. GROUP OF TEMPLES, CAVES, MAHABALIPURAM, DISTRICT KANCHIPURAM

Mahishamardini caves, Ganesa shrine, Varaha *mandapa* and Krishna *mandapa* were taken up for chemical conservation and preservation work to remove the micro-vegetational growth, dust, dirt, greasy matters, graffiti and oil and sooty accretions in the interior portions especially in the Ganesha shrine. For removing the micro-vegetational growth, dust, dirt, and other accretionary deposits, non-ionic detergent and ammonia solution was used. After removing the accretions completely 2% sodium pentachlorophenate solution was applied as fungicidal coating. Finally, when the surface was completely dried, preservative coating / water repellent coating was applied over the surface by applying silane, siloxane based water repellent Wacker SMK 1311 in water. The work is in progress.

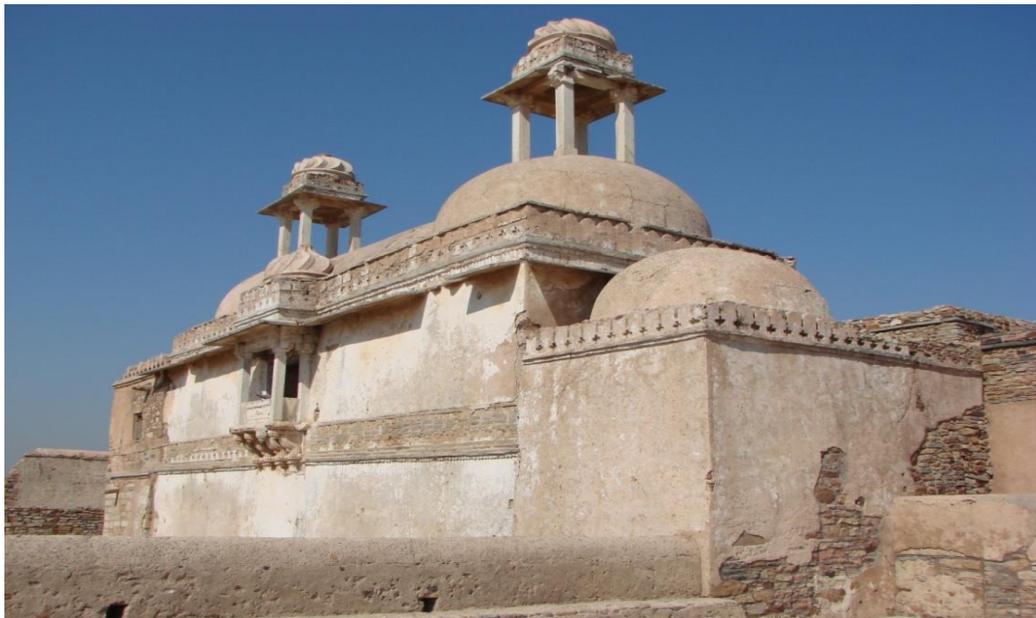
94. GROUP OF TEMPLES, KANCHIPURAM, DISTRICT KANCHIPURAM

The group of temples at Kanchipuram

Plate 145



A



B

Ratan Singh Palace, Chittaurgarh: A, before and B, after conservation



A



B

Chand Baori, Abhaneri: A, before and B, after conservation

is built of sandstone which is very fragile and in deteriorated state of condition due to atmospheric vagaries. The sandstone / brick surface is covered with stucco layer. Since the stucco surface is having high porosity, during rainy season, water percolates inside the tiny pores. The micro-vegetational growth over the stucco surface associated with deposition of dust and dirt were giving ugly appearance to the monument. In order to scientifically conserve the stucco layer and the stone layer, the group of temples at Kanchipuram was taken up for the chemical conservation and preservation work during the period under review. In order to strengthen the deteriorated stone surface, an ethyl silicate based stone strengthener Wacker OH-100 was applied over the fragile and loose portions and it was left for 15 days for proper polymerization. For the removal of micro-vegetational growth, dust, dirt and other accretionary deposits, non-ionic detergent and ammonia solution was used in the ratio of 1:3. 2% Sodium pentachlorophenate solution was applied as fungicidal coating over the dried and cleaned surface. Finally, preservative coating/water repellent coating was applied over the surface by applying silane, siloxane based Wacker SMK 1311 in water. The work is in progress.

95. SHORE TEMPLE, MAHABALIPURAM, DISTRICT KANCHIPURAM

The soluble salts viz., chlorides deposited over the surface were extracted by applying wet paper pulp technique. The salt-free paper pulp soaked in distilled water is applied to salt deposited areas. The pulp is allowed to dry for a period of 4 to 5 days and then removed from the surface. By the process of absorption, the pulp had absorbed the salt

deposited on the holes and cavities of the stone surface. After complete drying, the pulp was then tested for soluble salts. The removed pulp from the surface was dissolved in water and it is tested with silver nitrate (AgNO₃) solution. The process was repeated again and again till no white precipitate is formed. Sodium pentachlorophenate (2%) was applied to prevent further micro-vegetational growth. Finally, when the surface was completely dried, preservative coating/water repellent coating was applied over the surface by applying silane, siloxane based water repellent Wacker SMK 1311 in water. The work is in progress.

96. SRI KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT KANCHIPURAM

In order to scientifically conserve the stucco layer and the stone layer, the group of temple was taken up for the chemical conservation and preservation work. In order to strengthen the deteriorated stone surface, one coat of an ethyl silicate based Wacker OH – 100, as stone strengthener was applied over the fragile and loose portions and it was left for 15 days for proper polymerization. After that, for removal of the micro-vegetational growth, dust, dirt and other accretionary deposits, non-ionic detergent and ammonia solution was used in the ratio of 1:3. When the accretions were removed completely, 2% sodium pentachlorophenate solution was applied as fungicidal coating. Finally, when the surface was completely dried, preservative coating/water repellent coating was applied over the surface by applying silane, siloxane based water repellent Wacker SMK 1311 in water.

**97. KORUNGNATHA SWAMY TEMPLE,
SRINIVASANALLUR, DISTRICT KARUR**

The scientific conservation and preservation work was taken up to remove micro-vegetational growth, dust and dirt accumulated over the entrance of *gopurams* and to remove greasy matters, bats' excreta, oil and sooty accretions in sculptures and statues. For removing micro-vegetational growth, dust, dirt, non-ionic detergent and ammonia solution was used. For removing the oily accretions and other greasy matters from the sculptures and other structures, 5% solution of ammonium carbonate and bi-carbonate was applied over the surface and it was left free for 10-15minutes. After that, the surface was gently scrubbed with coir brushes and washed with plenty of water. 2% Sodium pentachlorophenate solution was applied as fungicidal coating. Finally, when the surface was completely dried, preservative coating/water repellent coating was applied over the surface by applying silane, siloxane based water repellent Wacker SMK 1311 in water.

**98. SHRI UTTAMANTHA SWAMY TEMPLE,
KEERANUR AND AGASTISVARA TEMPLE,
VELLANUR, DISTRICT PUDUKOTTAI**

The main aim of taking group of monuments for chemical conservation and preservation work was to remove the micro-vegetational growth, dust and dirt accumulated over the entrance *gopurams* and in the interior portions to remove greasy matters, graffiti vandalized by visitors, oil and sooty accretions in all sub-shrines and the main shrine. For removing the micro-vegetational growth, dust, dirt and other accretionary deposits, non-ionic detergent and ammonia solution was used. For

removing the oil accretions and other greasy matters from the sculptures and other structures, 5% aqueous solution of Ammonium carbonate and bi-carbonate was applied over the oily surface and it was left for 10-15minutes. After that, the surface was gently scrubbed with coir scrubbing brushes with excess amount of water. The treatment was continued till the surface was free from oily and other greasy matters as well as Ammonium salts. 2% sodium pentachlorophenate solution was applied as fungicidal coating. Finally, when the surface was completely dried, preservative coating/water repellent coating was applied over the surface by applying silane, siloxane based water repellent Wacker SMK 1311 in water. The work is in progress.

**99. SHRI BRIHADESWARA TEMPLE,
THANJAVUR, DISTRICT THANJAVUR**

In continuation to the previous year's work (2009-10), the scientific conservation of main *vimana*, Keralantha *gopuram* and other small *vimanas* was taken up for the removal of dust, dirt and micro-vegetational growth using neutral detergent and ammonia solution. 2% solution of sodium pentachlorophenate was applied as fungicide and silicone based micro-emulsion Wacker SMK 1311 with water was applied as water repellent. Paintings around Siva shrine and Amman shrines were covered with dust, dirt and old preservative coat. For the removal of these accretions, various organic solvents like toluene, diacetone alcohol, few drops of triethanolamine, oil of turpentine, etc., were used. Filleting, edging and fixing of bulging, wherever required were attended using lime and casein mixture also. Finally, 1% solution of sulphur-free toluene was applied as preservative coat over the cleaned painted area. The work is in progress.

100. THIRUMALAI NAYAKA PALACE, SRIVILLIPUTTUR, DISTRICT VIRUDHUNAGAR

A thick coat of lime was applied over the painted surface on the interior of the palace masking the details, aesthetic look and beauty of the paintings. A beautiful painting was noticed beneath the very thick multiple layer of lime coat and similarly paint layer were applied on the wall portions up to 4 feet from the ground level. At some places, it is possible to visualize patches of paintings where thick lime coat has fallen off on account of weak adherence from the painted surface. Chemical conservation and preservation work was taken up during the period under review by removing the multiple coats of lime applied over the years. The hardened and thick lime coat applied over the painted surface was removed by physico – chemical means using suitable tools and by using mixture of organic solvents in appropriate proportion. The work is in progress.

TRIPURA**101. SHYAM SUNDAR TILLA (EXCAVATED REMAINS), PILLAK, DISTRICT SOUTH TRIPURA**

The chemical preservation excavated remains of brick structures having terracotta Linings were taken up for scientific conservation for eradication of micro-vegetational growth, dirt, dust, etc. by using mixture of ammonia and non-ionic detergent. The surface free from all accretionary deposits was then subjected to fungicidal treatment with santobrite to arrest re-growth followed by application of silicone based Wacker BS-290 to make the surface water repellent.

UTTAR PRADESH**102. AKBAR'S TOMB SIKANDRA, DISTRICT AGRA**

The four marble *chhatris* and corner *burjies* of 1st floor had become dirty black at many places due to deposition of dust, dirt and dried micro-biological growth especially on the sandstone and lime plaster surface. The surface of four *chhatris* and corner *burjies* had become dull in appearance. The marble portion of four *chhatris* had become yellowish due to deposit of smoke, fine dust and suspended particulate matter. The sandstone surface was treated with 2-3 % aq ammonia solution containing a little liquid non-ionic detergent in order to remove dust, dirt and micro-biological growth on stone surface. The marble surface is being treated by applying the paste of fuller's earth containing traces of sodium carbonate. The work is in progress. The entire second floor of the mausoleum in two parts, first marble and sandstone *Burjies* and second the sandstone portion was taken up for treatment and preservation during the year. The sandstone surface was treated with 2-3% aq. ammonia solution containing a little liquid non-ionic detergent in order to remove dust, and microbiological growth from the surface. The chemically treated surface was given fungicidal treatment by using 2% sodium pentachlorophenate solution and finally preserved with Wacker BS 290 diluted in MTO.

103. BARAH KHAMBA, KAGAROL, SADAR, DISTRICT AGRA

The sandstone and lime-plastered sur-

-face of the monument became black at many places due to deposition of dust, dirt and dried microbiological growths. The loose dust and dirt were cleaned by using soft brushes. The deep rooted micro-vegetational growth on lime surface was removed by the paste of calcium hypochlorite followed by cleaning with mild aqueous ammonia solution containing a little liquid non-ionic detergent. The cleaned surface was applied with a coat of 2% sodium pentachlorophenate solution to arrest the re-growth. Finally, the surface was preserved with Wacker BS 290 diluted in MTO.

104. FATEHPUR SIKRI, MUGHAL CITY, DISTRICT AGRA

The external sandstone surface of Birbal Cell and Langarkhana had become black at many places due to deposition of micro-vegetational growth, smoke, fine dust, dirt and suspended particulate matter. The loose dust and dirt were cleaned by using soft brushes from the exterior surface followed by cleaning with mild aqueous ammonia solution containing a little liquid non-ionic detergent. The scientifically surface was given fungicidal treatment by using 2% sodium pentachlorophenate. Finally, the stone surface was preserved with Wacker BS-290 diluted in MTO. Paintings on the entrance gate and central hall had bulged at many places and lost colours due to weathering. Some of the paintings were lost with passage of time, due to seepage of water or due to loss of binding medium as it has very thin layer of base over which paintings have been executed. The paintings were consolidated by means of edging, fixing and filleting along with general cleaning with mild organic solvents. Finally, the surface was preserved with 1% solution of PVA in sulphur free toluene. The external

sandstone surface of Baradari had become black at many places due to deposition of micro-vegetational growth. There was also deposition of smoke, fine dust, dirt and suspended particulate matter. The loose dust and dirt were cleaned by using soft brushes from the exterior surface followed by cleaning with mild aqueous ammonia solution containing a little liquid non-ionic detergent. The chemically treated surface was given fungicidal treatment by using 2% aq. solution of sodium pentachlorophenate followed by application of a silicone based Wacker BS-290 diluted in MTO.

Continuous influx of heavy rush of tourist and religious people inside narrow passage of Dargah Sheikh Chisti and touching paintings by hand, made the painting hazy in appearance. Pigments of paintings were lost at many places especially at human height. Apart from this, deposit of dust, dirt and some mortar over the paint layer, diminished the beauty of wall paintings. The paintings were consolidated by means of edging, fixing and filleting along with general cleaning with mild organic solvents. Colour reintegration was also carried out to maintain uniformity. Finally the surface was preserved with 1% solution of PVA in sulphur free toluene.

105. JAJU KI SARAI, DISTRICT AGRA

The gates of Sarai had become blackish in appearance due to deposition of dried micro-vegetational growth and soot. The loose dust and dirt were cleaned by using soft brushes and the micro-vegetational accretions were eradicated by treating with 2% aqueous ammonia solution containing a little liquid non-ionic detergent from the exterior surface. The chemically treated surface was applied with a

coat of 2% sodium pentachlorophenate solution. Finally, the treated surface was preserved with a silicone based Wacker BS 290 diluted in MTO.

106. JAMA MASJID, DISTRICT AGRA

The marble portion of central and adjacent domes had become yellowish due to deposit of smoke, dust, dirt and suspended particulate matter. Apart from it, due to constant touch of marble by visitors and persons offering prayer, there were deposition of oil, grime, grease and other tarry matter on the marble surface. The marble surface was scientifically treated by applying the paste of Fuller's Earth containing traces of ammonium carbonate and cleaned by 1-2 % aqueous ammonia solution containing a little liquid non-ionic detergent. Finally, the cleaned surface was thoroughly washed with distilled water.

107. RAM BAGH, AGRA, DISTRICT AGRA

The upper portion of *chhatris* i.e., lime plastered surface had become black due to micro-biological growth and deposition of dust, dirt and smoke. Sandstone portion of the *chhatris* was also become black at many places due to deposition of dust, dirt, smoke, pollutant and dried micro-biological growth especially on the cornices. The sandstone surface was treated with 2-3% aq. ammonia solution containing a little liquid non-ionic detergent in order to remove dust, dirt and micro-biological growth on stone surface. The deep rooted micro-organism on lime plastered surface was removed by applying the paste of calcium hypochlorite. The treated surface was applied with a coat of 2% sodium pentachlorophenate solution as fungicidal treatment. Finally, the

treated surface was preserved with silicone based water repellent Wacker BS-290 diluted in MTO.

108. RC CEMETERY, AGRA, DISTRICT AGRA

The main tomb and several smaller tombs were covered with dust, dirt and other tarry matters along with micro-vegetational growth. The loose dust and dirt were cleaned by using soft brushes. The deep-rooted micro-vegetational growth on lime surface was removed by using paste of calcium hypochlorite followed by cleaning with mild aqueous ammonia solution containing a little liquid non-ionic detergent. The chemically treated surface was given a coat of 2% sodium pentachlorophenate solution as fungicide. Finally, the surface so treated was preserved with a silicone based Wacker BS-290 diluted in MTO.

109. TAJ COMPLEX, AGRA, DISTRICT AGRA

The marble portion of central and adjacent domes had become yellowish due to deposit of smoke, fine dust, dirt and suspended particulate matter, grime, grease and other tarry matter. The red sandstone portion of domes and roof top wall had deposits of dust, dirt and growth of micro-organisms. Erosion of stone was also observed on sandstone area. The marble surface was cleaned by clay pack cleaning method consisting of Fuller's Earth containing traces of ammonium carbonate as additive. The sandstone surface was treated by using 2-3% aqueous ammonia solution containing a little liquid non-ionic detergent.

110. IKHLASH KHAN'S TOMB, BADAUN, DISTRICT BADAUN

Plaster of boundary had become weak and fragile. The tomb had become blackish in appearance due to deposition of dried micro-vegetational growth. The loose dust and dirt were cleaned by using soft brushes. The deep rooted micro-vegetational growth on lime surface was removed by using the paste of calcium hypochlorite followed by cleaning with mild aqueous ammonia solution containing a little liquid non-ionic detergent. Finally the treated surface was preserved with a silicone based Wacker BS-290 diluted in MTO.

111. CHAR ANGUL MOSQUE, DISTRICT JAUNPUR

Chemical treatment and preservation of Chunar sandstone mosque having lime plastered domes was initiated. For the removal of accretionary deposits like, micro-biological growth, dirt, dust and bird-excreta alkaline solution and non-ionic detergent mixture was used. Fungicidal treatment was carried out using 5% aqueous sanntobrite solution on entire cleaned area to arrest re-growth. Finally, the dried surface was made hydrophobic with application of two coats of silicone based Wacker BS-290 in MTO.

112. R.C. CEMETERY SARDHANA MEERUT, DISTRICT MEERUT

Plaster of boundary wall and some of the graves was not in good state and had become weak and fragile. Hence, the scientific conservation of boundary wall and these graves was taken up after structural repairs. The tomb and graves of R.C. Cemetery had become blackish in appearance due to deposition of

dried micro-vegetational growth. To save it from further deterioration and to retain its aesthetic value, micro-vegetational accretions were eradicated by treating with 2% aq. Ammonia solution containing a little liquid non-ionic detergent. The plastered surface of tomb was treated with calcium hypochlorite to kill the deep rooted micro-organism. The treated surface was given a coat of 2% sodium pentachlorophenate solution to arrest the remains of spores if any. Finally, the treated surface was preserved with silicone based water repellent Wacker BS-290 diluted in MTO.

113. GOVIND DEV TEMPLE, VRINDAVAN, DISTRICT MATHURA

The interior surface of the temple had become grey-black at many places due to deposition of dust and dirt and dark patches of bat-excreta. The loose dust and dirt was cleaned by using soft brushes and micro-vegetational accretions were eradicated by treating the surface with 2% aqueous ammonia solution containing a little liquid non-ionic detergent. The work is in progress.

UTTARAKHAND

114. LAKSHMI – NARAYANA TEMPLE, TALLIHAT, BAIJNATH, DISTRICT BAGESHWAR

The scientific conservation work was taken up for the removal of micro-vegetational growth, dust and dirt from the weathered sandstone surface of the monument. The micro-vegetational growth and other accretions were removed using 2-3% aqueous ammonia solution and non-ionic detergent mixture. As the lower portion of the temple was deteriorating and there were many cracks deve-

-loped over the fragile stone surface, the whole deteriorated lower portion was given strength using an ethyl silicate based stone strengthener OH-100 to prevent its further deterioration. The work is in progress.

115. RUDRANATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI

Due to its exposure to open climatic conditions, the metal core of the trident engraved with inscriptions in the temple complex had become corroded. The trident mainly consists of two types of metals. The main portion is of iron with the hinges of brass. Both the metals were found corroded due to oxidation in the presence of moisture in the atmosphere. The conservation treatment carried out removal of superficial dust, dirt, etc. by gentle brushing, removal of corrosion products and then stabilizing it with 1-2% solution of benzotriazole in ethanol. Finally, 1-2% solution of micro-crystalline wax in ether was applied as a preservative coating.

116. KALINGA WAR MEMORIAL, KALINGA, DISTRICT DEHRADUN

This monument was having thick growth of micro-vegetation along with superficial accretionary deposits like dust, dirt and bird-excreta. Micro-vegetational growth and other accretionary deposits were removed from the lime mortar surface using 2-3% aqueous ammonia solution and non-ionic detergent followed by washing with plenty of water. After chemical cleaning, the whole surface was subjected to fungicidal treatment with 2-3% sodium pentachlorophenate solution. An ethyl silicate based stone strengthener OH-100 was applied on the inscri-

-bed stone surface of the war memorial. The micro and macro cracks had been filled up by stone dust and OH-100 paste. Finally, a silane, siloxane based micro emulsion SMK-1311 with de-ionized water applied over the dried surface as preservative.

117. SIVA TEMPLE, LAKHA MANDAL, DISTRICT DEHRADUN

During the period under review, the life-size images of granite stone, Nandi and many scattered *Siva-lingas* at exterior compound of the temple had been taken up for scientific conservation. The granite statues were covered with dust and dirt accumulation and the other images were covered with thick growth of micro-vegetation along with dust and dirt. The micro-vegetation and dust and dirt were removed from the surface using 2-3% aqueous ammonia solution and non-ionic detergent by gentle scrubbing with different type of soft bristle nylon brushes. The work is in progress.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS¹

118. Five copper antiquities from Sanauli excavation and 18 copper antiquities from Dholavira, classified on stage-basis, stage II (4 No's.), stage III (14 No's.) were received from the office of Superintending Archaeologist, Excavation Branch-II, Purana Qila, New Delhi. Most of the copper objects reported above were heavily corroded and fragile in condition. There were pale green powdery spots due to the bronze disease visible over the surface of most of the antiquities. One of the possible reasons for it may be the presence of chlorides in the ground which presents an acute problem for their conservation. An unstable cuprous chloride is formed as a corrosion product, further reacts with moisture and gives rise to progressive corrosion under humid conditions. It causes the surface to become powdery and spotty. Chemical cleaning and analysis of these metal antiquities was completed. The chemicals used for the treatment of these copper objects were Rochelle's salt (alkaline solution of sodium potassium tartarate) and Sodium sesquicarbonate solution, etc. Finally, these were allowed to get dry and then preserved with 1% solution of PVA in toluene. The work is in progress.

119. Seventy Five coins from Lalkot, received from Central Antiquity Section,

Purana Quila, Delhi, were treated in the Laboratory of Delhi Zone.

120. Restoration and preservation of archival materials Thanka Painting, Size 135.00x69.0cm. (Acc. No.858); Urdu/English printed book measuring 26.0 X 17.0cm. (Acc. No. 282), total pages 960; Bhagwat Gita with Miniature Painting, size 10.5x16.6cm, and Arabic/Persian Manuscript, Size 28.0x18.5cm. (Acc. No. 283) Total Pages 758) 68 nos. received from Central Antiquity Section, Purana Qila, Delhi was carried out in the Laboratory of Director (Science), Dehradun.

121. Twenty seven folios of Manuscript seventeen drawings and Twenty four Photographs received from Delhi Circle, Delhi were restored and preserved in the laboratory of Science Branch, Dehradun (Pl. 147).

122. A large size site plan of the Taj Mahal showing the front elevation of Taj Mahal and other building of complex in the vicinity (size: 354 X 132cm., Acc. No.22, Period: 19th Century A.D.) received from Taj Museum, Agra was restored and preserved in the Laboratory of Science Branch, Dehradun.

¹ Information from Director (Science) of the Chemical Branch of the Survey.

Plate 147



B



A

Arabic Manuscript: A, before and B, after conservation

MONITORING OF AIR POLLUTION

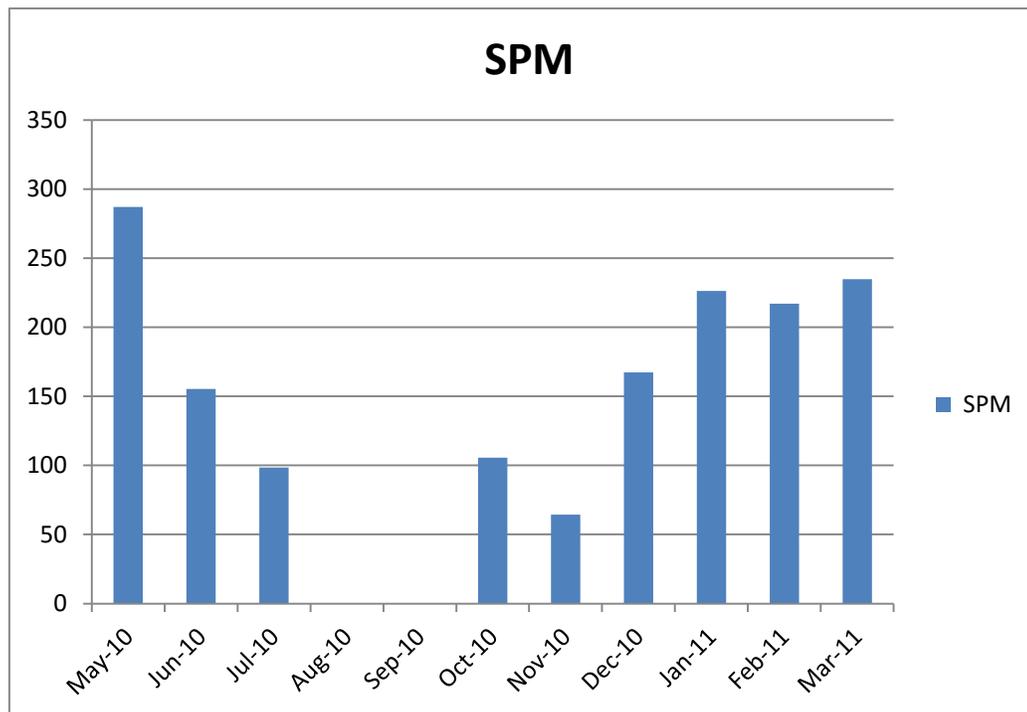
123. AIR QUALITY MONITORING STATION, BIBI KA MAQBARA, AURANGABAD

Air Quality Monitoring exercises have been in progress at Bibi ka Maqbara, Aurangabad. Studies are being carried out pertaining to monitoring of suspended particu-

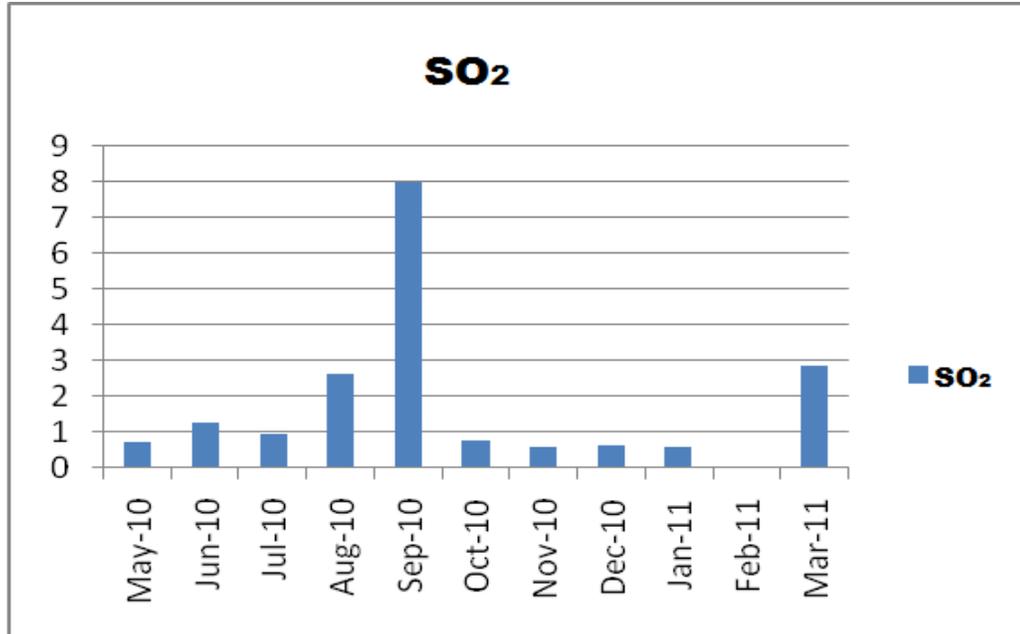
-ate matter in the ambient air in and around the monument using High Volume Sampler instrument, measurement of SO_2 and NO_x concentration during the period. The data collected have been useful in assessing the impact of pollutants on the preservation and stability of the protected monument (Figs. 25-27).

**AIR QUALITY MONITORING STATION BIBI-KA-MAQBARA, AURANGABAD
MONTHLY AVERAGE CONCENTRATATION OF SPM, SO_2 & NO_x IN
MICROGRAM/ M^3 DURING THE YEAR 2010-11**

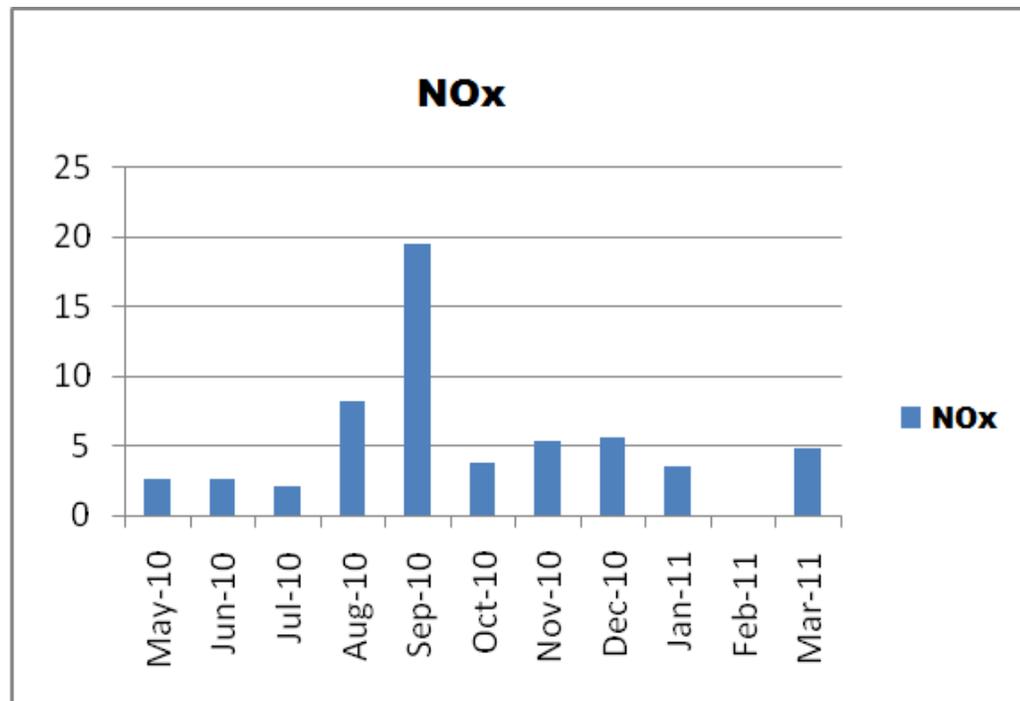
Fig. 25



Figs. 26-27



26



27

IX. ARCHAEOLOGICAL GARDENS

ASSAM

1. NEGHERITING, GOLAGHAT, ASSAM

The garden development work has been taken up to maintain good environment as well as to beautify the surroundings of the ruins of the fortress area. The garden development work included laying of lawn, dot plantation, shrubbery border and flower beds. The garden development work has been completed and the same is being maintained in good condition.

BIHAR

2. CHANKIGARH, DISTRICT WEST CHAMPARAN

The laying out of garden has been taken up to maintain good environment at the site.

3. NANDANGARH, DISTRICT WEST CHAMPARAN

The laying out of garden has been taken up to maintain good environment as well as to beautify the surroundings at the ruins of the fortress area. The garden development work included laying of lawn, dot plantation, shrubbery border and flower beds.

CHHATTISGARH

4. RATANPUR FORT, DISTRICT RATANPUR, BILASPUR

The laying out of garden has been taken up to maintain good environment as well as to beautify the surroundings of the monument.

The garden development work included laying of lawn, dot plantation, shrubbery border and flower-beds. The garden development work has been completed and the same is being maintained in good condition (Pl. 148).

5. SIVA TEMPLE 4, SIRPUR, DISTRICT MAHASAMUND

The laying out of garden has been taken up to maintain good environment as well as to beautify the surroundings of the monument. The garden development work included laying of lawn, dot plantation, shrubbery border and flower-beds (Pl. 149).

6. RAM MANDIR, SIRPUR, DISTRICT MAHASAMUND

The laying out of garden has been taken up to maintain good environment as well as to beautify the surroundings of the monument. The garden development work included laying of lawn, dot plantation, shrubbery border and flower-beds (Pl. 150).

DELHI

7. ADILABAD FORT, TUGHLAQABAD, NEW DELHI

It was built by Ghiyathu'd-Din's son and successor Muhammad bin Tughluq (1325-1351) on a hill south of Tughlqabad. The challenging task of developing a garden on a

hillock full of stones and wild vegetation was accomplished in the 2010 in palace area. The whole area was divided in portions. In view of the water scarcity at the site, grassed area was

The environmental development of vast stretch of undulated land along the south eastern side citadel wall was taken up. After

INDIAN ARCHAEOLOGY 2010-11-A-REVIEW

restricted to the entrance and main palace area, with hardy plants. In remaining area xerophatic and drought resistant shrubs of indigenous varieties were planted.

8. QILA RAI PITHORA, PRESS ENCLAVE, NEW DELHI

South eastern area of this garden taken over from Delhi Development Authority was undeveloped. The development of this area was taken up during common wealth games of 2010 when the conservation of southern arm of the wall completed. The wild vegetation and *malba* was removed. The irrigation pipe was extended from bore well and the plants of *Kanak Champa*, *Harsingar*, *Amaltas*, *Gurhal* and *Kund* were planted. (Pl. 151).

GUJARAT

9. SITLA MATA MANDIR, PILUDARA, DISTRICT MEHSANA

The area is little lower than surrounding area. Therefore, a rain harvesting pit was prepared to avoid stagnation of water and to recharge the ground water which will also help in improvement of ground water quality. The top ground water is saline. The informal dot plantation was done with little water supply available. After trenching of the area, the plants of *Champa*, *Aam*, *Kachnar*, *Gultora*, *Gurhal*, *Kaner*, *Chandni*, *Harsingar* was planted.

10. CITADEL WALL SOUTH EASTERN SIDE, PAVAGARH, CHAMPANER

clearance of wild vegetation, a bore well of 20cm dia to a depth of 100m was drilled for irrigation. The strata were full of stones and *malba*. The garden development was undertaken by spreading good earth. The shrubs and creepers were planted and trees were planted along the compound wall.

MADHYA PRADESH

11. KOSHAK MAHAL, CHANDERI, DISTRICT ASHOK NAGAR

A borewell and pipeline has been provided for irrigation purpose. Many fruit plants including guava, aonla, mango, have been planted.

12. NEW MUSEUM BUILDING AREA, CHANDERI, DISTRICT ASHOK NAGAR

A beautiful garden has been developed by planting different types of colourful shrub plants, trees and a bore well has also been sunk at the site for proper irrigation (Pl. 152).

13. BAJ BAHADUR MAHAL, MANDU, DISTRICT DHAR

The area of Baj Bahadur Mahal has been developed with a beautiful landscape by planting grass and colourful shrubs plants. In the extensive area fruit plants have been planted. The pipeline has also been laid for proper irrigation of the garden (Pl. 153).

14. HOSHANG SHAH'S TOMB, MANDU, DISTRICT DHAR

The site is situated in the western side of Jami Mosque and Hoshang Shah's Tomb at

ARCHAEOLOGICAL GARDENS

Plate 148



A



B

Ratanpur fort: A, before and B, after laying garden

Plate 149



A



B

ARCHAEOLOGICAL GARDENS

Plate 150



A



B

Plate 151



A



B

Qila Rai Pithora: A, before and B, after landscaping

342

ARCHAEOLOGICAL GARDENS

Plate 152



A



B

Plate 153



A



B

ARCHAEOLOGICAL GARDENS

Mandu. The area which was undeveloped & lying vacant has been developed by planting of colourful shrub-plants which are giving a pleasant look. The pipe-line also been laid for better irrigation facility at the site (Pl. 154).

15. ROOPMATI PAVILLION, MANDU, DISTRICT DHAR

This site is situated near Baj Bahadur Mahal, Mandu. The site has been developed by planting of colourful ornamental plants. The grassing work has also been done on slopy areas near the entrance and “Doorbeen plot” for checking of soil erosion due to slopy site. In the extensive area plantation has been done including different kinds of fruit plants such as Guava, *Jamun*, and *Katahal*. The pipe line has also been laid in this area for providing irrigation facility (Pl. 155).

16. GARHI AND TEMPLE, PADAWALI, DISTRICT MORENA

A garden has been developed here and pipe line has also been laid out for proper irrigation.

MAHARASHTRA

17. BIBI KA MAQBARA, AURANGABAD, DISTRICT AURANGABAD

Under Phase II of the development of Bibi Ka Maqbara at Aurangabad, the regrassing of lawns and plantation of fruit crops such as mango, citrus, and sapota was undertaken. The garden has improved and

giving aesthetic look to the monument (Pl. 156).

18. DAULTABAD FORT GARDEN, DAULATABAD, DISTRICT AURANGABAD

At the Kachehri Bauli garden as well as front lawn of Chand Minar at Daulatabad Fort, a visitors' friendly garden has been developed by planting *cynodon dactylon*, *tabernaemontana coronariea*, etc. (Pl. 157).

19. ELLORA CAVES GARDEN, ELLORA

A visitor friendly garden has been developed in front of Cave No. 16 by planting *hibiscus rosasinensis*, *Cynodon dactylon*, *Tabernaemontana coronariea*, etc. (Pl. 158).

ODISHA

20. SUN TEMPLE, KONARK

The environmental development work at the back side of Museum Complex at Sun Temple, Konark has been taken up in order to maintain good environment as well as to beautify the surroundings of the Museum Complex. The environmental development work included laying of lawn, dot plantation, shrubbery border and flower beds. The environmental development work has since been completed and garden laid out is being maintained in good condition.

RAJASTHAN

21. MAHAL BADSHAHI, PUSHKAR, AJMER

The area is lower compared to surrounding area but flat and even. The area

was dressed up and rubbles were removed. The stratum was sandy. Hence, farmyard manure

INDIAN ARCHAEOLOGY 2010-11-A-REVIEW

Plate 154



A

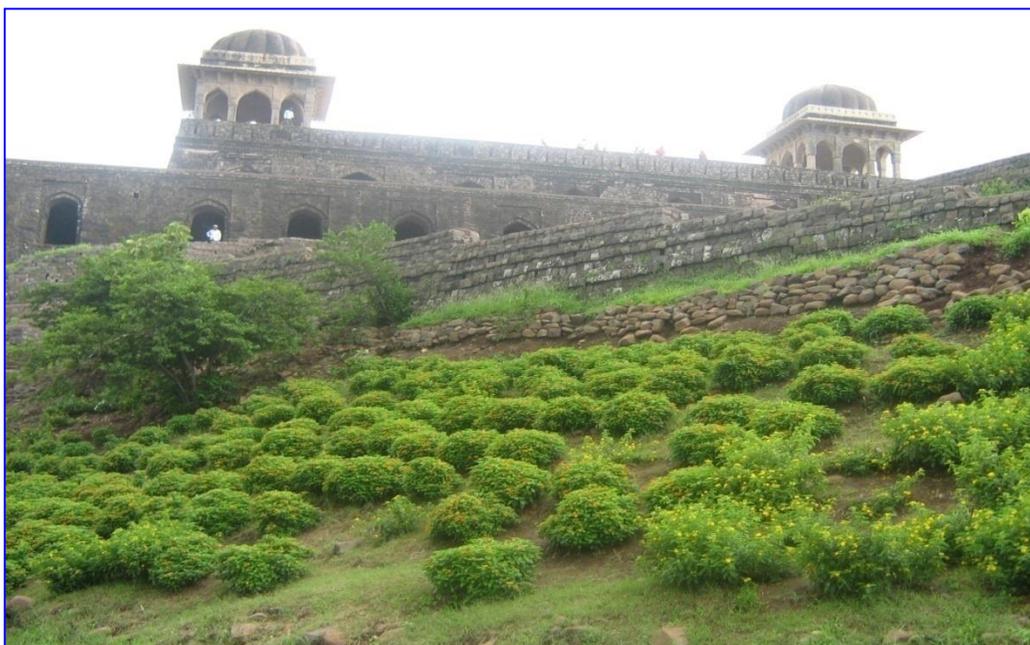


B

Hoshang Shah's Tomb, Mandu: A, before and B, during extension of garden

ARCHAEOLOGICAL GARDENS

Plate 155

**A**

B

Roopmati Pavillion, Mandu: A, before and B, after landscaping

Plate 156



A



B

ARCHAEOLOGICAL GARDENS

Plate 157



A



B

Daulatabad fort, Kacheri Baoli: A, before and B, after re-grassing

Plate 158



A



B

ARCHAEOLOGICAL GARDENS

was added to improve the texture of soil. Grassing and plantation of aromatic shrub has been done (Pl. 159).

22. RADHEY SHYAM MANDIR, KRISHNAVILAS, DISTRICT BARAN

The area was informal, undulated and full of wild vegetation and stones. The small thorny shrubs were uprooted and area was made accessible. All the stones found during excavation were stacked at the site for use in conservation of monument. The area is given smooth shape as per topography. The grassing and plantation of *Gurhal*, *Kaner* and *Harsingar* have been done (Pl. 160).

23. SIVA TEMPLE, KRISHNAVILAS, DISTRICT BARAN, RAJASTHAN

Krishnavilas (Bilasgarh) is located in the heart of the forest on the bank of river Vilsa to the north-east of Baran. An informal garden was laid with aromatic shrubs at this monument (Pl. 161).

UTTAR PRADESH

24. FATEHPUR SIKRI, AGRA

The record office is situated close to Hakim House and back side area of Khawab Gah at Fatehpur Sikri, Agra. Earlier a metallic path was constructed at site which was used as link-road between Jodha Bai booking to Diwan-e-khas complex. It was decided to remove, after its complete removal, the area

has been re-developed as a single garden complex (Pl. 162). The back side area of the ancient Dak Bunglow was unmaintained since a couple of years though it was a prominent

place close to the area of Mint Building of Fatehpur Sikri commonly known as Taksal. Now this terraced area has been developed with the induction of caeti plant collections. To provide irrigational facility for this area, a borewell has been sunk at site which is supplying adequate amount of water for irrigational use. A small garden having a lawn has also been developed at the site which is providing a pleasant look to the Dak Bunglow (Pl. 163).

25. JAI SINGH PURA MOUND, MATHURA

This is an ancient mound situated in between Mathura to Vrindavan, Distt. Mathura in U.P. Development of garden work has been completed by planting different types of shrub plants and ornamental trees. For providing irrigation facilities, a bore-well has been sunk and pipeline has also been laid at site.

WEST BENGAL

26. COOCH BEHAR PALACE, COOCH BEHAR

The re-grassing work has been taken up to replace the old lawn, which was full of weeds and wild grass. The re-grassing work includes trenching the ground upto a depth of 45cm. The trenched ground has been grassed after providing good earth for better growth of

the lawn grass. The work has been completed and lawn of the garden is maintained in good condition.

Plate 159



A



B

Mahal Badshahi, Pushkar: A, before and B, after re-grassing and plantation

ARCHAEOLOGICAL GARDENS

Plate 160



A



B

Radhey Shyam Mandir, Krishnavilas: A, before and B, after landscaping

Plate 161



A



B

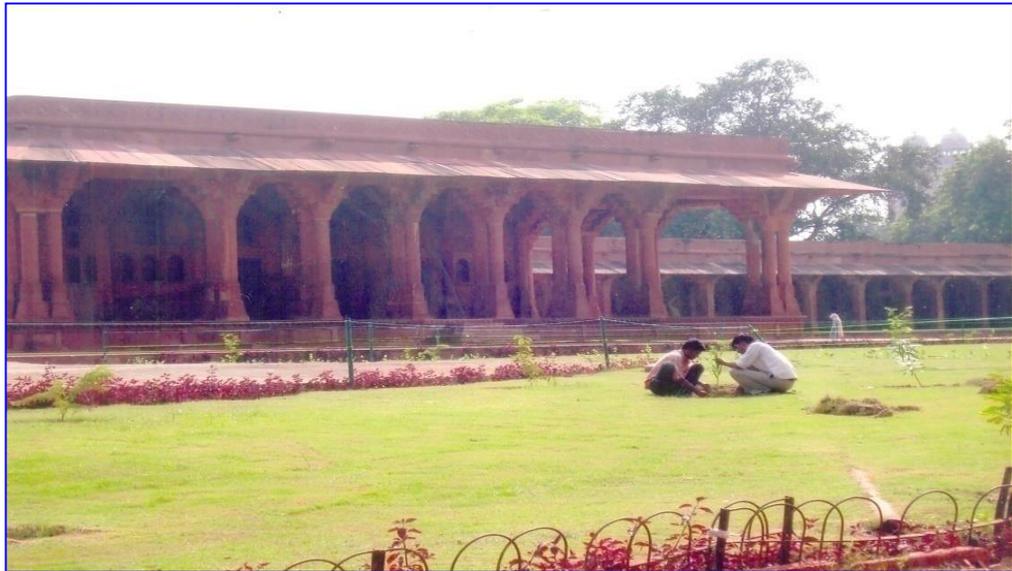
Siva Temple, Krishnavilas: A, before and B, after landscaping

ARCHAEOLOGICAL GARDENS

Plate 162



A



B

Plate 163



A



B

Fatehpur Sikri: A, before and B, after landscaping behind Dak Bungalow

X. PUBLICATION

PUBLICATIONS OF THE SURVEY

- | | |
|--|---|
| <p>1. Annual Report on Indian Epigraphy – The issue for the year 1991-92 was published.</p> <p>2. South Indian Inscriptions – The volume XXVIII was printed.</p> | <p>3. Guide Books – Sarnath (Hindi) and Brihadeshwara Temple were broughtout.</p> |
|--|---|

OTHER PUBLICATIONS

4. During the period under review, the following other publications have also been broughtout:
5. Geoscientific Studies for Conservation of Ajanta Caves.
 6. Monuments of Delhi
 7. Treasures of China
 8. Poster for China Exhibitions
 9. Tri-lingual and Catalogue on Exhibition on Treasures of Ancient China.
 10. Picture Postcards for Chinese Exhibitions.



ARCH

AEIOLOGICAL SURVEY OF INDIA