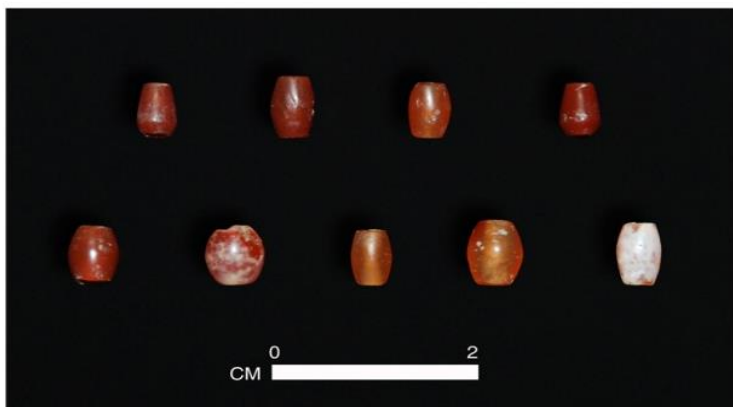


INDIAN ARCHAEOLOGY 2009-10

- A REVIEW



INDIAN ARCHAEOLOGY 2009- 10 A REVIEW

CHIEF EDITOR

Dr. Rakesh Tewari

DIRECTOR GENERAL

EDITORS

Dr. Millan Kumar Chauley

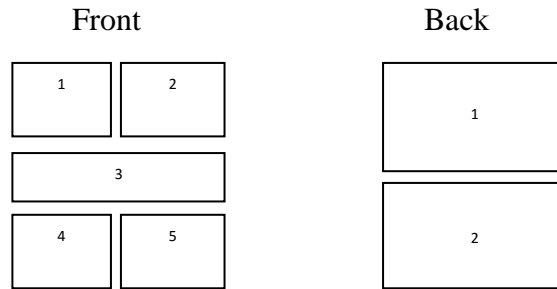
SUPERINTENDING ARCHAEOLOGIST

Dr. D.N. Dimri

DIRECTOR (PUBLICATIONS)



**PUBLISHED BY THE DIRECTOR GENERAL
ARCHAEOLOGICAL SURVEY OF INDIA
JANPATH, NEW DELHI
2016**



Front Cover: *Khirsara 1: north-east corner fortification*

2: parallel walls, 3: seals

4: bone beads, 5: terracotta animal figurine

Back Cover: *Kameswar temple, before and after re- plastering of the main temple*

©

2016

ARCHAEOLOGICAL SURVEY OF INDIA
GOVERNMENT OF INDIA

Price: ` /-

Printed at

PREFACE

I take the privilege to present the issue of *Indian Archaeology 2009-10 – A Review*, before the scholars and general readers.

This issue includes information on archaeological research undertaken during the year 2009-10 throughout the country including explorations, excavations, epigraphy, numismatics, outstanding discoveries, palaeobotany, museums, structural/chemical conservation, publications 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 States, 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 Ms. Anchal Sharma, DEO for formatting and designing the volume and also 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.

March 15, 2016
New Delhi



(Rakesh Tewari)
Director General
Archaeological Survey of India

CONTENTS

I.	Explorations and Excavations	....	....	....	....	....	....	1
	Andhra Pradesh, 1; Chhattisgarh, 2; Gujarat, 12; Haryana, 52; Himachal Pradesh, 58; Jammu and Kashmir, 59; Jharkhand, 66; Karnataka, 72; Maharashtra, 78; Odisha, 96; Rajasthan, 98; Tamilnadu, 104; Telengana, 113; Tripura, 115; Uttar Pradesh, 119; Uttarakhand, 154; West Bengal, 155							
II.	Epigraphy	....	....	....	....	....	....	173
	Sanskrit and Dravidic Inscriptions, 173 Andhra Pradesh, 173; Karnataka, 173; Rajasthan, 175; Tamilnadu, 175							
	Arabic and Persian Inscriptions, 178 Tamilnadu, 178; Uttar Pradesh, 181							
III.	Other Important Discoveries	....	....	....	....	....	....	184
	Arunachal Pradesh, 184; Maharashtra, 185; Pudduchery, 187; Uttarakhand, 187							
IV.	Palaeobotanical and Pollen Analytical Investigations	....	....	....	....	....	....	192
	Gujarat, 192; Uttar Pradesh, 192							
V.	Museums	....	....	....	....	....	....	194
VI.	Architectural Survey	....	....	....	....	....	....	197
	Temple Survey, North, 197; Temple Survey, South, 203; Building Survey Project, 208							
VII.	Preservation of Monuments	....	....	....	....	....	....	227
	Monuments of National Importance, 227 Aurangabad Circle, 227; Bangalore Circle, 235; Bhopal Circle, 241; Bhubaneswar Circle, 246; Chandigarh Circle, 250; Chennai Circle, 258; Dehradun Circle, 260; Dharwad							

Circle, 269; Goa Circle, 276; Guwahati Circle, 277; Jaipur Circle, 282; Kolkata Circle, 291; Lucknow Circle, 295; Mumbai Circle, 311; Raipur Circle, 312; Shimla Circle, 317; Srinagar Circle, 318; Thrissur Circle, 321; Vadodara Circle, 324

VIII. Archaeological Chemistry 335

Treatment of Monuments and Paintings, 335

Andhra Pradesh, 335; Assam, 338; Bihar, 339; Chhattisgarh, 339; Delhi, 339; Goa, 344; Gujarat, 344; Haryana, 351; Himachal Pradesh, 351; Jammu and Kashmir, 353; Karnataka, 354; Kerala, 358; Madhya Pradesh, 361; Maharashtra, 363; Odisha, 367; Puducherry, 368 Punjab, 369; Rajasthan, 370; Sikkim, 372; Tamilnadu, 372; Uttar Pradesh, 376

Treatment of Excavated Objects and Museum Exhibits, 381;

Monitoring of Air Pollution, 387;

Installation of Automatic Weather Station at World Heritage Site, 389;

Research and Analysis, 389

IX. Archaeological Gardens 396

Delhi, 396; Gujarat, 396; Haryana, 397; Himachal Pradesh, 397; Punjab, 397; Rajasthan, 397

X. Publications 399

Memoirs of the Archaeological Survey of India; 399

Guide Books; 399

Brochures; 399

INDIAN ARCHAEOLOGY 2009-10 – A REVIEW

I. EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. EXPLORATION IN BELAGAL AND GUDUR MANDALS, DISTRICT KURNOOL

As part of ICHR research project to work on the investigations into Neolithic and Megalithic Culture in the Lower Tungabhadra region of Andhra Pradesh, P. C. Venkatasubbaiah of the Deptt. of History, Archaeology and Culture, Dravidian University, Kuppam, carried out field investigations in the region and found the following archaeological sites:

Alavala (15° 47' 20" N; 77° 37' 40" E) is an early historic low-lying mound located on the right bank of Peddavanka, an affluent of Tungabhadra river about 200m away from the present village to its north-east. It measures approximately 100 x 200 x 2.5-3m 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 notice of full forms of pottery and other objects, it is clear that the habitation deposit is intact and a large scale excavation may reveal interesting things for historical reconstruction. The present investigator also noticed traces of Neolithic habitation debris, 1km, south-west of the early historic habitation, of the same village which has an extent of 50 x 60 x 1.5m, potsherds of grey ware, red ware, black ware, buff ware along

with pecked and ground stone tools and other objects were noticed at the site.

Chamalaguduru (15° 51' N; 77° 37' E) has a medieval temple dedicated to Lord Siva. The architectural features and sculptural pattern revealed that it belongs to the Chalukyan period, based on the *kudu* motifs, decorative capitals of pillars, etc.

The present investigations also lead to the discovery of Neolithic habitations at Daivamdinne (15° 49' N; 77° 35' 25" E) with an extent of 80 x 70 x 1.5m; Enugubala (15° 48' N; 77° 36' E): 60 x 50m extent; Iulakallu (15° 48' N; 77° 46' E) 60 x 55 x 0.2m extent; Kalugotla (15° 53' 35" N; 77° 58' 05" E) Neolithic habitation of 40 x 60 x 0.2m extent; Kanakavidu (15° 5' N; 77° 33' E) extent of 40 x 30 x 10m; Kanakavidupeta (15° 51' N; 77° 34' E) an extent of 100 x 60 x 1.5m; Kambadahal (15° 49' 40" N; 77° 37' 30" E) Neolithic ash mound-cum-habitation debris lie around the mound; Mallapuram (15° 49' N; 77° 49' E) with an extent of 40 x 30 x 0.10m Mittasomapuram (15° 53' N; 77° 35' E) with an extent of 70 x 50 x 0.20m; Ponakaladinne (15° 50' N; 77° 36' E) with an extent of 40 x 40 x 0.1m; Early Historic habitations Mennipadu (15° 53' N; 77° 57' E) and Pulluru (15° 52' N; 77° 59' E) and Medieval habitation mounds at Korivipadu (15° 54' N; 77° 55' E) and Madduru (15° 54' 55" N; 77° 53' 30"

E). The Neolithic material comprised pottery of 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 and blade tools. At Tsallaguduru was noticed a habitational mound 3-4m in height from the northern and north-eastern and eastern direction, the vitrified and soft ash normally found at ash mound sites like that found at Kambadahal, which had been erased because of agricultural activities as its adjacent area has been brought under cultivation, hence the traces of ash could be found all along the field's boundary. Potsherds of black and red ware, black ware and red ware were found on the ploughed zone which suggests that the sub-surface of the mound would have belonged to early historic times and the lower or bottom part of the mound belonged to the Neolithic period.

The Neolithic habitations so far found range in dimension between 1-3 hectares and at certain sites the sparse representation of habitations along with meager remnant of cultural material suggest existence of satellite settlements attached to the main sites. This indicates that the Neolithic populations had vigorous movement between them 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 some other source. The dolerite dyke formations have been found as outcrops everywhere in the present area of investigation intervened with the black cotton soils along with boulders of granite. The overall picture of the distribution of Neolithic settlements in the area could be seen as a network survived around 2500 BCE, as indicated by the evidence of an ash mound at Kambadahal which lies about 60 km east of Utnoor ash mound, the latter was excavated by Allchin (1961).

CHHATTISGARH

2. EXCAVATION AT ANCIENT HISTORICAL SITE, MALHAR, DISTRICT BILASPUR

The Excavation Branch-I Nagpur, of the Archaeological Survey of India¹, under the direction of S. K. Mittra assisted by Prabhas Sahu, Samir Diwan, Rajesh Meher, Miss Sudha Velip, H. J. Barapatre, D. K. Kasbi, B. V. Bhoyar, R. G. Nagulwar, S. K. Gulrande, S. M. Khairkar, A. E. Keshwar, P. M. Barik, V. B. Akhare, Shaheed Akhtar D. Kamble, M. S. Dahake, P. C. Dhendwal, Rajesh Patil, Balbahadur Ghale, K. G. Mudliar, K. M. Dessai, M. Alam, A. M. Tayde, Masram, Z. Hussain, V. Kanoujiya carried out excavations at ancient historical site of Malhar (21° 53' 54.34" N; 82° 16' 36.91" E).

The ancient city of Malhar (Mallalapattana) (fig. 1) falls within the ancient territorial jurisdiction of the Chedi (Cheti) later identified as in the region of Dakshin Kosala *Janapada*. Chedi was one

¹ Archeological Survey of India is referred to in the following pages as the Survey.

among the sixteen *mahajanapadas* later bifurcated to *uttar* and *dakshin* Kosala.

Malhar is located at a distance of about 33 km from the district headquarters of Bilaspur on the National Highway No. 200 from Bilaspur - Masturi – Chandikhol. The site can be reached through an offshoot from Masturi, taluk headquarters, at a distance of 13km.

Malhar has contributed immensely to its archaeological potentiality with the presence of ancient temples, sculptures, inscriptions, coins, copper plate grants and hundreds of minor antiquarian finds collected by local villagers from the ancient mound and its surroundings.

Between the periods 1975-80, excavations were carried out by K. D. Bajpai of the Department of Ancient Indian History, Culture and Archaeology, Sagar University. Bajpai's excavation was limited to certain trenches taken in the surroundings of the present village and not on the original ancient mud fortified mound. Therefore, in the light of above fact and the great potentiality of ancient Malhar, it was planned to excavate the ancient fortified mound at Malhar to unravel the different cultural horizons of the site, the nature of structural activity and to find out the antiquity of the fortification. Five months of extensive field work at the site has revealed five major periods of occupation, mainly arrived on the basis of ceramic finds, structural evidences, palaeographical and numismatic evidences, they are:

Period I: Pre- Mauryan

Period II: Mauryan and Sunga

Period III: Pre-Gupta

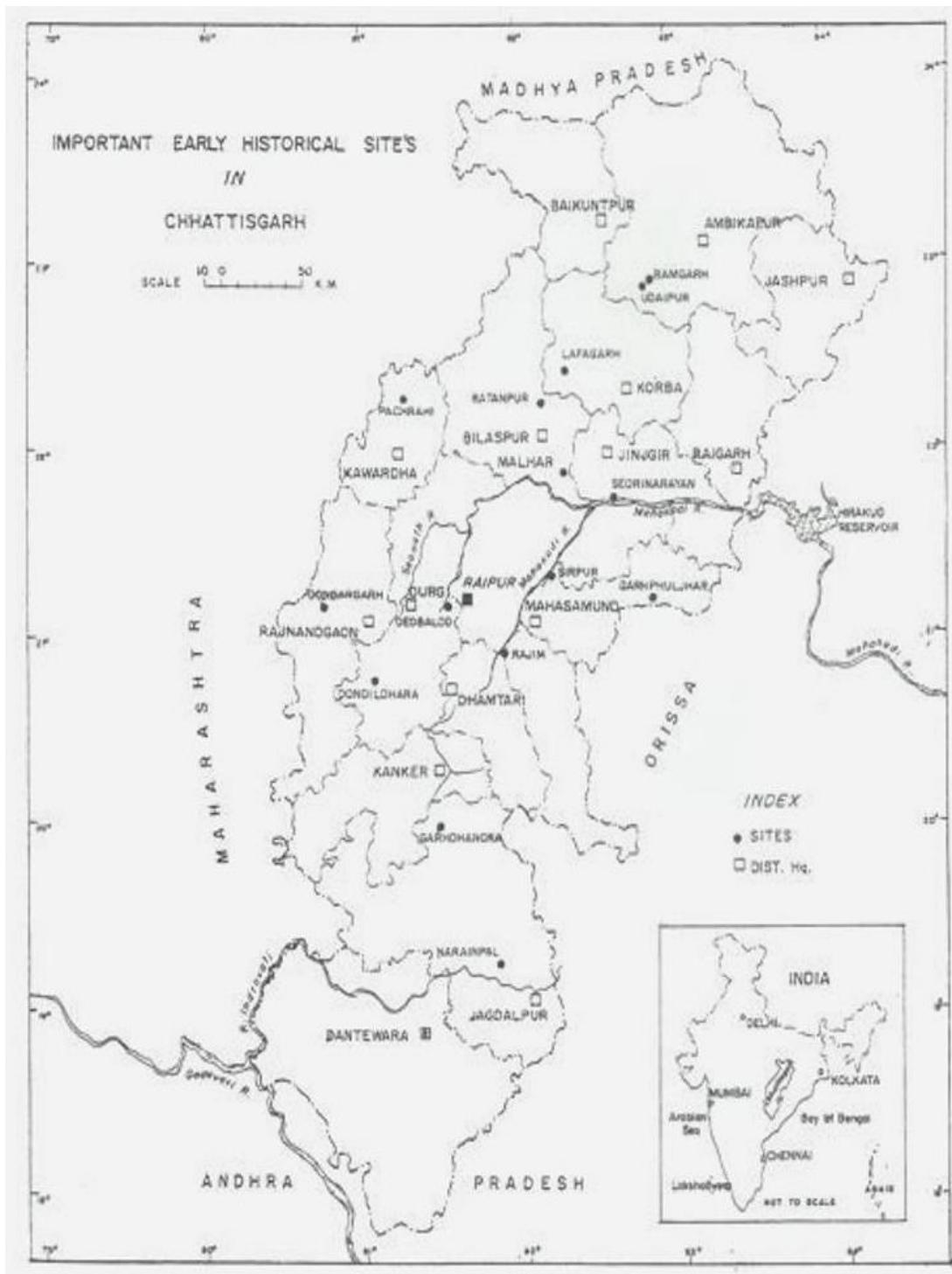
Period IV: Gupta-Vakataka

Period V: Later Gupta

Period I: In a limited area, the pre-Mauryan level was excavated which has yielded ceramic finds representing red ware, dull red ware, and sturdy red slipped ware and a distinct black and red ware. The later is little sturdier with the section mostly grayish and often well burnished. The general shapes represented in red ware and dull red ware are storage jar, medium to big vases and small bowls. The red slipped ware is mostly represented by carinated *handis*, vases and basins. The black and red ware consists of convex profile medium size bowls, carinated *handis* and small shallow basins. In the limited excavated area, no structural remains have been found.

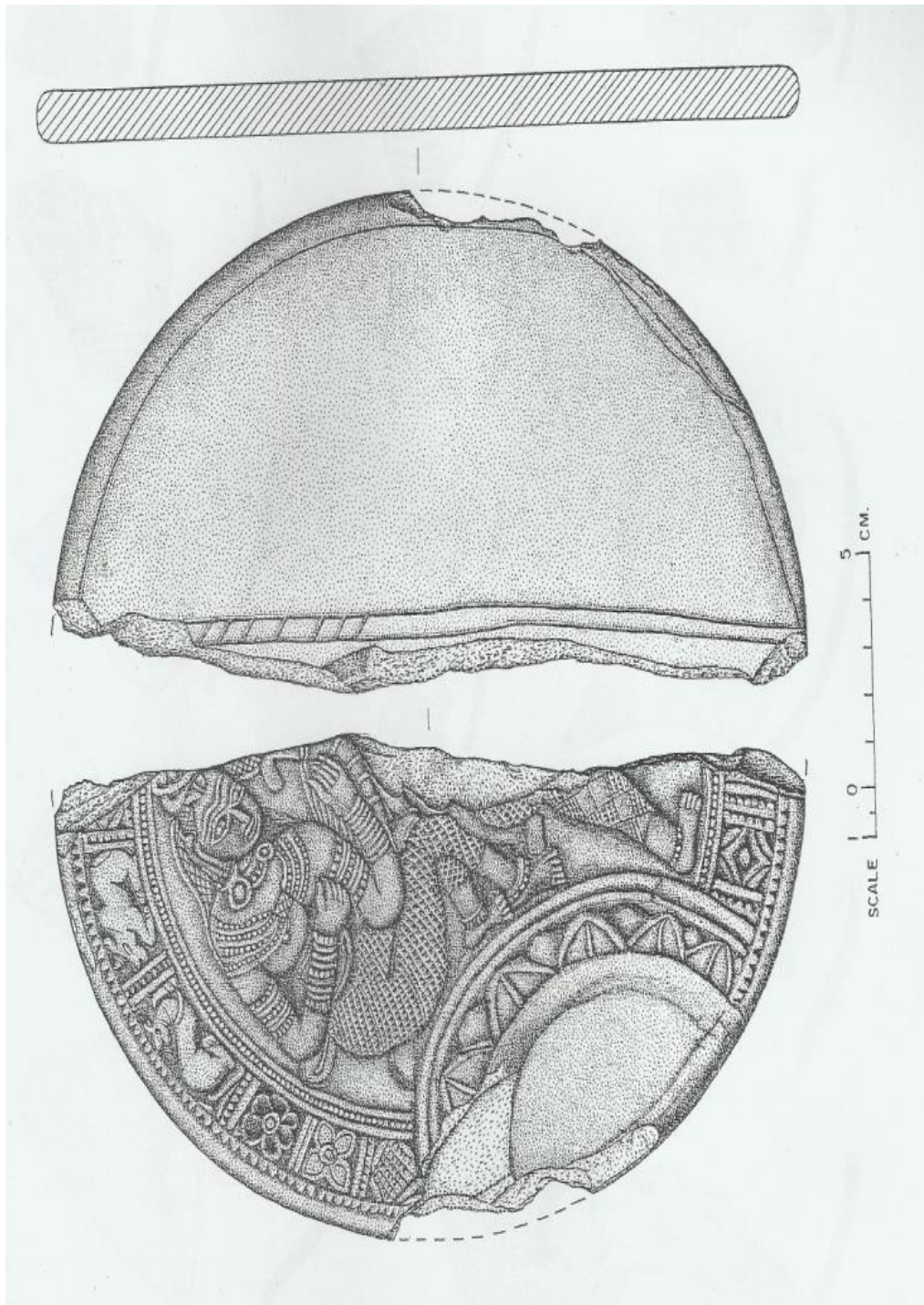
Period II: In a couple of trenches, the Maurya-Sunga level was reached with scanty representations of structural activity. The period is mostly identified with the help of few antiquarian and ceramic finds of the period which has its similar representations in the Gangetic Doab in the given time and space. The ceramic finds are mostly continuation of the previous period except the black and red ware and the sturdy red slipped ware which almost discontinued in this period. The notable antiquarian finds includes a broken, highly decorated stone plaque (fig. 2), highly polished chert ear stud with multi-faceted design quite similar to the ring stones finds from the Mauryan levels in the Gangetic belt. Besides, availability of few broken, highly polished sandstone objects carrying its affinity with Chunar sand stone of the Mauryan period is

Fig. 1



Malhar: location map

Fig. 2



Malhar: stone plaque –showing lady playing string

very important and noteworthy.

The ceramic finds of red ware, dull red ware and red slipped ware continued in quantity and shape with a new introduction of black slipped ware mostly confining to the shapes of bowls and shallow dishes. Other finds include stone beads of semi-precious stones, terracotta objects, few fragmentary finds representing inscriptional evidence in the form of a broken sealing datable palaeographically to this period.

Period III: The largest occupation in this season's excavation has produced a mixed assemblage of antiquities all datable to pre-Gupta period. The ceramic finds include red slipped ware, black slipped ware, large quantity of finger grooved single and double holed backed tiles having rice husk impressions. The pottery shape includes storage jars; big, medium and small globular bodied vases and basins; small to big vases; lipped rim; flask and lota. Number of saddle and querns represents the kitchen items etc. A singular find of Rouletted ware sherd is a noteworthy find of this period (fig. 3).

The antiquarian finds includes human and terracotta figurines, wheels, hopscotches, beads mostly representing the arecanut shape, semiprecious stone beads of which banded agate accounts for the most number, ivory dice, a good quantity of iron antiquities were unearthed in the form of nails, knife, arrowhead, spears, rings and spoons and most importantly quite a few number of terracotta sealings with legends which on paraeographical grounds can be assigned to the Kushana- Satavahana period.

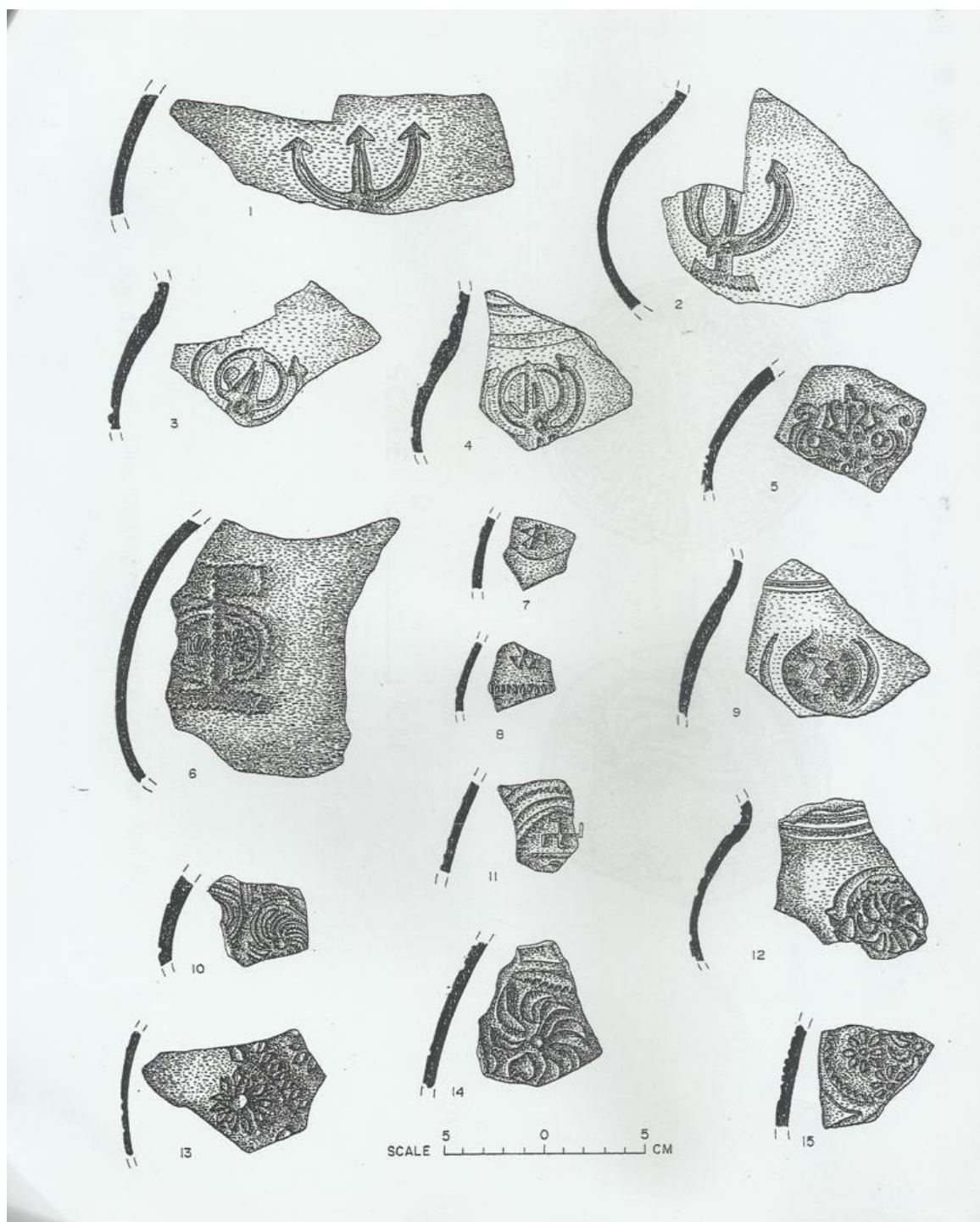
An important circular sealing, recording the name around the Brahmi letter 'ma' starting in anti-clockwise fashion mentioning "yuvaraajsya vaashishthiputrasya gutalaashiya". The central letter 'ma' mostly is identified as "Malhar symbol". Many of the sealings were documented *in situ*.

This period has produced many burnt brick structures with single or double rooms connecting walls having number of courses in proper alignment and steps. The bricks used measured 32 x 16 x 06cm. In most of the cases from the foundation to the plinth level ashlar masonry stones were used in each of the structures except in case of the repair and additions. These lime stones are locally available in the region. Significant evidences excavated from just below the structure in this period are a flask with lipped rim, red slipped ware carinated *handi*, an iron implement and a copper coin.

Period IV: This period is identified on the basis of findings of two important sealings, one silver seal carrying legends in typical Brahmi characters (fig. 4) of Gupta period and other carrying box-headed Vakataka palaeographic characters. The pottery finds includes dull red ware, red slipped ware, some sherds of dull grey ware and a sizeable number of sherds carrying stamp design (pl. 1). Some of the identifiable designs include crescent moon, *swastika* both clockwise and anti-clockwise, star, floral, geometric and *tri-ratna*.

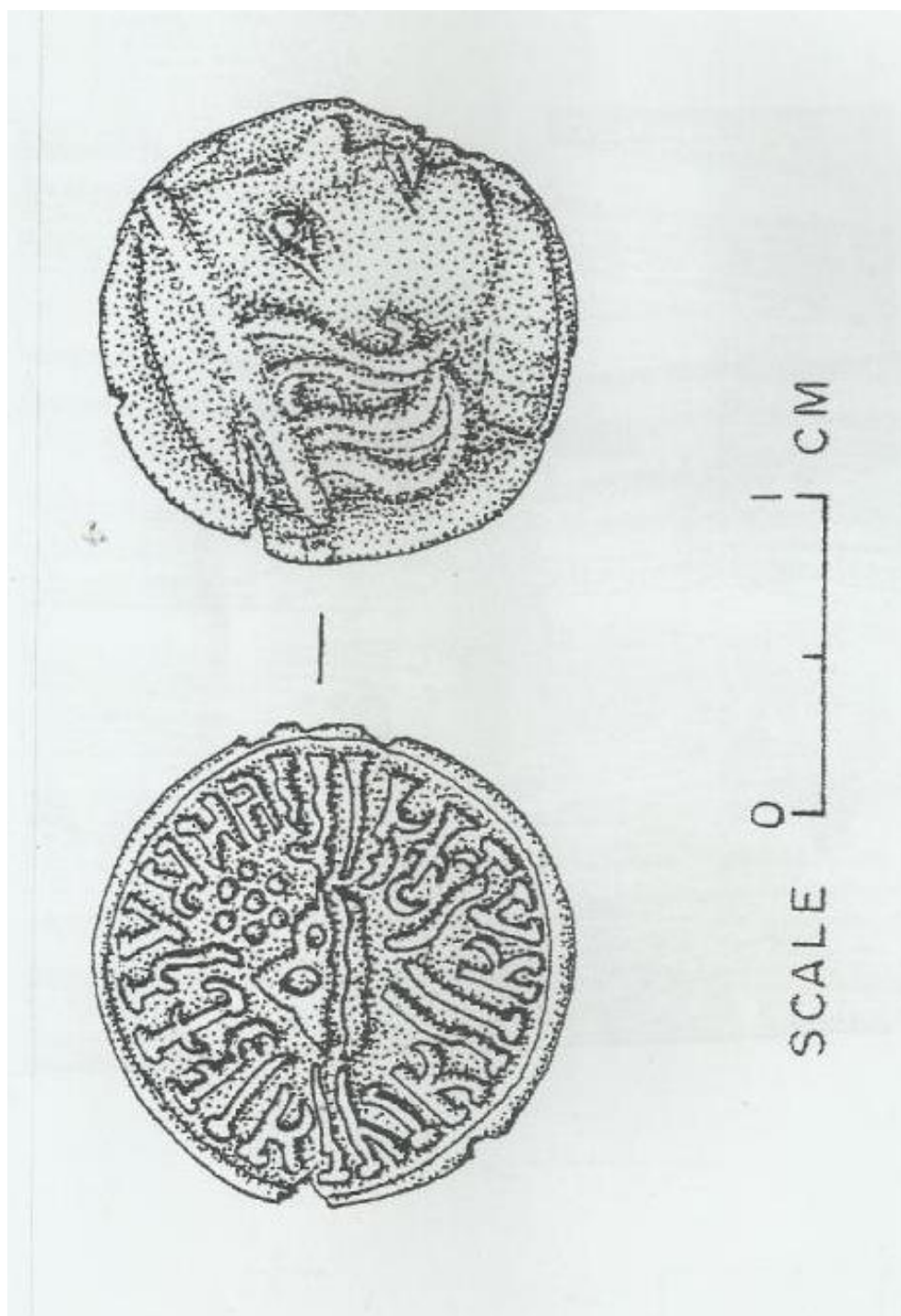
Structurally, it has yielded burnt brick built rooms of various sizes, drain and walls. In association with these structures, bigger post holes dug through the brick and

Fig. 3



Malhar: Rouletted Ware sherd

Fig.4



Malhar: Chhatrapa coin, Obv. and Rev.



Malhar: stamped potsherds

good numbers of grooved tiles were also found.

The iron antiquities continued to be found in large numbers mainly representing the types found in Period III with additions of scissor, razor, hole pass used in the wooden doorframes but here the frequency increased. The other antiquities included terracotta human and animal figurines, circular stamps, ear studs, beads, ivory dice, semiprecious stone and terracotta beads.

Period V: In this part of the fortification, the top is almost devoid of any big trees and vegetation and was almost flat except a low gradient is seen in the south to north direction. Period is mostly confined to the upper slope of the mound and is clearly distinguished by its structural remains where majority of the structures are built of broken bricks, brick bats and is associated mostly with locally available stones. Except the broad outline, not a single structure has been found having a complete house plan. On one occasion, a stone block has been found with iron dowel. A feature otherwise found elsewhere in the construction of temples datable to 1000 CE and later.

The ceramic and antiquarian finds were less in number due to less occupational deposit. The ceramic finds consists of red ware, dull red ware with little influx of stamped and decorated sherds. The antiquarian remains are represented by iron nail, arrowhead, axe, beads of semiprecious stones, terracottas and other finds.

This season's excavation has produced four cornered lipped rimmed pots

in red ware in Period II, III and IV in different shapes and sizes which perhaps is synonymous symbolic representation of Malhar site. Thus, so far five periods have been tentatively identified in the general stratigraphy (fig. 5).

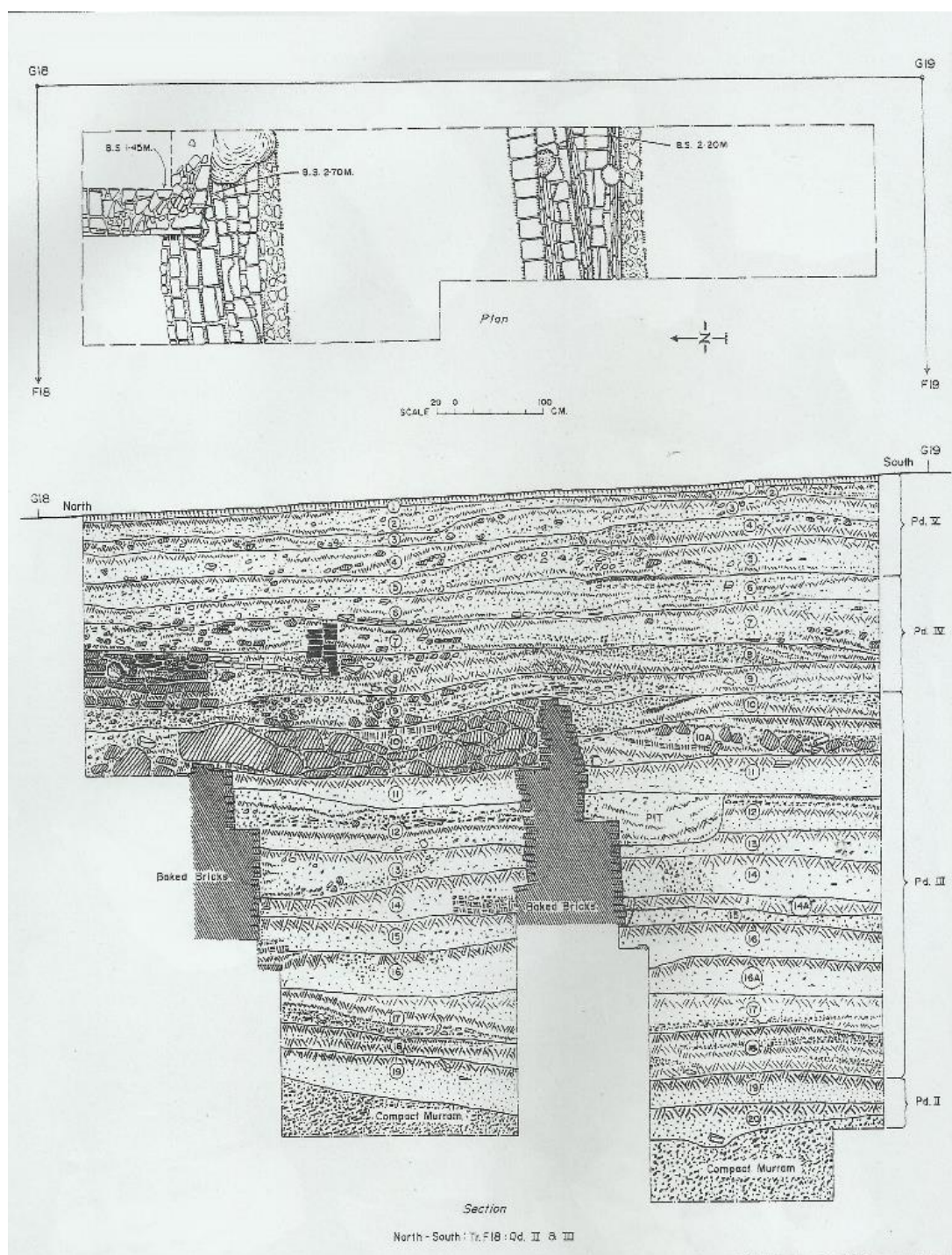
On the southern fringe of the fortification, a cutting was made to ascertain the constructional pattern of the fortification and it is largely understood that the fortification was constructed in the latter half of Period II. It was enlarged in the subsequent periods both in dimension and height. The ancient moat surrounds the ancient fortification and is still living.

3. EXPLORATION IN SHIVNATH RIVER VALLEY, DISTRICT DURG

Archaeological exploration was carried out in Shivenath River Valley between Durg, District Durg and Simga, District Raipur in Chhattishgarh, covering an area of 90km on both banks of river.

During the survey near Durg, a mound (21° 12' 08" N; 81° 14' 08" E) was traced near the railway bridge, which is passing over river Shivenath. The mound has risen to a height of about 8m from the river side. According to local tradition, the mound is known as the abode of snake god and accordingly the local people offer terracotta toy cart to fulfill their desire. The exploration has revealed red ware, black ware, black slipped ware, terracotta horse figurines, terracotta wheels, etc. Among the important pottery shapes *handi*, dishes, bowls, jar, etc. are noteworthy. In addition to this, many modern religious structures were noticed around the place.

Fig. 5

*Malhar: general stratigraphy*

4. SCIENTIFIC CLEARANCE WORK AT TUMAN, DISTRICT KORBA

Raipur Circle of the Survey carried out scientific investigation works at Tuman to trace out the habitation site as well as the temple remains. As many as seven mounds were located within the Mahadev temple complex. Investigations of mound-1 to mound-6 was carried out which has revealed remnants of as many as 20 temples of different dimensions with different phases of structural activities. Temples are constructed from very inferior quality sandstones in dry stone masonry. Iron dowels have been used for locking the architectural components. The work has revealed as many as 93 sculptures apart from large number of architectural fragments.

Before taking up the scientific clearance work, documentation and plotting of different mounds and structures located inside the Mahadeva temple complex was carried out, (fig. 6) and subsequently scientific investigation of mound- 7, located to the immediate north of existing Mahadeva temple was taken up.

The clearance work has revealed remains of two large temples named as STR-7 and STR-8. Both the religious edifices are constructed on elevated platform constructed in inferior quality sandstone in dry masonry. Iron dowels have been used for locking the architectural members. STR-8 located by the side of Mahadeva temple to its immediate north has revealed that the

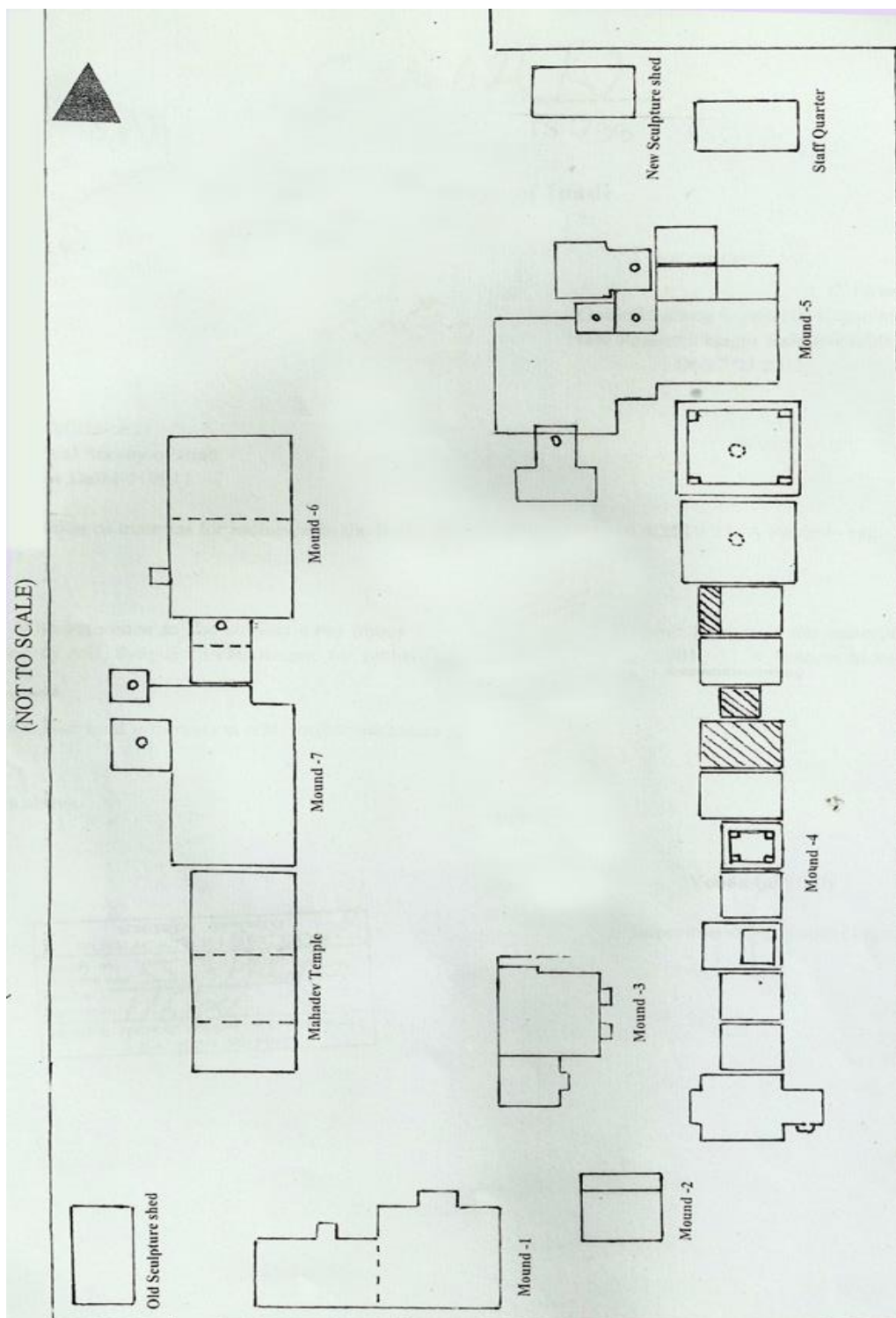
structure was *saptaratha* on plan. The investigation has revealed all the components i.e., the *rahapaga*, the *anurahapaga*, the *anurathapaga* and the *kanikapaga*. The structure STR-8 measures 20m in east-west and 10-30m in north-south orientation. Probably STR-7 was the largest structure among all in the temple premise. During clearance sculptures of Vaishnava, Saiva and Sakta cult besides secular figures such as turban headed bearded male figure, man sitting in crossed legs, amorous couples, *vyala* figures, etc. have been found. Among figures of Brahma, Vishnu, Siva, Durga, Ganesa, Hanuman are noteworthy. The other important findings includes *amlaka* stones, iron dowels, iron nails, etc.

GUJARAT

5. EXPLORATION IN DISTRICT BANASKANTHA

In continuation of the previous year's work, exploration was carried out by the Excavation Branch-V, Vadodara, of the Survey, under the general direction of Jitendra Nath, assisted by N. Kumaran, Vinay Kumar Gupta, N. B. Soni, J. B. Makwana, Rajesh S. Shambarkar, Bipin M. Rohit, H. R. Tadvī and K. P. Parmar in District Banaskantha. The talukas of Deesa, Palanpur and Amirgadh was partly surveyed, where the exploration had yielded 66 archaeological sites of varied nature ranging from Mesolithic to late medieval periods. The details of the sites are as under:

Fig. 6



Tuman: site plan of Mahadev temple complex, after scientific clearance work

<i>Site / Village</i>	<i>Taluka</i>	<i>Cultural Sequence</i>
Kochasana	Deesa	Chalcolithic pottery
Bachalva	Deesa	Chalcolithic pottery
Vithodhar	Deesa	Chalcolithic pottery
Talegadh	Deesa	Chalcolithic pottery
Viruna	Deesa	Chalcolithic pottery and a medieval well
Fagudra	Deesa	Medieval bricks and inscribed memorial stone
Robas moti	Deesa	Chalcolithic pottery
Robas nani	Deesa	Chalcolithic pottery and medieval memorial stone
Javal	Deesa	Chalcolithic pottery, medieval architectural fragments and a late medieval well
Tetoda	Deesa	Chalcolithic pottery and medieval hero stone
Nagfada	Deesa	Chalcolithic pottery and medieval architectural members
Ramun	Deesa	Chalcolithic pottery
Dhanawada	Deesa	Medieval sculptures reused in a late medieval well
Bural	Deesa	Chalcolithic pottery and medieval Jain <i>Tirthankara</i> sculptures in a late medieval well
Nava	Deesa	Medieval pottery
Aseda	Deesa	Medieval structures and pottery
Khadosan	Deesa	Late medieval pottery
Bhoyan	Deesa	Medieval pottery
Nana Rasana	Deesa	Medieval period
Dhuva	Deesa	Medieval pottery and bricks
Silasana	Dhanera	Chalcolithic pottery and medieval bricks
Khimat	Dhanera	Medieval architectural members and sculptures
Kotda	Palanpur	Chalcolithic pottery
Gadh Kotada	Palanpur	Chalcolithic pottery and medieval fortification with bastions on the hilltop
Antroli	Palanpur	Medieval pottery
Pirojpur	Palanpur	Medieval watch tower on 'Takani Dungar'
Samadhi Ranajiwas	Palanpur	Medieval period
Hanumanpura	Palanpur	Medieval structural remains and pottery
Gadh	Palanpur	Medieval structures
Jhabadiya	Palanpur	Medieval architectural fragments, inscription and late medieval copper

		coins
Bhadramali	Palanpur	Medieval pottery
Dharisana	Palanpur	Medieval pottery
Samau Mota	Palanpur	Medieval pottery
Samau nana	Palanpur	Early and late medieval pottery
Velavapura	Palanpur	Early medieval pottery
Saviyana	Palanpur	Medieval pottery
Hasanpur	Palanpur	Medieval sculptural panel with inscription
Malpuriya	Palanpur	Late medieval pottery
Bhutedi	Palanpur	Medieval inscribed panel and pottery
Bhatmal Moti	Palanpur	Late medieval pottery
Sangla	Palanpur	Medieval and late medieval pottery
Malana	Palanpur	Medieval pottery
Hebatpur	Palanpur	Medieval pottery
Chitrasani	Palanpur	Medieval sculptures
Bantawada	Amirgadh	Medieval pottery
Juna Karaza	Amirgadh	Medieval pottery
Juni Rampura	Amirgadh	Chalcolithic pottery
Umarkot	Amirgadh	Chalcolithic pottery
Rajpuriya	Amirgadh	Medieval pottery
Jethi	Amirgadh	Medieval pottery, architectural and sculptural fragments and un-inscribed memorial stone
Juni Deri	Amirgadh	Medieval pottery
Iqbalgadh	Amirgadh	Medieval period
Juni Sarotri	Amirgadh	Medieval architectural and sculptural fragments
Zanzar vav	Amirgadh	Medieval pottery
Ambapani	Amirgadh	Medieval bricks and inscribed memorial stone
Ranpuriya	Amirgadh	Medieval pottery
Virampur	Amirgadh	Chalcolithic, medieval and late medieval pottery
Gadh/ Mahadeviya	Amirgadh	Medieval pottery and sculpture
Ranpura	Amirgadh	Medieval sculptures
Balaram	Amirgadh	Medieval sculptures
Neechlo	Amirgadh	Finished and unfinished microlithic tools of Mesolithic period, grey

Bandh		ware and red ware pottery
Dungarpura	Amirgadh	Late medieval sculpture
Khuniya	Amirgadh	Microlithic tools of Mesolithic period, grey ware and red ware
Ghongha	Amirgadh	Microlithic tools of Chalcolithic period along with red ware and pottery of late medieval period.
Dholiya	Amirgadh	Microlithic tools of Mesolithic period, grey ware and red ware.
Vaghrol	Dantiwada	Late medieval pottery

6. EXPLORATION IN SOMNATH COAST, DISTRICT JUNAGADH

Arati Deshpande-Mukherjee and Sushama Deo, from the Department of Archaeology, Deccan College, Pune carried out field explorations along the Somnath coast, Junagadh district between Veraval and Kadwar. Collection of modern shell samples was made along with observations of coastal geo-morphological features such as sandunes, beach rocks, etc. At Somnath, an exposed sand dune section was observed on the beach close to the modern Somnath Temple. In earlier explorations, pottery fragments along with bones had been observed here. This sand dune is a deposit of coarse sand extending to a distance of nearly 1km parallel to the shoreline. A few pottery and animal bone fragments were collected. The latter are fairly numerous and comprise teeth, scapula and long bone fragments and phalanges and mostly belong to that of cattle, goat and pig. A few shells belonging to *Turbo* and *Thais* sp. were also found. About a kilometer south of the river mouth of the Hiran, a few potsherds were found in an old dune behind the present-day beach. The coastline near Kadwar and Hirakot, a fishing village was also surveyed. At Kadwar, an old Varaha Temple reported by Henry Cousens in the early part of the 19th

century and now under the protection of the Gujarat State Department of Archaeology, was further surveyed.

7. EXCAVATION AT KHIRSARA, DISTRICT KACHCHH

Excavation Branch-V, Vadodara of the Survey under the direction of Jitendra Nath assisted by R. N. Kumaran, V. K. Gupta, N. B. Soni, J. B. Makwana, Partha Dhara, Rajesh S. Shambharkar, Bahuleyan. K, Bipin M. Rohit, D. P. Modi and others undertook excavations at Khirsara (23° 50' N; 69° 05'E) a small village situated in Nakhatrana Taluka of district Kachchh at a distance of about 7km towards south of the village Ravapar and 5km north on the Bhuj-Narayan Sarover State Highway near village Netra.

The site, located close to the hills of the Kachchh spread widely over the western part, is surrounded by two seasonal streams on the northern and southern side which drains into the river Khari flowing at a distance of around 400 m from the site. The massive fortification built of stones with dressed outer face is roughly rectangular in plan and measures 310 x 270m (pl. 2A). The site, presently under cultivation, shows distinct mark of vandalism and destruction. A large portion of the fortification exposed

along the eastern and western periphery is severely disturbed due to robbing of stones. Even inside, barring a stretch of land in the central part of eastern half extending from northern to southern fortification, the entire area within fortification has been flattened to make it cultivable. It was also brought to the notice that a few decades back huge quantity of bones were dug out from the site and sold for industrial purpose. The huge depressions on the surface testify this fact and are evidence of damage caused to the site.

Excavation at Khirsara was taken up with a view to ascertain the cultural sequence of the site besides understanding the nature of the settlement, subsistence pattern of the Khirsarans and their regional affiliation in Harappan context. Hence the main concentration of first season was on documentation (including general survey, mapping and contouring, etc.) besides taking up a few trenches for excavation in the different areas to have an overview of the site. The entire site was divided into horizontal grids each trench measuring 10 x 10m. The numbers in alphabetical order runs north to south and the numerical numbers from west to east. A total of fifty trenches (inclusive of partially and fully) were taken up for excavation. The maximum habitation deposit encountered was 4.62m in trench H-31 Qd. 4. The excavation revealed several interesting aspects of a fortified settlement belonging to the mature phase of the Harappan culture.

Trenches were laid across the northern periphery in order to trace out the entrance and understand the nature of the fortification as well as the cultural sequence.

The excavations carried out in trench G-28, G-29, G-30, G-31, F-30 and F-31 exposed the fortification with a maximum width of 7.10m and revealed that the fortification was repaired and widened at least thrice in the subsequent phases as the alignment of walls, material used and construction method employed in each phase were quite distinct. The thickness of main fortification was originally 3.40m but the width was subsequently increased by way of additional reinforcement on either side to strengthen the fortification. Evidence of thick mud plaster was found on the outer face of the main fortification wall. Subsequently a formidable masonry wall with a thickness of 2.80m was added to the main fortification on the northern side, in the second phase (pls. 2B-2C). This wall rests on a thick and hard rammed base made of silt and lime mixed with mud raised on the bed rock. The stones used in the second phase differ significantly in size and shape. Another noteworthy addition in the second phase was a salient measuring 6.45m x 1.85m. It was also raised abutting the fortification with a view to provide strength to the fortification. The corners of the salient were provided with well dressed stones. The second reinforcement with the width of 0.90m was added on the inner side (south) of the main fortification wall in third phase which rests over a hard rammed surface made of mud brick bats mixed in clay. The maximum extant height of the fortification including the foundation exposed in trench G-30 and F-30 is about 7.20m.

The excavation on the inner side of the northern fortification in trench H-29, H-

Plates: 2A-2C



A



B



C

Khirsara: A, general view of the site and B-C, northern fortification

30, H-31, J-29 and J-30 revealed the evidence of residential structures, rectangular in shape with flat circular pillar bases, hearths, etc. The rooms were provided with entrance and were generally interconnected. The evidence of different phases of construction is evident in all the trenches; the wall where raised after every phase, the area was leveled using mud and mud brick bats mixed with house hold wastes. However, three structural phases were noticed in the south facing section of the index trench H-31 Qd. 4. The index trench with nine layers and total depth of 4.62m has yielded Harappan ceramics in fairly large number including a variety of Reserve slip ware. Trench J-30 Qd. 4 was also dug up to the natural soil. It yielded huge quantity of animal bones along with typical Harappan ceramics and antiquities. Occurrence of fish and animal bones in such a huge quantity is quite interesting and a few of them even show cut marks. The samples have been sent for scientific investigation and the real purpose and use of these bones could only be ascertained after the report is received. But the use of these bones for making tools and ornaments cannot be ruled out. Trench H-29 yielded evidence of a fine circular fire pit having a diameter of 50 cm adjoining the wall on the inner side of the residential structure. A pot filled with ashy mud and fragments of charred bones was placed within the fire pit. On the southern edge of the residential complex a street like formation rammed with pot sherds, bones and shell debitage, etc were noticed. A variety of typical Harappan ceramics and antiquities have been recovered from the residential area including two seals.

To trace further extension of residential complex trench G-34, H-34, J-34, K-34 and L-34 were taken up for excavation. The excavation revealed that the area was badly disturbed. However, a limited excavation in trench L-34 has revealed two structural phases. A variety of antiquities and typical Harappan ceramics have been recovered from this area. Trench Y-39 located on the most elevated area, to the west of the warehouse has revealed a floor having coloured mud bricks measuring 12 x 24 x 48 cm. Further digging is required to ascertain the actual purpose of this floor (pl. 3A).

Trenches F-43, F-44, E-43, E-44, D43 and D-44 were laid towards the north-eastern periphery to ascertain the nature of the fortification as well as the corner bastion. It was apparent from the surface that this area was also affected due to vandalism. Digging in trench F-43 exposed the inner alignment of the fortification facing south. To trace the inner corner, excavation was extended to trench F-44 which exposed the inner corner as well as the outer face of eastern fortification and also a part of the bastion. The core of masonry wall was filled with stone rubbles and mud mortar. The extant width of fortification on the eastern side is around 6.80m. Digging was gradually extended to other trenches E-43, E-44, D-43 and D-44 towards the north exposing the complete edge of north-eastern bastion and a protection wall running parallel to the fortification. The bastion, having a projection of 1.60m on the eastern and 2.45m on northern side from the fortification, measures 8.80 x 7.60m and is

rectangular in plan. The outer face of the bastion was provided with dressed stones and the core was filled with rubble stones and mud mortar. The average width of protection wall exposed in Trench D-43 and D-44 is around 2.30m. It was probably raised to provide protection to the site from the danger of floods from the river Khari. The distance between the bastion and the northern parallel wall is around 3.15m and from the outer fortification it is around 5.80m (pl. 3B). On the eastern side too, the protection wall was exposed in trench H-46 at a distance of about 19m from the fortification.

Trench F-40, E-39 and E-40 were taken up for excavation to probe the area across the northern fortification wall having depression to trace the possibility of an entrance. But, the excavation revealed only the remains of fortification with a width of around 7m and a salient measuring 6.75 x 2.90m abutting the fortification on the outer side. Further, extension of protection wall was also noticed in E-39 and E-40. Trench X-42, X-44 and X-45 were laid across the partially exposed wall along the elevated south-eastern portion of the site with a view to understand the purpose of construction of this wall. Excavation in Trench X-44 revealed that the partition wall with a total width of 6.30m was constructed in two stages. The width of northern half of the partition wall is 2.50m whereas southern half measures 3.80m. The northern half is slightly damaged towards eastern end whereas the southern half is comparatively intact and joins the main fortification. Excavation in the Trench X-45 laid across the fortification on the eastern side has

revealed different structural alignments and repairs carried out in successive phases. Salient with a size of 8.70 x 2.20m had been provided on the outer side of the fortification which bears the sign of damage caused due to vandalism. Trench X-42 dug up to the natural soil has yielded antiquities and a variety of Harappan ceramics.

The south-eastern area with a considerably higher elevation in relation to north-eastern area was taken up for excavation with a view to trace the nature of elevation as well as human activities in this area. Trench AC-45 and AD-45 laid on the eastern fortification revealed that the wall with a total width of 7.10m was constructed in three stages as three different alignments are clearly visible in plan. Excavations in Trench AE-45 and AF-45 exposed the southern fortification wall with a width of 4.40 m as well as an entrance from the eastern side of south-east corner and a pathway measuring 6.90 x 3.00m with flight of steps. The entrance was, however, closed in the later phase. On the either side of entrance guard rooms with opening towards the pathway were provided. The guard rooms on southern side measures 3.40 x 2.60m; 3.55 x 2.60m and 2.70 x 2.60m while the one along the northern wall measures 3.80 x 2.40m and 3.50 x 2.50m. Fragments of a big storage jar along with broken pieces of bowls and pots were found in the corner of one of the guard room located in the north-eastern side. The excavation taken up in Trench AC-43, AC-44, AD-42, AD-43, AD-44, AE-42 and AE-43 revealed a very interesting structure with series of parallel walls in north-south orientation. The walls are built of roughly dressed stones and rests

over a hard rammed mud platform. The average length of these walls is around 10.80m which are supported with three intersecting walls at regular intervals. The average distance between these walls is around 0.70m to 0.75m and the average width of these walls varies from 1m to 1.50m. A rectangular platform abutting the parallel walls was provided at the northern end of this structure, which probably served as a working platform. Its location close to the south-eastern entrance suggests that it was probably used as a 'Ware House' with some kind of super structure made of perishable materials like wood over it (pl. 3C). Trench AK-18 was taken up for excavations to find the south-western extent of the fortification. As the outer side was extremely disturbed, trench was laid on the inner side to trace the extent of inner corner. The excavation was restricted only to quadrant one which exposed the remains of two masonry walls, the southern wall joining the western wall which extends further towards the south. The core of the southern wall was filled with mud bricks and rubble stones set in mud mortar. The excavation on the inner side of the fortification wall has revealed very rich cultural materials from the ashy layers of trench such as drill bits, beads of semiprecious stones (finished, unfinished and broken), steatite micro beads, cores and debitage of raw materials, etc. Besides, a small broken piece of rectangular soapstone seal depicting two Harappan characters was also recovered. As the area of excavation was very limited, it is very difficult to understand the nature of the structure. But the contents found reveals the importance of

the area and the possibility of this area being a bead making workshop cannot be ruled out.

The ceramic assemblage at Khirsara represents a vast variety and includes almost all types of Harappan potteries. On the basis of surface treatment, shapes, firing, fabric, decoration, etc. they are further divided into the different categories like red ware, red slipped ware, coarse red ware, grey ware, buff ware and reserve slipped ware. All these wares are well fired and made on fast wheel using well levigated clay except the Coarse red ware. In Coarse red ware, a lot of tempering materials were mixed and were ill fired. The ceramic assemblage also includes a good number of painted motifs, incised decoration, graffiti and appliqué designs. Black on red paintings with geometric and naturalistic pattern is the most common. The main shapes include dish on stand, goblet, beakers, basins, convex sided bowls and globular pots of various sizes. The Reserve slip ware in various combinations and the perforated pottery are the dominating feature of the Harappan Ceramics at Khirsara (pls. 4A-4D; figs. 7-9).

The site has yielded cores and debitage of a variety of raw material in a large number as well as finished items such as stone sling balls; chert blades; beads of carnelian, agate, jasper, chalcedony, faience and steatite; weights of chert and black jasper with polished surface; gamesman; pendant, etc. which indicates that Khirsara was a prominent centre for production of such items in Kachchh region. Besides, fish hooks, rings, spear head, knife, chisel, etc. made of copper, bangles, beads, inlays made

Plates: 3A-3C



A

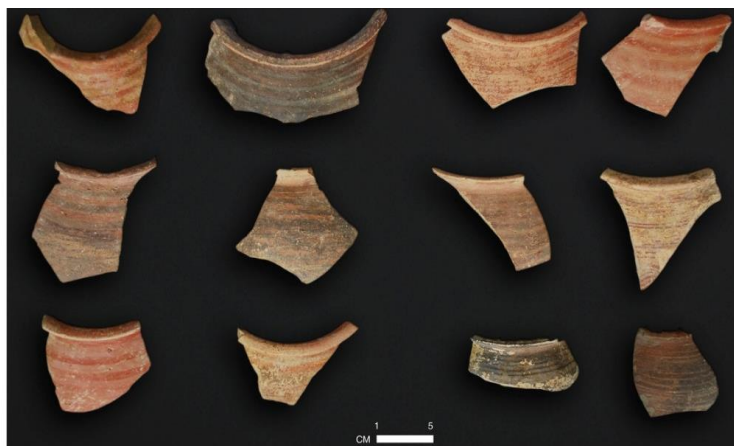


B



C

Khirsara: A, mud brick floor; B, north-east corner of the fortification and C, parallel walls



A



B



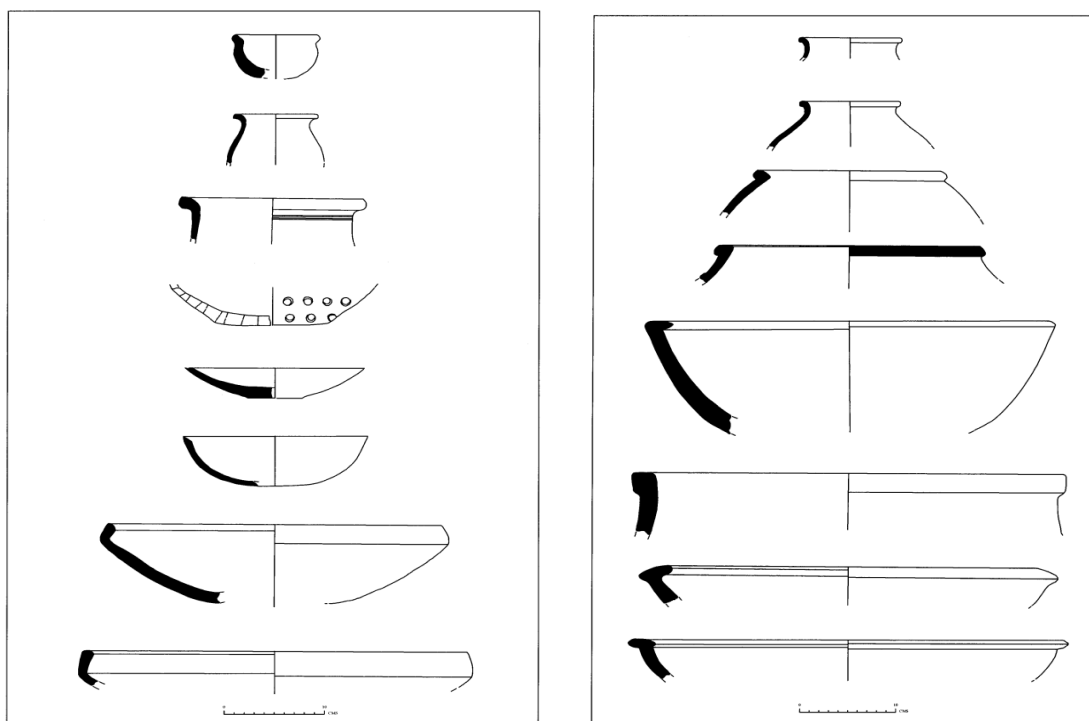
C



D

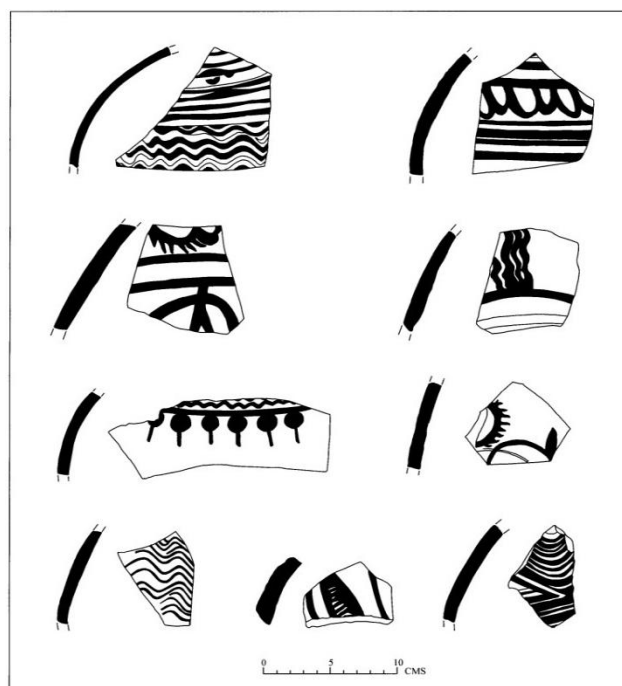
Khirsara: A, reserve slip ware; B, black on red painting; C, graffiti and D, perforated pottery

Figs. 7-9



7

8



9

Khirsara; 7-8, pottery types and 9, painted pottery

of shell, gold beads, bone points, beads, etc. were also found during the excavation at Khirsara. The terracotta objects recovered from the site include animal figurines, beads, bangles, wheel, perforated disc, cart frame, cakes, etc. A bar type seal with ten Harappan character had been the most significant find of the first season (pls. 5A-5D).

8. EXCAVATIONS AT SHIKARPUR, BHACHHAU TALUKA, DISTRICT KACHCHH

The Department of Archaeology and Ancient History of the Maharaja Sayajirao University of Baroda, continued excavations at Shikarpur in Kachchh under the direction of K.K. Bhan assisted by P. Ajithprasad and Bhanu Sharma. The main objective of the excavations was to figure out the configuration of the prominent fortification wall on all the four sides and to trace the entrance gate. In view of these primary objectives several new trenches along the wall and across the wall were taken up for excavation in the north, west and in the north-eastern corner of the site.

As has been reported earlier the contour features of the site clearly suggested a strong fortification around the site in the form of low ridges on all four sides except in the west where the wall was badly eroded and partially washed away. The site therefore has a large basin like configuration with a low-lying central area surrounded by the slightly elevated ridges formed by the remains of the extant fortification. Excavations in the 2008-2009 field seasons had revealed that the wall had an average thickness at the base that varied from 10m to 12m in the south and about the same in the

north. The southern and the northern fortification walls are at about 103.50m apart and therefore the north-south wall of the fortification should be of that much length. It was built at least in three stages during the urban phase and was expanded laterally both internally and externally at different stages of construction.

The present excavation in the west and north-east corner revealed that the western and eastern walls are also about 103.50m apart making the fortified area almost a perfect square measuring about 1.07 hectare. If the mean thickness of the wall is added about 10m on either side, the total area covered by the fortification would be 1.52 hectare. Judging from the last two year's excavation, it is apparent that the central part of the site functioned as a large open court surrounded by several series of structures. These structures were meant for household craft production and other routine activities of daily life of the Harappans. The central open space itself was used temporarily for different functions associated with economic activities of the site.

A series of five new trenches, extending from last season's excavations were opened up in the north primarily to trace the entrance gate along a sudden breach or depression in the wall. This did not however produce the desired result as deep erosion had removed structural features almost completely leaving behind only a large gap in the wall. There however is some regular pattern of brick alignment at the base of the wall forming a 2m wide gap that probably was part of the original gate which was blocked and built up in the subsequent

Plates: 5A-5D



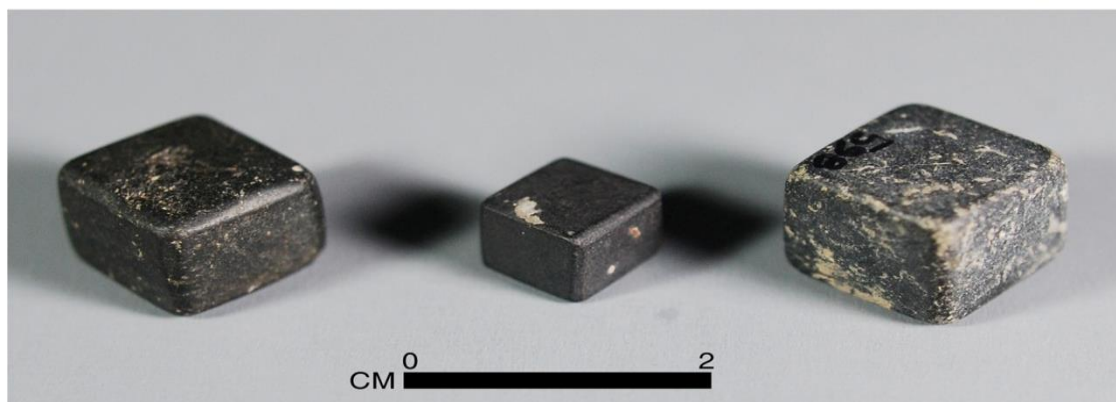
A



B



C



D

Khirsara: A, seals; B, bone beads; C, terracotta animal figurine and D, weights

stage. Whatever it is, the evidence is inconclusive to suggest the presence of a gate at this point in the northern wall.

The western side of the settlement is another specific part of the fortification where an entrance gate was expected. Large scale erosion probably through the entrance gate has created a deep and about 15 to 20m wide erosion gully breaching through the fortification on this side. This has completely washed away features of the entrance gate if at all there in fact was a proper gate on this side. Excavations in these trenches along with the trenches in the northeast corner have helped to understand the constructional sequence and additions and expansions to the wall at different periods. Some of the trenches clearly show evidence of extensive repair work carried out as a part of maintenance. The fortification wall in the beginning of the habitation was much thinner, measuring about 6 m to a maximum 7.6 m, than the breadth it acquired later. This remained as the centre core of the wall as it expanded both laterally and in height in due course of time (pl. 6A). The early wall was built of predominantly dark grey bricks of varying shades and composition. Along with the gray bricks whitish and light reddish brown bricks were also used in the early construction. It was plastered both internally and externally with a thick, whitish clay plaster (pl. 6B). This is a regular feature on the wall in the early stage in the southern and eastern sides also. By looking at the remnants of plastered top preserved in the north it could be estimated that the wall at this stage probably had a height of 2.90m from the ground.

It appears that a rampart or a supporting wall was added at the base in course of time probably in order to strengthen the wall as well as to provide an easy elevated pathway around the wall. It is at this point the wall measured 10 to 12m at the base. Subsequent to this the wall was broadened internally and externally by adding several courses of bricks which in the first stage of expansion was predominated by dark grey coloured bricks but later by light yellowish brown bricks. The external extension initially could easily be a rampart built at the base of the wall which acted like a projecting ledge around the wall. Similar ledge-like projection, though a bit narrower than the external one, is found in the internal face of the wall also. This observation is consistent with similar features associated with the southern fortification where the wall is well preserved to a much better height than in the north or in the west.

Excavation in the north-east corner revealed the external and internal features of the north-eastern corner of the fortification. General features of the wall construction remained more or less the same including the remnants of the plaster over the original wall still preserved at places within its core. Excavations have also revealed the presence of an internal bastion projecting about 3.20m from the eastern and 3.70m from the western walls. This was added to the corner probably in the second stage of the wall construction. Not only the brick types and style of masonry work in the bastion conform to this but also there are instances of wall plaster found in between the newly added bastion and the original wall. The

excavated parts of the fortification extending from the north-east corner towards west and south also show similar constructional features described above.

The excavations have also revealed remains of structures built close to the fortification. These were built either of mud-bricks or of large stone rubbles set in mud mortar. The mud-brick structure exposed close to the western wall in the trench Eb 6 and Eb 10 has thick walls measuring 1.20m. This structure belonged to the Phase I at the site. The stone built structures exposed close to the north-east corner in the trench Ha 4 were built in the far end of phase I and was continued to be used in the Phase-II during which the Sorath Harappan traits started predominating in the ceramic assemblage. In fact, the phase II deposit in the current excavation is encountered only in the trench Ha 4 and adjoining trenches Ha 7, Ha 15 and Ha 1, all located close to the north-east corner. In the trench Ha 4 and Ha 7, the top 1 to 1.5m accounts for the phase II deposit which is marked by several ashy layers and a general admixture of ash and ashy waste throughout the deposit. It must also be mentioned that a human skeleton belonging to a modern time burial was found in the upper part of the Ha 4 trench in the excavation.

Among a large number of various Harappan artifacts recovered in the excavation mention must be made of huge quantities of Rohri chert blades which in all probability were produced at the site. Beads of carnelian, agate, lapis lazuli, amazonite and other semiprecious stones (pl. 6C) and shell bangles and other ornamental and

decorative items in shell are the other important artifact recovered in the excavation. Although a few beads perform and unfinished shell bangle pieces are found in the excavation, there is little evidence at the site suggesting their mass production. At the same time terracotta beads, bangles and toys such as cart-frames and wheels, small terracotta sub-triangular pyramids and pellets and animal/bull figurines were produced at the site in large numbers. Other artifacts collected in this season include a banded chart weight and a small broken drill-bit of the black earnestite and a small fragment of a smooth and thin siltstone bar with beveled edges.

As has been reported in the previous excavation, the pottery recovered from the site included both the Classical Harappan and the Anarta pottery of north Gujarat. The Classical Harappan pottery is represented by most of the type-fossil shapes and decorations (pl. 7A). There however is a predominance of large basins, cooking vessels (pl. 7B) and shallow bowls with a narrow base (pl. 7C) in the Classical Harappan ceramic assemblage. The Anarta pottery is represented by bowls with incurved rim, basins, small or medium size pot/jar with constricted neck and slightly elongated body and simple medium size pot with a globular body. Often the paintings on the Anarta pottery are done with using different shades of dark brown tending towards red in a light buff or cream coloured background over a red overall slip (pl. 7D). White pigment was also used for painting the Anarta pottery (pl. 7E). In addition to these two categories of potteries, there are several sherds of the Sorath Harappan

bowls, pots, dishes and dish-on-stand belonging to the Phase-II reported from the site. They are found in association with the Classical Harappan pottery.

9. EXCAVATION AT VADNAGAR, DISTRICT MEHSANA

In continuation of the previous year's work, the Department of Archaeology, Gujarat State conducted further excavations at Vadnagar in district Mehsana under the direction of Y. S. Rawat assisted by M. V. Joshi, G. S. Dabhi, D. M. Modi, P. B. Otia, Dilip Kushwaha, Shishir Jain, Bhimraj Barhat, Ritesh Makwana, and Mukesh Thakore. Excavations were resumed at all the previous four locations namely Ghaskol Darwaja, Durga Mata Mandir and Khari-Kui (near Primary School-3) and Ghaskol-2 to continue the work in order to ascertain the cultural process in the lower levels of the town. All these areas are located within the fortified area of the present town.

Monastery area near Ghaskol Gate: The entrance porch to the Buddhist monastery exposed in the previous season and two stair cases attached to the same were further brought in to more relief in order to know the details of the steps. The base of the entrance porch was also found provided with a molded band. The west side stair cases measured 1.25m in width with a flight of 5 steps. The width of the treads and the height of the risers of these step vary from step to step. The tread measured from 37cm to 41cm while the riser measured from 16 cm to 26cm. This type of variation indicates that the original steps had been repaired several times. The eastern side stair case was found

much damaged but its remnants show that it was exact copy of the other one. Interestingly, no stair case was found provided from the northern side, i.e. opposite to the main entrance of the monastery.

Outside Ghaskol Gate, where the southern fortification forms roughly a large right angle externally by turning first towards northward and then again to westward before it joins the western wall, excavation remained under progress to understand the cause of this large off set as well as the outside features of the fort wall and the nature of deposit there. Further, to find out the continuation of the moat that was noticed near the Pithori gate in earlier excavations. Excavations revealed presence of two massive brick built walls running parallel to each other at about a distance of 7.20m. Interestingly, these walls are oriented in north-west to south-east direction. Whether they follow the orientation of the fort wall is yet to be confirmed. One of these walls which run close to the fort seems to be a riveting wall possibly to hold the core of the fort of preceding phase. This riveting wall belongs to the Solanki era. The northern end of this wall has been found turning towards eastern direction in a curvature form. Possibility of an entrance at this point, where two walls joined each other and formed a right angle, cannot be ruled out. Another wall located to the west of the riveting wall appears to be the outer wall of a large complex. Further excavation may throw more light on the precise use of these walls.

Plates: 6A-6C



A



B



C

Shikarpur: A, brick fortification in the northeast corner and internal bastion; B, Rohri chert blades and C, semiprecious stone beads

Plates: 7A-7E



A



B



C



D



E

Shikarpur: A, the Harappan painted pottery, Sun (?) motif; B, classical Harappan cooking vessels; C, classical Harappan lids and shallow bowls; D-E, Anarta pottery with geometric decoration and bi-chrome painted potsheerds

Khari Kui (Primary School-3) area: In this area the previously exposed deep trench named as XA4/II was further taken up for probe in order to know more details of the early levels of the site. The unexcavated area of this trench measuring about 3·85m x 1·90m along the section facing south was brought down to a depth of about 18·10m from a previous depth of 5·00m below the surface. As mentioned earlier this deposit represents the successive levels of a north-south street. In the lower levels also the trench was expanded towards east and south in order to excavate larger area of the earliest deposit. However, the virgin soil could not be reached due to water seepage below the depth of 18·10m. In all 44 layers of cultural deposit have been identified, many of them are divisible into more sub-layers. But the composition and content of the earliest deposit excavated so far which has been numbered as layer 44 suggested that the natural soil was not far below. This layer consists of calcareous soil and yielded very few antiquarian remains. The maximum depth reached in this cutting during the current season was, however, 18·10m. The lower level cultural accumulation which underlies the previously exposed composite brick structure of 130 courses measuring about 6·05m in thickness seems to represent the pre-current era deposit on the basis of the archaeological material it yielded. This deposit is further divisible into three sub-periods as described hereunder.

The earliest 2·40m thick deposit represented by layers numbered as 42, 43 and 44 is devoid of brick structures. But layer 42 yielded handmade terracotta broken

roof tiles having one or two holes nearer its thickened end. The thickened end of the tile across its breadth also shows parallel shallow grooves created with finger while the tile was in leather hard condition. The other end of the tile is made sharpened with a side being slightly curved. Besides, this deposit yielded considerable quantity of charred bones. Some of the bones show cut marks also.

Among minor antiquities mention may be made of Punch Marked Coins (pl. 8A) both circular as well as rectangular/or square coins of copper and silver/alloy, a small copper ring, bone point, glass beads, cowries shell, terracotta objects like arecanut shaped beads and hopscotch etc. Another important object recovered from this deposit is a fragmentary crucible (pl. 8B) with vitrified surface and also speckles of iron. However, the most significant finding from layer 43 is a rectangular terracotta object which seems to be refinished out of a square pendant depicting four *tri-ratna* symbols placed around an elevated circular object. At each of the corners of square, in between the symbol, are depicted another four similar objects though of smaller dimension (pl. 8C). Can this scene be conjectured as the depiction of an early Buddhist stupa? Surely requires confirmation of the expert on Buddhism.

The second phase of occupation is represented by a burnt bricks wall which was oriented in north-south direction and found overlying the above mentioned initial deposit. This wall made of burnt bricks laid with mud mortar may be considered so far the first built structure in this trench. It has

been partially exposed up to a length of 3.80m and found continuing in either direction. The breadth of the wall also was exposed partially which measured about 0.42m. But, the actual breadth measured 0.70m. The brick wall was found laid in English bond and nineteen courses were available. Interestingly on the top of the wall along its longitudinal centre were noticed three post holes at a distance ranging from 0.80 to 1.40m from each other. The extant depth of these post holes measured 45cm with diameter ranging from 14 to 16cm (pl. 9A). It appears that it was a composite structure with lower portion built of bricks and the upper portion of wood (pl. 9B). The structure seems to have been in use for a long period and its contemporaneous deposit is represented by layers numbered 41, 40 and 39 from bottom to top. The overlying layer 38 which consists of brick bats appears to be the debris of the same structure. The debris is found sealed by a dark ashy deposit numbered as layer 37 most probably formed due to a major event of conflagration. Thus, layers 38 and 37 indicate a major phase of disturbance at the site.

It has been noticed that after an accumulation of about 1.00m thick cultural debris represented by layers 36, 35 and 34 another wall was built exactly above the previous wall and in same orientation. This wall is also built of the same sized large bricks which were found used in the preceding wall. Only seven courses of this wall are available at present with an extant height of about 0.55m. The presence of post holes on the top of the preceding wall and also in the deposit overlying it indicates that

during the early stages use of wood could have been more prevalent in building construction.

The deposit associated with the above mentioned two structural phases has yielded a good number of antiquities some of them are very unique and interesting. Mention may be made of a few punch marked coins circular, square and rectangular in shape. Interestingly the motifs depicted are of peculiar type and seem to be regional in nature. A few coins from the upper level of the deposit have been found depicting sun and moon motifs on one side and three arched hill on other side. Another significant finding include a button type terracotta seal depicting negative impression of a legend in Brahmi script datable to 3rd-2nd century BCE (pl. 10A). The other end of this seal shows an engraved *swastika* symbol. A through hole across the constricted neck of the rare knob of the seal indicates that it could have been used as a pendant. Recovery of 11 (including fragments) beautifully finished terracotta spacers of a necklace possibly with ram head shaped lower end (pl. 10B) is another important finding during the current season. Other objects such as arecanut shaped beads, glass beads, simple shell bangles, bone points, ivory comb, terracotta animal figurines of bull, tortoise, etc. and many other objects of terracotta-wheel, pendant, ear-stud, etc. have been reported.

The ceramic industry (pl. 10C) during the early periods comprises of a varieties of red ware, black and red ware, grey ware, Micaceous red ware. The main forms include bowls with incurved rim, dishes, vases and bowl-cum lid. A fragment

Plates: 8A-8C



A



B



C

Vadnagar: A, punch marked coins from the lower level; B, fragments of a crucible and C, fragment of a pendant with tri-ratna



A



B

Vadnagar: A, wall of an early phase and B, post-holes on the wall top and section

of spouted vessel made of fine clay; a vase of stone with constricted neck and a corrugated neck (pl. 10D) of a large pot were also recovered.

The lower level deposit of Vadnagar measuring about 6.05m in thickness with two visible structural phases can tentatively be dated between 4th to 1st century BCE on the basis of ceramics, script and brick sizes recovered.

The brick wall belonging to second structural phase with extant seven courses is followed by a 0.30m thick deposit, devoid of any structure but appears to be consisting of well prepared floor with fire activities. On top of this deposit i.e., at a depth of about 12.02m below surface, on the western margin of the cutting on a hard pecked earth floor, rests the first course of a corner of a large building which belonged to a new phase and seems to be the foundation of a new era in the life of the town. It is evident that at this level the settlement planning was re-done along with some alteration in the fortification. Although the orientation of walls and other structure did not appear to be changed but there was a considerable shift in their location. The two structural phases described earlier actually have been found underneath one of the north to south running streets of the re-planned town. From the beginning of this new phase upward till an accumulation of a 4.57m thick deposit which represents successive street levels between two opposite row of buildings, the orientation and breadth of the street remained unchanged. However, after five successive phases of building reconstruction the breadth of street was narrowed down to

3.80m from the original breadth of 6.40m. From this level upward till the above mentioned street remained functional, a 2.60m wide space within the street's breadth along the east side building seems to be spared for building construction possibly to accommodate the increasing population. A wall of such addition shows three successive phases of construction. It appears that in this phase well planned city ended with an abandonment of this area. The following deposit indicates about a major change in the landscape of this area. The streets were gone and the buildings flanking them turned into ruins. A deposit of about 1.50 to 1.90 m thickness posterior to the street level has been found devoid of any structure in the present cutting. The nature and composition of this deposit indicates that this area remained unoccupied for a long period. However, it was reoccupied most possibly in mid early 19th century CE and remained so till early 20th century CE as revealed by the succeeding two phases of structural activities. These structural activities indicate that during this period the internal planning of the town has considerably been modified possibly to accommodate more people.

Durgamata Temple area: Excavation was further resumed in trenches A1 Qd. II in order to know the beginning of the settlement as well as the fort wall in this area. However, due to high water table the natural soil could not be reached. Excavation in the lower levels of trench A1 Qd. II revealed that the beginning of the 10.70m high composite wall consisting of 142 courses of bricks belonging to at least seven successive phases of reconstructions was erected at a depth of 13.60m below the



A



B



C



D

Vadnagar: A, a terracotta seal; B, terracotta spacers; C, red ware - early levels and D, corrugated pot

present surface of the trench. To lay the bricks the builders had prepared a hard bed of clay. The lowest five courses all laid header wise are slightly offset to the upper courses indicate possibility of a foundation. The size of these bricks measured 26 x 25 x 7cm in length, breadth and thickness respectively. The deposit underlying the wall is numbered as layer 33. It yielded ceramics which may be pre-dated to the current era along with a few circular and square coins. Further depth could not be reached due to water logging. However taking into consideration the contour level the cultural deposit may have gone further up to 1.00m depth. This cutting has, however, revealed the most interesting aspect about the growth of the town; that during the long span of time spread over centuries, the successive occupants of the buildings meticulously raised their walls right on the walls of the buildings of their predecessors.

In another cutting numbered as A2 the excavation was resumed at a depth of 6.75m below the surface in layer 13. A small area against the interior of the fortification in quadrant I of this trench was brought down to about 13.85m below the top of the extant fortification. In this trench also natural soil could not be reached due to high water table. However this cutting provided important information regarding the beginning of settlement and the growth of the fortification. In this cutting the earliest 0.52 cm thick deposit represents possibly a pre-fortification phase at the site. This deposit which consists of dark clay mixed with compact earth yielded potsherds, bones, charcoal and other cultural material. Its

exact nature of deposition could not be ascertained due to its high water table and water logging. Overlying this deposit has been found the southern arm of the first rampart (pl. 11A) made of calcareous earth and clay deposit. The core of this wall revealed successive event of dumping. The length of this east-west oriented wall was exposed only to a length of 2.35m. The extant height of this earthen rampart measured 2.25m and its top was found sloping towards north possibly due to erosion. The full width of this wall could not be ascertained as it was found continuing in the unexcavated area of the trench. In the southern side it underlies the subsequent period's brick wall. In the northern side, the wall does not continue beyond 2.46m as is evident from the opposite section of the cutting. It is presumed that the exterior face of the successive period's wall followed its exterior; the width of this earthen rampart should not be less than 10m.

The earthen rampart is replaced by a proper burnt brick wall in the successive period. In all the seven phases (five major and two minor) of reconstruction and repairs to the fortification is noticed. About 11.06m thick accumulation is deposited against these successive walls, beginning from the top of the earthen rampart, which has yielded cultural material datable from the beginning of the current era to late 19th century CE. The last reconstruction phase of the wall is represented by the lime plastered interior, possibly dated to 16th century CE. This phase again seems to be preceded by the phase of major repairs are carried out during the time of Solanki king Kumarpal (1143-1173 CE). The interior face of the

wall underlying the above mentioned 16th century CE wall and street deposit revealed that before the repair was carried out the wall was in a very bad shape. Its bricks were missing at places which created wide gaps in the core of the wall. The street also seems to be eroded and undulating. Therefore, a major repair operation seems to have been carried out by laying out the road afresh and raising its height by earth filling. A thick deposit of 1.86m numbered as layer 13 represents this one time filling episode. The wall was also simultaneously repaired and its height increased. The road was paved with flat dressed stone slabs at places to prevent erosion as well as smooth movement of public and transport. The repaired road level also followed the pre-existing gentle slope towards the direction of Ghaskol gate. The width of the 14.00m broad road of preceding period was now reduced to about 5.72m by erecting a 1.20m thick wall along its longitudinal direction. This archaeological evidence noticed in this cutting corroborates well with the description of the Kumarpal *Prasasti*.

It has been noticed that during the time of reconstruction some minor modifications were also made here and there as a result many offsets and recesses are visible on the interior face of the composite wall. The interior faces of these successive walls also show battering. Each phase of repair or reconstruction also show some change in the sizes of bricks.

The street deposit yielded a large variety of antiquarian remains which include ceramics of different wares and types, coins

of different types, minor objects made of terracotta, metal, shell, bone, glass, semiprecious (pls. 11B-11D and 12).

The details of each of the cultural periods at the site will be ascertained only after further study and analysis of the materials recovered from the above mentioned locations.

10. EXCAVATION AT LOTESHWAR, DISTRICT PATAN

Department of Archaeology and Ancient History of the Maharaja Sayajirao University of Baroda in collaboration with the Department of Archaeology and Anthropology, Institución Milá y Fontanals – Consejo Superior de Investigaciones Científicas (IMF - CSIC), Barcelona, Spain, under the direction of P. Ajithprasad and Marco Madella (co-director) carried out a small scale excavation at Khari-no-timbo (23° 36' N; 71° 51' E), the Anarta Chalcolithic site at about half a kilometre east of Loteswar village.

The site was excavated earlier in 1991 by the M. S. University of Baroda and had reported a twofold cultural sequence: Period I belonging to the Mesolithic and Period II is a regional Chalcolithic cultural tradition (IAR-1991). The beginning of these two cultural periods has subsequently been dated by a number of Radiocarbon estimations to 7000 BCE and 3600 BCE respectively, making the site one of the earliest for the Mesolithic and the Chalcolithic cultural developments in Western India. The main objectives of the renewed excavation were to unravel the resource management strategies of these two

Plates: 11A-11D



A



B



C



D

Vadnagar: A, earthen rampart; B, coins from early levels and C-D, coins with sun and three arched hill



A



B



C



D



E



F

Vadnagar: A, terracotta sealing; B, shell bangles; C-D, iron ore and a spear-head; E, fragments of torpedo jars and F, terracotta buffalo

communities and to investigate the tenor and context of their interaction through an extensive study of archaeo-botanical and zoo-archaeological remains and their depositional context. The excavation therefore has made special efforts to ensure maximum recovery of plant and animal remains through wet sieving and floatation. The site is located on top of a large stabilized sand dune on the right bank of the Khari, a tributary stream of the Rupen River which originates from the Aravalli in the east and flows in a south-westerly direction and empties into the Little Rann of Kachchh. The dune is reasonably large, measuring 8m high from the surroundings and is under intense cultivation today. The cultural remains at the site are spread over three hectare on the sand dune forming discrete clusters which show a maximum concentration at the top. A 5 x 5m trench located by the side of the earlier (1991) trench (Trench I) on top of the dune was taken up for renewed excavation.

The excavation revealed a total of 1.67m thick cultural deposit comprising of four distinct layers belonging to two cultural periods: Period I, the Mesolithic and Period II, the Anarta Chalcolithic (pl. 13A). The first two layers constituting 30 to 60cm from the top primarily belonged to the Chalcolithic occupation and the lower layers 3 and 4 belonged to the Mesolithic occupation.

Period I Mesolithic: The lower most part of the deposit up to about 1.00 to 1.20m comprising layers 4 and 3 lying above the natural sediments belonged to the Mesolithic period as these two layers yielded

microlithic tools (pl. 13B), palette stones (pl. 13C) and skeletal remains of wild animals. Layer 3 is light grey in colour and its thickness varies from 20 to 40cm, whereas layer 4 which is lying below layer 3 is much lighter and compact due to calcium concretions within it. There is no sharp line of distinction that separates these two layers as the colour variation is gradual. It appears that the dark grey colouration of the third layer is primarily due to its direct contact with the more ashy and dark layer 2 of Chalcolithic habitation debris at the top. Apart from the usual Mesolithic micro-blade artifacts and palette stones a few fragmentary potsherds are found in the relatively loose layer 3. These sherds are all fragmentary pieces of the Chalcolithic pottery belonging to the layer 2 that lies directly on top of the layer 3, making it abundantly clear that they are not integral to the Mesolithic period.

The microlithic artifacts from the Mesolithic deposit primarily consist of both the geometric variety of tools such as the triangles, trapeziums and crescents and the non-geometric ones such as the points, backed blades, borers and different types of scrapers. The raw materials used in their production are fine grained siliceous rocks such as chalcedony, agate, chert and jasper. An opaque variety of milky quartz was also used extensively for making micro-blade tools. The lithic artifacts from the Mesolithic assemblage also included a few small hammer stones and number of fragmentary, thin and flat sandstone pieces



A



B



C

Khari-no-Timbo: A, stratigraphy of the Mesolithic and the Chalcolithic cultural deposit in the Trench-V; B, microliths from layer 3 Period I and C, grinding and palette stones from the Mesolithic period

having a smooth, slightly concave grinding surface. These are described as grinding stones or palette stones.

Period II Anarta Chalcolithic: Lying directly over the Mesolithic deposit is the Chalcolithic habitation deposit represented by layers 2 and 1 having an overall thickness of 20 to 60cm. Although the Chalcolithic deposit is very thin, it is predominated by a number of subterranean pits three of which are found within the excavated part of the trench. The diameter and the depth of these pits varied from a mere 50 to 1.70m. While the smaller ones appear to be mere trash pits, the larger ones with relatively flat bottom were dug up with certain more serious utilitarian purpose. Two of such large pits (Pit-2 and Pit-3) do have a 5.00 to 6.00cm thick heavily concentrated crunchy phytolith deposits at the very bottom of the pit which appear in the section as a thick whitish band. Phytolith deposit similar to this was noticed in one of the pits excavated in Trench I in 1991.

The Chalcolithic habitation debris in layer 2 and in the pits is a loose ashy deposit incorporating pottery, bits and pieces of charcoal, lithic blade tools, grinding stones and occasionally clay lumps with reed and finger impressions. The pottery discovered from this deposit primarily belonged to the Anarta pottery defined after the pottery recovered from this site in the 1991 excavation. It comprises the gritty red ware, fine red ware and coarse red ware with a matt surface (pl. 14A) and the burnished red ware and burnished grey ware sherds. Besides, there are a few sherds of the black and red ware with a white painted exterior

that resemble the pottery reported from balathal in southern Rajasthan. A few sherds of the Harappan/Sorath Harappan potsherds are also found in the upper levels of layer 2.

Major vessel forms in the Anarta pottery are the incurved bowls, basins with short, incipient and sometimes grooved neck, small jars/pots with constricted, elongated neck, flared out rim and bulbous body with a round bottom (pl. 14B), medium size pots and bowl or shallow dishes on a short stand or pedestal. Often the gritty red ware and the fine red ware vessels are decorated with shades of Black or Reddish Brown colour painted in a cream or white coloured background. In the case of bowls, the paintings are confined to the rim in registered panels, whereas on pots and jars the paintings are found at the rim, neck and the shoulder in the form of horizontal and vertical or oblique lines, wavy lines and loops, triangles and other geometric forms forming intricate patterns. The burnished red ware and burnished grey ware are represented primarily by small pots/jars. Some of the Anarta potteries have incised decorations at the shoulder.

The lithic artifacts in the assemblage were predominated by micro-blade tools and a number of grinding stones. The blade tools were made of chert, chalcedony, agate and quartz, that included backed blades, points and geometric forms like the triangles, lunates and trapeziums (pl. 15A). There are also several exhausted regular micro-blade cores and flaked nodules of the same raw-materials.



A



B

Khari-no-Timbo, Anarta pottery: A-B, fine red ware and gritty red ware bowls, Period II

Apart from pottery and lithic blade tools there are also a few *mushtika* type terracotta lumps, many of which are fragmentary, broken pieces. These are mainly confined to the upper levels of the deposit and not found deep in the pits. There are also a number of clay lumps with reed impression suggesting that these could either be part of some kind of temporary structures made of wattle and daub or of a pottery kiln. Artefacts recovered in the excavation included a few spherical and small biconvex disc shaped beads of terracotta and a few beads of lapis, amazonite, carnelian and steatite micro-beads. The beads are found in the upper part of the Chalcolithic deposit in layer 2. These and a few shell bangle fragments along with the convex sided Sorath Harappan bowl at the top in this trench probably are the vestiges of a later Harappan occupation at the site. The most interesting terracotta object, apart from the beads and perforated discs, found in the excavation is a stick-like human torso (pl. 15B). It stands out for the simplicity of its modeling and pinching technique used for depicting nose, eyes and other facial features. A series of incised dots on both sides encompassing the neck and the back probably may suggest the position of hands and some sort of ornamentation. As the lower part of the figurine is broken off, it is difficult to judge its actual size/height.

The faunal collection from the site in the earlier excavation has been studied fairly extensively and has provided some very interesting results. The current excavation has also revealed a reasonably good collection of skeletal remains of fauna exploited by the Mesolithic and the

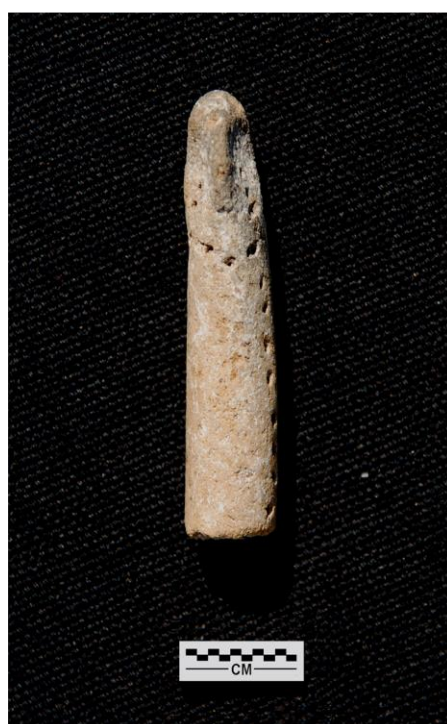
Chalcolithic community. While the Mesolithic assemblage is associated with skeletal remains of wild fauna alone, the Chalcolithic remains incorporated domesticated cattle besides the wild animal remains. Small pieces of turtle *carapaces* and a few fish vertebrae and otoliths were recovered from both the periods. It is obvious that exploitation of fish and other aquatic edible resources was a common practice during the Mesolithic and Chalcolithic occupation at the site.

Samples for archaeo-botanical studies were collected quite systematically from each lot having a maximum of 5 to 10cm depth. Ideally, two 20 litres samples from the top and the bottom of each lot were collected and floated for retrieving charred grains and other light fractions of the plant remains. These were wet sieved for collecting the macro remains. The same systematic method is employed for collecting soil samples for phytolith and pollen studies which are now in progress. In addition to these a series of sedimentary samples from the trench for micro-morphological studies were collected to understand the site formation process involving deposition agents and post-depositional modifications at the site.

One important part of research in North Gujarat was the geomorphological and palaeoenvironmental investigation of the region using conventional palaeoenvironmental studies for understanding the pattern of settlements in north Gujarat. Strategy was devised to integrate conventional geological and geomorphologic investigation with



A



B

Khari-no-Timbo: A, microlithic tools from Period II and B, terracotta stylized human figurine

information that can be gleaned from satellite imageries of proper resolution. Specially focused was, on the geographical, hydrological and vegetation information and physically verified these from the empirical data collected on the ground.

These are then processed in GIS based data analysis tools for understanding features of settlement patterns. With this purpose, a transept was made stretching from the foot of the Aravalli to the Little Rann collecting sedimentary samples from different geomorphic context and recording features of the sediments and soils and the present vegetation cover in the region. It is planned to extend it to a larger area for better resolution of results and interpretation.

11. EXPLORATIONS IN THE BHADAR VALLEY, DISTRICTS RAJKOT AND JUNAGADH

P. Ajithprasad of the Department of Archaeology and Ancient History, M. S. University, Baroda and August G. Costa, Department of Anthropology, Indiana University, USA carried out an exploratory survey for locating Palaeolithic sites along the main channel of the Bhadar River and several of its tributaries. In particular explorations were carried out near Jetpur (21° 46' 10.93" N; 70° 37' 27.42" E), District Rajkot and at Badalpur/Badalpara (20° 53' 26.22" N; 70° 26' 12.92" E), in District Junagadh. The aim of this work was to evaluate Palaeolithic sites reported by earlier scholars and to search for new prehistoric finds. The project was concerned with locating evidence of early human migration during the Palaeolithic period. Initial archaeological and geological

exploration began near the headwaters of the Bhadar River and proceeded down river. The goals of this field work were to identify Palaeolithic tools in stratified river deposits, to revisit and reevaluate locals described by previous investigators that have yielded Palaeolithic finds, to make observations that would allow for a better understanding of the fluvial geology and geo-morphology of the Bhadar River and to collect geological samples for absolute dating and geo-chemical analyses which will provide a better chronological and environmental context for the Palaeolithic finds.

In the vicinity of Jetpur on the Bhadar river, explorations focused on exposed sections from the main channel of the Bhadar river as well as the lower parts of tributaries including Champander *nadi*, Phopal *nadi* and Surva *nadi*. It was discovered that the tributaries to the Bhadar possess their own unique stratigraphy different from the main channel even in their lower reaches.

Sections on both the right and left banks of the Bhadar River were explored in the vicinity of Jetpur. Approximately 273 flaked Palaeolithic stone tools were found as surface finds and in stratigraphic section. The principal raw materials used for stone tool manufacture are rhyolite 55%, agate 26% and mixed fine (aphanitic) igneous rock 14%. All these raw materials appear to have been obtained by early humans from exposed dykes and gravel bars that may be found even today within the Bhadar channel. Considerable lateral variation was observed in the fluvial sections near Jetpur; however, a general stratigraphic pattern emerged.

Deccan Trap bedrock is overlain by gravelly cross-bedded sand containing large stone tools belonging to the Lower Paleolithic, this is overlain by a fine sand unit with soil development (likely representing the last major interglacial 125-70Ka), and this is followed by second gravelly cross-bedded sand with Palaeolithic artifacts (fig. 10).

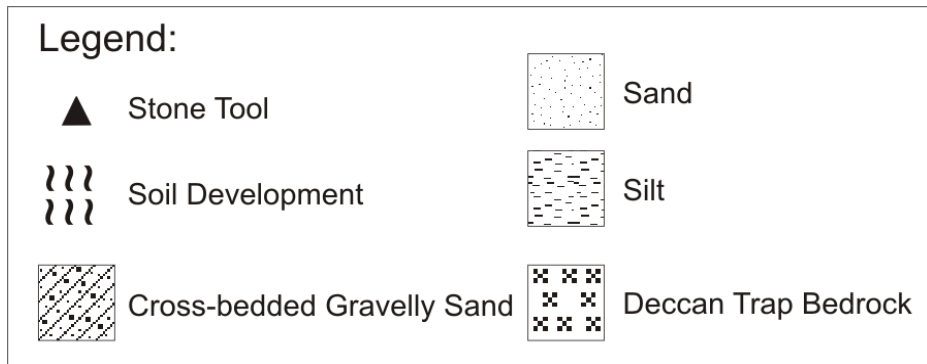
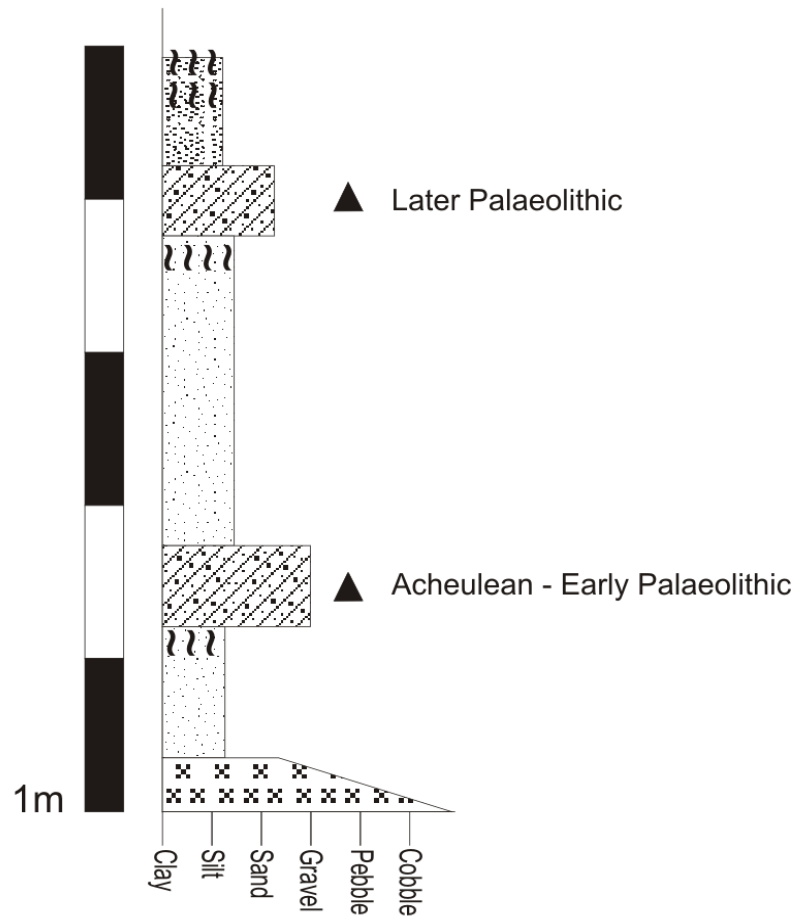
No truly diagnostic artifacts from either of these fluvial units have been discovered *in situ*. However, the stone tools from the lower fluvial unit were made on a narrow range of fine igneous rocks and they reflect manufacturing strategies based on large flakes like Acheulean Large Cutting Tool (LCT) technology. A few Acheulean handaxes were also observed as surface finds associated with the lower fluvial unit and were made on similar rock types. Technologically, typologically and stratigraphically the lower fluvial unit observed at Jetpur and throughout the Bhadar river valley is Acheulean. This conclusion is consistent with previous work in the region. The stone tools of the second fluvial unit however cannot be so easily classified. No truly diagnostic tools were found in this horizon. Two disc cores found on the surface of the dry channel suggest the presence of Middle Palaeolithic like technology however in all the collections were very simple whole flakes and cores. Chronologically the lithics from the upper unit are likely less than 70Ka years in age but absolute dating is necessary for this to be confirmed. Previous workers classified tools from the second fluvial unit as Middle Palaeolithic. A more conservative view adopted here is to refer to them as Later Palaeolithic.

A site by site breakdown of the stone tool typology of the collection is given in table below. Overall what is striking about the collection is its simplicity. Whole flakes (unmodified flakes struck from cores) were the most abundant type of artifact found, followed by cores in various forms (pls. 16-A-16B). Finished artifacts, such as handaxes (LCTs) and scrapers (objective pieces) made up less than 10% of the collection. Archaeological sampling in the field was biased toward *in situ* or near *in situ* finds, yet the general lack of finished tools in the river valley terrain surveyed suggests that artifacts may have been “roughed-out” on site and then transported away from the channel by early humans.

The Surva, a southerly tributary of the Bhadar east of Jetpur was also investigated. The sections in the lower part of this stream were quite good and many Palaeolithic artifacts were collected directly from the outcrop. Several geological samples were made from this area as well for geochemical analyses, dating and sedimentological studies. The upper part of the Surva was found to be lacking in exposures and Palaeolithic tools. Working further downstream the Utavali River was investigated near Supedi where it joins the main channel of the Bhadar River. This tributary was found to be lacking in artifacts, however many good exposures of fluvial sediments were observed and stratigraphic observations were made. Further downstream near Upleta the Moj River was surveyed in its lower part and proved to be rich in exposures and archaeological finds. The Venu River west of Upleta was also explored but few Palaeolithic finds were

Fig. 10

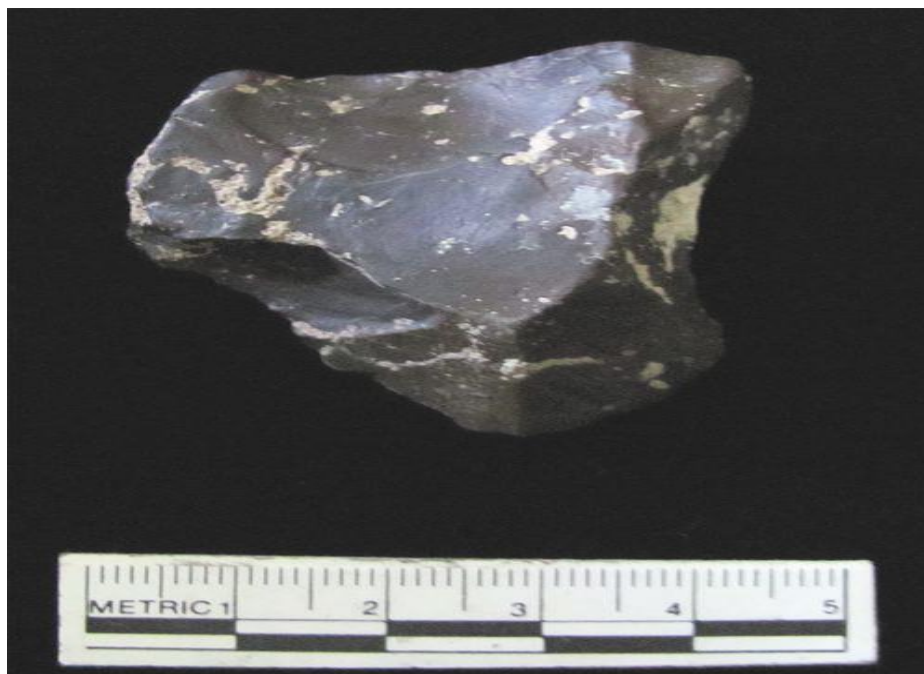
Jetpur Composite Section



Jetpur: composite stratigraphic section



A



B

Jetpur: A, whole flake and B, core collected in situ from the upper fluvial deposit

made and the exposures were poor.

The main channel of the Bhadar was surveyed extensively at Kutiyana where the river becomes influenced by tidal forces. A sizeable collection of Palaeolithic tools was made here mostly from the slope below the river cut section. This was the first sizeable collection from this location made yet. Moreover, a small indeterminate fragment of vertebrate bone was collected in situ from one section. The significance of the latter discovery is currently unclear as the bone does not appear to be fossilized and could not be identified. Additional survey in the region of Kutiyana for vertebrate remains is warranted to determine whether fossil remains are preserved in this location.

Fieldwork was carried out near the present day villages of Badalpara (Badalpur) and Kajli east of Veraval to investigate earlier reports of Palaeolithic tools associated with marine deposits. No stone tools were found during this fieldwork. Field observations were made of sections along Sarasvati stream upstream and downstream of Badalpara village. Most sections here were found to be poorly exposed and very limited in thickness. A large quarry between Badalpara and Kajli focused on due to the presence of thick, laterally extensive and unobstructed outcrops. Geological samples were made at this location for dating and geochemical analyses. One heavily rolled Acheulean handaxe on igneous rock was recovered from the lower pebbly-gravel horizon of the quarry (fig. 11).

This work has not yet uncovered clear evidence for early human migrations in Saurashtra. However this research has made

positive progress in providing a clearer picture of the Palaeolithic and paleo-environmental record of Gujarat. These explorations have enabled to collect several samples for absolute dating and many more samples for geo-chemical analysis. The data from these two categories of evidence will help to firmly establish the timing of prehistoric human occupation of Gujarat and provide a better understanding of the connection between early humans and their environment.

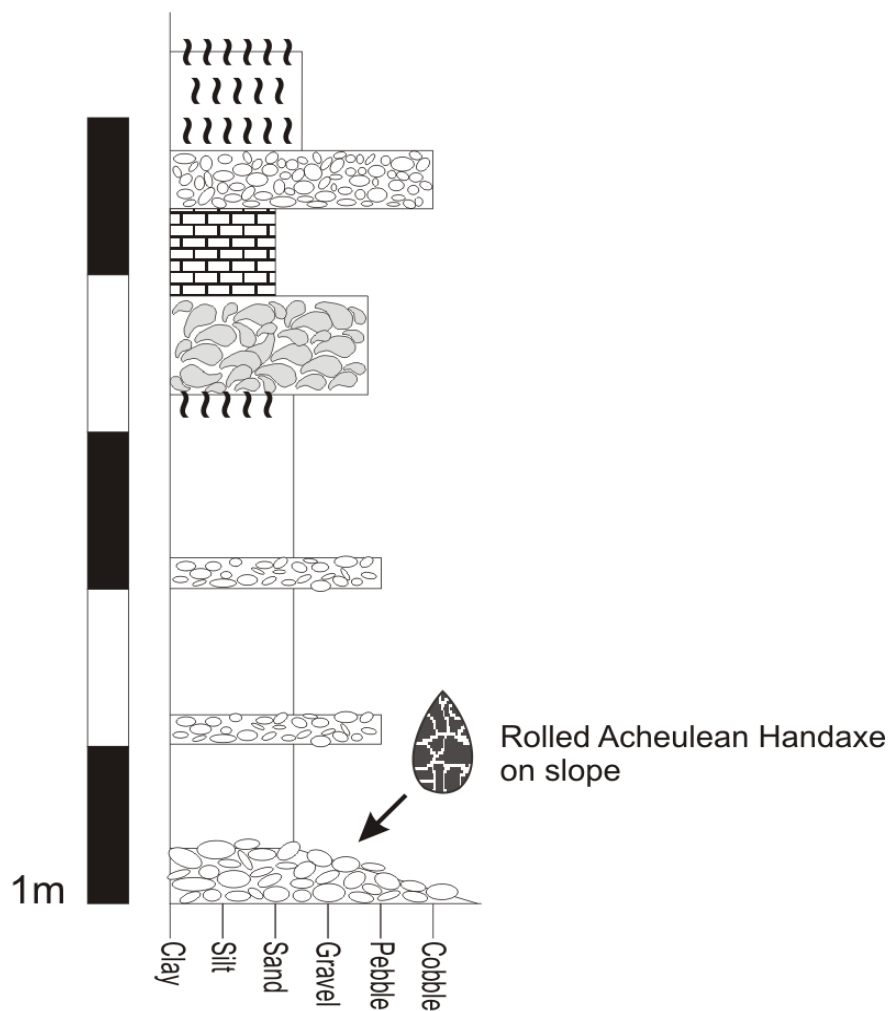
HARYANA

12. EXCAVATION AT FARMANA, DISTRICT ROHTAK

Vasant Shinde of Deccan College and Manmohan Kumar of the M. D. University assisted by Amol Kulkarni, Nilesh Jadhav, Kanti Kumar Pawar, P. D. Sable, Vivek Dangi, Ayumu Konasugawa, Neha Kothari, Gopal Joge, Nisha Sawant, C. V. Sharada, K. Malap and all Master's and P. G. Diploma students of Deccan College carried out excavation at Farmana for the 4th successive season with the objectives to provide field training to the students of Deccan College in exploration and excavations methods, as this is the part of their syllabus. They were trained for two months in excavation and exploration methods and also in collection and classification of archaeological data. In addition, excavation was also aimed to understand the nature of the structural remains excavated earlier to the north of the structural complex 2 and 3 located in locality I belonging to Period IIA excavated in the previous season at the site with a view to understand social organization and

Fig. 11

Badalpur Quarry Composite Section



Legend:

}}} Soil Development

Massive Carbonate Sand

Pebble Horizon

Oyster Bed

Badalpur: composite stratigraphy

activities areas. The main street which was excavated in 2007-08 season between the structural complexes 2 and 3 was found to be extending towards north. Its portion towards the northern end was excavated in trenches 2C3, 2B3 and 2A4. It is excavated to a length of 16 m, which passes between structural complexes 3 and 17 of the western side and 15 and 16 on the eastern side. The average width of the street is 3 m which is slightly wider than the portion excavated towards its southern end. This street appears to continue further towards north (pl. 17A).

More rooms of the Structure 1 which was excavated in the first season (2006 - 07) have been discovered in this season. Three more rooms of structure-1 have been excavated (pl. 17B).

Structure 1A is located to the north of Structure 1. The northern wall of Structure 1 forms the southern wall of this structure. The part of eastern wall towards its southern end of Structure 16D forms the western wall of this structure. The northern wall is a 2.50m long and 32cm wide. The eastern wall of the structure is 1.95m long and 32cm wide. It is survived by its basal course. The total area enclosed by the structure is 2.05m (north-south) x 2.45m (east-west). There is a small rectangular storage basin along the inner face of southern wall measuring 95 x 95cm. This basin may have been used for storage, as four stones were found equidistant in the room; they may have been used for supporting storage bin. The room has well-made floor of alternate layer of silt and sand rammed hard and plastered.

Structure 1B is located to the north of Structure 1A. It is badly disturbed by the

rat holes and later pits. It is slightly smaller in size compared to Structure 1A and appears to be a storage platform of the complex. It is paved with mud bricks set in mud mortar. It measures 2.15m (north-south) x 2.00m (east-west).

Structure 1C is located to the east of Structure 1B. The eastern margin of this structure has been completely destroyed. The surviving portion measures 1.67m (north-south) x 1.45m (east-west). The southern wall of the structure has survived up to a length of 2.47m (north-south) and 70cm in width. The north wall is 2.47m long and its average width is 34cm. This wall, however, continues towards the eastern side. It has flimsy floor devoid of any other features. This small chamber like room may have been used for storage proposes.

Structure 1D is a courtyard located to the south of Structure 1C and east of Structure 1A. This appears to be an open courtyard of the structure. It has a well-made floor of brick and brick bats, which are visible at places. The total area excavated measures 4.80m (north-south) x 2.80m (east-west). A north-eastern corner of Structure 3 excavated in previous two seasons was excavated in trenches 2C4 and 2C5. This appears to be the northern most limit of the Structure Complex 3. In the previous two seasons, the eastern, western and southern peripheries of this complex were already excavated. This season the northern periphery is clear and thus the entire complex is now excavated. The eastern wall of the complex is excavated to a length of 2.80m. The original thickness of this wall is 75cm, however, at a later stage an additional



A



B

Farmana: A-B, excavated structural complexes, Mature Harappan (IIB)

60cm wall was added to the eastern face of the original wall. There is a gap of 20cm between the original wall and the later-built one. The total thickness of the combined wall is 1.35m. The northern wall of the structure is excavated to a length of 7.70m and its average width is 75cm. Both the walls have survived to a thickness of 20cm and three courses of brick are visible. Inside the northeast corner is a rectangular fire pit, the edges of which are disturbed. It is located 30cm west of the inner face of the eastern wall and 60cm from the inner face of the northern wall. It is 80cm x 1m in size. The base of this pit is brunt red. Along the inner face of the northern wall at a distance of 2.42m from the north-eastern corner, lies one red ware globular pot. Three successive floor levels have been exposed. Considering well-made nature of the floor and the presence of fire pit and the pot in excavated portion of the structure it appears to be a cooking place of the complex.

Structure Complex 15, discovered in this season lies to the north of structural complex in trenches 2B4, 2B5, 2C4 and 2C5. The total area of the room excavated measures 9.50m (north-south) x 4.90m (east-west). Only a part of the eastern wall was excavated. The length of this wall is 3.90m and the width is 75cm and is survived to a thickness of 25cm. The northern wall of the Structure Complex 3 forms the southern wall of this complex. It has rough but well-made floor. Inside the structure were excavated circular fire-pit and one pottery kiln. The fire-pit exposed inside the Structure Complex 15 is later than the Structure probably belonging to period IIC. It is located 4.90m to the north of the outer

face of Complex 3 and 2.64m to the eastern wall of the same complex. The diameter of this fire pit is 40cm. The brick-brunt red surface indicates its use for longer period.

This feature belongs to the Structure as it is contemporary with floor level. It is 50cm to the west of eastern wall and 1.70m to the north of southern wall. It is perfectly cylindrical with the diameter of 1.60m; it is 25cm deep; the sides are perfect vertical and the bottom is flat. It is lined with 8cm thick clay lining, which is brunt red.

Structural Complex 16 is located to the east of the main street lies in trenches 2C2 (northwest-southwest), 2C4, 2B3 and 2A2. Four rooms of this complex have been excavated. Structure 16A is a partly excavated room of this complex which is located in the south-eastern corner of the complex. The northern wall of this room is fully excavated, which is made of single vertically placed bricks measuring 32 x 16 x 8cm. It is 3.30m long and its average width is 32cm. It is survived to a thickness of 16 cm. The western wall is excavated to a length of 87cm and its average width is 47cm. It is made of two bricks, the inner one is placed vertically and the outer horizontally. It survived to a thickness of 15cm. The eastern wall is excavated to a length of 1.80m and its average width is 32cm. It is survived to a thickness of 16cm. This is also made of single brick line placed vertically. Inside the structure, in its south-east corner lies a circular (50cm) pit. It is perfectly cylindrical and appears to be a small storage pit for this structure. This room has a rough floor and is disturbed by some later features. Considering its small

size, rough floor and the presence of storage pit, this room is identified as storage area of the complex.

Structure 16B is to the north of Structure 16A. It is rectangular with the inner space measuring 2·75m (east-west) x 2·10m (north-south). It has walls on three sides and opened towards the east. The northern wall of Structure 16A forms the southern wall of this room. The western wall is 2·10m in length and 65cm in width. It has survived to a thickness of 10cm. The northern wall is 3·50m in length and its average width is 50cm. This could be a small enclosed courtyard within Structure Complex 16.

Structure 16C lies to the north of 16B a well preserved room of this complex, the inner space is 65cm in width. It has survived to a thickness of 10cm. The north wall is 3·50m in length and its average width is 50cm. This could be a small enclosed courtyard within Structure Complex 16 which measures 3·66m (north-south) x 2·40m (east-west). The major portion of the floor is destroyed by some later features. The northern wall of Structure 16B forms the southern wall of this structure. The western wall is 4·70m long and 64cm in width and has survived up to a thickness of 18cm. The northern wall is 3·50m in length and its average width is 54cm. The eastern wall is 4·60m long and 50cm wide. Inside the structure is located a fire pit which is partly survived along the western wall. It is 1·55m to the north of the south-eastern corner. The fire-pit is rectangular with rounded corners; it has an opening towards the east. It is made of 14cm thick clay which

is burnt red because of constant use. The fire-pit has survived to a thickness of 10cm. In the south-eastern corner lies red ware globular pot with a diameter of 22cm. It has a flat projecting rim and disc base. Considering the rough nature of floor and the fire-pit this could be identified as the kitchen of the complex.

To the east of Structures 16A, 16B and 16C lies some open space, which is enclosed from eastern and northern sides by brick walls. As its south side is not exposed it is not clear whether there was a similar wall on that side. This appears to be a large open courtyard of this complex (Structure 16D). It has a well-made floor of alternate layers of sand and silt with a smooth surface. This floor is badly disturbed because of later pits in the northern part. The northern wall is 6·90m long and its average width is 60cm; it is survived to a thickness of 20cm. The eastern wall is exposed to the length of 5·95m and is 50cm wide. This wall is badly damage. To the east of eastern wall of the structure 16C lie 4 later pits. A rectangular fire-place of the structure 16B was discovered, 1·55m to the south of northern wall and 2·45m to east of the outer face of eastern wall. It is rectangular and measures 78cm (north-south) x 73cm (east-west). To the west side at a distance of 20cm from fire-pit lies a medium size red ware pot. As the courtyard has a well-made floor and contains a fire place, possibly cooking was done here in summer times.

Structure Complexes 16 and 17 are separated by a lane which is excavated for a length of 16·65m. It is 1·60m in width, which is a standard width in Farmana. Some times

at a later stage this lane was closed by mud brick wall of 50cm thickness. This wall is located 2.35m to the east of western end. Three rooms of Structure Complex 17 have been exposed in trenches 2A3, 2A4, 2B3 and 2B4. Structure 17A, 17B, 17C and 17D are the rooms of this complex. The first three structures are rooms and the fourth is the courtyard of this complex. Structure 17A is located to the north of the lane near its western end. It is a rectangular chamber enclosing an area of 2.45m (east-west) x 1.30m (north-south). It has an entry provided in the eastern wall. The opening is 82cm in width, which is near the north-western corner. The remaining portion of the wall is 55cm in length and 56cm in width. It is survived by its basal course. The southern wall is 3.58m long and its average width is 55cm. It has survived to a thickness of 20cm. The western wall is 1.77m long and 80cm wide. The northern wall is 3.50m long and 50cm wide; it has survived to a thickness of 50cm. This could be identified as the living room of the complex as it has a well-made floor.

Structure 17B is the kitchen of the complex, located to the north of structure 17A. It is square in shape measuring 2.40m (north-south) x 2.40m (east-west). The northern wall of structure 17A is the southern wall of this room. The western wall is 3.60m long and 80cm in width. It has survived to a thickness of 10cm. The northern wall is 3.50m long and 70cm wide. The eastern wall is 2.40m long and 36cm in width. Only the basal course has survived. Remains of possibly rectangular fire place, only a small portion of the fire place has survived that can be seen in the centre. Only

the south-eastern corner of this room Structure 17C has been excavated. The northern wall of Structure 17B forms the southern wall of this room. The western wall is exposed up to a length of 1m near its southwest corner. As the structure is not excavated to its entirety it is difficult to determine its function. To the east of Structures 17A and 17B is located possibly a courtyard of the complex. It is enclosed only at the southern side by mud brick wall which has survived to a length of 1.72m. Its average width is 44cm. The area of the courtyard exposed measures 4.50m (north-south) x 2.85m (east-west). In the north-western corner is located a cylindrical pit. It has a diameter 1m and is 90cm deep. This circular pit was originally the storage in the courtyard. A human foot print on the floor of the structure was noticed to the east of structure 16B. It is 90cm east of the eastern margin of structure 16B. It is oriented east-west and is a print of the left foot. It is 29cm in length and 8cm broad near its toe and 12cm near phalanges. This appears to be a foot print of a female as it looks delicate. The excavation in the Harappan level at the site yielded the usual Harappan pottery of this region, the large number of terracotta cakes of different sizes and shapes, scores of fragments of terracotta bangles, Rohari chert blades, bead of semiprecious stones etc. One of the noteworthy finds of the season is a terracotta lump stamped with Harappan seal. Only the rhino symbol of the seal is visible.

HIMACHAL PRADESH

13. EXPLORATION ON THE BANKS OF RIVER YAMUNA AND TONS, DISTRICT SIRMOUR

Dehradun Circle of the Survey carried out exploration under village to village survey scheme on confluence of the banks of river Yamuna and Tons in District Dehradun, Uttarakhand and partially in the District Sirmaur, Himachal Pradesh. During the exploration, ancient site, Majri Khodri, Khodri, District Sirmaur (30° 30' 45" N; 77° 49' 01" E) on the opposite of Bamanwala across the river Tons was found. Here a monolithic stupa of about 56cm high was discovered. The base of the stupa is 27cm square; shaft is octagonal with moldings, cylindrical top. The circumference of the cylinder is about 75cm. On the top there is square hollow probably for *chatrawali*. A seated image probably of Buddha is carved on the shaft (pl. 18). In addition fragment of stone sculpture, brick bats and pot sherds were also encountered at the site. The bricks measures 36 × 22 × 6cm appear to be of Kushana period.

JAMMU AND KASHMIR

14. SCIENTIFIC CLEARANCE AT ANCIENT BUDDHIST SITE, AMBARAN, AKHNOOR, DISTRICT JAMMU

In continuation of previous year's work, Srinagar Circle of the Survey carried out scientific clearance work at ancient Buddhist Site, Ambaran under the direction of R. Krishnaiah, assisted by A. K. Khanna, Prakash Kumar, Balbir Singh Jamwal, Raghubir Singh, Gulzar Singh, R. K. Koul, and S. K. Ghazi with a view to expose the buried structures (fig. 12).

During clearance work, a spoked wheel stupa made of brick in mud mortar was discovered for the first time in the northern part of Jammu and Kashmir state (fig. 13). It

has 8 spokes inside, each measuring 0.80m and is made of reused bricks of various sizes. Core of stupa is filled with pebbles. Its outer periphery is almost 1.20m which is partly missing due to later occupation. Only remains of platform are available while super structure is missing. On the eastern and southern side, pebble paved passages are encountered. The exposed bricks structure is similar to famous excavated stupa of Nagarjunakonda in Andhra Pradesh and Sanghol in Punjab. Besides the main stupa on the eastern side, a seven course brick structure of Gupta period has also been exposed (pls. 19A-19C).

15. EXCAVATION AT TIBBA NAME SHAH, DISTRICT JAMMU

In continuation of the previous season's work the Srinagar Circle of the Survey under the direction of R. Krishnaiah, assisted by A. K. Khanna, Prakash Kumar and Balbir Singh Jamwal, Raghubir Singh, T. Phunchuk, Poonam Vind, Sonam, Gulzar Singh, R. K. Koul, V. K. Koul, Aurn Ji Sidha, Ashwani Kumar and Yam Bahadur have carried out a small scale excavation at the site, Tibba Name Shah (32° 44' N; 74° 44' E) with the aim to confirm the habitation of PGW culture, establish the nature and sequence of cultural deposits and to correlate the same with other sites of the region (fig.14; pl. 20).

A preliminary study of the site revealed following fivefold cultural period:

Period I: Painted Grey Ware (PGW) Period

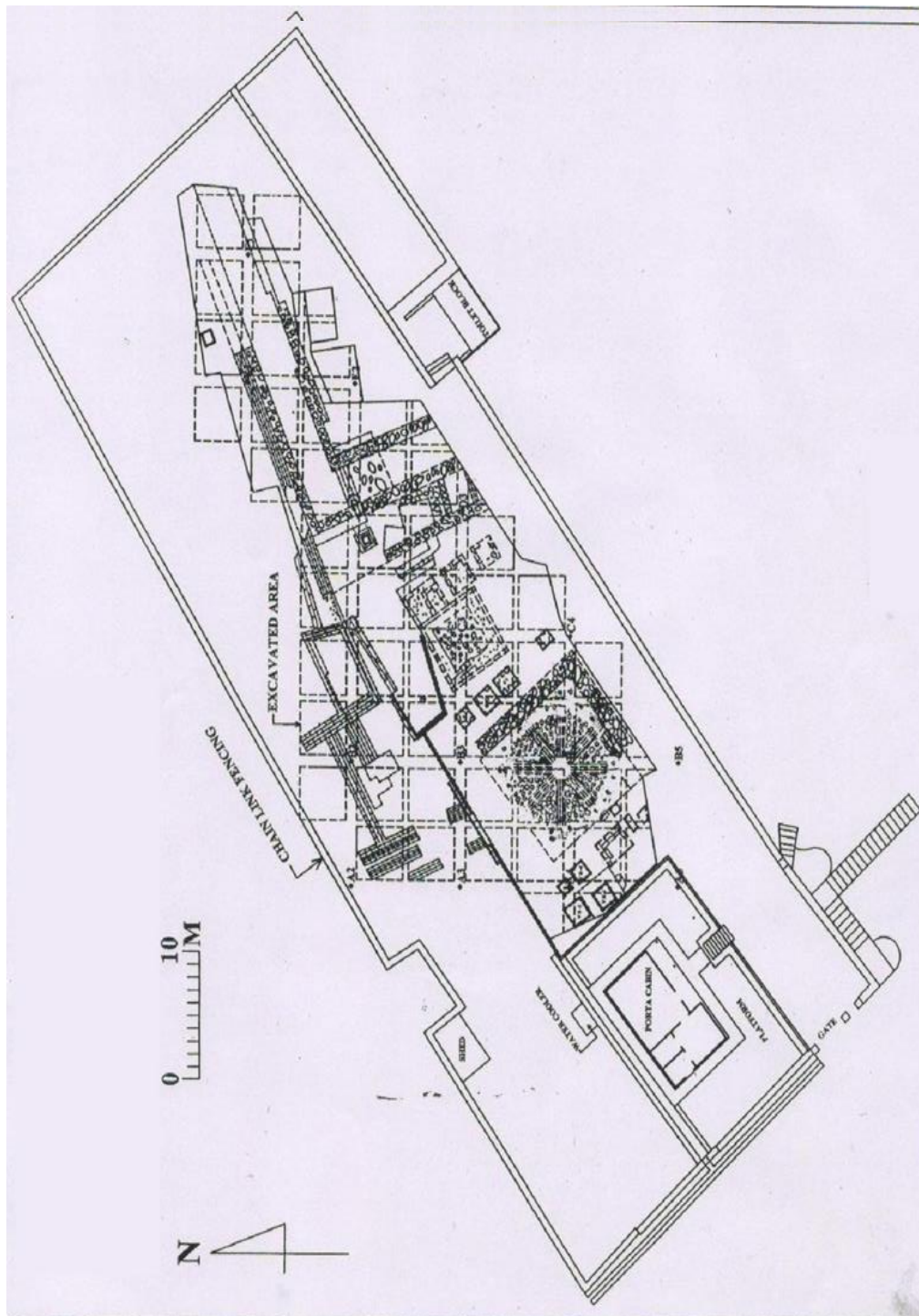
Period II: Pre-Kushana Period (Grey Ware)

Plate: 18



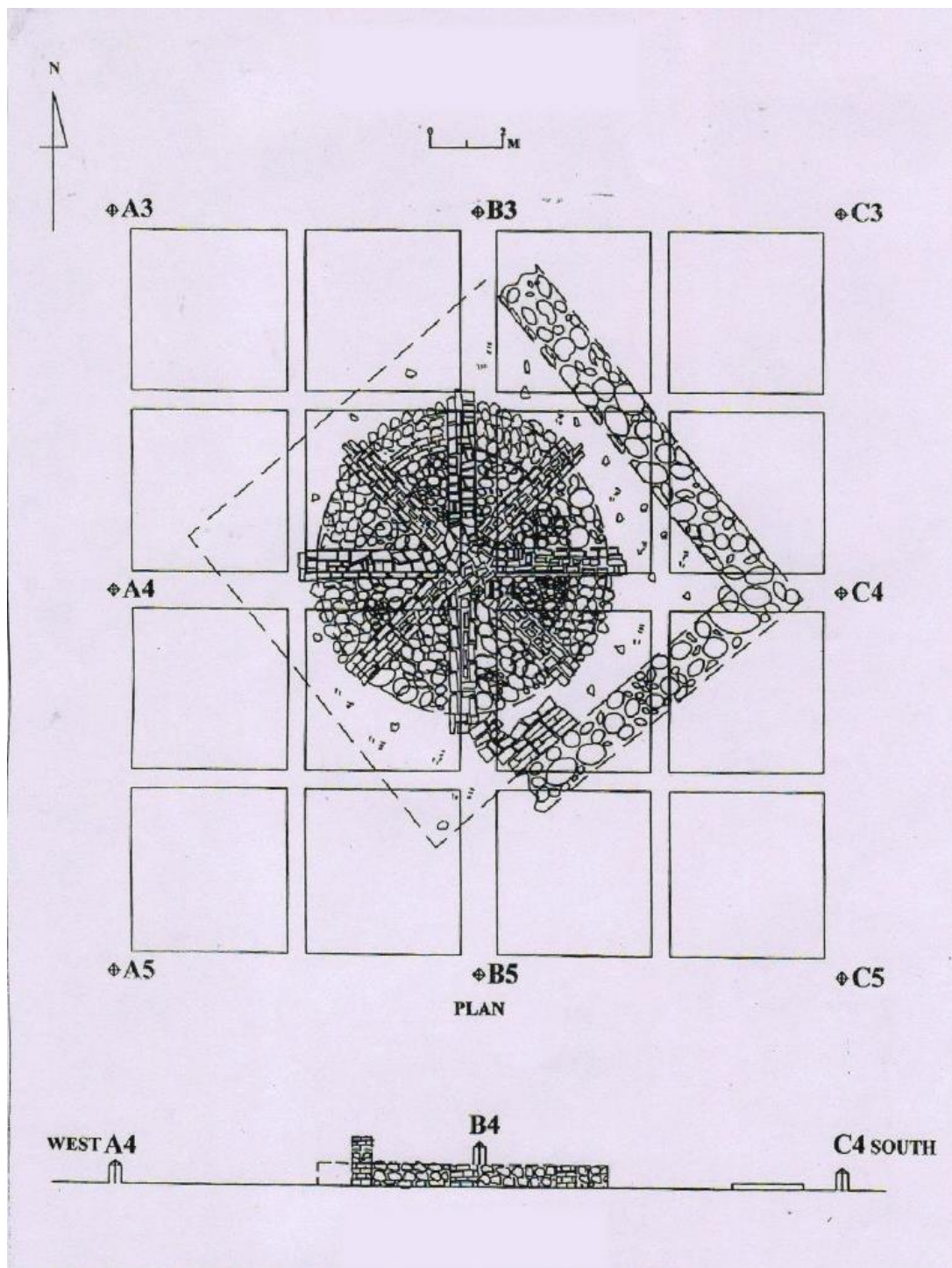
Majri, Khodri: monolithic stupa

Fig. 12



Ambaran: plan of excavated structures

Fig. 13



Ambaran:sectional elevation, spoked stupa



A



B



C

Ambaran: A-C, exposed structures and spoked wheel stupa facing north



Tibba Name Shah: ancient mound

Period III: Kushana Period

Period IV: Gupta Period

Period V Post-Gupta Period

Period I, the site Tibba Name Shah has for the first time unearthed Painted Grey Ware (PGW) from this part of the Indian Sub-continent. Subsequently, two quadrants namely Qd. 2 of Square XC6 and Qd. 2 of Square XA7 were taken up to know the stratigraphy at the site. The excavations revealed that the habitation started from the PGW period and continued up to post-Gupta period. No structural remains were noticed in any of the periods. A separate horizon of the PGW period was noticed in Qd. 2 of Square XC6 and Qd. 2 of Square XA7 over the natural soil at a depth of 4.39m and 4.82m respectively (figs. 15-16; pls. 21A-21B).

The pottery of the PGW Culture is wheel made, well fired and distinguished by surface treatment with black painting on grey surface (pl. 22A). Good quantity of grey wares and few black wares, black and red wares, black painted red ware have also been found having shapes like bowls and dishes fine to medium in fabric. No antiquities were noticed in this period.

Period II belonging to the pre-Kushana phase yielded sherds of grey ware, red ware. Shapes were mainly that of dishes, bowls, lid, vase, miniature pots, etc. The important antiquities recovered from this period are terracotta sling ball, beads, toy cart wheel, stone pestle, etc. There are evidences of working surface with semi-circular hearth and a triangular hearth with circular mouth facing north (fig. 17; pl. 22B).

Period III is Kushana Period, which yielded sherds of red ware and the shapes are mainly stamped vase, dishes, bowls with incurved rim, basin, spouts, basin with lips, lids, storage jar, miniature pots are decorated with stamped design and geometrical pattern with black painting on the surface. Among the antiquities found from this period are terracotta beads, sling ball, bangle piece of shell, etc.

Period IV belongs to the Gupta Period. The pottery of this period consists of red ware and red slipped ware and black painted red ware. The shapes are dishes, bowls, basin, spouts, basin with lips, lids, storage jar, miniature pots, etc. The important antiquities found from this period include terracotta sling balls, gamesman, beads, hopscotch, animal figurine and beads of semiprecious stones, iron objects, etc.

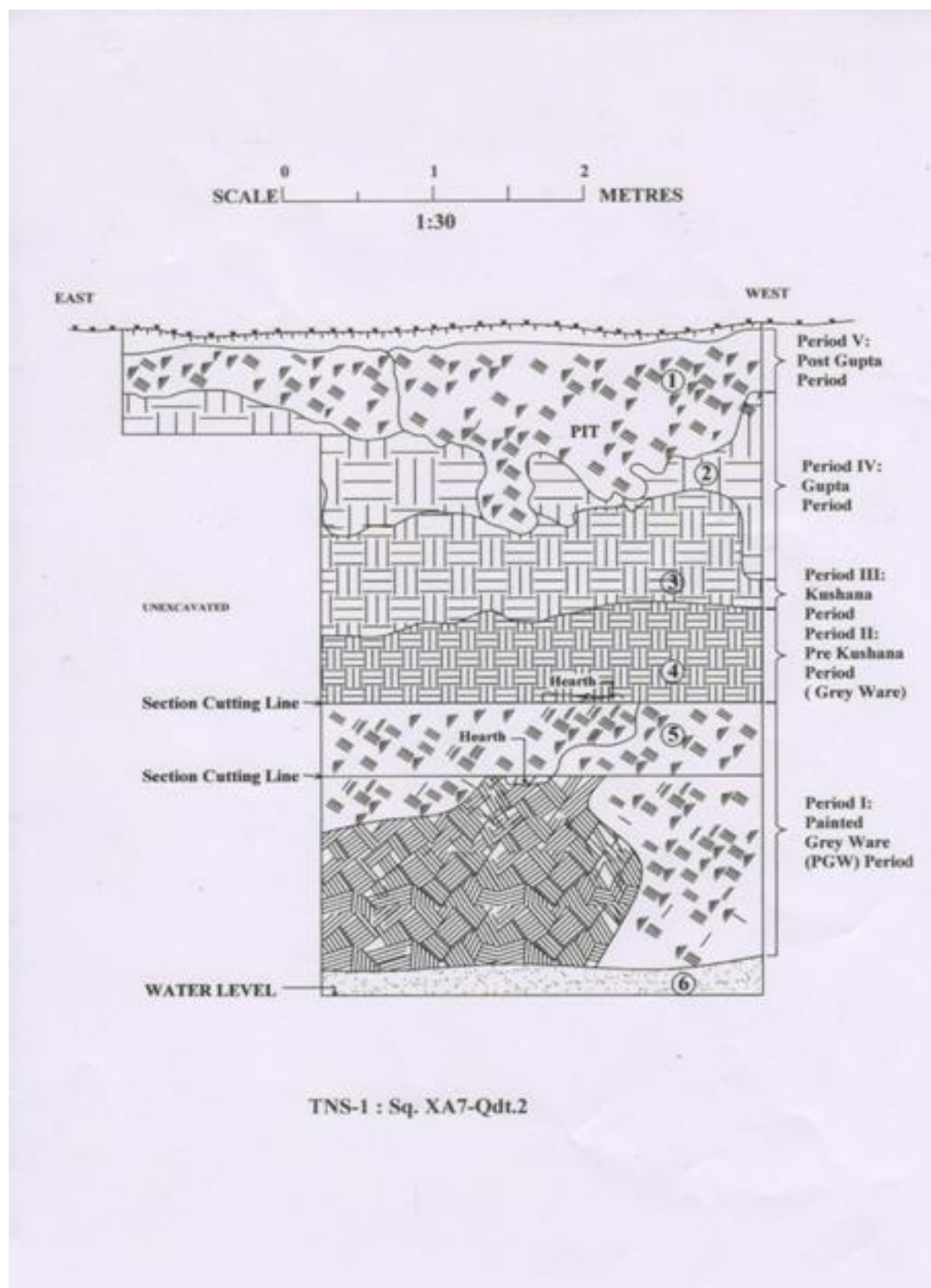
Period V represents post-Gupta Period. A large number of red ware and some of black painted red ware potsherds are noticed from this level. The shapes are similar to Period IV. Among the antiquities, terracotta beads, hopscotch, sling ball, fragment of animal figurines, toy cart wheel, bead of semiprecious stones, stone ritual object, etc. are noteworthy.

JHARKHAND

16. EXPLORATION IN RAJMAHAL AREA, DISTRICT SAHIBGANJ

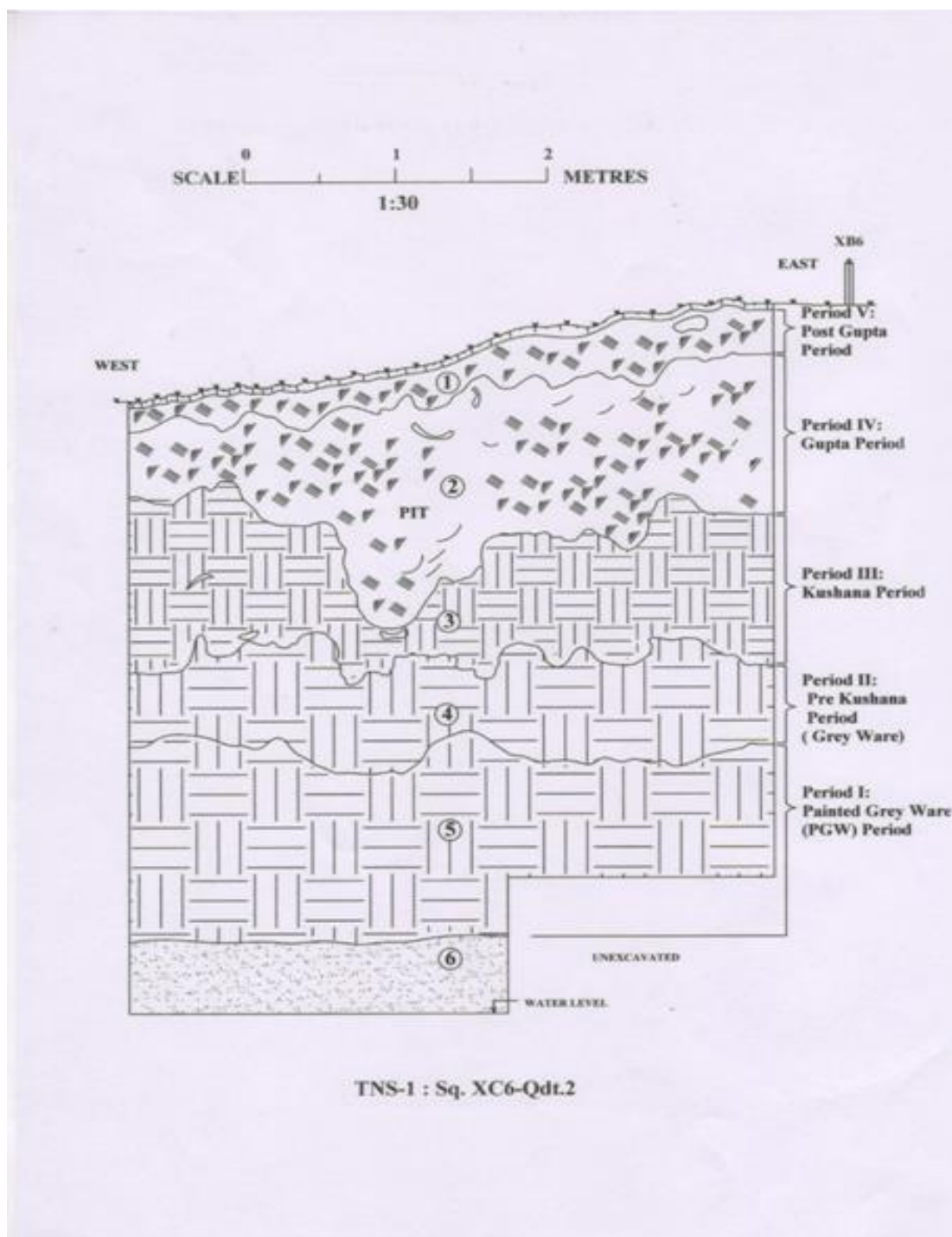
Exploration in District Sahibganj in Rajmahal area has been conducted by Ranchi Circle of the Survey under the direction of N. G. Nikoshey assisted by R. K. Verma, M. K. Sarkar, Abdul Arif, Rajnish Kr. Raj and Dr. Brijesh. The

Fig. 15



Tibba Name Shah: section facing north

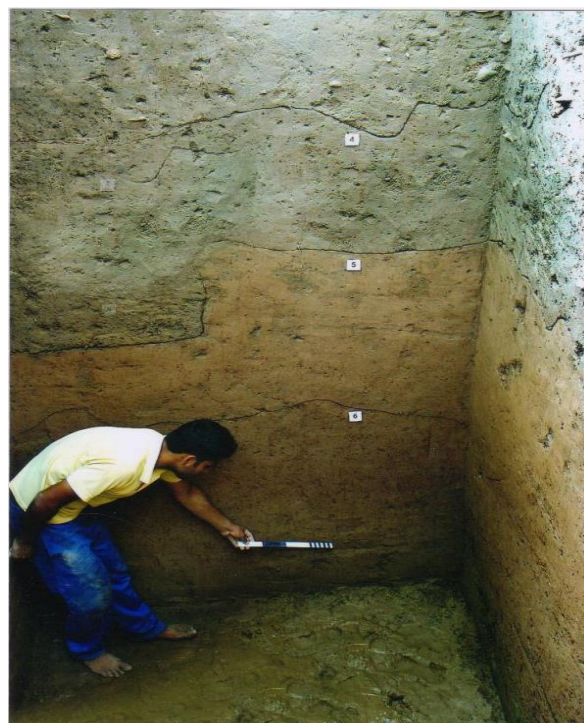
Fig. 16



Tibba Name Shah: section facing south



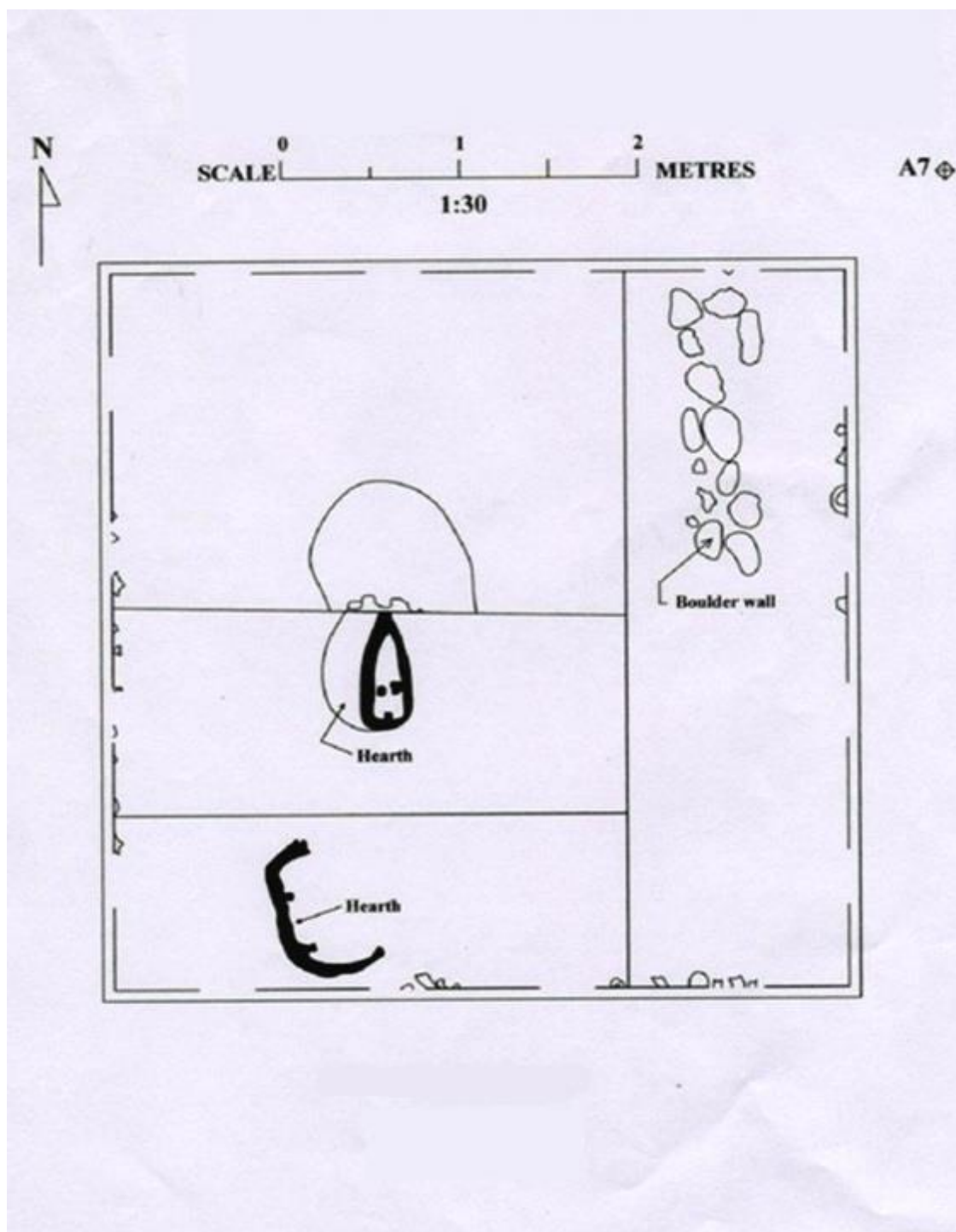
A



B

Tibba Name Shah: A, general view and B, section facing east-north

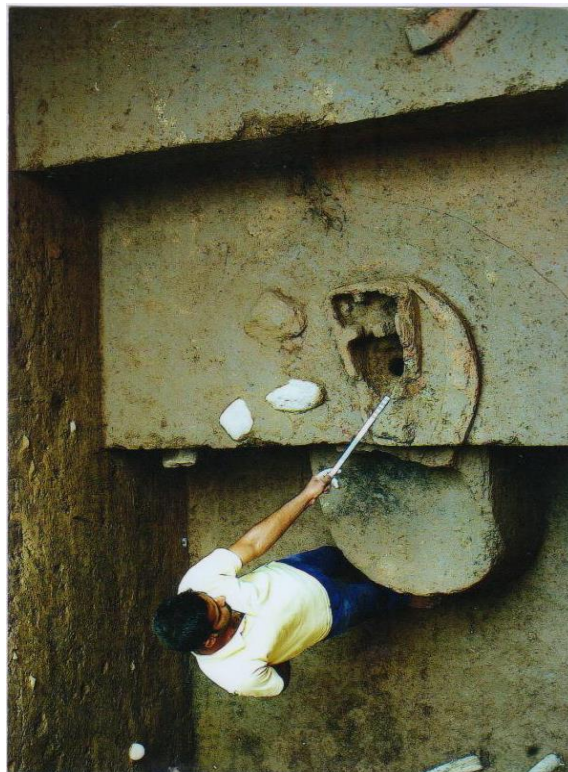
Fig. 17



Tibba Name Shah: plan TNS-1, Sq. XA7 Qd.2



A



B

Tibba Name Shah: A, Painted Grey Ware sherds, Period-I and B, hearth, Period-II

objective of exploration was to trace the archaeological remain in the area. In course of exploration in and around the Rajmahal area, several archaeological monuments and sites have been surveyed. The Jainabad Mosque, Tomb of Mirza Mohammed Beg, Twin Mosque of Imblibari, Maina Bibi Tomb, Jagat Seth Taksal situated in Rajmahal area District was inspected. The Birsa Munda Central Jail situated in the heart of Ranchi city, where the famous freedom fighter Birsa Munda was incarcerated was also identified for making proposal to include the same in the list of centrally protected monuments.

17. SCIENTIFIC CLEARANCE AT BENISAGAR, DISTRICT WEST SINGHBHUM

Ranchi Circle of the Survey has continued the scientific clearance work at Benisagar in District West Singhbhum under the direction of N. G. Nikoshey, assisted by R. K. Verma, A. Arif, R. K. Raj, M. Brahmachari and Mukesh Ekka.

During the course of scientific clearance, a number of *panchayatana* temples were exposed. The sculptures of Agni, Ganesa, Mahisasurmardini, Surya, Brahma, Bhairava, Lakulisa, a panel of stone depicting erotic scenes, image of Yamuna, Siva-lingas, temple architectural fragments, door lintels, door jambs were recovered during clearance. The scientific clearance was also done towards the south-eastern portion from the tank. In this area at the depth of 50cm, burnt brick paved flooring was encountered which may be the *mandapa* portion of already exposed temple. The sanctum is *triratha* on plan, constructed with finely dressed rectangular slabs of

laterite. These represent the *khura* moldings of *pabhaga* portion of temple of Orissastyle.

The site also revealed ceramic in red ware of coarse varieties, black ware and coarse grey ware. A few pot sherds of red slipped ware sprinkler at a depth of 1.25m have also been found (figs. 18-19; pl. 23A).

The antiquities comprised terracotta, stone, copper and iron objects found from the site. Terracotta objects include human and animal figurines while majority of stone artifacts were made of soap stone which comprises human sculpture i.e., *Naga* King and other decorative architectural fragments. Iron objects include spear-head, arrow head, clamp, dowels, rings and chisels. A copper antimony rod-like object and a few fragments of copper foils have been found from the site (pls. 23B&24-25).

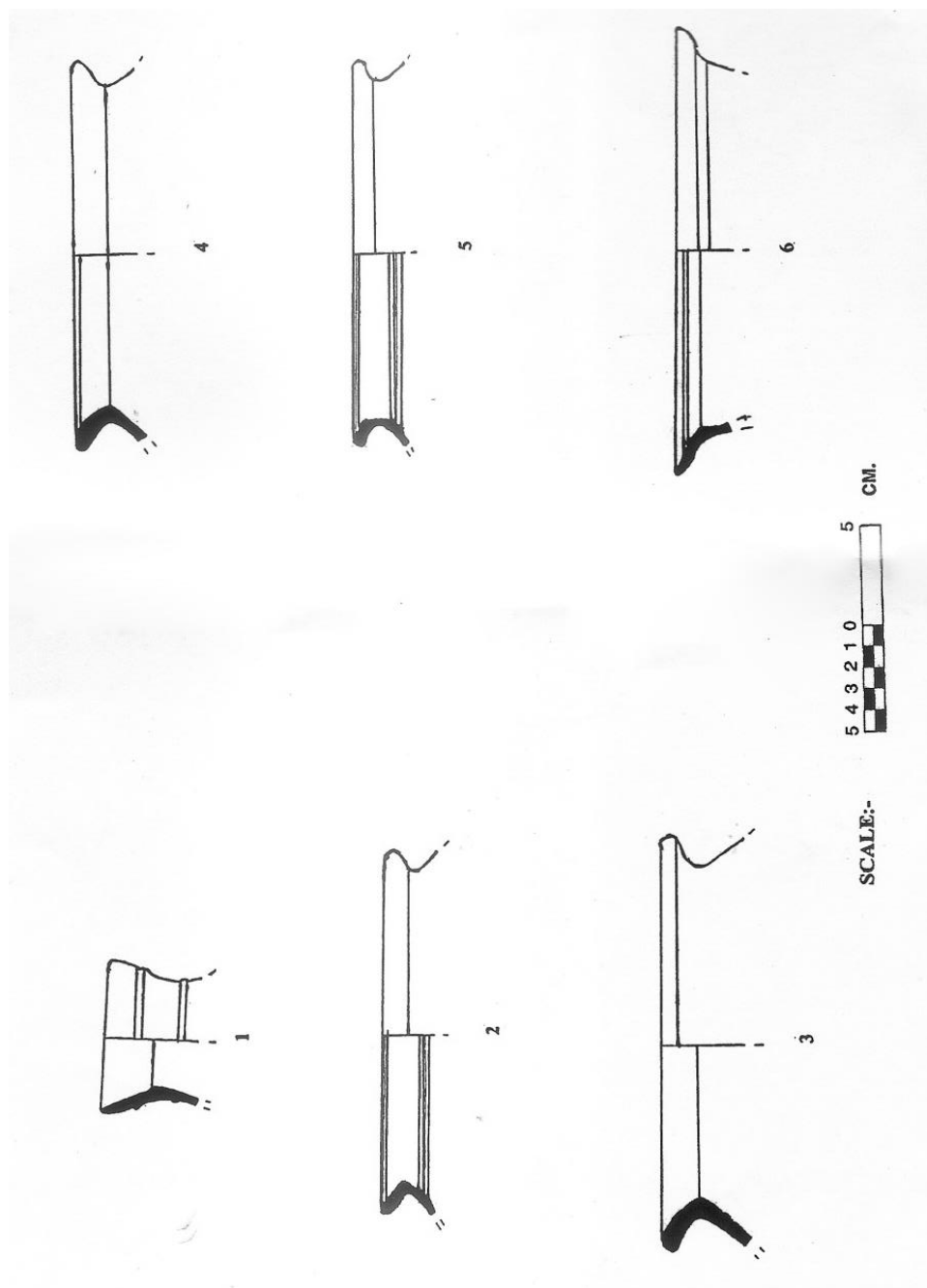
Remains of a *tri-ratha* temple of 5th-6th century alongwith architectural fragments and a *bhumi-amlaka* were also found from the site. Here, it is interesting to note that the findings such as spout, sprinkler and a few stamped potsherds indicate that the site may be inhabited earlier.

KARNATAKA

18. EXPLORATION IN DISTRICT GULBARGA

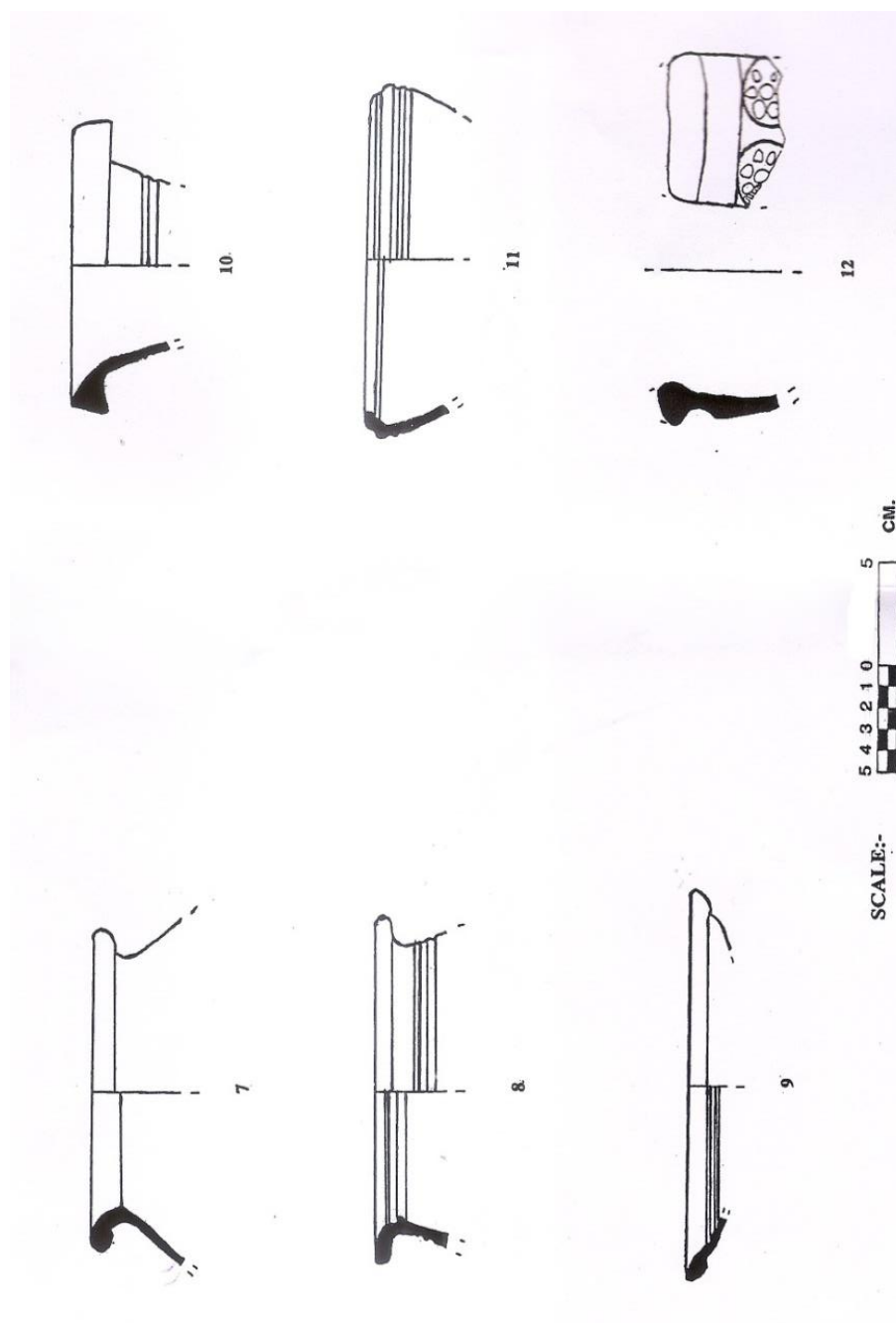
The Excavation Branch-VI of the Survey, under the directions of M. Mahadevaiah, assisted by N. Veeraraghavan, conducted exploration in Chitapur and Yadgir Taluk of Gulabarga District. Explorations conducted in these areas revealed a number of sites from prehistoric to early historical period.

Fig. 18



Benisagar: pottery types

Fig. 19



Benisagar: pottery types



A



B

Benisagar: A, wheel-made potsherds and B, copper object

Plates: 24A-24B



A



B

Benisagar: A-B, iron objects



A



B

Benisagar: A, stone and B, teracotta objects

Tunnuru is situated approximately 9km from Nalwar Village in Chitapur Taluk. On the north-western side of the village near the agriculture field, a good number of limestone panels were found scattered. These panels depict probably Buddhist Jataka related stories and *swastika* symbols. Some of these panels with inscriptions in Brahmi script speak about the donor and are datable to 3rd and 4th century CE. During the exploration, on the western side of the village a mound was noticed on top of which Siva temple of a later period was built. At the entrance of this temple, a limestone slab was found engraved with the depiction of Jetavana panel. Adjacent to this, a number of red ware shreds and a fragment of a sprinkler of fine variety red ware were also collected belonging to 3rd - 4th century CE. Explorations revealed that the Tunnuru village is archaeologically potential and further extensive survey may unravel a number of Buddhist remains in the area. (pls. 26-27).

Hadigimadra village is located on the road to Sannati at an approximate distance of 11km from Yadgir. During the exploration, a late medieval Kannada inscription and an interesting granite stone

slab with horse warriors was found near the local *dargah*. The warriors are shown riding on the horses holding weapons like sword bow and arrow. It belongs to 9th-10th century CE (pl. 28).

Gurusanagi village Gurusanagi is located 5km north of Yadgir in Yadgir taluk on the Yadgir-Shahpur national highway. Near the village, there are series of granitic hills. On top of the hillocks microliths made out of quartz were collected. Besides, remains of a brick structure measuring 46 x 24cm was also noticed. A number of red ware sherds in shape of bowl, pot of 8th - 9th century CE were also found.

MAHARASHTRA

19. EXPLORATION IN ACHALPUR AND MORSHI TEHSILS, DISTRICT AMARAVATI

Prehistory Branch of the Survey conducted exploration in Achalpur and Morshi Tehsils under direction of Nandani Bhattacharaya assisted by Gajanan Laxmanrao Katade, Ekta Dharkar, Vijay Gedam, Jyotiram Deshmukh, P. L. Janbandhu and N. K. Nimje and discovered Palaeolithic, Mesolithic, Early Historical and Medieval sites. (pls. 29A-29B). The details are as unde:

Sites in Tehsil Achalpur

<i>Village</i>	<i>Site</i>	<i>Geo-coordinates</i>	<i>Nature of Remains</i>
Kuma	Pandhari	21°18' 2" N; 77° 38' 3" E	Early Historical
Lakhanwari	Sindhi Somthana	21° 17' N; 77° 36' E	Medieval Period
Wishorli	Andher Bawdi	21° 21'1" N; 77° 45' 7" E	Middle Palaeolithic

Meghwari	Mayawadi	21° 22' 1" N; 78° 2' 5" E	Middle Palaeolithic
Dangri	Supala	21° 23' 10" N; 78° 0' 6" E	Medieval

Sites in Tehsil Morshi

<i>Village</i>	<i>Site</i>	<i>Geo-coordinates</i>	<i>Nature of Remains</i>
Ambara	Ambada	21° 20' 42" N; 77° 53' 8" E	Mesolithic
Chincholi	Ambhori	21° 22' 1" N; 77° 56' 6" E	Middle Palaeolithic
Yeral	Madhapuri	21° 19' 22" N; 77° 59' 6" E	Mesolithic
Pardi	Pardi	21° 11' 02" N; 78° 18' 4" E	Mesolithic
Palasvad	Pusla	21° 11' 12" N; 78° 9' 02" E	Medieval

20. EXPLORATION IN MELGHAT REGION OF AMRAVATI, DISTRICT AMARAVATI

Prehistory Branch of the Survey carried out exploration work in Melghat

region under the direction of D. Bhengra, assisted by Gajanan Katade, K. M. Girhe and R. K. Dwivedi, and P. L. Janbandhu. The exploration yielded following sites (pls. 30-31).

<i>Site</i>	<i>Geo-coordinates</i>	<i>Nature of Remains</i>
Sembadoh	21° 30' N; 77° 19' E	Lower Palaeolithic
Bairat	21° 22' 47" N; 77° 15' 3" E	Mesolithic
Pastalai	21° 23' 45" N; 77° 15' 3" E	Mesolithic
Motha	21° 24' N; 77° 22' E	Mesolithic
Somwarkhera	21° 20' 19" N; 77° 20' 63" E	Lower Palaeolithic

21. EXCAVATION AT DAULATABAD FORT, DAULATABAD, DISTRICT AURANGABAD

Aurangabad Circle of the Survey carried out excavations at Daulatabad Fort (19° 56' 39.64" N; 75° 13' 02.63" E) under the direction of V. N. Prabhakar assisted by A. M. V. Subramanyam, Tejas Garge, Manoj Kumar Kurmi, Shilpa Rangari,

Umesh Mendhe, D. L. Sirseshpande, V. R. Satbhai, A. K. Ture and S. A. Pandit. Previously, the area to the south and southeast of Bharat Mata temple was subjected to large scale excavations by the ASI in 1984-86, 1988-89, 2003-2006 and Deccan College in 1980-82, 1985-86. These excavations have revealed structural remains

Plates: 26A-26B



A



B

Tunnuru: A-B, Buddhist panel



A



B

Tunnuru: A, label inscription and B, Jetavana panel

Plate: 28



Hadigimadra: warrior panel



A



B

Amravati: A, view of a Middle Palaeolithic site and B, Middle Palaeolithic tool in situ

Plate: 30



Motha, Melghat region: view of Mesolithic site



Motha, Melghat region: stone tools

and material culture from the Yadava period to the Sultanate, Nizamshahi, Mughal and Maratha levels.

The present excavation was carried out in an area to the north of *Aam Khas* gate and to the south-west of Haji Kattal gate and east of *Shahi Mahal* and *hammam*. The entire area was subjected to surface reconnaissance and excavations. The excavation preceded by a total station survey of the entire area to the north of *Aam Khas* gateway. A contour plan of the proposed excavated area was thus completed. The surface cleaning revealed plans of the last structural phase at the site. In order to layout the trenches, the entire fort was divided into four sectors namely I, II, III and IV. The area selected for this season's excavation falls under Sector IV.

The excavation revealed evidence of a large structural complex (STR 1). This structure runs from east to west and continues in trench E20 N10, then turns towards north and continues in trench E20 N20. The total length of the wall running east-west is 15.30m and 12.88m in north-south direction and it is 0.70 m wide on the top. Another structure (STR 2) found in the same trench is located at the north-west corner measuring 1.90m and 0.88m in width. The trench E20 N20 revealed a wall (STR 3) running from the west of trench measuring 2.90m and 0.84m in width. This wall was plastered with a thick coat of lime. It is also parallel to the wall (STR 1) noticed in trench E20 N10. The STR 3 is constructed of stones in random rubble masonry with mud as a binding material and three courses have been exposed so far. The structure (STR 3)

found in the trench E20 N20 is located at the eastern corner and is an extension of STR 1 found in trench E30 N10. Another structure (STR 4) exposed in the trench E40 N10 is a part of the main wall (STR 1) running towards north and continues in trench E40 N20, measuring 12.25m. The exposed structures form a huge verandah surrounded by small walls. The trench E20 S10 revealed the entire plan of two rooms (STR 5) measuring 3.80 x 3.24m. The thickness of the wall varies from 0.80 to 0.88m. The exposed structures are built of stones in rubble masonry set in mud mortar. The evidence of *kawellus* (tiles) inside the rooms indicates that the superstructure was probably covered with tiles placed over wooden planks. The evidences of lime plaster on the inner and outer faces of walls show that they were originally plastered with a thick coat of lime (pl. 32A).

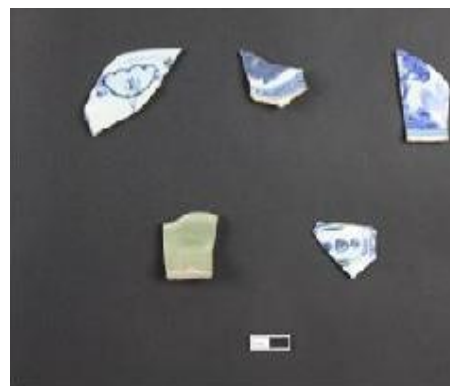
The ceramic assemblage from this excavation comprises of plain red ware, red slipped ware, grey ware, glazed ware, Porcelain and one isolated sherd of Caledon ware (pls. 32B-32D). The plain red ware is coarse in section and often ill-fired. The shapes include bowls, vases, dishes, storage jars, etc. The red slipped ware is of medium fabric, coarse in section and slip is applied on inner and occasionally on outer surface or both sides. The shapes noticed in red slipped ware included mostly vases, dishes and small vessels, etc. A small quantity of glazed ware fragments is also reported from the excavations. This ceramic type has a thick coarse fabric with rough outer surface in most of the sherds. Very few sherds are covered with white glazing. The glaze is of



A



B



C



D

Daulatabad Fort: A, excavated structures; ceramic assemblage; B, red ware; C, Porcelain and Caledon Ware; and D, glazed ware

different colours, mostly blue, white and silver which have been applied over the inner surface of the ceramics. The different kinds of designs such as check board pattern, wavy lines between thick horizontal lines and thick bands all around the rim portion are noticed on the glazed wares. Among them, blue glazed sherds are devoid of any designs. The shapes noticed are small dishes and shallow bowls. A few sherds of Chinese Porcelain ware are also reported. It has fine fabric, milky white surface, smooth texture with both faces decorated with floral and faunal motifs in blue colour. The shapes available in this type are shallow dishes and bowls.

The other objects unearthed comprises of copper coins (18), terracotta animal figurines, glass bangle fragments, terracotta beads (3), glass beads (12) copper rings (3), a Siva-linga of soapstone, nails, iron arrowheads and stone debitage. Among metal objects, copper finger ring, rings, and nose ring are noteworthy. The short as well as elongated glass beads with circular section are the most common variety. They are reported in black, white and different shades of red, blue, green, etc. Among the terracotta beads, elongated beads with circular section, one annular bead with cylindrical body are reported. Other terracotta antiquities include animal figurine, hop scotches, lamp, glass bangle fragments in black, grey, blackish green and very few in deep red colour. Iron objects include nails, knife blade, rings and arrow heads.

The excavation during period under review was confined to the upper most layers near *Haji Kattal* gate. The surface

reconnaissance of the area between this gate and *Aam Khas* has revealed evidence of a part of medieval township with spacious house complexes having large courtyards that enjoined proximity to royal palaces. The excavated remains in this area are roughly assignable to 17th century CE.

22. EXPLORATIONS AROUND LONAR AREA, DISTRICT BULDANA

Exploration in Khadak Purna basin was undertaken under the direction of B. C. Deotare assisted by P. D. Sable, Satish Naik and Vijay Omble of Deccan College, Pune. For having an overall understanding of the area under study, Bhon, a major early historic well documented site from the Purna basin, was visited and succeeded to trace out palaeo-channel on the basis of satellite imaginary and actual field observations of the surrounding area. With a view to understand the behavior of Purna and Khadak Purna River basins, team traveled across north to south covering major portion of these rivers with prominent divide. The remains of deserted village were noted while crossing the Khadak Purna River near Pahara showing some element of ancient habitation.

The Lonar meteorite lake in India is one of the youngest lakes in basalt with approx. 2km diameter and 8km surrounding rim in Deccan Trap area. It is observed that due to the impact, compact basalt deformed and converted into the recumbent fold. Rock samples were collected from upper rim, middle flows and unconsolidated sediments from lower saline part of lake for Geo-archaeological investigations. While exploring the upper periphery of the lake, lot

of unfinished microliths were found. The concentration of microliths is more on north-west side and they are spread all over except south-west part. These are made on quartz with varied sizes. The early Historic settlements in this part are relatively less as compared to the Purna basin may be due to limited seasonal water source.

Another field work was carried out under the direction of B. C. Deotare accompanied by P. D. Sable and S. S. Naik in coastal region of Konkan area especially around Kuda and Mandad area. Some early Historic localities were found with the recovery of pottery containing pieces of amphora indicating trading contact with other region. There is enough scope to work for establishing correlation with inland sites. For palaeo-environmental point of view, it is quite interesting to have archaeological material remains to correlate with palynological data from the intact and controlled locations (pl. 33).

During exploration indigenous wares like black and red ware, red polished ware, mica washed red ware, slipped black ware, glass bead, bricks, broken four legged saddle quern and broken double handled Roman Amphorae datable to the early centuries of the Christian era were found. A group of famous rock cut caves at Kuda is located 3km to the East of ancient settlement of Mandad.

Mandad seems to have lot of potential for the archaeological record but it is not yet excavated because during high tide, sea water covers the entire site. Hence to study the changes in the vegetation, climate, and geomorphology with

archaeological record, palaeoecological excavation at Mandad and extensive explorations in coastal region may prove to be very useful asset for future study.

23. EXCAVATION AT CHANDANKHEDA, DISTRICT CHANDRAPUR

The University of Sant Tukdoji Maharaj of Nagpur, State Department of Archaeology, Deccan College, Pune and Chandrapur Chapter of INTACH, jointly carried out excavation at Chandankheda, under the direction of Pradip S. Meshram assisted by Anand Bhoyar of the SAD, Ashok Singh Thakur and Amol Kulkarni.

Ancient site of Chandankheda (20° 16 N; 79° 13 E) lies 22 Km north-east side of Bhadrawati Tehsil of Chandrapur district and around 148 km south-east from Nagpur city. A large number of surface antiquities, going back to the Medieval and Satavahana period, had already been reported from the site.

The total area of site measures approximately 500 x 500m and rises over a height of 3 to 5m from the surrounding plains. The northern area of the site is occupied by the present day village and most of southern part has been distributed by the local brick manufacturing activities. This ancient site is enclosed by massive rampart measuring 500 x 500 m and is still extent with a moat encircling it. Altogether four trenches in the southern part of the mound (measuring 3 x 3m, in a step manner) and four trenches across the rampart and the moat (measuring 2.5 x 3m) were taken up with the objectives: to ascertain the cultural sequence and chronology of the site; its

Plate: 33



Mandad: cluster of potter, west coast

interrelationship, if any, with other contemporary culture of the region; to see the formation of rampart and the moat and to understand the settlement system within the rampart and the socio-economic perspective of the site. The excavation revealed 21 habitational layers over the natural soil. The occupation of the site reveals four different cultural periods.

Period I Early Iron Age (layer 9 to 21)

Period II Early Historic (layer 6 to 8)

Period III Early Medieval (layer 5)

Period IV Medieval (layer 1 to 4)

Period I: Early Iron Age (layer 9 to 21) has three meter thick habitational deposit. It is further divided in to three sub-phases namely 1A, 1B and 1C on the basis of cultural material and construction methods.

Phase 1A: The remains of this first settlement (layer 20 and 21) were very meager in quantity and quality as evidenced by few sherds of the black and red ware, Micaceous red ware and the coarse red ware along with a few very heavily encrusted pieces of iron or indeterminate use. In this phase, for the construction of the floor they used crushed murrum mixed in the clay, which helps in differentiating these layers as different phases in Period I. These earliest settlers directly inhabited on the natural soil. They laid murrum bedding overlain with clay and lime. The floors are not evenly rammed and not well finished. However, in course of time, the settlement seems to have prospered as the yield of pottery and other antiquarian remains increased in quantity in the subsequent deposits.

Phase 1B: The deposit (layer 16 to 19) formed in this phase are relatively a homogeneous deposit as indicated by its uniform light brown colour finer texture. Apart from the nature of the deposit, these layers yielded a relatively greater amount of finer black and red ware pottery and better fired red and red slipped ware. Besides these ceramic distinctions, the nature of the architecture had its own distinctions. There was a greater use of lime and dark brown clay for flooring overlain by a thin layer of slit and lime. Even the floors are well rammed and finished. This shows a gradual development from the earlier phase.

Phase 1C: In this phase (layer 9 to 15) a thin layer of clay, slit and lime is used for flooring. Most probably in this phase the domestic habitation might have shifted to some other place as we find a big furnace of iron working in this phase. These events on a technological view, denotes to a new phase, which developed from the earlier phase. The ceramic content of this phase was the same as that of the earlier phases.

The ceramics in this phase shows much affinity with typical Megalithic ceramics like Micaceous red ware small and medium size globular pot with constricted neck and thick flaring rim, black and red ware (deep carinated bowls, small size globular pot with featureless rims), red slipped ware (globular pot) with slightly vertical rim with a deep groove in the inner portion. The ceramic continues in the later phases too. In phase 1C towards the end in layer 10, there is change in the ceramics.

The Iron Age in Vidarbha can be said to begin around 8th century BCE. This

can be said with the help of dates from Takalghat-Khapa and Khairewada, it can be dated up to 4th century BCE. Since Chandankheda represents the same culture it can also be dated in the same time bracket.

Period II Early Historic: It has 2.50m thick deposit (layer 6, 7 and 8), which is further divided into two sub-phases viz., IIA and IIB on the basis of cultural material.

Phase IIA: It is pre - Satavahana phase (layer 8), witnessed some fundamental change in the cultural content perhaps due to the developed of iron technology. An abrupt transformation in the total outlay of the house plan even in the construction material, use of bricks, tiles, etc. indicate a departure from the rural to urban settlement. The cultural material of this phase represents one die-struck coin with animal impression (uninspired), ceramic assemblage comprising coarse red ware, red slipped ware, black burnished ware and finer black and red ware, shapes mostly comprise medium size globular pot having short neck with collar like rim, bowls, basins in the black and red ware carinated bowl with fattish base is the most common feature. Antiquities consist of earstud of obsidian, terracotta beads, bone points, beads of semiprecious stones like carnelian, jasper, etc. The outstanding discoveries of this period were the fragmentary legged querns and mullers in sandstone with typical Mauryan polish. The period has been dated between circa 4th century to 150 BCE.

Period IIB: On the basis of numismatic evidence, this is the proper Satavahana phase. The total thickness of the deposit is 1m. Ceramics of this phase are red ware, red

polished ware, Kaolin ware, Megarian ware, Stone ware and red slipped ware. Shapes are V-shaped bowl, lid cum bowl, globular pots without going under cut rim, storage jars, *handi* with constricted neck. Other antiquities of this phase are copper coins of the Satavahana dynasty, beads of semiprecious stone, terracotta and glass bangles, hopscotch, copper sticks and rods, Kaolin and terracotta figurines. Finding of imported ware and the other material speaks of domestic and international trade. Quality and quantity of cultural material and its spread over a large area suggest that this was the most flourishing period at this site. The period has been dated between *circa* 150 BCE to 200 CE.

Period III Early Medieval: In this period, a 50 to 60cm thick deposit of habitation exists including one floor level made of murrum and crushed brick bats. The finding of a gold coin belonging to *Sri* Varaharaj of the Nala dynasty is the peculiar feature of this period dates about 5th century CE. Ceramic industry includes a good amount of mica washed red slipped ware, red ware and black ware. Shapes are constricted necked *handi* with angular rim, globular pot with short and thick neck and rim, storage jars. U-shaped bowls, some stamped potsherds are also found in the excavation. Other antiquities of this period are monochrome glass bangles, terracotta and glass beads (small in size) and terracotta figurine.

Period IV Medieval : Total deposit of this period is 1.25m, including two floor levels. The earlier floor is made of murrum and silt and the later is made of brickbats. Ceramics found in this stage include coarse black

ware, black burnished ware, mica wash red ware and celadon ware. Shapes are small and medium size globular pot, *handi*, thick plates and big storage jars. Antiquities included good amount of polychrome glass bangles, glass beads and copper coins.

During excavation 7m high rampart is noticed around the site. Excavation on the rampart revealed that it was constructed during the Period IIB (Satavahana). The excavation shows the three modes of construction. The base is made of thick and well ramped clay mixed with potsherds and roof tiles. It is overlain by murrum and mud masonry. On top the boulders, murrum are laid which appears to be the third mode of construction. Mud is used as mortar and is well mixed with boulders and murrum.

24. SCIENTIFIC CLEARANCE AT CHANGDEV, DISTRICT JALGAON

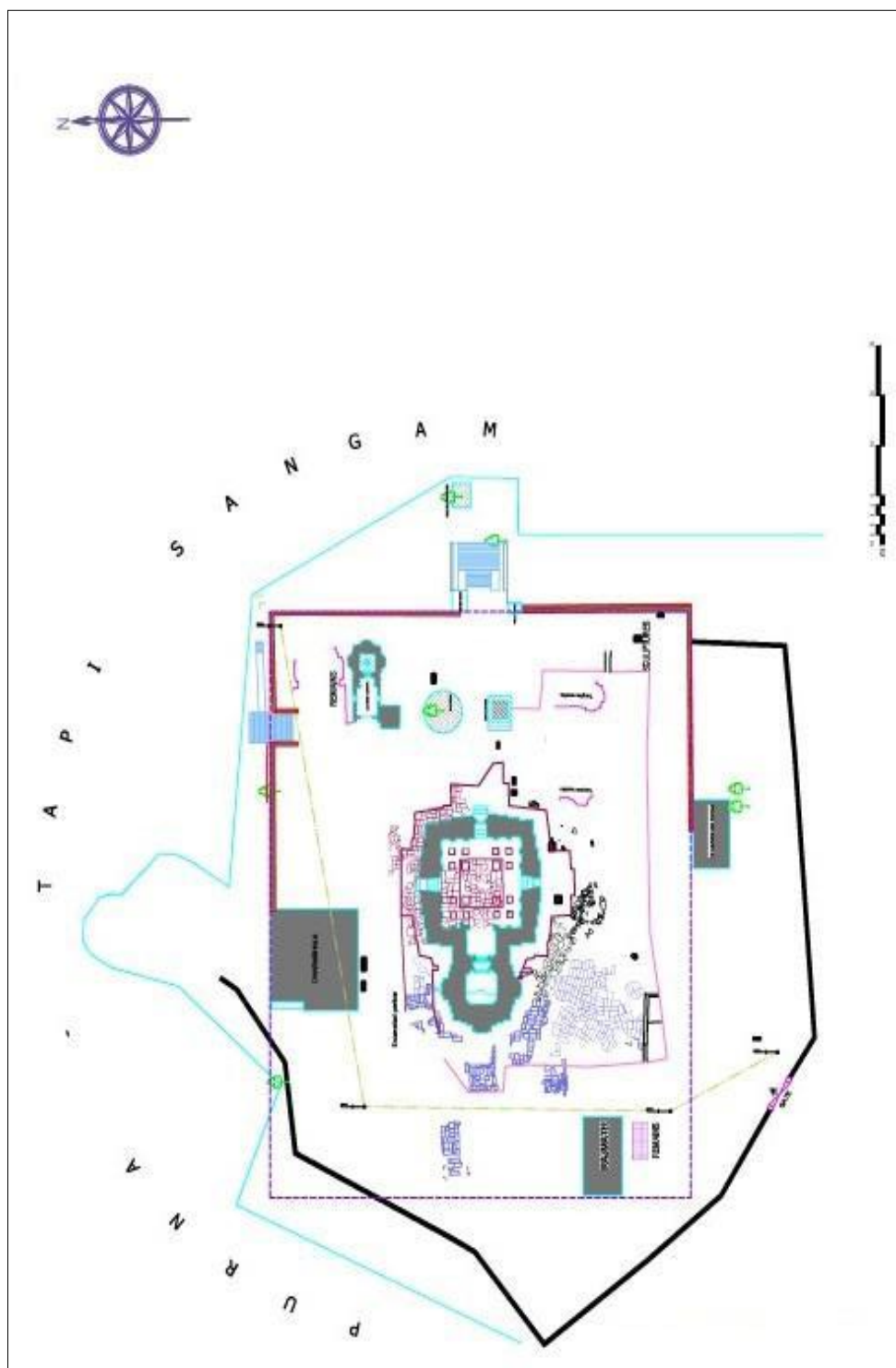
Aurangabad Circle of survey carried out scientific clearance at Changdev, district Jalgaon (21° 5' 31.20" N; 76° 0' 22.69" E) as a part of conservation work under the direction of V. N. Prabhakar assisted by Tejas Garge, Manoj Kumar Kurmi, Umesh Mendhe, D. S. Danve, A. K. Ture and S. A. Pandit. During the course of structural conservation, a small patch of area adjoining to the *garbhagriha* to its south was cleared off debris up to a depth of nearly 60cm from the surrounding ground level. This excavated patch revealed the original floor level of the temple and hence it was necessitated to expose the floor level all around. The deposit above the original flooring is ascribed to the modern village of Changdev which once stood all around the temple. The clearance work in the area has

revealed the architectural members and sculptures corresponding to the *bhitti* (walls) and *sikhara* of the main temple. The plan and contour map of the entire area of temple was prepared before the debris clearance (fig. 20).

The clearance work carried out on the southern side of the temple yielded architectural members, sculptures, images, original floor and plinth of small shrines, etc. The architectural members and sculptures were recovered from the 90cm thick debris (pl. 34A). The debris consisted of stones, loose earth, ash, brickbats, boulders, sculptures and broken architectural members. The section shows that these architectural members were buried in the dump and the plain ground had been raised by the villagers to build their houses all around the temple before the partial submergence of the area from a nearby dam.

The clearance revealed the original platform. Adjoining to the *mandapa* revealed flight of steps attached to the platform on the south which was one of the entrances to the *mandapa* (pl. 34B). This platform continues towards the east. Similar kinds of steps were also noticed in other trench attached to the platform extending towards the east. The exposed area on the southern side of temple revealed the original stone flooring extending up to a length of 29m from the main temple towards the southern side. The floor is made of dressed stone blocks of irregular shapes laid over a layer of soil. It was probably laid out all around the main temple inside the *prakara wall* (pl. 34C).

Fig. 20



Changdev: documentation of the structural remains



A



B



C

Changdev: A, section showing the architectural members; B, exposed stone flooring and C, flights of steps on the southern side of the temple

The excavation also brought to light four subsidiary shrines to the south-east and south-west of the main temple. These subsidiary shrines might have occupied an important place in the overall arrangement of the temple complex, as it also correlates with the already existing two subsidiary shrines on the north-east of the temple complex. These shrines might have housed the *parivara devatas* of the main deity of the temple.

The shrine of smaller dimensions noticed to the west of the main temple is named as STR 1. It is square on plan and made of stone blocks in dry masonry. This square shrine is provided with stone flooring made of rectangular stone blocks. Another small shrine (STR 2) was noticed adjacent to STR 1 to south-west. It is square on plan and made of rectangular stone blocks. The remains of another smaller shrine (STR 3) have also been found in the trench E10 S20 to the south-east of the main temple. This structure is rectangular in shape and quite high from the surrounding floor level. The exposed structure faces north and consists of a sanctum, rectangular hall (*mandapa*). The walls of the temple are completely missing except the off-sets at the sanctum wall. It measures 1.50 x 6.70m. The inner area of *garbhagriha* is full of debris with composition of loose soil, ash stone blocks and architectural members of temple. A stone bowl with an image of deity inside it has been noticed adjacent to the left wall of the shrine.

A plinth of another smaller shrine (STR 4) was found in trench E20 S20 to the south-east corner of the temple. It measures 7.50m

in length and 4.25m in width and 0.43m in height. It consists of a sanctum and a small rectangular hall. The hall (*mandapa*) measures 3.25 x 4.15m and the shrine is built of undressed stones which might have been veneered on the exterior (pl. 35A).

A wall (STR 5) unearthed at a depth of 0.4m runs east-west and takes a turn towards south. The wall is built of dressed rectangular stone blocks which might have been obtained from the original flooring and placed in an upside position. The wall measures 9.50 x 2.00m and was built with huge rectangular dressed stone blocks and filled up with brickbats.

The clearance work has revealed more than ninety figures of various deities and architectural members. These were originally part of the *bhitti* portion of the temple. They include images of Vishnu, Shiva, (pl. 35B) Durga, Varuna, etc. The large architectural members of temple were also found in a haphazard position. These big stone blocks and images have been maintained *in situ* to carry out proper documentation with the aid of Total Station. The documentation work of the sculptures, architectural members, big stone blocks is in progress. Further debris clearance work is in progress in order to expose the entire plan of the temple complex along with the original features.

ODISHA

25. SCIENTIFIC CLEARANCE AT SISUPALGARH, DISTRICT KHORDA

The scientific clearance work was undertaken by the Bhubaneswar Circle of the Survey on the southern side of western



A



B

Changdev: A, subsidiary shrine and B, Siva from the scientific clearance

gateway. The southern wing of the retaining wall covered by earth has been completely exposed.

26. SCIENTIFIC CLEARANCE AT HARIPURGARH, DISTRICT MAYURBHANJ

The Bhubaneswar Circle of the Survey has undertaken the scientific clearance work at the ancient site of Haripurgarh. The work was conducted in the palace area lying to the north-western corner of the Rasikaraya temple complex and to the south of the water reservoir. The clearance work has revealed a well planned structural complex comprising 13 residential rooms, large corridor, a large courtyard at the center, water tanks, a well planned water body and a drainage system through terracotta pipes, two sets of stair cases and a pavilion (on the edge of the reservoir). The structures are mainly built of bricks and laterite. Lime plaster in the walls is clearly visible. The structures were built in two successive stages. Post holes in regular

intervals are visible in the structures. Various types of pottery have been collected. Grey ware is dominating over red ware. Important shapes include vases, jars, basins, dishes, *handis*, etc. From the comparative study of the structures and related potsherds the complex can be datable to 15th/16th century CE assemblage to the Bhanja dynasty of Mayurbhanj (pl. 36A-D).

RAJASTHAN

27. EXPLORATION OF KATHUMAR TEHSIL, DISTRICT ALWAR

Manoj Dwivedi under the guidance of Syed Jamal Hasan of Jaipur Circle, of the Survey carried out exploration of 50 villages in Kathumar tehsil of Alwar District out of which 13 villages revealed archaeological remains. These include sculptures, fragments of architectural members and potsherds of historical to medieval period. Details are as under:

<i>Name of site</i>	<i>Archaeological Remains</i>
Chainpura 27° 10' 11" N; 76° 57' 37" E	Medieval period
Udapura 27° 10' 26" N; 76° 55' 10" E	Medieval period
Bhanwar 27° 10' 38" N; 76° 56' 47" E	Historic period
Khera 27° 09' 51" N; 76° 55' 38" E	Gupta to medieval period
Kalyanpura 27° 09' 37" N; 76° 56' 17" E	Gupta to medieval period
Ranpurapatan 27° 10' 32" N; 76° 56' 17" E	Medieval period
Samuchi 27° 11' 04" N; 76° 59' 57" E	Medieval period
Maithana 27° 19' 30" N; 77° 07' 39" E	Vishnu image of medieval period

Katheara 27° 09' 52" N; 77° 54' 10" E	Few sculptures of medieval period
Masari 27° 16' 22" N; 77° 06' 04" E	Surya image of medieval period
Rampura 27° 21' 05" N; 77° 05' 25" E	Ancient mound
Bharithal 27° 15' 42" N; 77° 07' 00" E	Vishnu Image of medieval period
Mankhera 27° 20' 08" N; 77° 03' 33" E	Architectural members of medieval period

28. EXPLORATION IN DISTRICT CHITTORGARH

Jagat Narayan, Director, Maharishi Kanva Historical Research Institute, Kota has discovered the Prehistoric rock paintings at Anderi Nala, District Chittorgarh. Anderi Nala situated near Barkhera village is 7km north east from Gandhi Sagar dam and 43km south from Rawatbahata and 93 km from Kota city. This Nala leading towards river Chambal is full of rock paintings depicting wild animals. These prehistoric paintings belong to Mesolithic period. Besides many painted rock shelters, this nala is also a house of several varieties of Herbal Vegetation and full of wild animals even today.

29. EXPLORATION IN DISTRICT RAJSAMAND

A preliminary research was carried out under the Chatrikhera Archaeological Research Project (CHARP) at the site of Chatrikhera. The Principal-collaborator of CHARP is Lalit Pandey from the Institute of Rajasthan Studies, Janardan Rai Nagar Rajasthan Vidyapeeth University, Udaipur and co-collaborators are Namita Sugandhi (formerly from Lehman College, City University of New York), Teresa Raczek (University of New Hampshire) and

Prabodh Shirvalkar (Deccan College). The team also included Nilesh Jadav (Deccan College), Jagdish Meena and Kulshekhar Vyas (Institute of Rajasthan Studies, Udaipur). Remains of a mound in the village of Chatrikhera (CHAT IV) were previously reported (1957-58, pp. 44-45; Misra, 1967, p. 149, Hooja, 1988, p.163, Dasgupta, 2006a, 2006b), but this was the first intensive examination of the site.

The objectives of investigation were to document the remains of the main archaeological mound and artefacts of Chatrikhera, and to explore the previously reported cultural areas making up the site (CHAT I-VI); to create a topographic map of the site and systematically map the exact dimensions of the remaining mound using a total station; to conduct a systematic surface survey of the area surrounding the village in order to determine the distribution of artifact density across the site; to extensively photograph the various features of the site and create a profile drawing of the known intact deposits of Chatrikhera; and to collect oral history from villagers about including.

In addition to the northern intact deposits previously known and reported as CHAT IV, the team also identified a second

Plates: 36A-36D



A



B



C



D

Ruins of Ancient Fort, Haripurgarh: A, before; B-C, during and C, after scientific clearance

intact portion of the main mound at the southern end of the village. The northern deposition is approximately 9m thick and has four exposed profiles, one in each of the four cardinal directions. The southern deposition is approximately 7m thick and has two exposed profiles, one to the north, and one to the west. The team also identified three main areas of secondary deposition where villagers have dumped materials excavated from the mound. Examination of both in situ and displaced artifacts within the village and surrounding has determined that the sequence represented at Chatrikhera spans from the Chalcolithic (Ahar-Banas) to Early historic, middle and modern periods. Additional research is required before determining whether this sequence is continuous and how it may be compared to other known sites in the region.

The team used a Topcon GPT-7500 series Pulse Total Station to create a detailed contour map of the village and surrounding fields. Using the total station, the mapping team was able to shoot in major features of the village including the intact deposits of the mound, streets, houses and shrines. The boundaries of the fields surrounding the village were also shot in, and topographic data of both intact deposits and the surrounding fields was also recorded. The data collected with the total station was used to create a map of the site (fig. 21).

A systematic survey of the agricultural fields surrounding the village was also conducted in order to determine the density and distribution of archaeological materials across the site. Surrounding fields were numbered and marked with pegs in the

south-west corner of each field (pl. 37). Transects were walked across each field, and survey forms completed for each transect included data on natural setting, present land use, and observed archaeological remains. Depending on the size of fields, transects were approximately 30-175m in length and spaced at interval between 10-3 m. The orientation of each surveyed field determined the direction of transects, which ran mostly north-south or east-west, with a few oriented in a north-east south-west direction. Survey revealed that the highest densities of archaeological remains are concentrated towards the south-eastern end of the village. To the west of the village, a moderate density of surface artifacts were visible in the fields nearest to the village but dropped off very quickly as one moved further west. These remains are quite likely the result of dumping by the villagers. Very few archaeological remains were observed in the northern fields of the village. In general, the highest concentrations of artifacts were observed in the south-eastern fields closest to the village. These results concur that the ancient mound slopes downwards towards the south-east.

The team carried out extensive photo documentation of the village, the intact deposits of the mound in north and south, areas of secondary deposition and objects such as pots and figurines removed from the mound by villagers. Stone querns found throughout the village were also extensively documented. Significant and diagnostic antiquities were also collected and photographed. These artifacts included diagnostic ceramics from the Ahar-Banas, Early historic and middle periods, animal

Fig. 21



Chatrikhera: contour map



Chatrikhera: map showing surveyed fields

figurines and other terracotta objects, ore/slag, a faience bead, and lithic remains such as a quartz sling ball, mullers, and a micro blade core. The visible stone house foundations on top of the southern deposits were also drawn.

As a part of the preliminary first season, a number of formal interviews were conducted in order to collect information from the villagers about their knowledge of the village's history and their memory of the mound and any ancient remains found in it. All interviews were conducted according to the ethical standards required by the Institutional Review Board for the Protection of Human Subjects (IRB). According to villagers living adjacent to the existing northern side of the mound that once extended towards the west 20m, has been cut by an additional and leveled. They had discovered artifacts like ceramic fragments and some whole vessels, pieces of stone, bones, ash and charcoal. It is revealed that the name of the village was changed from 'Ruppura' to 'Chatrikhera', as well as the recent history of the Bhil tribes who once lived in the village but now occupy a separate settlement just to the north.

TAMILNADU

30. EXPLORATION AT PUMPUHAR, DISTRICT NAGAPAAATINAM

Pumpuhar (11° 09' N; 79° 52' E), earlier known as 'Kaveri-poom-pattinam' is located 22km to the east of Sirkali in district Nagapaatinam. Pumpuhar is a site of archaeological importance as mentioned in the ancient literature especially in Sangam

literature, which has been proved by earlier excavations. Although the area where fresh investigations has been carried out does not fall in the ancient port site mentioned in the Sangam literature, but, this investigation reveals that there were some other small settlements, probably belonging to early medieval period and is represented by pottery types found in the explorations as well as in the trial excavation. The finding of bead and hopscotch clearly indicates the human activities in the area. It is quite possible that the surrounding area was inhabited many times since the geographical location of the site is ideal for the trade and sea contacts.

It is also assumed that the ancient site of Kaveripattinam which is submerged in the sea is far away from the present shore since sea level is rising in the area and a big piece of land has also submerged in the recent past which is lamented by the local villagers. As told by them about 50m of land/ coast is engulfed by the sea in the last 10 years. It is worth mentioning here that in 1973 the statue of Kannagi was installed on the shore of Pumpuhar about 200m away from the high water line and in 1994 it was shifted about 150m inward from its original location because the structure was destroyed by the sea. Similarly, other monuments at Pumpuhar were also destroyed by the sea. In spite of this, the area of Pumpuhar still retains the evidence of its glorious past as the archaeological evidences are supported by Sangam literature.

31. EXPLORATION AT SENGALUR, DISTRICT PUDUKKOTTAI

The Temple Survey Project (Southern Region) of the Survey, under the direction of D. Dayalan, assisted by A. Anil Kumar, S. Ashok Kumar, A. Palanivel, T. Samuel Joshua and T. S. Balasubramanian carried out field exploration at Sengalur (10° 40' 22.3" N; 78° 53' 2.8" E), an Iron Age site in Kulattur taluk of Pudukkottai district of Tamilnadu.

The village is one of the major sites yielding hundreds of megalithic edifices of different varieties and also has a habitational deposit of the contemporary period. Through field exploration with the application of GPS, Total Station Survey, Digital Topographic Maps and satellite images, plotted hundreds of megalithic monuments. The assimilated data was transferred to AUTOCAD software and a site map plotting more than 500 archaeological vestiges spread over an area of nearly 17 hectares was created falling within the jurisdiction of three villages viz., Sengalur, Vadakkipatti and Kattukkottaipatti (pls. 38-41).

On the basis of the surface finds, the Iron Age sepulchral monuments at the site are classified as stone circles with or without cairn packing; stone circle with cist burial of different type; urn burials with or without capstone; pit burial within stone circle menhir; and rectangular enclosure. These edifices not only reveal the architectural skill of the people but also the technique adopted by them. The sepulchral monuments are the forerunners of all the architectural edifices which evolved in the later stages. Hence, the study of these monuments and its technique of construction will provide an evidence of the architectural and technical

evolution of construction of both secular and religious monuments in this region. Further excavation will definitely provide ample evidence to study the early architectural style, the mode of their execution, human resource management, equipments used, volume and time involved in execution, etc.

32. EXCAVATION AT ERANIYAN KUDIYERUPPU, RAJAKKALMANGALAM, DISTRICT TIRUNELVELI

The excavation of Eraniyan Kudiyeruppu was conducted by T. Subramanian and G. Arjunan under the guidance of T. S. Sridhar and S. Vasanthi, of the State Department of Archaeology, Tamilnadu. Rajakkalmangalam is located at a distance of 5km from Thalapathi Samudram village. The site is called Eraniyan Kudiyeruppu is believed to be the palace of King Eraniyan, a local hero. Exploration conducted has brought to light a number of stone sculptures from a dilapidated temple belonging to Early Pandya period.

The archaeological exploration has thrown light on the possible existence of a buried temple belonging to Early Pandya period (8th-9th century CE). Three trenches were laid on the sand mound of Eraniyan Kudiyeruppu. During excavation, floor paved with dressed granite slabs was noticed at a depth of 60cm. Floor was found extended in all the three trenches. The size of bricks were 40 x 20 x 10cm and 30 x 15 x 8cm. Excavation also yielded good number of antiquities such as potteries and stone sculpture throwing light on the socio-cultural condition in this region (pl. 42A-C).

Plates: 38A-38B



A



B

Sengalur: A-B, disturbed urn burial, Iron Age



A



B

Sengalur: A-B, stone circle, Iron Age

Plates: 40A-40B



A



B

Sengalur: A-B, stone circle and cairn circle, Iron Age



A



B

Sengalur: A-B, cist within stone circle, Iron Age

Plates: 42A-42C



A



B



C

Rajakkalmangalam: A, exposed flooring; B, unearthed stone sculpture and C, granite flooring with lime mortar

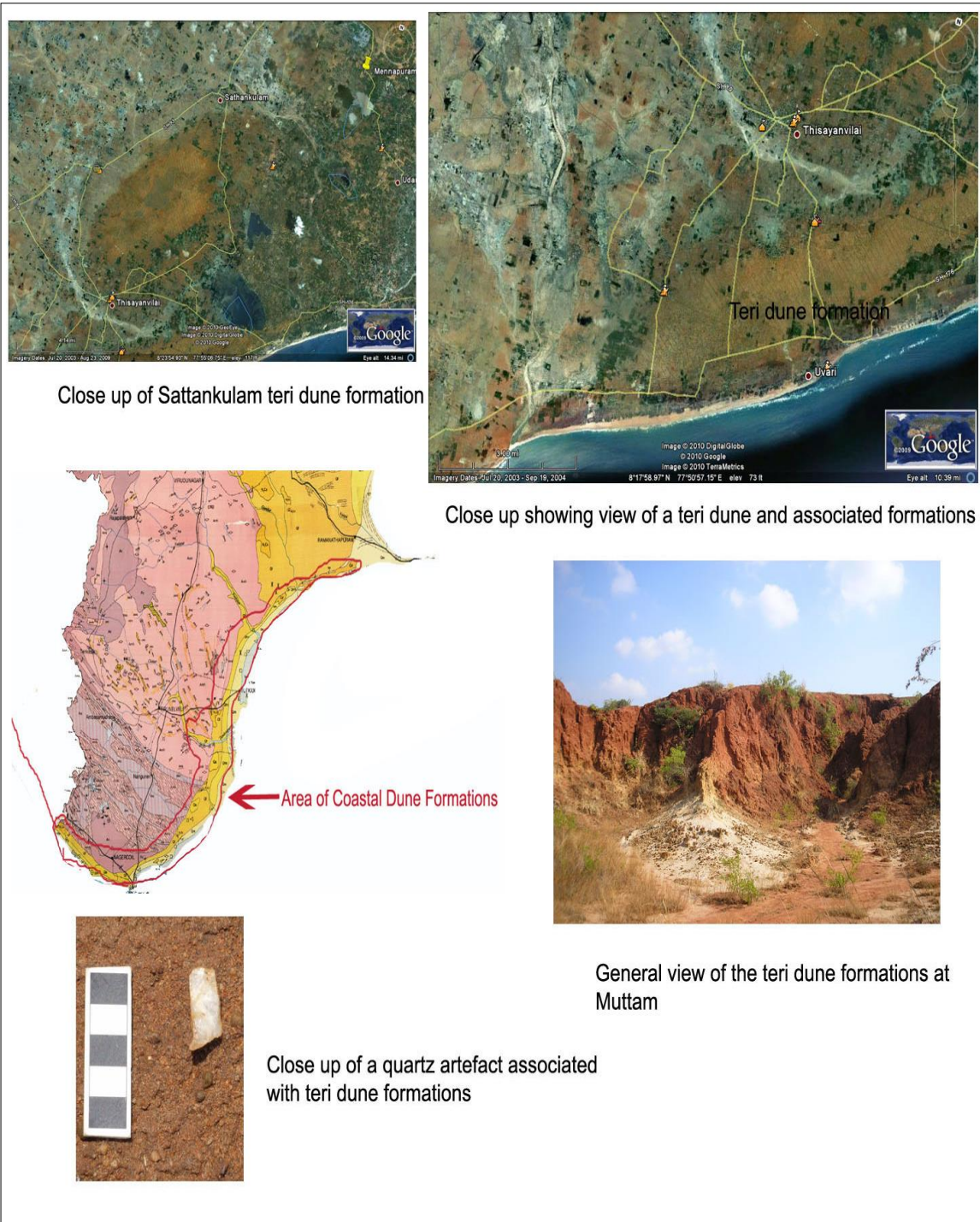
33. EXPLORATION OF PRE-HISTORIC SITES IN QUATERNARY FORMATIONS, DISTRICTS TUTICORIN, TIRUNELVELI, KANYAKUMARI, RAMNATHAPURAM, RAMAND AND THIRUVELLUR

The southern districts comprising the basin of the river Tambraparani and the coast, has been sporadically investigated, despite the discovery of prehistoric sites in the 19th century (Foote 1883) and early 20th century (Aiyappan 1945). The purpose of investigation was to re-examine the context of artifacts occurring within the Teri dunes and associated with microlithic industries, and to collect sediment samples and artifacts for further laboratory analysis by which a more detailed strategy may be planned for future studies. Field surveys were supplemented and aided by studies of satellite images in collaboration with ISRO/RRSC, Bengaluru. As in previous studies, this was used along with field data for purposes of survey and investigation and analysis of the location of sites in relation to a number of parameters (geology, geomorphology, elevation, drainage, etc.). Lithics collected are currently under analysis and sediment samples will be sent to the relevant laboratories for further studies.

The distribution of Teri sand dunes (pl. 43), was noted to extend from as far north as in the vicinity of Surangudi to Muttam located near Kanyakumari. Although previous scholars had documented sites associated with almost all the Teri dune formations, it was noted that owing to infrastructure development, reforestation and shifting of the dune sands, many sites have either been destroyed or are no longer visible/ accessible. Thus, these sites could

not be studied in detail. Further, surveys in areas adjoining the Teri dunes were conducted and new sites could be located in differing sedimentary contexts. Owing to discrepancies noted in the stratigraphic sequences described by previous scholars, it was necessary to search for suitable sections to interpret the regional Quaternary sequence. For this purpose, a number of sections were also studied and documented. The base of the sequence noted comprises gritty and calcareous sandstones and arenaceous lime stones (Subramaniam and Selvan 2001), underlying which are Archaen formations. Quaternary formations also include tuffaceous limestone patches, and extensive spreads of kankar are also noted. Gardner had identified several marine sediments termed the Ovari Series (15-18 m), the 6- 9 m Idindikarai Series pointing to a complex development of the landscape ranging from lagoon to near shore open shelf environments. The Teri sands were interpreted as Aeolian sediments, later weathered in situ, which overlie these series, and were deposited under a stronger north-east monsoon, during the last glacial (Gardner and Martingell 1990-91). In current field work, the context of the artefacts was on an indurate surface of the lowermost part of the Teri dune sands, which agrees with Gardner and Martigell's observations at some sites. In adjoining areas, artefact scatters occur in association with laterite like gravel. However, in the absence of suitable sections, underlying stratigraphy at many sites could not be determined, for which trial digging is essential. A total number of 611 artefacts are under analysis comprising cores, tools

Plate: 43



Distribution of the Teri dunes and quartz artifact

and debitage. Raw materials used were both charts and quartz; sources of which occur in the vicinity (pl. 44).

While chart is derived from weathering of blocks occurring within the lime stones, quartz nodules are noted in the Archean formations from where they were weathered and redistributed across the landscape through fluvial processes. Artefacts include a range of scrapers, retouched flakes and cores. Considerable waste flakes, chips and chunks were also noted at some sites. Owing to the extensive disturbance suffered as a result of modern infrastructure development, reforestation, cultivation, mining/ quarrying, it was difficult to estimate exact site areas or densities per unit area. A comparison of these sites with similar formations in Sri Lankan (Iranamadu Fm. sites), was undertaken based on existing literature and both differences and similarities in contexts and tool types was noted. This season resulted in a) re-examination of the known sites associated with the Teri sand dunes of south-east coastal Tamilnadu; b) collection of artifacts and sediment samples in order to assess potential areas for further studies; c) studies of microlithic sites in adjoining areas for assessing different sedimentary contexts of such sites; d) comparison with sites in northern Tamilnadu and e) continuation of community heritage education programmes.

TELENGANA

34. SCIENTIFIC CLEARANCE AT SWAYAMBHU TEMPLE COMPLEX, WARANGAL FORT, DISTRICT WARANGAL

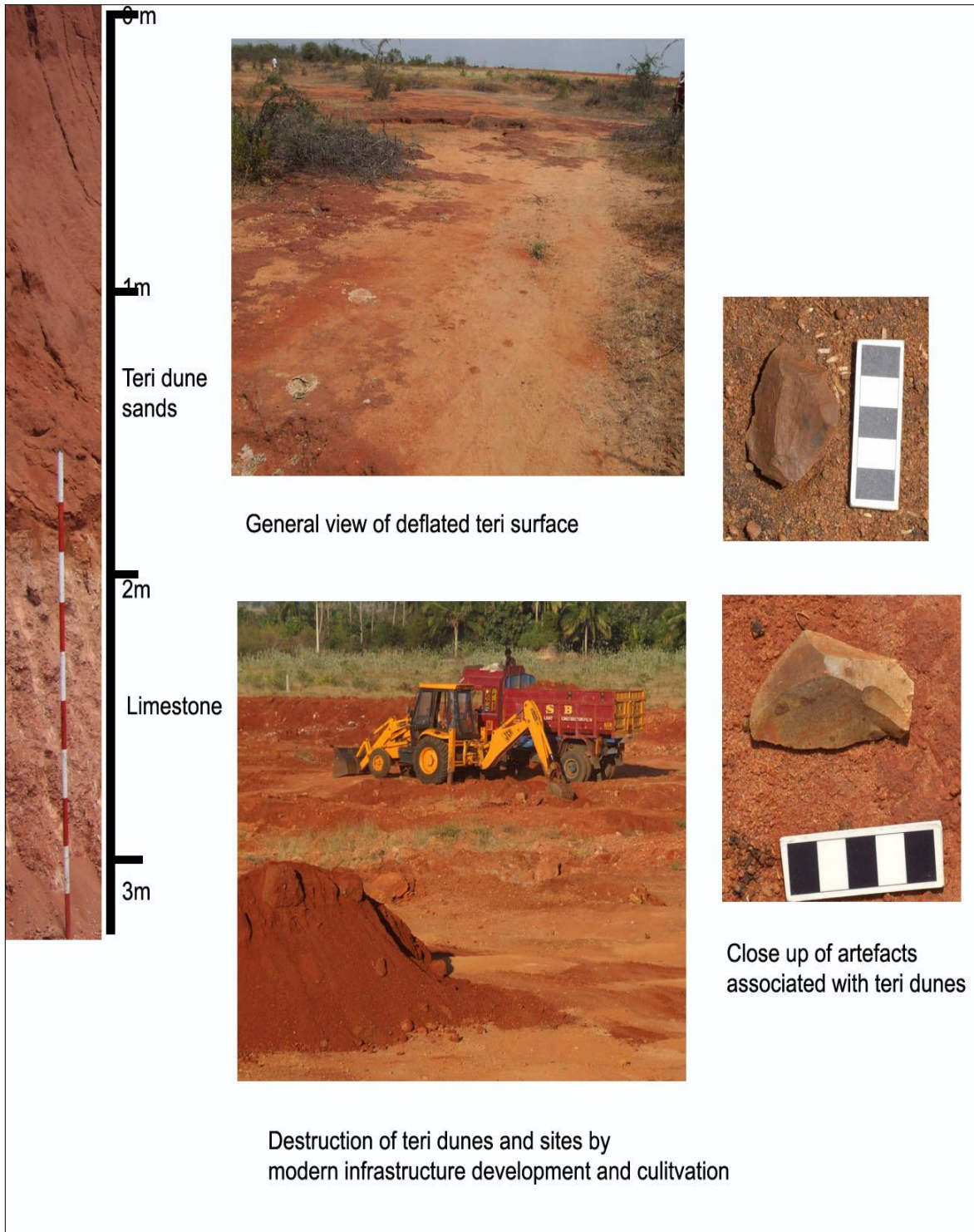
The Hyderabad Circle of the Survey, under the direction of K Veerabhadra Rao

assisted by T. Sri Lakshmi, S. J. Rani Mole and Smt. V. Nithya has carried out scientific clearance at the Swayambhu temple complex, Warangal Fort, Warangal (17° 50' N; 79° 32' E). In total, five trenches were laid, two on the north-eastern side of the eastern *torana*, and the remaining three at the eastern side of the Rama Temple and south-east of the linga *pitha* complex. During clearance, architectural members, beads, fragments of bangle, fragments pieces and antiquities etc. assignable to 12th to 14th century CE (Kakatiya Period) have been recovered. The exposed area yielded loose ashy sandy soil admixed with a good number of red ware. The circular and semi circular part of stones were found. The rectangular stone alignments in three rows are constructed with different materials like granite, polished red stone, yellow stone rubbles and bricks were also found.

The ceramics found during clearance of the site include bright red ware, red ware and grey ware. The shapes include shallow dishes, vases, miniature pots, bowls, etc. The cuttings on northern side of the site have yielded more pottery than the southern ones ascribable to medieval period.

Several semiprecious stone beads made of amethyst, garnet, glass, quartz, paste and terracotta were found. Some micro beads and glass beads were also found. Glass beads of various colours like green, black, violet, brown, yellow and blue were recovered. Among important antiquities copper talisman, iron fragments, string bell of stone, hopscotch, lipped lamp, spindle whorl, sickle, fragment of miniature Ganesa figure, *Vyali* of black polished granite stone,

Plate: 44



Stratigraphic sequence of a Teri dune site with close-ups of artifacts and evidence of destruction of dunes by modern infrastructure development

fragmentary headless female granite figurine are worth mentioning. The clearance yielded some stone blocks in an alignment on north-south direction indicating some earlier structural activities near the *linga pitha* complex. This temple structure seems to be an important one and perhaps was constructed during the Kakatiya period.

TRIPURA

35. EXCAVATIONS AT BOXANAGAR, DISTRICT WEST TRIPURA

The Guwahati Circle of the Survey, under the direction of Hanumanthappa Telagu assisted by Bimal Sinha, Sanjay Panda, Tapas Dutta and Sunil Kumar Das conducted excavation at Boxanagar with an objective to know the buried architectural features. The earlier excavation of the site revealed a stupa, *chaityagriha* and other brick structures.

Altogether 20 trenches were laid in the north-eastern portion of the area. The diggings have enabled to expose complete burnt brick structures in the north-eastern part of the site. The central portion of the structure is found with a *tri-ratha* projection (pls. 45A-B) within which a square sacred chamber measuring 3.20 x 3.20m appears to contain the extant remains of three sacred spokes (pl. 46A), which may be the object of veneration. The length of each spoke is 1.10m in average. These are found radiating out from and located in the eastern side of a sacred chamber. The structural features show that it may be the place of the sanctum. Chamber is badly disturbed and half of this was opened to see the cultural contents or other features. The lower portion

is found intact and filled up with fine clay. The sizes of bricks used in the walls of the chamber are of different sizes viz. 28 x 22 x 5cm, 28 x 18 x 5cm, 30 x 18 x 5cm, etc. No any significant antiquarian remains were found from the chamber except a few ceramics of fine fabric and a few copper granules. The height of the extant remains of the structures is 2.60m. The external walls are thick and plain but set in *tri-ratha* order. The burnt bricks are well laid with the help of mud mortar. The architectural feature as described above appears to be three-spoked, but does not have any resemblance with those of spoked stupa with complete circular outline as reported in other parts of India in the Kushana and Satavahana levels.

In front, there is a rectangular hall which measures 7.40 x 3.90m. It is enclosed by a 1.40m thick long wall all around. A brick rammed floor (pl. 46B) is provided inside this rectangular hall. This was meant for facilitating the congregation of devotees for offering prayers. A wide *pradaksinapatha* (pl. 47) is also provided around these structures. It measures 2.60m wide in average and further enclosed by an outer wall having 1.60m width. The area of the rectangular enclosure wall measures 23.45 x 15.35m externally. The evidence of decoration of the walls with carved bricks has been noticed at some places. On the western side of this a rectangular porch is provided measuring 4.50 x 5.40m internally. A staircase is also attached to the porch on the western side. The structures were exposed only up to a depth of 6m from ground level. The exposed portion of the foundation level shows that the burnt bricks were laid over a plain surface. It was built in

Plates: 45A-45B



A



B

Boxanagar: A-B, exposed structures showing the tri-ratha projections



A



B

Boxanagar: A-B, extant remains of spokes radiating out of an arc

Plate: 47



Boxanagar: brick structures and pradakshinapatha

two sub-structural phases. In phase two the floor level of earlier phase was considerably raised following same plan with same sizes of the bricks.

The ceramic assemblage is less and comprised mostly red wares having fine to medium fabric and mostly wheel turned variety. Besides, full red wares with coarse fabric and chocolate slipped wares with external decorations are found from layers (4) and (5) at a depth of approx. 0.90m to 1.30m. Among the external decorations 'V' shape, criss-cross and net impressed designs are prominent. The common forms are vases, carinated pots and dish. Most of them are wheel turned but some hand-made varieties were also found. The cord impressed pottery is the most common form (fig. 22; pl. 48A). The external decorations of the ceramic wares are mostly cord impressed variety. Some are having red slip in fine fabric with incised external decoration. A few sherds of Black Slip Wares are also found (pls. 48B-C).

The limited area of excavation has yielded a large number of moulded bricks as well as semi-circular molded objects, moulded tiles, etc. The study reveals that the objects were not prepared in systematic manner and lacks the uniformity and perfection. However, some are made of fine

alluvial clay and are well fired. These moulded objects might be the dislodged members from the walls of the structures. Terracotta objects with *amalaka* and stupa motifs were also found during the course of excavation from the site. A few pieces of iron implements were found from the upper level. Although in the eastern part of the site a sufficient number of iron slags are found but the limited number of iron objects in lower stratigraphical levels shows that the iron slags were perhaps not meant for industrial production during the period.

UTTAR PRADESH

36. EXPLORATION IN DISTRICTS AMBEDKAR NAGAR, BASTI, FAIZABAD AND SULTANPUR

In continuation of the previous year's work under the project titled 'Ancient Pilgrimage Route from Kaushambi to Kapilvastu', further exploration was carried out in the districts of Ambedkar Nagar, Basti, Faizabad and Sultanpur under the direction of I.D. Dwivedi, of the Lucknow Circle of the Survey assisted by Indu Prakash, O.D. Shukla, Rajeev Dwivedi, Anil Kumar Tiwari, Sanjay Kumar Singh, Rajendra Yadav, Nikita Chandra, S.B. Shukla, K.K. Pangti, Ravi Saxena and Rajni Shanker. The sites explored/ re-visited have yielded cultural remains as detailed below:

<i>Site</i>	<i>Latitude and Longitude</i>	<i>District</i>	<i>Findings</i>
Puredarbar	26° 24' 48'' N; 82° 15' 05'' E	Ambedkar Nagar	Red ware; Kushana and Gupta periods
Baure	26° 25' 47'' N; 82° 16' 35'' E	Ambedkar Nagar	Red ware, black slipped ware; medieval stone sculpture of Ganesa; Kushana and medieval periods
Umrahan	26° 27' 05'' N; 82° 17' 09'' E	Ambedkar Nagar	Red ware; medieval period

Bangaon	26° 25' 38'' N; 82° 17' 35'' E	Ambedkar Nagar	Red ware; Sunga-Kushana to medieval period
Bhiti	26° 28' 45'' N; 82° 17' 58'' E	Ambedkar Nagar	Red ware; late medieval period
Deeh Nagahara	26° 33' 45'' N; 82° 21' 31'' E	Ambedkar Nagar	Red ware, black and red ware; Sunga-Kushana to medieval period
Daiya Deeh	26° 28' 18'' N; 82° 19' 52'' E	Ambedkar Nagar	Red ware; Sunga-Kushana to medieval period
Sehra Jalalpur	26° 24' 26'' N; 82° 21' 54'' E	Ambedkar Nagar	Red ware; Sunga-Kushana to early medieval period
Sikta (Damaruwa Jungle)	26° 49' 50'' N; 82° 40' 45'' E	Basti	Red ware
Mura Dih	26° 58' 01'' N; 82° 48' 59'' E	Basti	NBP ware, red ware; NBP ware to Kushana period
Kuri-Barawa	26° 59' 48'' N; 82° 49' 43'' E	Basti	Red ware
Badahar Kalan or Badahar Dih	26° 47' 18'' N; 82° 26' 02'' E	Basti	Red ware, Gupta to medieval periods
Dharli Parki	27° 00' 15'' N; 82° 51' 26'' E	Basti	Red ware
Surwal or Auwal	27° 00' 10'' N; 82° 51' 48'' E	Basti	Red ware, grey ware
Sarai Dihwa	26° 56' 01'' N; 82° 43' 43'' E	Basti	Red ware
Madhwapur	26° 57' 24'' N; 82° 41' 25'' E	Basti	Red ware
Pakki-kuti	27° 01' 08'' N; 82° 37' 54'' E	Basti	Red ware
Mailani	27° 04' 13'' N; 82° 35' 43'' E	Basti	Red ware; Kushana, Gupta and early medieval periods
Ujjaini-Gram-Dih	26° 51' 41'' N; 82° 17' 25'' E	Basti	Black slipped ware, red ware, grey ware; NBP ware to medieval period
Nar-Khorna Dihwa	27° 04' 22'' N; 82° 38' 52'' E	Basti	Red ware
Badhni Mound	26° 45' 17'' N; 82° 37' 47'' E	Basti	Red ware
Tikariya Dih	26° 42' 33'' N; 82° 34' 14'' E	Basti	Red ware; Kushana and Gupta periods
Chueil Babu Dih	26° 43' 11'' N; 82° 27' 50'' E	Basti	Red ware, red slipped ware; Kushana and Gupta periods
Chueil Kaji Dih	26° 44' 05'' N; 82° 26' 50'' E	Basti	Red ware, red slipped ware; Kushana and Gupta periods
Gularihwa Ghat	26° 46' 35'' N; 82° 29' 39'' E	Basti	Black and red ware, black slipped ware, grey ware, red ware; chalcolithic, NBP ware, Kushana periods
Amodha Dih	26° 45' 42'' N; 82° 23' 26'' E	Basti	Late medieval period
Arshath	26° 26' 50'' N; 82° 11' 29'' E	Faizabad	Red ware; early medieval stone sculptures; Sunga-Kushana to early medieval period

Semra	26° 34' 28'' N; 82° 08' 28'' E	Faizabad	Red ware; late Gupta period
Amauni	26° 34' 57'' N; 82° 11' 24'' E	Faizabad	Red ware, black slipped ware, grey ware; Sunga-Kushana and Gupta periods
Rampur Bhagan	26° 34' 53'' N; 82° 11' 54'' E	Faizabad	Red ware; Kushana and Gupta period
Mahan Mau	26° 35' 26'' N; 82° 12' 46'' E	Faizabad	Red ware; Kushana and Gupta periods
Parsawa	26° 36' 07'' N; 82° 12' 41'' E	Faizabad	Red ware; Sunga-Kushana and Gupta periods
Tendua Maufi	26° 35' 81'' N; 82° 08' 59'' E	Faizabad	Kushana, Gupta and early medieval period
Bachhrampur	26° 34' 72'' N; 82° 01' 51'' E	Faizabad	Kushana, Gupta and early medieval period
Dhamaiya	26° 37' 94'' N; 82° 09' 19'' E	Faizabad	Kushana, Gupta and early medieval period
Dhanapara	26° 34' 30'' N; 82° 05' 19'' E	Faizabad	Kushana, Gupta and early medieval period
Maurawan	26° 34' 07'' N; 82° 03' 06'' E	Faizabad	Kushana, Gupta and early medieval period
Dhenuwani	26° 36' 37'' N; 82° 06' 07'' E	Faizabad	Kushana, Gupta, and stone sculpture of early medieval period
Suhwal Saloni	26° 027' 69'' N; 82° 34' 78'' E	Faizabad	Kushana, Gupta period
Devkali	26° 35' 37'' N; 82° 02' 44'' E	Faizabad	Sunga-Kushana, Gupta and early medieval period
Ruru	26° 35' 91'' N; 82° 03' 89'' E	Faizabad	Kushana, Gupta period
Niayi	26° 37' 12'' N; 82° 05' 04'' E	Faizabad	Kushana, Gupta period
Sirsir	26° 37' 44'' N; 82° 52' 17'' E	Faizabad	Sunga-Kushana, Gupta period, early medieval period. Temple remains
Michkurhi	26° 37' 00'' N; 82° 54' 47'' E	Faizabad	Sunga-Kushana, Gupta period, early medieval period.
Kail	26° 38' 94'' N; 82° 05' 41'' E	Faizabad	Sunga-Kushana, Gupta period, early medieval period
Bharatkund		Faizabad	Nawabi structure
Astikan		Faizabad	Red ware and red slipped ware. Gupta period, medieval period
Gah-nagan Old		Faizabad	Red ware, dull red ware and red slipped ware; Gupta period, medieval period
Karamdanda	26° 40' N; 82° 01' E	Faizabad	Chaturmukhi Siva-linga of Gupta period
Patopur Rahet		Faizabad	Red ware, dull red ware, black slip ware and grey ware; Kushana, early medieval period
Majhargaon		Sultanpur	Red ware and glazed ware; Gupta and medieval period

Tihsa	26° 23' 11'' N; 82° 16' 24'' E	Sultanpur	Red ware of Kushana and Gupta periods
Dhopap		Sultanpur	Red ware, black slipped ware; NBP ware, Gupta and medieval period
Amdeva	26° 23' 01'' N; 82° 17' 24'' E	Sultanpur	Red ware, Black slipped ware; Sunga-Kushana period
Bahli	26° 22' 02'' N; 82° 17' 48'' E	Sultanpur	Red ware; medieval period.
Purkhipur	26° 26' 27'' N; 82° 08' 22'' E	Sultanpur	Red ware; medieval period

37. EXPLORATION IN MAU BLOCK, DISTRICT CHITRAKOOT

Archaeological exploration has been conducted in Development Block Mau, by Ram Naresh Pal, Regional Archaeological

Officer, Allahabad under the direction of Rakesh Tewari, of State Archaeology Department. The following is the list of villages/sites with antiquarian remains in alphabetical order.

<i>Village/Site</i>	<i>Cultural Assemblages</i>
Bankat	Mesolithic tools (flake, blade, bladelets and other fragments of stone tools). Early Historical sites (Popularly known as Kotia culture) with red ware and black ware
Barambaba	Medieval mound with red ware
Bareth	Early medieval mound with red ware
Bargarh	Early medieval mound with red ware
Basdha	Early medieval mound with red ware
Bhairam Baba	Remains of a temple and broken sculptures of 11 th - 12 th century CE
Bojh	Early medieval mound with red ware and two stone <i>Kolhu</i>
Chhaahra	Mesolithic tools (flake, blade, blade lets and other fragments of stone tools). Medieval mound with red ware.
Chhibulha ki Pahari	Rock shelters painted in ochre colour, hunting scenes of animal, etc.
Daur dam	NBP ware, Kushana, Early Medieval with red ware and iron slag
Dashrath Ghat	Rock shelter painted in ochre colour, animal scenes, and rock-cut sculptures of <i>Sheshshayi</i> Vishnu, Mahishamardini and other god-goddess of early medieval period.
Devriha	Remains of a medieval temple
Dhooman	Early medieval mound with red ware and three stone <i>Kolhu</i> .
Etaha Devipur	Remains of an ancient temple (11 th -12 th century CE) early medieval culture with red ware
Gahur	Early historical sites (Popularly known as Kotia culture of Vindhyan region) with red ware and black ware)
Gateha	Early medieval mound with red ware
Jamuniha Pahari	Early historical cultures (Popularly known as Kotia culture of Vindhyan Region) with red ware and black ware
Kolmajra	Medieval mound with red ware

Konia	Mesolithic tools, early medieval mound with red ware
Koriya Dih	Early medieval mound with red ware
Kothi	Medieval mound with red ware
Kotra Khambha	Early historical sites (Popularly known as Kotia culture of Vindhyan region) with red ware and black ware
Kotwa	Early medieval mound with red ware
Kuria Dih	Early medieval mound with red ware and seven stone <i>Kolhu</i>
Mahewa Dham	Mesolithic tools (flake, blade, bladelets and other fragments of stone tools)
Misiri Pahari	Mesolithic tools (flake, blade, bladelets and other fragments of stone tools)
Nevada	Early medieval mound with red ware
Panchmukhi Hanumanji	Mesolithic tools (flake, blade, bladelets and other fragments of stone tools)
Panihai	Early medieval mound with red ware and two stone <i>Kolhu</i>
Paranu Baba	Middle paleolithic tools, Mesolithic tools, Kushana with red ware
Raipura Dih	Early medieval mound with red ware
Rehuha	Medieval mound with red ware
Semra	Early medieval mound with red ware
Singuti Pahari	Mesolithic tools (flake, blade, blade lets and other fragments of stone tools)
Tilha	Mesolithic tools (flake, blade, blade lets and other fragments of stone tools)
Varia	Early medieval mound with red ware
Vinoba Nagar	Early medieval mound with red ware

38. EXCAVATION AT LATHIYA, DISTRICT GHAZIPUR

The Excavation Branch-III, Patna of the Survey under direction of B. R. Mani, assisted by Sanjay Kumar Manjul and I. D. Dwivedi, Arvin Manjul, Sujeet Nayan, Jalaj Kumar Tiwari, Ashish Kumar, Neetesh Saxena, S. P. Gupta, O. P. Pandey, Raman Kumar, Dhananjay Kumar and Ram Naresh Yadav, conducted excavation at the Lathiya mound with the objectives to establish cultural sequence of the site; to find out the structural activity and its connection with the stone pillar; and to identify the regional speciality, if any.

Archeological site Lathiya (25° 23' 37" N, 83° 34' 53" E) is situated 2.5km south-east from Zamania Tehsil on Zamania-Darauli road. The holy river Ganga flows

4km west from the site. The site proper is located approximately 6km east from the nearest railway station Zamania in the east-central zone of Indian Railway. It is located about 20km south-east of Ghazipur and 60km east of Varanasi.

The mound of Lathiya roughly measures 158 x 61m and rises up to the height of 2.5m from its surrounding plain (fig. 23). A stone pillar is standing on the western end of the mound. The top of the shaft has bell-shaped capital surmounted by eight broken lions facing eight directions; the capital was once crowned by a sculpted member of two Garuda figures back to back resting on a circular based pedestal depicting lotus leaves (*Padma pitha*). It is now lying near the pillar. The trenches are laid out in horizontal pattern measuring 10 x 10m each

(pl. 49). The pegs are numbered in such a manner that the whole mound comes under 'A' zone. In all, 47 trenches were fully or partly taken up for excavation. In order to get the sections of the mound from north to south and east to west, excavation work has been taken up in a series of trenches numbering from C3 to C10 and from A5 to K9 along with other trenches.

The site is very disturbed due to human vandalism. The district gazetteer of Ghazipur mentioned that many of the houses in Zamania were built from the bricks taken from the site and many were used for ballast in the construction of the Mughalsarai-Howrah main railway line passing at a distance of 1.2km south-west from the site. Due to brick robbing in large scale most of the structures were found in the form of ghost walls.

On the basis of ceramic industries, antiquities and other material culture recovered from two fold cultural sequences is established.

Period I: Sunga-Kushana Period

Period II: Gupta Period with three phases

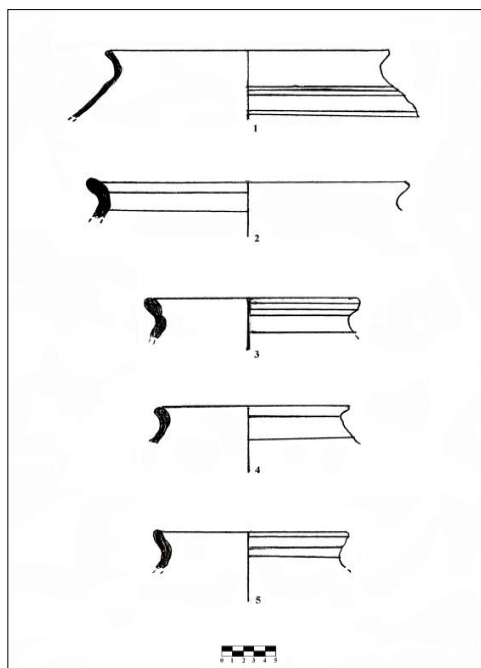
On the basis of the structures unearthed from the excavations, the excavated area has been classified into Temple Complex Area; Southern Residential Area; and Eastern Residential Area; Temple Complex Area: This is situated near the stone pillar. The area is comparatively elevated than its surroundings. In all 16 trenches were laid. Remains of four brick temples of Gupta period has been found mostly in the form of

ghost walls facing east with same plan. These temples were composed of two architectural units, the sanctum (*garbhagriha*) and *mandapa*. The stone pillar is situated west of the temple group. Temple 1 and 2 and its enclosure wall were constructed in Phase I of Period II; and Temple 3 and 4 were constructed in phase-II. Temple 1, is the biggest among the group, comprises of a sanctum 2.75 x 2.15m internally and 3.2 x 4.85m externally and a rectangular *mandapa* in the front. The dimension of the *mandapa* is 7.6 x 8.05m externally and 5.26 x 5.26m internally. The width of the wall of the *mandapa* in north-south axis is 1.27m and east-west axis is 1.4m. The width of the walls of the sanctum is 1.05m. The distance of the enclosure wall from the outer wall of the *mandapa* on the eastern and western arm is 6.5m.

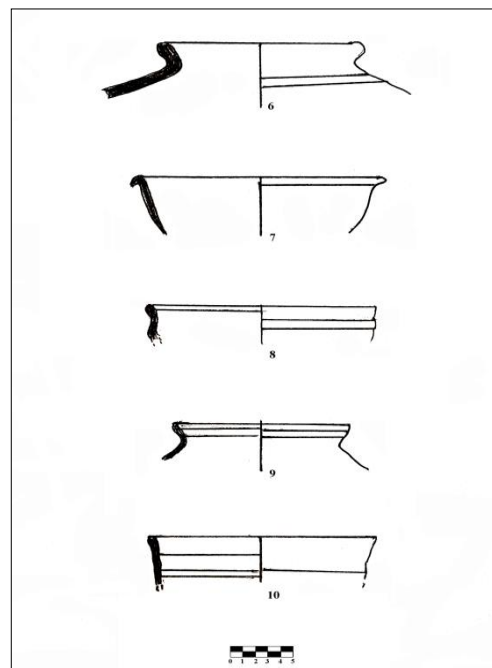
Temple 2 comprises of a sanctum (2.5 x 2.00m internally and 3.5 x 3.7m externally) and a rectangular *mandapa* (4.00 x 3.7m internally and 6.2 x 5.9m externally). At the north western corner only 9 courses of bricks with a height of 73cm has been found. The width of the *mandapa* walls is 1.10m and width of the sanctum walls in the east-west axis is 0.85m and in the north-south axis, it is 1m.

Both the Temple 1 and 2 are enclosed by an enclosure wall measuring 30.55m in the north-south direction and 32.45m in the east-west direction. Most of the walls have been robbed. Northern arm of the enclosure wall has been found in trench C3, D3, D4 and E4. At the western end only lower most courses of the bricks has been encountered with a width of 1.10m.

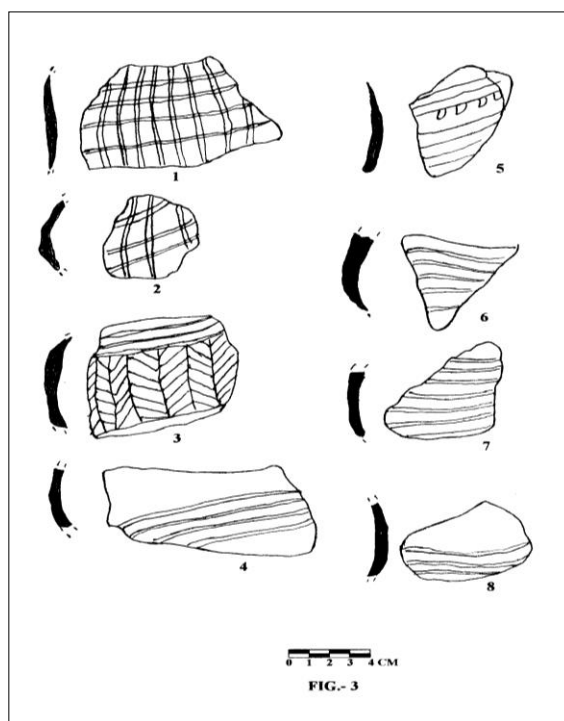
Figs. 22A-22C



A



B



C

Boxanagar: A-B, red ware pottery and C, decorated potsherds

Plates: 48A-48C



A



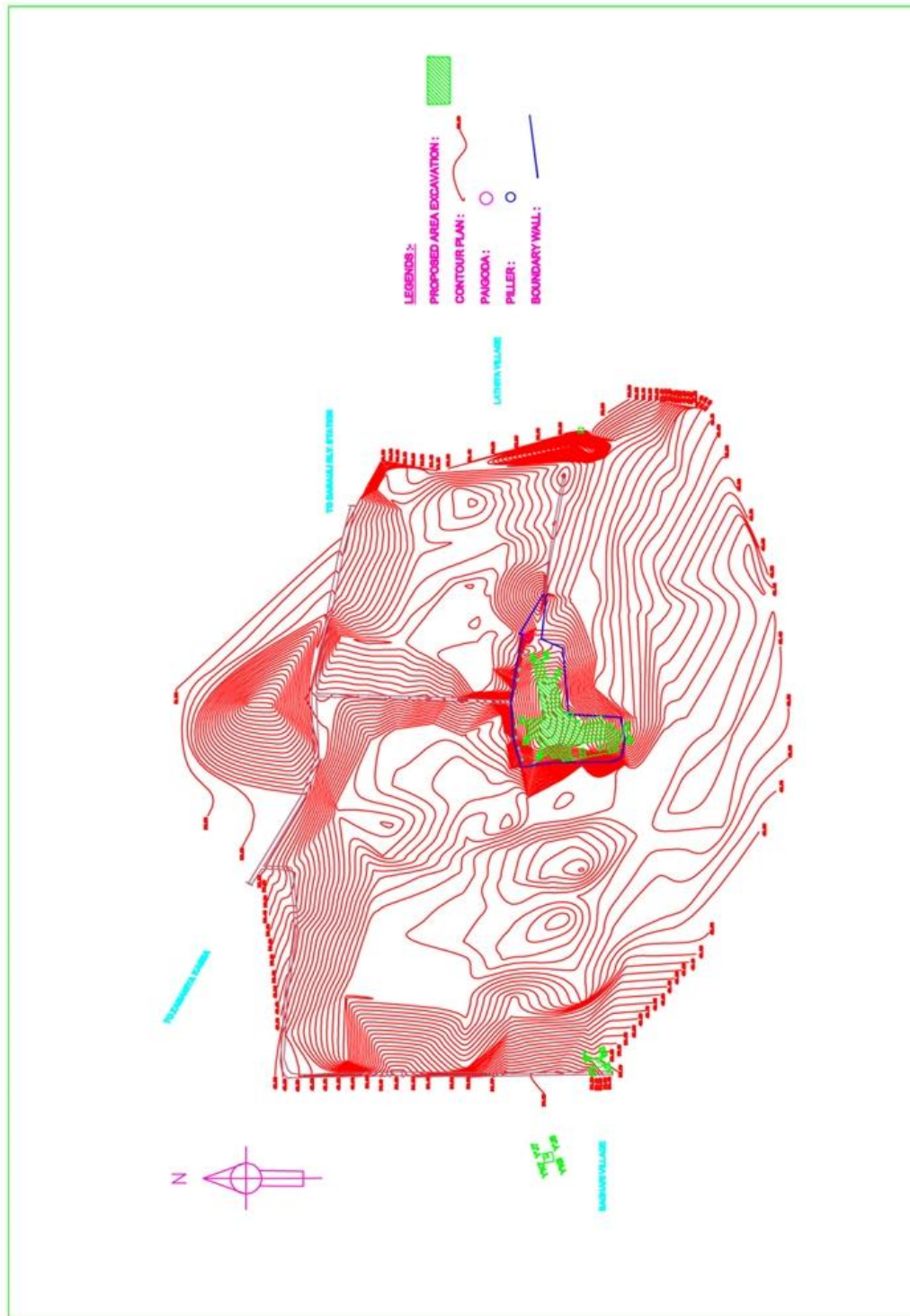
B



C

Boxanagar: A, red ware sherds and B-C, potsherds with decoration

Fig. 23



Lathiya: site-cum-contour plan and excavated trenches of site

Plate: 49



Lathiya: general view of temple complex Gupta period, phase I and II

At D3 and D4 trench a part of the wall has been traced up to 5 courses.

The southern arm of the enclosure wall is having a length of 23.45m found in trench C6, C7, D7 and E7. It is found totally in the form of a ghost wall. The eastern arm of the enclosure wall has been traced in the trenches E4, E5, E6 and E7 measuring 30.55m. At E5 trench, only lower 4 courses up to a height of 28cm, has been traced. Near the southern end, hearth of a later period has been noticed. The western arm of the enclosure wall has been exposed in the form of a ghost wall in trenches C3, C4, C5 and C6 measuring 30.55m. At the north-eastern edge of the wall only a few bricks of lower most courses have been noticed in trench C4.

Temple 1 and 2 with enclosure wall was constructed in the same phase. The pillar is located almost in the middle of both the temples. In the next phase of construction Temple 3 and 4 were constructed. The size of the Temple 3 is almost same as Temple 2.

Temple 3 was constructed over the northern arm of enclosure wall. It also comprises of a sanctum measuring 2.5 x 2.0m internally and 3.5 x 3.7m externally. Similarly the *mandapa* is having the dimension 3.75 x 4.00 m internally and 6.2 x 5.2m externally. The width of the wall of the sanctum in east-west axis is 0.85m and north-south axis is 1.10m. Similarly, the width of all the walls of the *mandapa* is 1.10m.

Temple 4 is located 3.25m north of Temple 3. It also has a rectangular sanctum

measuring 2.5 x 1.0m, internally and 3.5 x 3.80m externally. The *mandapa* measures 3.65 x 3.80m internally and 5.85 x 5.95m externally. A rectangular pit measuring 1.6 x 1.56m has been noticed in the centre of the *mandapa*. The difference between the foundation of the temple and the depth of the pit is almost at the same level and rests on the layer 2.

A trough made by stone chips with lime plaster has been found 5cm below the ground level in trench B4, Qd. IV for making the stucco paste. The size of the trough is 125 x 46cm externally and 112 x 25cm internally and the depth is 18cm. It may be dated to phase-II of Period II. Lower half of the trough is filled with lime plaster. Remains of lime plaster and fragments of stucco suggest that the superstructure of the temples was decorated with lime plaster and stucco. Stucco fragments mainly represent the floral, geometric and snake designs. Remains of brick paved floor belong to phase-II of Period II have been noticed at 20 to 30cm below the surface level (pls. 50A-B).

A flimsy single course brick wall assigned to phase-III of Period II found in trench E2, Qd. I in east-west alignment was traced up to a length of 3.05m. The width of wall is 0.55m and it is located on the southern side of the Temple 4. Stone pillar also has an outer enclosure wall. The outer enclosure wall measures 22.40m in the north-south alignment and 10m in the east-west alignment. A part of the enclosure wall has been found in the form of ghost wall in trench C4, Qd. I having the width of 1.10m traced up to 3.44m in east-west alignment in the trench. The symmetrical projection of

Plates: 50A-50B



A



B

Lathiya: A, remains of Temple 3 and B, remains of Temple 4, Gupta period phase-II

the enclosure wall has been shown (fig. 24). It is also contemporary to the temple's enclosure walls.

The stone pillar of Lathiya is a single circular shaft of sandstone having a square base. It is firmly fixed on the ground by four large upright stones. The excavation near the base of the stone pillar in Trench B5 shows that upright stones with pillar were also enclosed by an enclosure wall made of baked bricks for further strengthening of the pillar. The western arm of the enclosure wall has been traced up to a length of 1.54m, width of 1.6m and height of 1.86m with 28 courses of bricks. Similarly, southern arm of the enclosure wall was exposed up to 2.9m in length 0.85m in width and 3.25m in height with 44 courses of bricks. The eastern arm of the enclosure wall is traced up to 1.39m in length, 0.75m in width and 0.30m in height with four courses. The total height of this arm was not traced due to safety reasons. The enclosure wall may be assigned to phase-I of Period II.

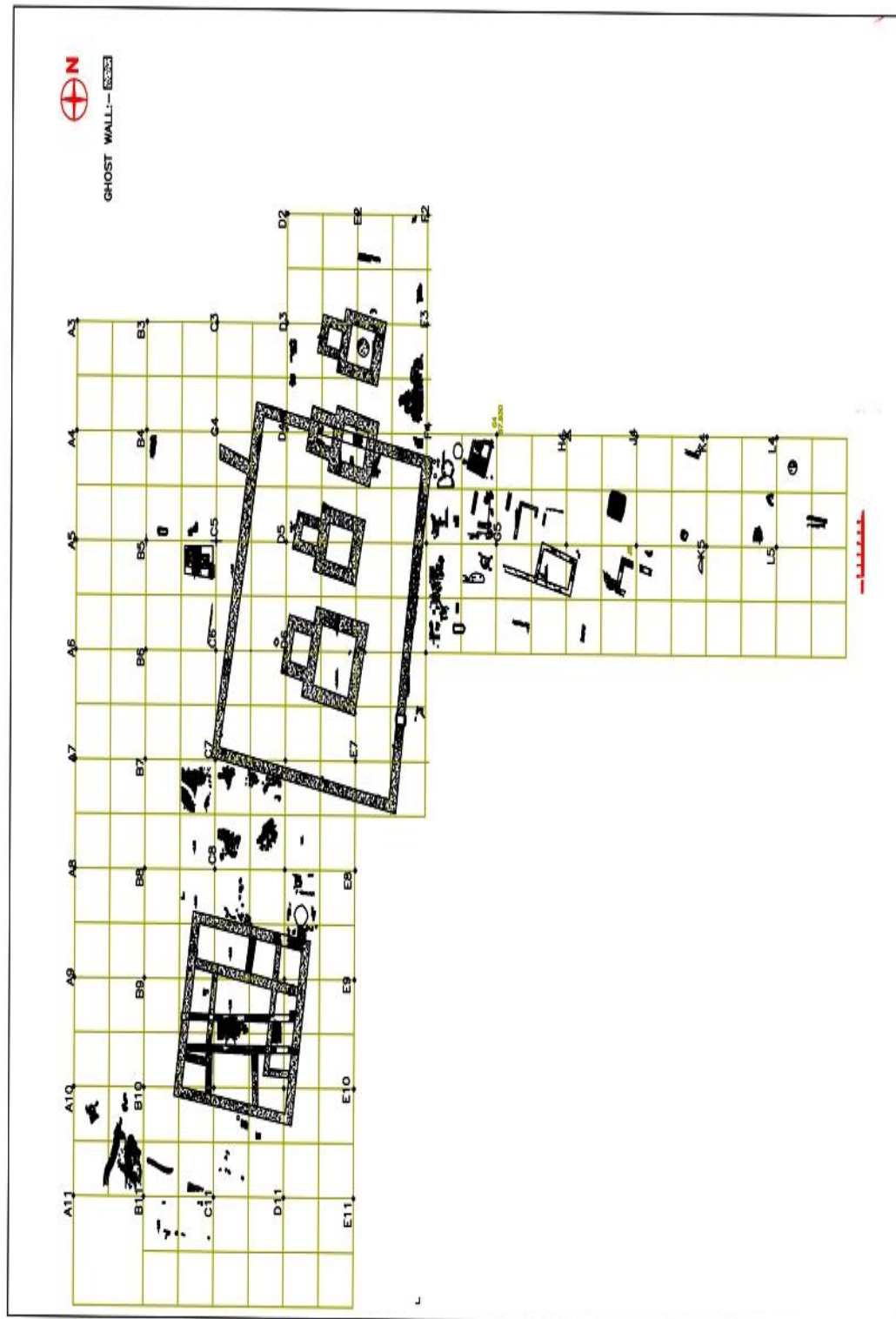
Another brick wall was found in north-south alignment having a length of 1.61m, width of 0.5m and height of 0.42m with seven courses.

Southern Residential Area: Period I has been represented here by two parallel walls found in trench no. B9, C9 and D9 at a depth of 80cm below the ground level. These walls are running in the east-west direction. The distance between these walls is 2.3m and forms a passage (*galiyara*). Both the walls are exposed up to a length of 15.10m and are having a width of 60cm and have only two brick courses. These two parallel walls in north-south alignment join

the southern wall and form a house complex, but due to restricted excavation, the actual size of the room could not be ascertained. The western parallel wall is having the north south axis is exposed up to a length of 4.72m with the maximum width of 70cm and has two courses. The eastern wall was also exposed up to 4.72m length. Distance between these two walls is 5.70m. All these structures belong to Period I.

A house complex belonging to Period II A and II B has been exposed in the Trenches B8, B9, B10, C8, C9, C10, D8, D9 and D10. This rectangular house complex is enclosed by a wall having a width of 1.10m and is mostly found in the form of ghost walls. The northern, eastern and southern walls are 17.6m in length and eastern and western walls are 17m long. A room in this level was found measuring 7.32 x 3.25m. Two rooms have been traced on the north-eastern side of the complex in the trenches C8, Qd. III; D8, Qd. IV; C9, Qd. II and III and D9, Qd. I and IV. The size of the smaller room in the north-eastern corner is 3.35 x 2.98m and that of the bigger room is 7.15 x 2.98m. All the walls of these rooms are found in the form of ghost wall and the width varies from 72cm to 1m. The floor, made of bricks and brick bats of Period II A has been traced in the Trenches C9, Qd. III and IV; B9, Qd. II and III. The temple complex seems to be used as an open space or corridor made of bricks and brick bats. It has been traced partially in trenches B7, C7, D7, B8, and D8. A huge dump 12.55m in diameter and 20cm in height has been found in the square A10, Qd. II and III. Contain hundreds of bowls of various shapes and sizes identified as ritual material dump here after worship.

Fig. 24



Lathiya: site plan of the site

A drain made of burnt bricks with both its sides brick lined, having 2 to 4 courses of bricks was found in square A10, towards north-south periphery of the mound. The length of the drain is approximately 5.30m and its internal width is 0.19m and the external width is 0.64m, running in north-south direction.

Remains of a floor made with brickbats was also traced in the north-western and north-eastern portion of the trench 25cm below the ground level. On the eastern side of the drain few bricks have been laid, probably for the pedestrian. Thus, square A10 may have been used to drain out the water and as a dumping place for the offering bowls. The discovery of oblation dump further speaks about the religious practices of the contemporary society at Lathiya.

Eastern residential area: A brick bat paved platform, edged by a row of brick on edge; roughly rectangular shape trough has been found 1.2m below the ground level in trench H4, Qd. II and III. The dimensions are 2.21m x 2.38m x 2.01m x 2.11m on west, east, north and south respectively. The depth of this trough like structure is 0.2m. It may be assigned to Period II phase-I and it was possibly meant for preparation of mortar for construction of temples. A rectangular chamber for preparation of lime mortar has been found 1.2m below the ground level in Trench F4. Qd. measuring 3.10 x 2.65m. These chambers were further divided into two parts *viz.*, northern and southern sub-chamber. The inner dimension of northern sub chamber is 2.18 x 1.35m. The southern sub-chambers were further divided into two

compartments i.e., eastern and western. The inner dimension of the western compartment is 1.16 x 1.16m and eastern compartment is inner dimension is 0.79 x 1.16m. This unique structure which may be assigned to Period II phase-II is very important to understand the building material technology during the Gupta period.

Phase-III of Period II has been represented by the rudimentary house complexes. These houses have been constructed by using mostly brick bats and do not represent a good masonry work. Brick robbing and human vandalism were also noticed in these brick structures. The houses or rooms of the period are made randomly and are not well planned. The remains of a house complex have been found partly in the trench numbers G4, H4, G5, H5. This house complex is consisting of two rooms within a bigger room. The first room is inside the western part of the complex. The inner size of this room is 3.62 x 2.60m. The wall of this room is 0.60m thick with maximum courses of bricks. The height of the wall is 0.50m. In the south-east corner of this complex remains of another room has been found. The inner size of the room is 4.3 x 2.6m. The wall of this room has survived with maximum four courses up to a height of 50cm. The width of the wall is 50cm. These two rooms are located in a big room or enclosure. Another big room measures 11 x 10.5m. The walls of this room have survived with 1 to 4 courses and are having maximum width of 0.5m. Most of the part of this complex has been robbed off. A room has been traced partly in the Trenches H5, Qd. II; J5, Qd. I and IV. The inner size of the room is 5.25 x 2.9m. The width of the

wall is 45cm and has survived partly with 1 to 2 courses. Few flimsy structures were also found in Trench F4, Qd. III and IV, G5, Qd. IV and H4, Qd. IV but its plan is not clear due to brick robbing.

Pottery recovered from the site right from the lower most level above the natural soil is wheel-made. The fabric ranges from coarse to fine and well fired, but the storage jar and heavy lids are ill fired showing un-oxidized smoky mid section. Pottery of Lathiya has been categorized into two different periods as follows.

The ceramic industries of the Period I may be classified into three groups i.e., (i) red ware, (ii) black slipped ware and (iii) grey ware. Sherds of red ware are highest in percentage. The fabric ranges from coarse to fine. They are well fired and few of them are treated with self slip or ochreous slip. The types include vase, bowl, dish, lid and miniature pot. Sherds of black slip ware stand next in percentage. This ware is found from the lower level to upper level of the period. The fabric ranges from medium to fine and are well fired. The types include bowl and dish. Bowls are represented with incurved rim, rounded profile and rounded base. Dishes are represented with incurved thickened rim, incurved sides and almost flat base. The sherds of grey ware are having fine fabric and are well fired. Only dish and bowl types are represented in this variety. Few sherds of degenerated NBP have also been reported from the site. *Varaha* faced spouts are reported in black slipped ware (pl. 51A). Few sprinklers in red ware with ochreous slip have been recovered from the site assignable to Kushana period.

The pottery represented in Period II is only red ware. The fabric ranges from coarse to medium. Sherds of red ware are found both in slipped and dull varieties. The percentage of dull red ware is more than that of slipped variety. The types include vase, bowl, lid, *lota*, basin, knobbed lid and lamp. Vases of different sizes and different types such as out turned rim long concave neck, out turned rim with short neck and wide mouth, bowl with featureless rim and rounded profile, lids are of different sizes. They are with featureless rim, tapering side and flat base, lid with incurved rim incurved sides and flat base, spouted vases with single spout, spout with stainer, *Varaha mukha* type spout are represented in different sizes. Sprinklers with red slip were recovered from the site. The sprinklers are of fine fabric and are treated with red slip. Carinated *handi* with sharp and blunted carination were followed to the by a rounded base.

Three hundred eighty seven of antiquities were recovered from the excavations which included terracotta, stone, copper, glass, iron, bone, shell and ivory objects. Copper ring-cum-seal and terracotta sealings bearing Gupta Brahmi script are the noteworthy (pl. 51B). Among other the antiquities like beads, tortoise shaped amulets, sling balls, hopscotch, wheels, stoppers, skin rubbers and dabbers, beads of semiprecious stone, pestle, querns, bead polishers, sling balls and fragment of sculpture made of stone were also found. Among the copper objects coins, bangles, antimony rods, beads are noteworthy. A gold plated copper ear-ring was also found during the excavation. Iron sickles, khurpis, glass bangles, rings, ivory pendants in the



A



B

Lathiya: A, varaha mukha spouts and B, copper ring cum seal of Gupta period

shape of a dagger and beads are among the other miscellaneous objects.

39. EXCAVATION OF SAKRADIH, DISTRICT GHAZIPUR

Excavation Branch-III, Patna of the Survey under the direction of B. R. Mani and Sanjay Kumar Manjul assisted by Arvin Manjul, Sujeet Nayan, Jalaj Kumar Tiwari, Ashish Kumar, Neetesh Saxena, O. P. Pandey, S. P. Gupta, Dhananjay Kumar, Raman Kumar and Ram Naresh Yadav conducted excavations at Sakradih in District Ghazipur with the sole objective to know the cultural sequence of the mound as well as the archaeological potentiality of the site.

The site is located on the right bank of river Ganga hardly 1.5km south-west to the marked meander near Gahamar District Ghazipur. Ancient remains of the site are spread in an area of approximately 700 x 500m with an average height of 5 to 6m from the surrounding ground level. The site is located roughly 4km away from the nearest railway station Gahmar on the east central zone of the Indian railway (fig. 25).

On the basis of the potteries and antiquities recovered from the excavation, the entire occupational deposit of the mound has been tentatively divided into six cultural periods which are as follows:-

- Period I : Chalcolithic
- Period II : Pre - Northern Black Polished Ware
- Period III : Northern Black Polished Ware
- Period IV : Sunga-Kushana

Period V : Gupta

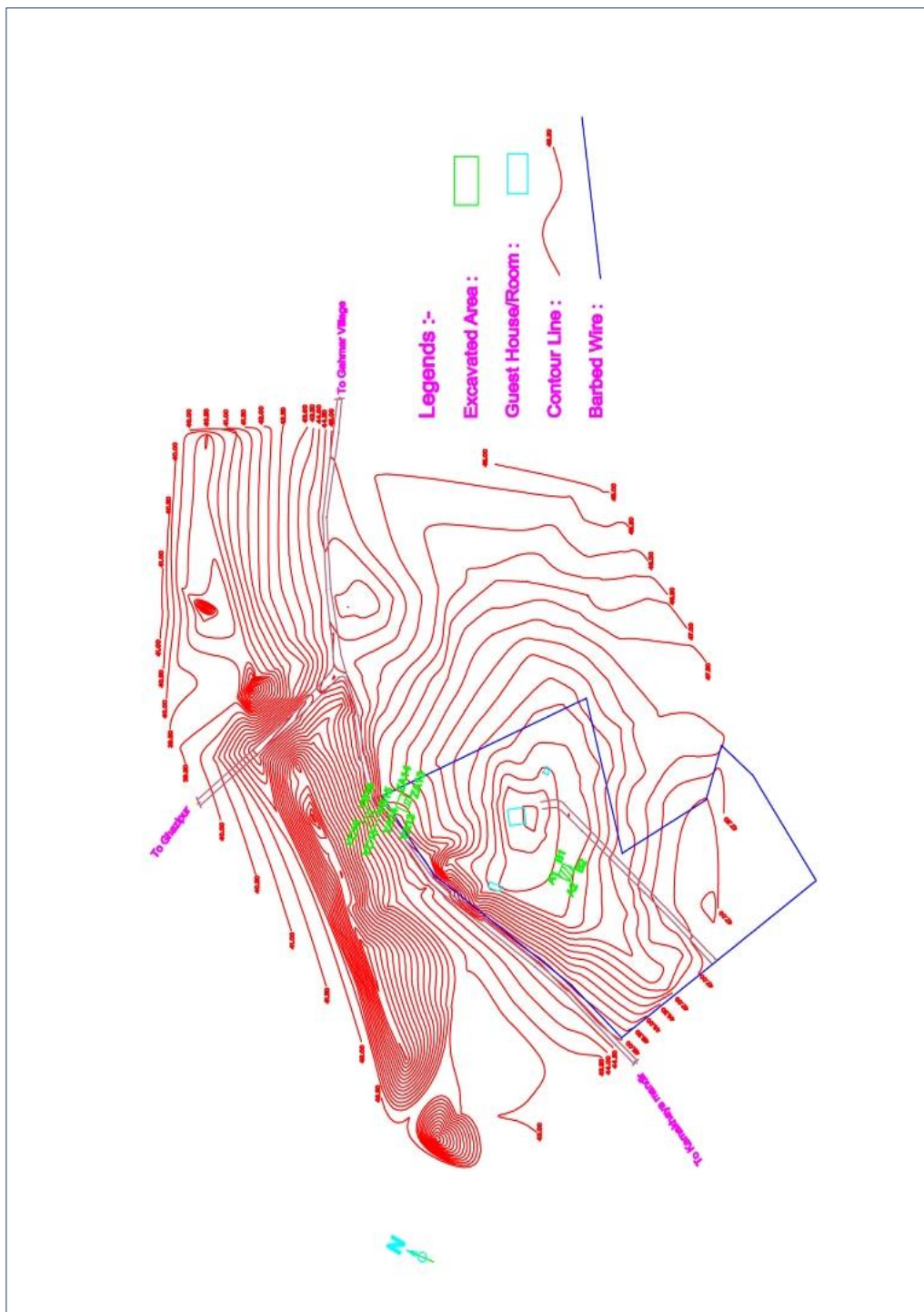
Period VI : Early Medieval

Period I is the earliest inhabitants of Sakradih were the people of Chalcolithic period. The representation of which is found in the form of about 0.80 to 1.5m thick occupational deposit. The upper horizon of the deposit is light ashy in colour while the lower deposit is of compact yellow clay. The ceramic assemblage of the culture is characterized by black and red ware, black slipped ware, White painted black slipped ware and red ware. Among the functional types mention may be made of different types of bowls, dishes, storage jars etc. Potteries of this period are mainly wheel turned. Noteworthy antiquities found from this horizon are hopscotches and various types of bone points like arrow head, barbed, socketed, leaf shape, etc. (pls. 52A-B).

Period II is shown with the dominance of the Black slipped ware, along with the associated Red Ware and Black and Red Ware industry. Among the functional types mention may be made of vases both long and short necked, bowls, *handi* and deep dishes. Noteworthy finding of the site is the occurrence of a few grey ware potsherds occasionally met with painted designs and an iron fragment. These potsherds are found in the latter phase of this period. Other remains of this horizon are same as of underlying Chalcolithic period (pls. 53A-B).

Period III is marked by the advent of a new type of pottery which is called as Northern Black Polished Ware. This pottery is found in various colours and shades i.e., copper,

Fig. 25



Sakaradih: contour plan and excavated trenches of site

Plates: 52A-52B



A



B

Sakradih: A, northern section A1, Qd. III and B, bone points and arrow heads (Chalcolithic period)



A



B

Sakradih: A, pottery, Chalcolithic period and B, pottery of Pre- NBPW

steel black silver and golden. Besides NBPW, red ware, black slipped ware, black ware, red ware and grey ware are found from this horizon. Among the functional types mention may be made of vases, bowls with convex profile and slightly by inturned straight featureless rim, deep dishes with convex sides and slightly by interned rim, carinated *handi*, etc. In this period the amount of black slipped ware decreased and shapes are limited to the deep dish with convex sides and slight interned featureless rims. Among the antiquities, copper antimony rod, bone points, terracotta beads, terracotta disc, balls, etc. are noteworthy.

Period IV is characterized by degenerated NBPW, red ware, red polished ware, slipped ware and a few black and red wares. Among the functional types found in this period mention may be made of lids with a cup type depression in the centre, bowl with flaring sides and internally turned rim containing the mild corrugation marks on the exterior and disc base, vases, with concave neck, bowl with elliptical collared rim, lid cum bowls, carinated *handi*, etc. Among the antiquities found from this period the most noteworthy is a terracotta female figurine which by its features can be dated in the transition phase between Sunga-Kushana and Gupta. Besides, terracotta beads of different shapes and sizes, disc, animal figurine, toy-cart wheel, stopper, handle of a rattle are noteworthy.

Cultural horizon of the Period V is marked by various structural e.g., hearths and pit activities (pl. 54). Ceramic assemblage of this period (Gupta period) consists of slipped and polished varieties of

Red Ware potteries along with sporadic black ware. Among the antiquities found from this period mention may be made of terracotta female figurine with a baby in her hand, terracotta disc bearing scallop design, dabber, stopper, toy- cart wheels, etc. During this period various structural activities have been traced i.e., structure made of burnt brick, hearths and potters kiln. Ceramic assemblage of this period is characterized by plain Red Ware, Red Polished Ware, dull Red Ware, Black Ware etc. Among the functional types mention may be made of vases, lid, knife edge bowl, lid-cum bowl, lid with central knob, storage jar, carinated *handi*, short carinated *handi* of hemispherical shape, miniature bowl with slip on one side, vase and *handi* with rusticated lower portion, etc. Among the antiquities found from this period mention may be made of glass bangle both plain and spotted variety, terracotta bird figurines, iron spout, terracotta beads, glass beads, crucibles, copper ring, glass ear-rings, etc. Noteworthy antiquities are two miniature sculptures made of sandstone found from the upper level of this period.

40. EXPLORATION IN DISTRICT JALON

Suresh Kumar Dubey, Assistant Archaeological Officer, Regional Archaeological Unit (Uttar Pradesh State Archaeology), Jhansi carried out village to village exploration in Jalon district and Development Block, Konch and Dakor under the direction of Rakesh Tewari of the Uttar Pradesh State Archaeology Department. 118 villages of Konch and 65 village of Dakor blocks have been explored. The exploration revealed mounds,

Plate: 54



Sakradih: cutting showing pit

temples, stone sculptures and Garhi and other archaeological remains from the following villages:

B and RW = Black and Red Ware, BSW = Black Slipped Ware, RW = Red Ware

<i>Block</i>	<i>Village</i>	<i>Cultural Assemblage</i>
Konch	Gurāvāti	Mound, fragmentary pieces of stone sculptures of medieval period and <i>sati-patta</i> of late medieval period
	Chhāni	Remains of stone temple, images of Uma-Mahesa, Vishnu and Surya of medieval period
	Chamarsenā	Image of Parvati of early medieval period, <i>ek-mukhi</i> Siva-linga of late medieval period
	Padhari	Image of Mahisamardini and fragmentary pieces of stone sculptures of medieval period; <i>sati-patta</i> and image of Hanuman of late medieval period
	Anda(Anandnagar)	Fragmentary pieces of stone sculptures of Medieval Period; <i>sati-patta</i> of late medieval period
	Bilaya	Ruins of <i>garhi</i> of late medieval period
	Jakholi	Late medieval Siva-linga and ruins of <i>garhi</i>
	Gumavali	Late medieval image of Hanuman and ruins of <i>garhi</i>
	Jamrohi Khurd	Image of dancing <i>Ganesa</i> of medieval period
	Thurat	Image of Vishnu, remains of stone temple and fragmentary pieces of stone sculptures of medieval period
	Sala	Image of Anjanimata of medieval period and ruins of <i>garhi</i> of late medieval period
	Inguai Khurd	Mound with RW.
	Paraichha	Door-sill of medieval stone temple.
	Pali	Mutilated image of Hanuman and Chamunda; decorated ceiling of two temples.
	Basov	Mutilated image of Jin and Uma-Mahesa; late medieval brick temple
	Sami	Ram-Janaki brick built temple with wall painting and Kothi of British period
	Konch	Mound, remains of stone temple, mutilated images of Ganesa, Brahma and fragmentary pieces of sculptures of medieval period
	Baroda kalan	Ruins of <i>garhi</i> of late medieval period
	Kura	Image of Parvati of medieval period and ruins of <i>garhi</i> of late medieval period
	Ata	Mutilated image of Ganesa, Varaha and fragmentary pieces of sculptures of medieval period; late medieval brick built Siva temple
	Sunaya	Mound with BRW, BS, NBPW, RW; remains of stone

		temple and mutilated images of Ravananugraha, Vishnu, Hanuman of medieval period
	Chandurra	Mound with BRW, BS, RW; two <i>Kolhu</i> of late medieval period
	Mundari khera	Mound with RW
	Bhuva	Mound with RW

<i>Block</i>	<i>Village</i>	<i>Cultural Assemblage</i>
Dakor	Hardoigujar	Remains of <i>garhi</i> and image of Hanuman of late medieval period
	Timaro	Remains of brick temples, Siva-lingas of medieval period and image of Anjanamata of late medieval period
	Kotra	Late medieval brick built temples, Islamic buildings and <i>sati-patta</i>
	Bardh	Remains of stone temple and fragmentary pieces of sculptures of medieval period; ruins of <i>garhi</i> of late medieval period
	Dhagawan kalan	Fragmentary pieces of sculptures of medieval period; <i>garhi</i> of late medieval period
	Akorhi(Bairagarh)	Remains of stone temple of medieval period and earthen fortified <i>garhi</i> with ruins of brick structure
	Girthan	Ruins of late medieval <i>garhi</i>
	Birguan	Fragmentary pieces of sculptures of medieval period; a <i>sati-patta</i> of late medieval period
	Goran	Remains of stone temple of medieval period; <i>sati-patta</i> and brick temple of late medieval period
	Jaisari kalan	A <i>sati-patta</i> of late medieval period
	Kamatha	Remains of stone temple, fragmentary pieces of sculptures of medieval period; a <i>sati-patta</i> and structures of late medieval period
	Barsar	Remains of stone temple and fragmentary pieces of sculptures of medieval period
	Saidnagar	Brick temples and Islamic monument of late medieval period
	Dakor	Remains of stone temple and mutilated image of Mahisasuramardini of medieval period; three <i>sati-patta</i> of late medieval period

41. EXPLORATION IN DISTRICT JHANSI

Suresh Kumar Dubey, Assistant Archaeological Officer of the Regional Archaeological Unit, Jhansi, Uttar Pradesh under the direction of Rakesh Tewari, State

Archaeology Department, Lucknow carried out village to village exploration in District Jhansi. During the exploration a number of ancient sites and antiquarian remains have been brought to light.

BRW = Black and Red Ware, BSW = Black Slipped Ware, RW = Red Ware

<i>District</i>	<i>Village</i>	<i>Cultural Assemblage</i>
Jhansi	Amgaon	Mound with BRW, BSW and RW; remains of stone temple and fragmentary pieces of stone sculptures of medieval period, ruins of <i>garhi</i> and image of Hanuman
	Angathari	Stone images of Surya, Hanuman, Siva- <i>linga</i> and fragmentary pieces of stone images of medieval period
	Ata	Square <i>argha</i> with depiction of sun images
	Ata Sajoni	Remains of stone temple of medieval period and mutilated image of Uma-Mahesa of early medieval period
	Badokhari	Mound with BRW, BSW, RW; remains of stone temple, image of Surya, Hanuman, Siva- <i>linga</i> of medieval period, Ram-Janki temple of late medieval period and building of British period.
	Bajhera State	Late medieval <i>Baoli</i> and <i>Kolhu</i>
	Bamhroli State	Fragmentary pieces of stone sculptures, Hanuman and <i>kolhu</i> of medieval period
	Bangari	Fragmentary pieces of stone images, and Hanuman of medieval period
	Barathari state	Mound with RW, copper coins, mutilated images of Vishnu and Surya, <i>Mahisamardini</i> Durga, remains of stone temple and sculptures
	Barnaya	Mutilated image of Vishnu, Siva- <i>linga</i> , Nandi, Hanuman and fragmentary pieces of stone images of medieval period
	Baroda	Early medieval remains of stone temple, image of Hanuman and ruins of a <i>garhi</i> of late medieval period
	Bhaonraghat	Mound, fragmentary image of Vishnu, Anjanimata and Hanuman of medieval period
	Belmakhurd	Mound with RW, remains of stone temple, mutilated images of Vishnu and Ravananugrah, <i>sati-patta</i> of medieval period
	Birguan	Late medieval Siva- <i>linga</i> with <i>argha</i> , images of Hanuman and Anjanimata and inscribed water tank (<i>chaopara</i>)
	Budheraghat	Mound with medieval pottery and two <i>sati-patta</i>
	Dibiapur	Remains of stone temple and Siva- <i>linga</i> of early medieval period
	Chamara Imali	Mound with BRW and RW
	Chandar	Late medieval <i>bavali</i> , <i>veer-patta</i> and <i>sati-patta</i>
	Chhenvata	Decorated ceiling (<i>vitana</i>) of stone temple of medieval period
	Chirgaon khurd	Medieval <i>dwar-sakha</i> of stone temple, Siva- <i>linga</i> with <i>argha</i> , images of Hanuman and Anjanimata, <i>sati-patta</i>

		and Nandi
	Chitguan	Remains of stone temple and images of Hanuman of medieval period; <i>sati-patta</i> and <i>veer-patta</i> of late medieval period
	Dasana	Mutilated image of Uma-Mahesa, Gaja-Lakshmi and fragmentary pieces of stone sculptures of medieval period; late medieval watching tower, <i>baoli</i> , image of Anjanimata, Hanuman and three <i>sati-patta</i> of late medieval period
	Datavali kalan	A <i>sati-patta</i> of late medieval period and brick temple of 19 th century CE
	Deogarh	Mound with medieval pottery.
	Dhera	Remains of stone temple of medieval period.
	Dhoraka	Siva- <i>linga</i> , Vishnu and fragmentary pieces of stone image of medieval period
	Era	Mound with water-moat (<i>Udak-parikha</i>) comprising early medieval pottery; stone image of <i>Seshsayin</i> Vishnu and Hanuman of early medieval period
	Gyarai	Remains of medieval stone temple, Siva- <i>linga</i> and Nandi
	Imilia State	Inscribed <i>sati-patta</i> (1501 Samvat)
	Kador	Fragments of stone temple and sculpture, Hanuman and mutilated image of mother Goddess of medieval period
	Kadura	Pillar of a stone temple of medieval period
	Karai	Parts of stone temple, stone <i>Yajno-vedi</i> and mutilated images of Varahi, Gaja-Lakshmi, Hanuman and Vishnu of medieval period
	Khajuri	Mutilated image of Vishnu of medieval period, image of Hanuman and <i>Kolhu</i> of late medieval period.
	Khilli	Remains of stone temple of medieval period; <i>baoli</i> , image of Anjanimata and a <i>sati-patta</i> of late medieval period
	Kuiyan	Fragmentary pieces of stone sculptures and image of Hanuman of medieval period
	Ladavara	Image of Anjanimata and <i>sati-patta</i> of late medieval period
	Lohagarh (Luhari)	Mound with BRW, BSW, RW; remains of stone temple and <i>saptamatrika-patta</i> , Ganesa and fragmentary pieces of stone sculptures of medieval period; <i>garhi</i> of British period
	Magraora	Fragmentary stone sculptures of medieval period
	Mahalua	Remains of stone temple and image of Hanuman of medieval period
	Marodakalan	Medieval remains of stone temple, Siva- <i>linga</i> and ruins of late medieval period
	Marora khurd	Door-sill of medieval period and image of Hanuman

	Pachobai	Remains of stone temple and Siva- <i>linga</i> of medieval period
	Panari	Remains of stone temple and fragmentary pieces of stone sculptures of medieval period and two <i>sati-patta</i> of late medieval period
	Pandori	Mutilated stone sculpture of medieval period; <i>sati-patta</i> and remains of <i>garhi</i> of late medieval period
	Pirona	Mound with BRW, RW, Siva- <i>linga</i> remains of stone temple, mutilated image of Vishnu and <i>Mahisamardini</i> Durga of medieval period; brick temple of late medieval period
	Poonchh	Mound with BRW, BSW & RW; ruins of <i>garhi</i> and <i>sati-patta</i> of late medieval period
	Pulgahana	Ruins of <i>garhi</i> and kolhu of late medieval period
	Pulia	Remains of stone temple and <i>sati-patta</i> of medieval period
	Sahjahanpur	Mutilated stone sculptures, remains of stone temple, image of Hanuman of medieval period and ruins of <i>garhi</i> and Ram-Janki temple of late medieval period
	Sajokhari	Fragmentary pieces of stone sculpture of medieval period
	Sakin	Two mounds with RW, Siva- <i>linga</i> , images of Hanuman, Ravananugraha and Anjanimata of medieval period
	Salemapur	Mound with medieval pottery and image of Hanuman
	Shahpur	RW of medieval period
	Serasa	Remains of stone temple, fragmentary pieces of stone sculptures of medieval period; <i>sati-patta</i> and grand temple of Ram-Janki with wall painting of late medieval period
	Sikandara	Mutilated image of Hanuman of medieval period
	Simiriya	Fragmentary stone sculptures, Vishnu, Siva- <i>linga</i> and remains of stone temple of medieval period; Hanuman and late medieval temple of Ram-Janki
	Sorai	Fragmentary stone sculptures of medieval period and late medieval image of Hanuman
	Talor	Mutilated image of Vishnu, Nagi and fragmentary pieces of stone sculptures of medieval period; <i>sati-patta</i> and an image of Hanuman of late medieval period

42. EXCAVATION AT JAJMAU, DISTRICT KANPUR

In continuation of the previous year's work, the Uttar Pradesh State Archaeology Department resumed excavation at Jajmau, under the direction of Rakesh Tewari assisted by Ram Vinay, R. K. Trivedi, N. S. Tyagi, G. K. Rastogi, Balram Krishna, Mukesh Kumar and Panch Bahadur.

The cultural remains of Period III and Period IV were brought to light during the season 2008-09 in which 13 trenches were laid down at location 2 for this purpose. This year, the same area was selected for further excavation up to the natural soil (from 3.6m to the depth of 12.50m), to find out rest of the cultural deposit. Following results were observed after the completion of the excavation work.

Period I: This cultural deposit is 5.50m thick with distinct Northern Black Polished Ware in black, blue, brown and golden textures with shapes of dishes, bowls, cups, etc; along with black ware, black polished ware and grey ware having shapes of *handi*, jar, perforated bowls, water jars, etc.

Kiln-burnt bricks and sun baked bricks are used in the residential structures with separate rooms. The other finds include animal and human terracotta figurines, iron, copper and ivory goods, bone arrow heads, terracotta and semiprecious stone beads, dabber with Brahmi letters, pottery with Brahmi letters, soap stone lion capital and copper object like lumps, pots with heavy green patina.

Period II: The deposit of this period is 3.50m thick and is marked by the appearance of in turned bowls, carinated *handi*, spouted vessels, high neck jars, Swastik marked pot sherds, *makarmukha* decorated pot sherds.

The other antiquities include animal and human terracotta figurines, terracotta and semiprecious stone beads, gamesmen, seals and sealings, terracotta wheels, and dabber. A burnt brick work residences, drains, ring wells are reported from the residential complex. Burnt brick steps and a shop like construction between two lanes are also reported.

43. EXPLORATION IN DISTRICT SAHARANPUR AND MUZAFFARNAGER

Documentation of ancient archaeological remains was carried out by the Uttar Pradesh State Archaeology Department in District Saharanpur and Muzaffarnager by Rakesh Kumar Srivastava and Subhash Chandra Yadav under the general direction of Rakesh Tewari. The main objective of the operation was to explore and document the late Harappan and contemporary sites which were already reported by different agencies in the aforesaid area.

The area in question yielded red ware, black slipped ware, grey ware and painted grey ware. It is also worth mentioning that the red ware collected from different sites are mostly wheel turned, of well levigated clay and fully oxidized, baked under uniform temperature, sometimes painted with black paintings on red surface. Incised designs were also marked on the

outer surface of the pottery. Paintings are mostly done with black lines.

The presence of terracotta triangular cakes, and baked terracotta lumps (*mustika*) provides a glimpse of Harappan traits. The shapes in red ware mainly comprises of water vessels, dish-on-stand, disc knobbed

lid, basins, trough, big bowls, etc. On the basis of pottery types it may be concluded that the area explored was inhabited between late 2000 BCE to early medieval period. Lists of the sites investigated during this work along with the details of the findings are given below:

(RW = Red Ware; PGW = Painted Grey Ware; GW = Grey Ware)

<i>Name of Sites</i>	<i>District</i>	<i>Archaeological Remains</i>
Mohiuddinpur	Saharanpur	RW
Khatauli	Saharanpur	RW
Buddhakhera pundir	Saharanpur	RW
Jajner	Saharanpur	RW
Bahera sandal singh	Saharanpur	RW
Mohammadpur gara	Saharanpur	RW
Nausher heri	Saharanpur	RW
Faridpur	Saharanpur	RW
Gelhewala- III	Saharanpur	RW
Kamalpur	Saharanpur	RW
Ratnakheri	Saharanpur	RW
Krishni	Saharanpur	RW
Rerimalakpur	Saharanpur	RW
Chhapparheri	Saharanpur	RW
Dhaurala	Saharanpur	RW
Kalari	Saharanpur	RW
Tauli	Saharanpur	RW
Pilakhana	Saharanpur	RW
Sadhaula	Saharanpur	RW
Nayagaon	Saharanpur	RW

Adhyana	Saharanpur	R.W
Sukertal	Saharanpur	RW
Meerpur	Saharanpur	RW
Sarupur taga	Saharanpur	RW
Gaziwala	Saharanpur	RW
Salhapur	Saharanpur	RW
Tikraul	Saharanpur	RW
Barsi	Saharanpur	RW
Manohara (Hulas)	Saharanpur	RW, PGW
Pujana	Saharanpur	RW
Kaulakheri	Saharanpur	RW
Mazara Natthu singh	Saharanpur	RW
Fushgarh (Aakapur)	Saharanpur	RW
Randheri	Saharanpur	RW
Buddha khera	Saharanpur	RW
Husainpur	Saharanpur	RW
Lakhnauti	Saharanpur	RW
Bilaspur	Saharanpur	RW, GW
Isapur	Saharanpur	RW
Kalhalti	Saharanpur	RW
Kumharehra	Saharanpur	RW, GW
Bara sanpla (Khatri)	Saharanpur	RW
Unchagaon	Saharanpur	RW
Rajupur	Saharanpur	RW
Ransura	Saharanpur	RW
Maheshpur	Saharanpur	RW, Black slipped ware
Sisauna Jamalpur	Saharanpur	RW, Black slipped ware
Khudabakshpur	Saharanpur	RW

Jaypur	Saharanpur	RW, GW, Triangular terracotta cake
Shimlana (Hakti)	Saharanpur	RW
Belamazra	Muzaffarnager	RW
Kuntalpur	Muzaffarnager	RW
Jhinhana	Muzaffarnager	RW
Bhura (Pahar mazra)	Muzaffarnager	RW, PGW
Kairana	Muzaffarnager	RW, PGW
Issapur till	Muzaffarnager	RW
Tajpur simbhalka	Muzaffarnager	RW
Jasala	Muzaffarnager	RW
Bantikhera	Muzaffarnager	RW
Kailapur	Muzaffarnager	RW
Sikrera	Muzaffarnager	RW, PGW
Miragpur	Muzaffarnager	RW, PGW
Rohana	Muzaffarnager	RW, PGW
Sadhpur (Sadpur)	Muzaffarnager	RW
Kaliyana	Muzaffarnager	RW, GW, PGW
Mimlana	Muzaffarnager	RW
Sherpur	Muzaffarnager	RW
Saidpura	Muzaffarnager	RW, GW, PGW
Rasulpur	Muzaffarnager	RW
Luharikhurd	Muzaffarnager	RW
Akabergarh	Muzaffarnager	RW
Bhamela	Muzaffarnager	RW
Gujjarheri	Muzaffarnager	RW
Nawala- I	Muzaffarnager	RW, GW
Nawala- II	Muzaffarnager	RW, GW
Begrajpur	Muzaffarnager	RW

Miranpur	Muzaffarnager	RW, PGW
Lakarsandha	Muzaffarnager	RW
Dhaurala	Muzaffarnager	RW
Jasoi	Muzaffarnager	RW
Lakhnauti	Muzaffarnager	RW
Purkaji (pur)	Muzaffarnager	RW

44. EXPLORATION IN DISTRICT SANT KABIR NAGAR

In continuation of earlier work, Regional Archaeological Unit, Gorakhpur, of the Uttar Pradesh State Archaeology Department undertook exploration in and around the block Nathnagar, especially in Ghanghata Tehsil, District Sant Kabir Nagar. The exploration was carried out by Ambika Prasad Singh under the direction of Rakesh Tewari and covered 350 villages in the region. The exploration has revealed ancient sites, stone sculptures, monuments and other archaeological remains. Out of these villages and sites Jhankahichak-Belduha, Nathnagar Chitahi, Mudiya, Pachara-Dihwa, Parvatwa, Ghorhat and Deokali Kalan are worth mentioning. The ceramics collected from the surface of the ancient mound of Jhankahichak-Belduha, situated on the bank of a lake are represented by Corded ware, black and red ware, grey ware, black slipped ware and red ware. The shapes of dishes and bowls of black and red ware and black slipped ware

are notable. During the exploration of ancient mound of Nathnagar, situated at a short distance from the river Kathneha, potsherds collected from the surface are mainly represented by Corded ware, black and red ware, grey ware and red ware. The main shapes including dishes and bowls of black and red ware were collected from the surface of the ancient mound near the river. Broken potsherds of black and red ware, grey ware, black slipped ware and red ware were recovered from the village Mudiya located at the left bank of the river Kuwana.

Ancient ceramic industries represented by black and red ware, black slipped ware and red ware, etc. have been found from the ancient mound in the Chitahi located on the bank of Kathneha river, Pachra Dihwa on the Kuwana river, the village Paratwa, Ghaohat and on the bank of Deokali Kalan lake.

The list of the villages along with their archaeological findings, are given below:

(BRW = Black and Red Ware, GW= Grey Ware, BSW= Black Slipped Ware, RW= Red Ware)

<i>District</i>	<i>Village/Site</i>	<i>Cultural Assemblage</i>
Santkabirnagar	Ahara	RW

-do-	Amrit mahuwa	RW
-do-	Amihan	RW
-do-	Ajanva	R.W
-do-	Baroli	R.W
-do-	Bhainsahi	RW
-do-	Bhinkhini khurd	RW
-do-	Bandhupur	RW
-do-	Belori	RW
-do-	Bhainsakut	RW
-do-	Banda dihvā	RW
-do-	Barparva	RW
-do-	Bakoli kalan	RW
-do-	Belghat	RW
-do-	Bargadvā	RW
-do-	Chandroti	RW
-do-	Chitahi	Corded ware, BRW, BSW, RW
Santkabirnagar	Dhanjaval-tikari	RW
-do-	Deokali-kalan	BRW, GW, BSW, RW
-do-	Deokunda	Siva-lingam, Stone sculptures
-do-	Dhorahara	RW
-do-	Dadari hardon	RW
-do-	Dhanaghata	RW
-do-	Defardihava	RW
-do-	Dhay pokhar	RW
-do-	Etauwa	RW
-do-	Gonora	RW
-do-	Gorakhurd	RW
-do-	Ghorahat	Corded Ware, BRW, BSW, RW

-do-	Gopiyapur	RW
-do-	Gaibasantpur	RW
-do-	Hatva	R.W
-do-	Harpur	RW
-do-	Hardi	RW
-do-	Hainsar bazar	BRW, GW, BSW, RW
-do-	Jamuhat	BRW, GW, BSW, RW
-do-	Jhankahichak Belduha	Corded ware, BRW, BSW, RW
-do-	Kodawat	RW
-do-	Kataka	RW
-do-	Kadasarakhas	RW
-do-	Kathaicha	RW
-do-	Kuramol	BRW, BSW, RW
-do-	Kolhuwa	RW
-do-	Koraun	<i>Chaturmukhi</i> Siva-lingam, Stone sculptures
-do-	Kudiya	RW
Santkabirnagar	Mudiyari	BRW, GW, BSW, RW
-do-	Mukhalispur	RW
-do-	Mehniya	RW
-do-	Majhora	RW
-do-	Matihana	RW
-do-	Mahuvawa dand	RW
-do-	Mojhova Ekdanga	RW
-do-	Mahakharapur	BRW, GW, BSW, RW
-do-	Maloli	RW
-do-	Nathnagar	Corded ware, BRW, BSW, RW
-do-	Natava	BRW, GW, BSW, RW
-do-	Nahardih	BRW, GW, BSW, RW

-do-	Parsaurf Fidaipur	RW
-do-	Pachara Dihwa	BRW, BSW, RW
-do-	Parvatwa	BRW,GW, BSW, RW
-do-	Rampur chitoni	RW
-do-	Rivankhor	RW
-do-	Roza	Tomb (18 th -19 th Century CE)
-do-	Sakaraicha	RW
-do-	Shanichara babu	RW
-do-	Sankhi	RW
-do-	Shankarpur	RW
-do-	Semari	RW
-do-	Semadandi	RW
-do-	Taryapar	RW
-do-	Tilthadihva	RW
-do-	Thathar	Siva- <i>lingam</i>

UTTARAKHAND

45. EXPLORATION AT DISTRICT ALMORA

A Vishnu idol (105 x 70 cm) of 14th century CE was discovered in Badrinath Temple, Paltan Bazar, Almora by locals.

A few other idols i.e. Surya (26 x 20cm); Pārvatī (17 x 11cm); and Vishnu (20 x 12cm) were discovered by Ashish Kumar, Regional Archaeological Officer.

All these were discovered from Mahadev Temple, village Palyu of 16th century CE. Some other idols were also discovered in the *garbhagriha* of Sitala Devi Temple, Almora. They were Umā-Mahesa and Nandī.

46. EXPLORATION AT DISTRICT BAGESWAR

Chandra Singh Chouhan of State Department of Culture has documented the idols of Umā-Maheśa (39 x 22cm) of 8th-9th century CE, and Harihara (40 x 28cm) of 14th century CE from the *garbhagriha* of the Harjyu temple of Bageshwar.

47. EXPLORATION ON THE BANKS OF RIVER YAMUNA AND TONS, DISTRICT DEHRADUN

Dehradun Circle of the Survey discovered ancient site at Bamanwala on the confluence of river Yamuna and Tons. Major portion of the site has been leveled for purpose of plantation by forest department. However, scattered bricks, brick bats, potsherds and a few architectural

members suggest that the site remained under occupation from Kushana to medieval period.

WEST BENGAL

48. EXCAVATION AT BANGARH MOUND, MOUZA RAJIBPUR, DISTRICT DAKSHIN DINAJPUR

In continuation of the previous year's excavation, the Kolkata Circle of the Survey under the direction of T. J. Baidya assisted by S. Maiti, P. K. Naik, Nityanand, G. Bhattacharya, K. Srimani, D. Moitra, P. N. Biswas, S. Sarkar, S. Roy and D. K. Dey undertook excavation at Bangarh mound (25° 25' N; 88° 34' 33" E), Mouza Rajibpur, District Dakshin Dinajpur. The site of Bangarh consists of the citadel area (central mound), fortification wall and moat around on all the four sides (pl. 55) and settlement on eastern and northern sides. The area beyond the moat has been inhabited since long posing a barrier to the archaeological study.

During the period under review the earlier excavated area was further extended so as to correlate the different phases of habitation of the mound with the fortification wall on the southern side. In addition, trenches were also laid out on the northern slope of the mound. This year's excavation was conducted to throw further light on the structural activities at the site and to ascertain the complete cultural sequence envisaged last year. It was also aimed at throwing further light on the earliest habitation of the mound. The excavation was carried down to the natural soil to a depth of 12.57m. The entire deposit was divided into 10 layers including natural

soil. Excavation revealed seven cultural periods:

- Period I : Chalcolithic
- Period II : Mauryan
- Period III : Sunga-Kushana
- Period IV : Gupta period
- Period V : Post-Gupta
- Period VI : Pala period
- Period VII : Sultanate period

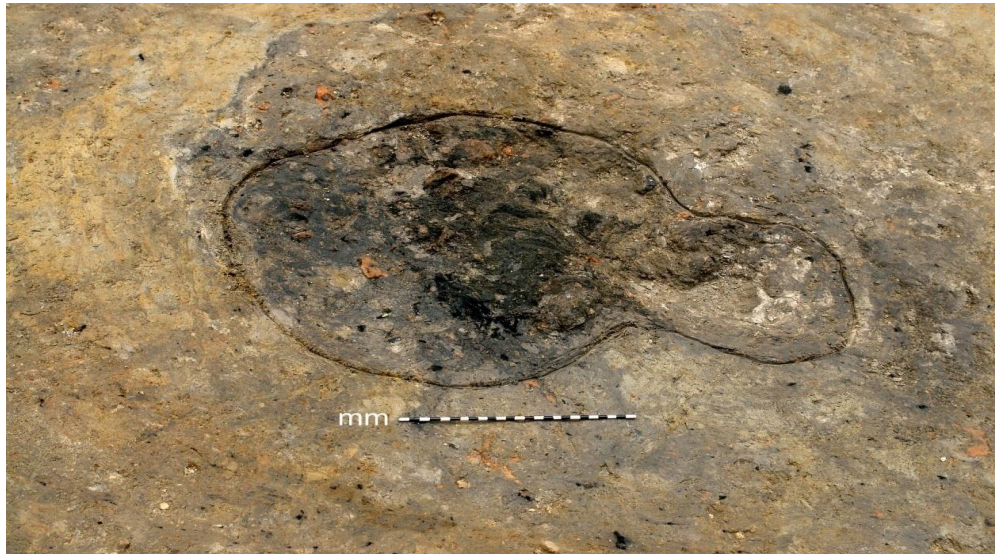
Period I (Chalcolithic): The excavation threw light on the earliest chalcolithic settlement at the site. A floor area associated with large scale burning activity (pl. 56A) was encountered at a depth of 10.97m. Another outstanding discovery of the period is that of a hearth measuring 50cm x 76cm found on the floor. A large number of potsherds, mostly black slipped ware and some sherds of black and red ware (pls. 56B-C) were found near the hearth. Other associated finds include polished pestle, heavily encrusted fragments of a copper bowl (pl. 57A), broken antimony rod, etc. A large numbers of reed impressed burnt clay chunks were also found from this level.

Period II (Mauryan): The structures belonging to the Mauryan period are made of burnt-bricks. A wall was exposed to a length of about 2.03m with thirteen courses. The size of the bricks varies from 45 x 28 x 6cm to 33 x 24 x 4cm. In addition, two walls of single courses bricks were also found. The main pottery types found from this period include black slipped ware and red ware. Grey ware sherds were also found in small quantity. The important antiquities found from this period are terracotta animal

Plate: 55



Bangarh: general view of the mound



A



B



C

Bangarh: A, floor with burning activity and B-C, black and red ware pottery, Chalcolithic period

and human figurines, hopscotches, balls, wheel, beads of terracotta, glass and semiprecious stones and solitary specimen of a bone point, etc. (pl. 57B).

Period III (Sunga-Kushana): The Sunga-Kushana period is represented by a platform built of bricks. The facing of the structure had complete bricks while the core was filled with brick-bats and tiles. The red ware industry was the main component of pottery assemblage of the period. The important antiquities belonging to this period are terracotta toy-cart, terracotta sealings (pls. 57C-D), broken plaque (pl. 58A), copper antimony rod, gold signet (pl. 58B), and beads of terracotta and semiprecious stones.

Period IV (Gupta Period): The deposit belonging to the Gupta period yielded a large number of tiles with single and double perforations. The red ware was the main ceramic industry of the period (pl. 59A). Bowls were found in large numbers. Another important finding of this period was a large number of lead coins. Other antiquities include terracotta human and animal figurines, miscellaneous copper objects, beads of semiprecious stones, terracotta and red ware having lizard figure (pls. 59B-C).

Period V (Post-Gupta Period): The post-Gupta period comprises walls made of reused bricks. These were poorly built with maximum three to four courses. Red Ware from medium to coarse variety was found this period from this level are very loss and comprises mainly of board of semiprecious stone, terracotta, ball, etc.

Period VI (Pala Period): The most important feature of this period is the structural remains which include remains of a temple complex and brick made fortification wall in association with bastions which encircled the entire mound (pls. 60A-B). The fortification wall was built over the earlier mud rampart. Among the structures a huge brick platform having a width of 8.75m was exposed to a length of 5.80m and is still continuing. A ring-well of later period was sunk through this platform which has uniform bricks on the facing while the core is filled with brick-bats. This platform has been found in association with a rammed floor which has been traced to a maximum length of 15.96m. Traces of lime-coating were found at some sections of the floor. A wall running parallel to the platform was also exposed which had mouldings on its outer face. A small rectangular room was found in association with the brick platform. At the top of the mound a massive wall having a maximum of seventy two courses of bricks was found. The wall also forms a small cubicle right in the centre of the mound. The contemporary deposit has yielded a large number of decorated bricks and brickbats apart from some brick plaques which appear to have been used for the facing of the structures.

Brick-built fortification wall with a bastion was further extended and four more bastions were exposed during the current season. The fortification wall of burnt-brick was exposed to a length of 15m with a width of 4m. A small well of burnt brick was found very closed to the wall. Its diameter is 1.45m and the inner is 0.85m. The fortification wall built over the earlier mud



A



B



C



D

Bangarh: A, copper bowl fragments; B, broken bone point and C-D, terracotta sealing

Plates: 58A-58B



A



B

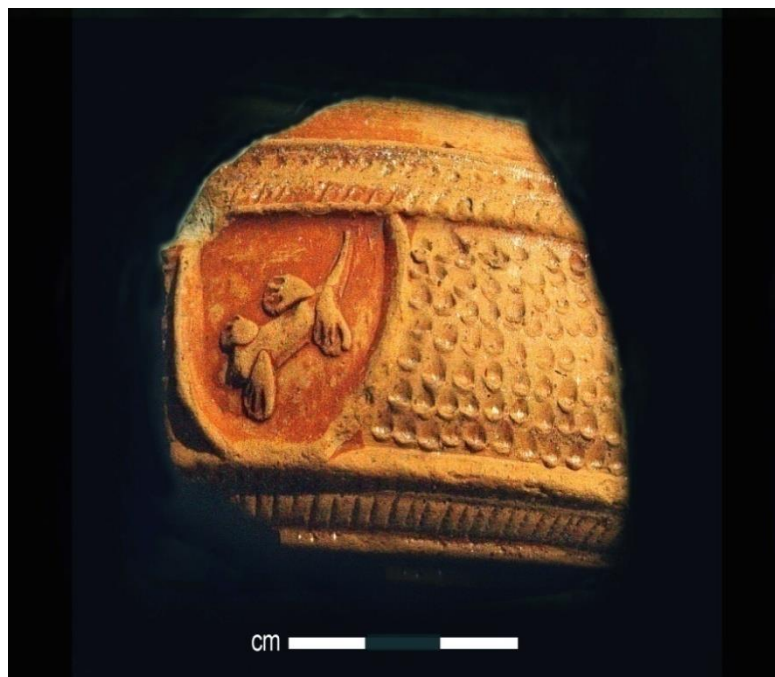
Bangarh: A, terracotta plaque and B, gold signet



A



B



C

Bangarh: A, pot with handle and lid; B-C, decorated red ware sherd

Plates: 60A-60B



A



B

Bangarh: A-B exposed fortification wall

rampart strictly adhered to the contour gradation of the earlier one. The fortification wall with Bastion 2 is abruptly close to the ground level. There was a gap at that point and the wall continued again from the opposite side rising up the slope. At the top, Bastion 3 was exposed. The abrupt ending of the fortification wall at this juncture with a space in between indicates the possibility of existence of a gateway here. Although the fortification wall associated with Bastion 3 could not be traced but several courses of a brick-wall to right to the fortification wall was exposed on the inner side. However, the complete feature of the wall could not be exposed. Altogether five bastions of different dimensions were exposed along the southern line of the fortification and they were found at regular intervals at a distance of 22 to 25m from each other.

The guard wall which was found during last season that further traced running to the west. However, the wall could not be traced around Bastion 4. The total length of the exposed Guard wall is 55-60m and the maximum extant height was about 86cm from the ground level.

The length of the bricks varied between 27-14.5cm and the width varied between 18.5-10cm while thickness ranged from 4.5-5cm. Mud mortar was used as the binding material.

The pottery repertoire of the period was predominantly Red Ware with small percentage of grey and black wares. The red ware comprises dull red and red slipped ware. Most of the potteries are medium to coarse in fabric. The coarseness in the pottery was found due to presence of mica

mixed with the clay. Most of the sherds showed a smoky grey section due to ill-fired condition. Most of the medium fabric sherds showed the application of slip. The prominent shapes included bowls of different variety, dishes, basins, karahis, pitchers, small *lota* type container, etc.

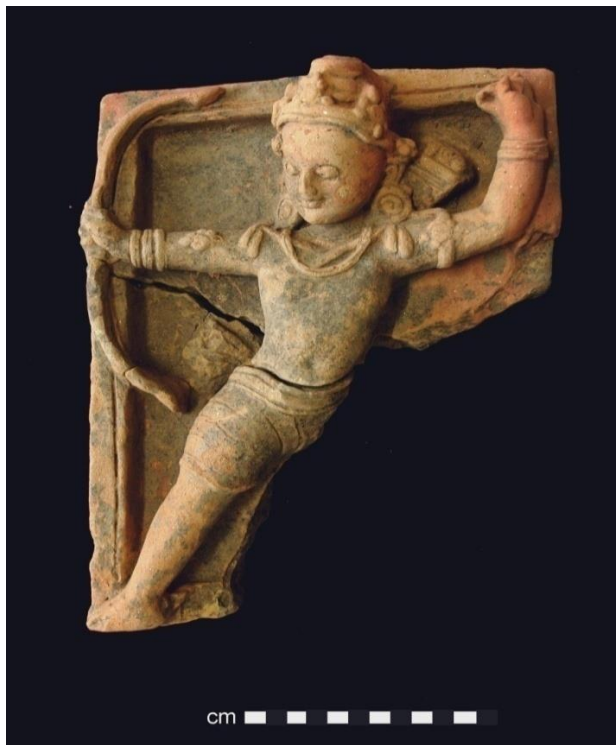
The antiquities found from this period include decorative bricks, brick plaques, terracotta human and animal figurines (pls. 61A-C), besides beads of semiprecious stones and terracotta; terracotta spindle-whorls, dabber, terracotta boats (pl. 61D), hopscotches, wheels, copper and iron objects, etc.

Period VII (Sultanate Period): A number of walls made of reused bricks during the Sultanate period were found just below the surface. Maximum five courses of brick walls are available. A house-plan comprising rectangular rooms, having different structural phases with the entrance was exposed. The potteries associated with this period are mostly red wares along with sherds of glazed ware and occasional Porcelain sherds. The main shapes are spouted vessels, shallow dishes, bowls, basins, etc. Antiquities comprised large number of glass bangles, iron nails, terracotta beads, balls, hopscotches, beads of semiprecious stones like agate, carnelian, etc. stoppers, animal figurines, etc. are found.

49. EXPLORATION AT PEERPAL MOUZA NARAYANPUR, DISTRICT DAKSHIN DINAJPUR

Kolkata Circle of the Survey under the direction of T. J. Baidya, assisted by S. Maiti, P.K. Naik, and G. Bhattacharya

Plates: 61A-61D



A



B



C



D

Bangarh: A-C, terracotta human animal figurines and D, terracotta miniature boat

conducted a detailed exploration at Peerpal, Mouza Narayanpur, District Dakshin Dinajpur, West Bengal.

The site of Peerpal is located on the western bank of the river Punarbhaba opposite to Dinajpur. The village well-known for the tomb of Bakhtiyar Khilji who died at Bangarh is located on the bank of a pond. A close examination of the tomb-site has revealed that it was constructed over the ruins of an earlier structure. The entire area in front of the tomb was found to be paved with basalt stone blocks. A flight of steps exists descending down to the pond. The villagers have informed that during the summer when the water level in the pond receded, sculptural pieces could be seen. To the right of the tomb is another, albeit smaller, flight of steps. A floral motif, resembling a lotus, is engraved on one of such stone block. A few meters away to the right of the tomb, there is another small mound locally known as 'Baradwari'. It contains potsherds along with two standing octagonal stone pillars. Near to another small pond in the village, a standing headless torso of a female was found. This life-size sculpture carved on basalt has profuse ornamentation. Stylistically, the sculpture may be dated to the Pala period (pl. 62). In another field, a complete pillar was also found. Houses in the villages have also sculptural fragments and large chiseled blocks of stone. The entire village is strewn with potsherds. Almost at the centre of the village, was originally a mound which has been leveled and converted into a playground. At another place in the village around a bamboo thicket, large

concentration of waste chips of basalt suggests that it was an atelier.

50. EXCAVATION AT RAKSHASHIDANGA, DISTRICT MURSHIDABAD

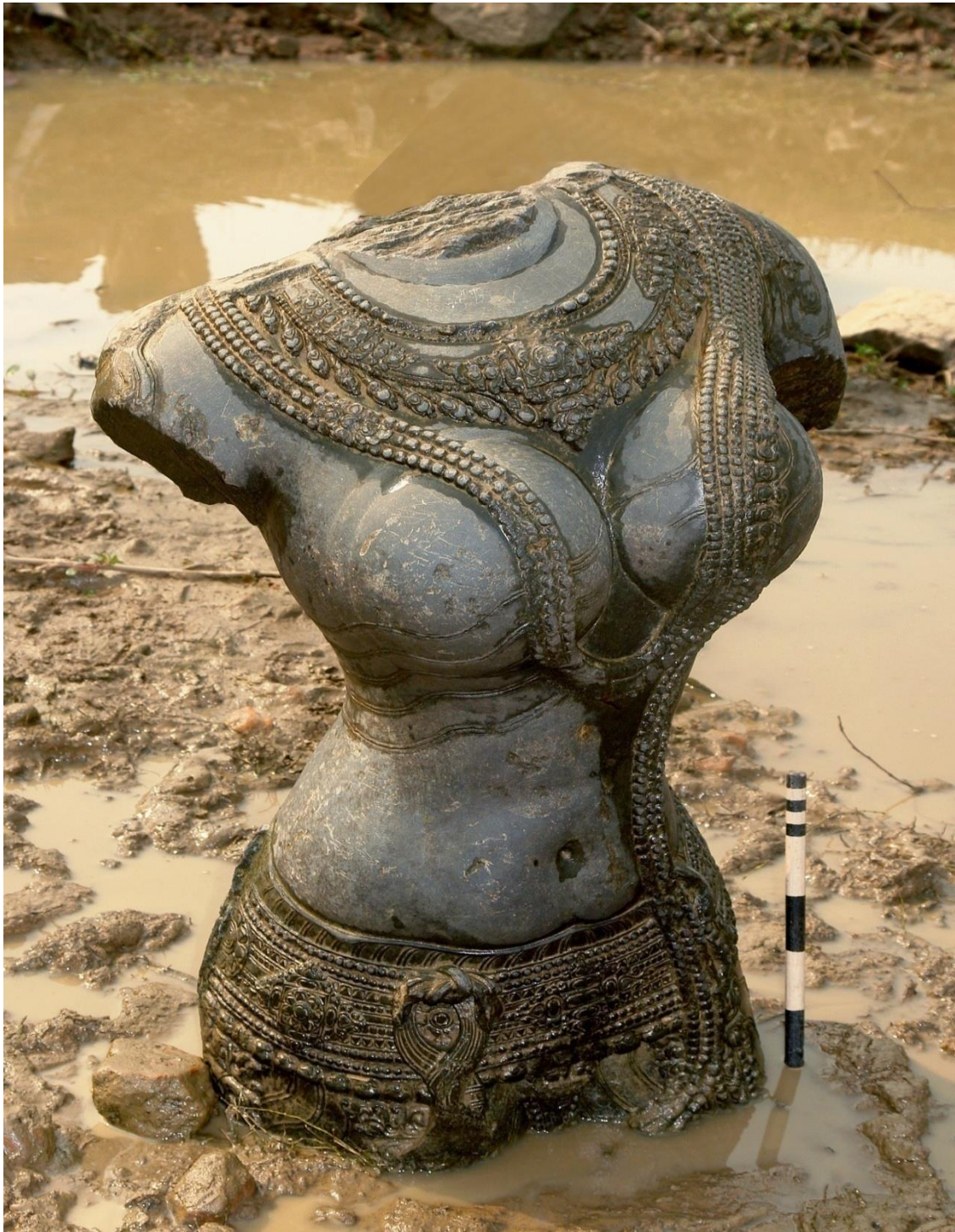
The Directorate of Archaeology and Museums, Govt. of West Bengal, in collaboration with the Survey conducted excavations at Rakshashidanga at village Pratappur under G.P. Rangamati, Chandpara Police Station Berhampore, Murshidabad.

The site (22° 52' 47" N; 87° 40' 55" E) is located on the eastern side of Karnasuvarna railway station at a distance of 16km from Berhampore town, the district headquarter of Murshidabad. The mound is almost square on plan and can be visualised from a long distance due to its considerable height (9.00m approximately). The site measures 95m east-west and 90m north-south. The *mazar* of Turkan Saheb on the eastern side of the mound is having strong religious beliefs among the local people. The ancient remains are gradually been destroyed due to several activities.

The main objective of the present excavation was to identify the structural plan through horizontal excavation, as well as to ascertain the cultural sequence in respect of the earlier chronology of the site as referred in the excavation-report of the site (1928-29).

The southern part of the mound was selected for excavation after a detail surface-study. Total 9 trenches were excavated. The digging was continued up to the natural soil encountered (layer 10) at a depth of 7.85m from the surface. The stratigraphical study clearly indicated two phases of

Plate:62



Peerpal: broken stone sculpture of Yakshi (Pala period)

structural activities, the earlier phase belongs to post-Gupta period i.e., 6th/7th century CE and the later to Pala/Sena period i.e., 8th/9th century CE.

Almost all the trenches have yielded remains of brick-structures having the mark of vandalism in the form of brick-robbings. The present excavation was concentrated only on the southern part of the mound for ascertaining the cultural sequence. The study of long section, across the mound in east-west direction, facing south, indicate that the exposed walls are running in north-south orientation, except the walls exposed in the Trench A4, which is associated probably with an opening for usage of entry or exit. This is also being substantiated with the contour-lines. Moreover, during the deep-digging in Trench A4, the successive water-borne deposits, indicate that it was under water-logged condition for a long time.

The structural activities are indicating that the site was occupied at least in two different phases. Both the structural phases have been demarcated clearly by layer 3A which has been identified as the sealing layer of the structural phase I which comprised of fine alluvium, light grey in colour, deposited over the structure of Phase I structure of phase II were constructed over it. This strip of filling soil is thin (5-8cm) and has not been traced throughout and only covers the top of the wall which belongs to phase I.

Layer 1 has been identified as the sealing layers of the structural activities belong to phase II, and not traceable all through. It comprises loose-debris of recent times, dumped by the occupants living nearby and accumulated debris of earlier the walls of the phase II.

Antiquities found from the upper level, are mostly iron nails. and terracotta figure. The stucco fragments have been found in association with the late phase of structural activities which indicate that the designed lime-plasters and stuccos were used for decorating the structural surfaces.

Bricks structure is found in two layers, 4 and 5 from the Trench A4, XB3, XC3, XB4, XA4 and C4. The total length of this structure exposed in Trench 4A is 3.25m breadth is 3.22m and in total 45 courses. Mud mortar is used for construction of the wall. The sizes of the bricks used are 42 x 24 x 7.41 x 27 x 7.5cm, 41 x 25.5 x 7.5cm, 39 x 23.5 x 7cm, 39 x 24 x 7cm. In Trench XB3 and XC3, a platform was reported with larger offset. In all, there are 24 courses in the platform up to the cutting level. Portion of this platform is destroyed. The sizes of the bricks used are 41 x 27 x 7.5cm, 41 x 25.5 x 7cm. A wall was unearthed, oriented north-south in the western part of Trench XB3. The total height of the wall is 2.6m and its breadth is 0.8 m. The brick sizes are 31 x 24 x 5cm, 37 x 25 x 8cm. Another wall was unearthed, oriented east-west, in Trench CA on the northern side. There are 16 courses of bricks in the wall. The brick sizes are 39 x 24 x 6cm, 36 x 23.5 x 6cm. The height of this structure is 1.01m.

Phase II: The 2nd phase's brick structures are found in the layers 1, 2, 2A, 2B and 3. Brick structures were reported from Trenches A4, B4, C4, XB4, and XC3. In Trench XB3, a wall was found oriented in north-south direction, its length is 1.81m, height is 2.57m and width is 0.89m. The bricks used measure 39 x 23.5 x 7 and 32 x 23.5 x 6.5cm. Mud mortar is used in its construction. Broken and fragmented bricks were used in the core of this wall. On both sides of this wall, lime dust and small quantities of stucco (plaster) fragments were found. It is seen that the bricks are reused. A brick wall was reported from Trench A3 and A4. The corner of this wall was recovered from the north-eastern corner of the Trench A4. In all, 31 courses of bricks exist in this wall. Similarly in Trench A3 the east-west corner part of the wall was removed. The bricks used measures 36 x 23.5 x 6cm, 37 x 25 x 8cm, 38 x 24 x 6cm, 34 x 27 x 6cm, and 31 x 24 x 8cm. This wall was extended to the northern part of the Trench B4 and in all, 45 bricks courses are reported.

Different types of potteries are reported from 1 to 8 layers (two phases). From layer 9, no potsherds were reported. Layer 3 to 1 belongs to phase II, Huge quantities of red ware, dull red ware, grey ware, dark grey ware, black ware, buff ware, red slipped ware potsherds are also reported. The shapes are bowl, shallow bowl, *handi*, jar, storage jar, storage vessel, vase, and small basin. Phase I includes layer 9, 8, 7, 6, 5 and 4. In this phase were reported red ware, dull red ware, grey ware, and red slipped ware are found. The occurrence of red ware and grey ware is better than that of other. The shapes of the potteries are bowl,

shallow bowl, *handi*, cooking vessel, vase and basin.

51. EXCAVATION AT MOGHALMARI, DANTAN, DISTRICT WEST MEDDINAPUR

In continuation of previous excavation at Moghalmari, Dantan, the Department of Archaeology, University of Calcutta resumed excavation at the site under the supervision of Asok Datta and assisted by Durga Basu, R.K. Chattopadhyay, Bishnupriya Basak, Rajat Sanyal and all the technical and non-technical staff.

The basic objectives of excavation of this pre-Pala Buddhist Monastic Complex were to trace the gateway of the Monastic Complex; and to understand the inter-relationship between different structural components of the complex.

MGM1: To achieve these objectives, the northern part of the mound was selected. Altogether 14 trenches measuring 6 x 6m were laid out at the northern slope of the mound. The excavations at these Trenches namely ZG1, G1, G2, ZH1, ZH2, H1, H2, ZI1, I1, I2, ZJ1, ZJ2, J1 were conducted at different levels ranging in depth from minimum of 61cm in Trench H2 and the maximum of 395cm in Trench H1 from BS revealing the existence of a beautiful brick gateway supported by two bricks pillars on both sides and crowned with brick shaped “*purnaghata*” and decorative elements within the 13.25 x 14.80m wide “*tri-ratha*” projection in the northern part of the Buddhist monastic complex which is not only unique, but unparalleled in the architectural designs of monastic

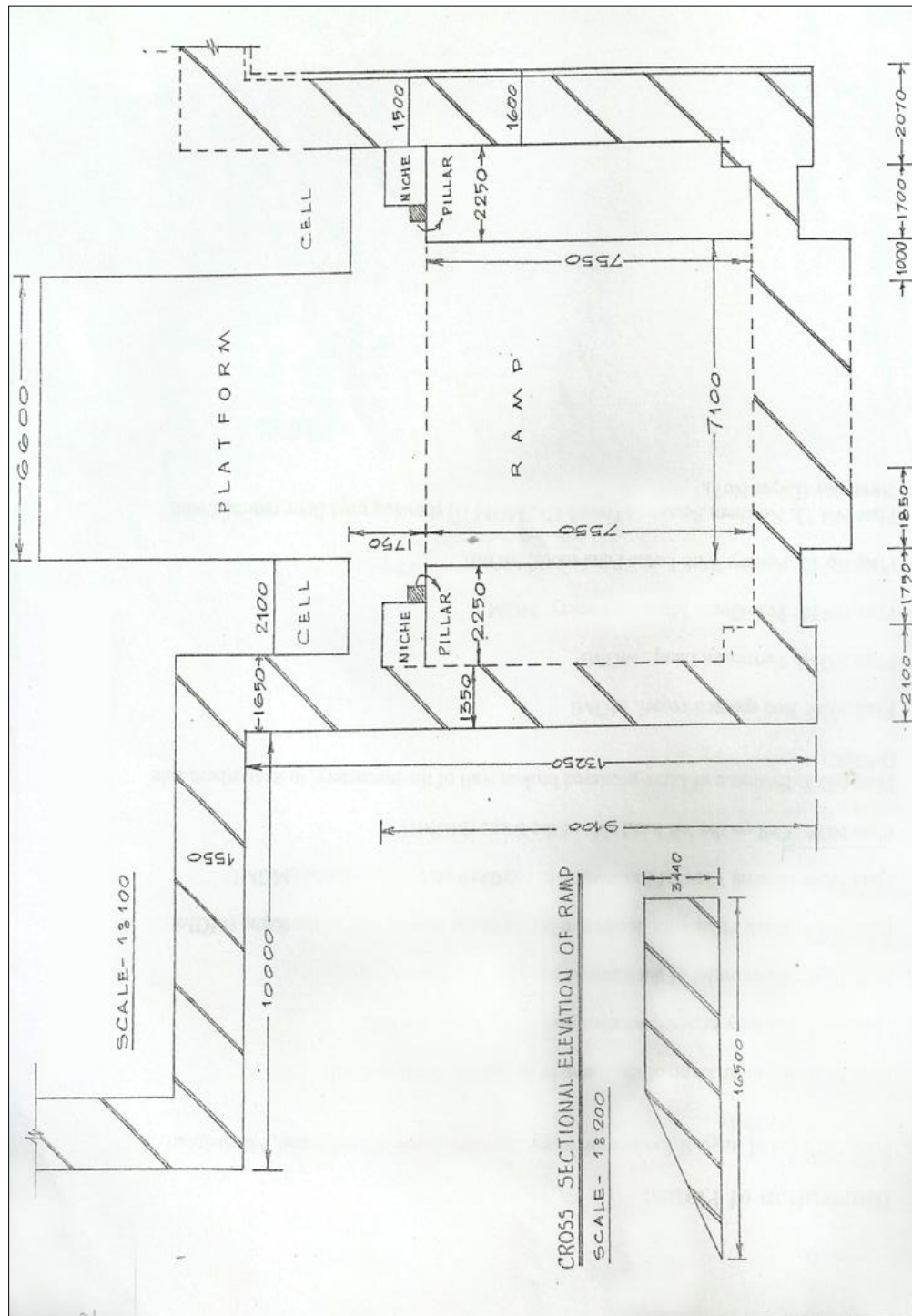
establishment in entire eastern India and West Bengal in particular. Since, the general height of the plinth of the monastery is 3.4m and to cover this height, a 7.55m long ramp was made in descending order supported on both sides by brick steps which are still visible at places on the ramp. The ramp is 7.10m wide and 7.55m long. The ramp landed on a 7.20m long and 6.60m wide brick platform on its ascending end. A number of cells measuring 2.50 x 2.60m are located on the sides of this brick platform and some are attached to outer wall of the monastery in the northern part of the complex (figs. 26-27).

The ramp is constructed within a “*tri-ratha*” projection of the monastic complex in its northern side. It is filled up with brickbats and mud and is supported on both sides by brick walls. The gap of 2.25m between the outer wall of the ramp and the inner wall of the “*tri-ratha*” projection has been deliberately created on both the sides for viewing the deity placed at the niches at the rare ends of the passage in trench 1 and H1 by the devotees. At the far end of the passage, two beautiful niches measuring 34 x 80cm on both sides of the ramp have been provided on the inner wall connecting the ramp with the outer wall of “*tri-ratha*” projection. Attached with the niche, there are two brick pillars on both sides crowned with “*purnaghata*” and decorated with different decorative bricks. The extreme northern wall of the “*tri-ratha*” projection is decorated with many projections.

It appears from the excavations carried out so far at Moghalmari that there were three phases of constructions at the

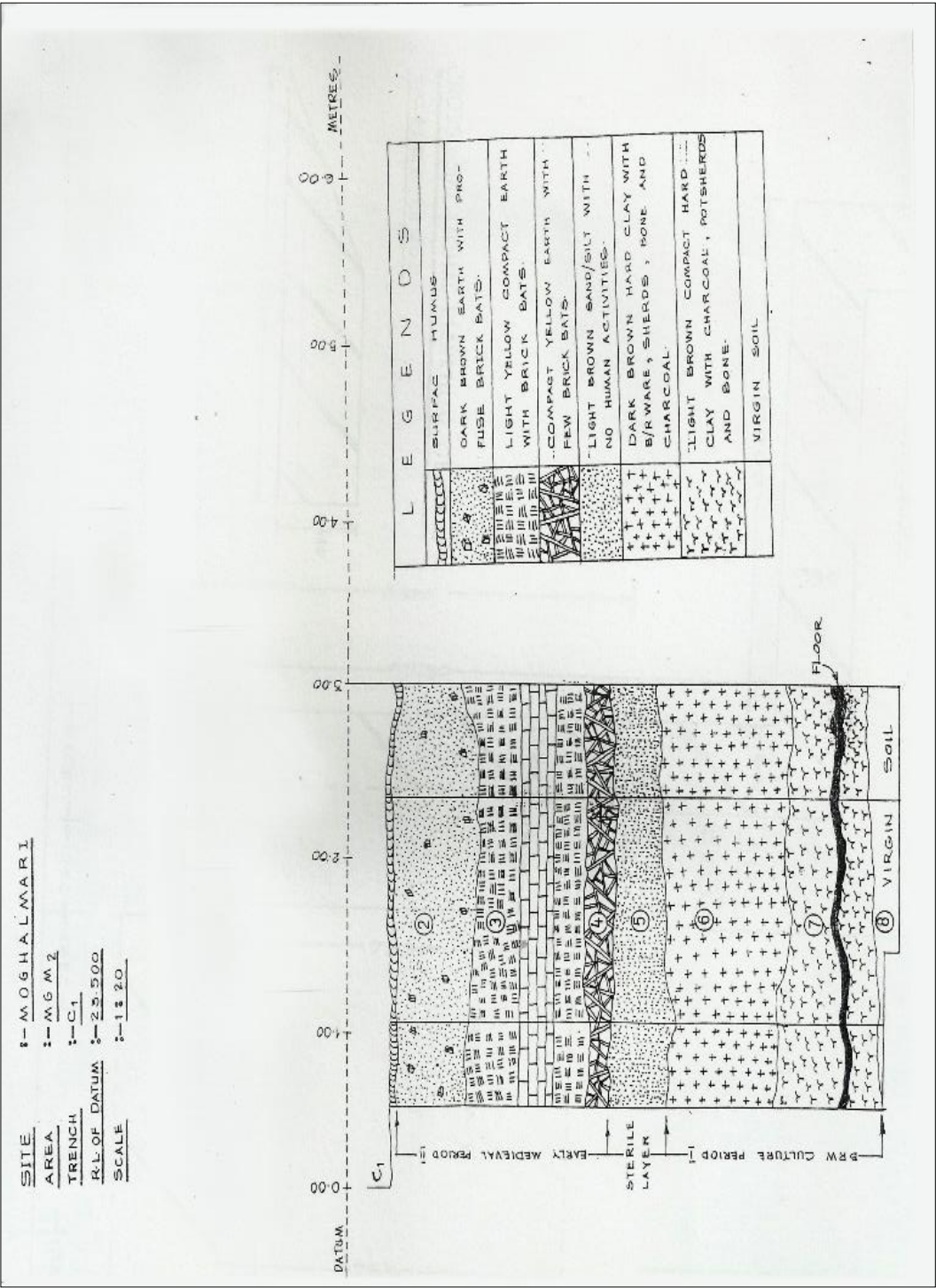
mound all belonging to Buddhist monastic establishment. The constructions range in time from 6th/ 7th century CE to 13th century CE. The Buddhist activity in the region was active for, at least, six hundred years. These structural phases represent different cultural periods. The first phase of construction of the monastic complex belongs to pre-Pala period which is the largest and most beautiful structural complex in the area. The early pre-Pala Buddhist monastic complex is beautifully decorated with stucco figures and floral designs and further added to its beautification by the application of wide range of decorative bricks specially designed for this purpose and sometime painted with red ochre. This early pre-Pala monastic establishment was, at least, renovated or reconstructed twice, the evidence of this is clearly visible at the gateway in the northern part of the mound. Here the ramp and its outer wall were reconstructed after partial damage or dislodged by external forces. However, after the demolition of this early monastic complex, probably in the early 10th century CE, another monastery was built over the earlier one, the evidences of the second construction were found in our earlier excavations. The evidences are found in the form of floor, stupa basement and superimposition of outer wall over the earlier one. However, the second monastery was similar in size and devoid of any stucco decoration. The third phase of construction of monastic establishment at Moghalmari was confined to the western part of the mound. This monastic establishment measuring 21 x 24m square meters area was provided with a small “*tri-tirtha*” projection in its western

Fig. 26



Moghalmari: plan of the gateway of the monastery

Fig. 27



Moghalmari: sectional elevation of the northern section

side and inside it there was raised brick platform.

There are a number of small cells in the northern and the southern sides of the monastic complex. The Buddhist religious activities in this small monastic complex possibly ceased to exist around 13th century CE due to Muslim invasion in the area. The excavation has yielded huge quantity of ceramics including black, red and grey ware while the shapes include *handi*, vessels, high necked jars, storage jars, terracotta pot with lotus motifs, footed cups, flaring dish. Typical Gupta and post-Gupta moulded red pottery has also been reported from the lower level. Besides, terracotta lamp, spouted bowls, stone heads, stone fragments of sculptures, evidences of red ochre and burnt shell have also been found.

MGM2: Another Trench C1 measuring 6 x 6m was taken up at MGM2 to check the earlier sequence of the site. The excavation at this site reveals a total cultural deposit of 3.43m which is divided into 8 layers and again this deposit represents two broad cultural periods *viz.*, early medieval represented by layers 2, 3, 4 and black and red ware culture represented by layers 6 and 7 while layer 8 represents the natural soil of the area.

After initial removal of surface humus, the excavation was confined to the north-western quadrant of the trench where a brick structure with five courses of bricks has been found at a depth of 0.56m. The foundation of the structure was laid directly on yellow alluvium soil at a depth of 1.38m from the surface level. The structure as well

as the associated pottery belongs to early medieval period. Due to these structural activities in the north-western quadrant, we shifted our area of excavation to south-western quadrant where digging continued up to 3.43m.

Layer 1 is surface humus with 0.5m deposit. Layer 2 with 0.39m deposit comprises dark brown earth with profuse broken bricks and brickbats while layer no 3 with 0.83m deposit comprises light yellow compact earth with brickbats and potsherds. Layer 4 with 0.17m deposit of compact yellow earth has few brickbats and potsherds at the upper level. Layer 5 with 0.32m deposit of sand and silt represents a sterile layer. Layer 6 with 0.88m deposit of dark brown hard clay with potsherds (BRW), charcoal and bone fragments represent the black and red ware culture of the site which developed immediately below the sterile layer. Layer 7 with 0.57m deposit comprises light brown compact hard clay with profuse potsherds, bone and charcoal represents the beginning of BRW culture. A floor rammed with burnt clay has been found at a depth of 2.95m below surface level in Layer 7. Layer 8 with 0.22m deposit of compact yellow clay represents the virgin soil of the area. The gap between the black and red ware culture and early medieval period is represented by Layer 5 which is a sterile layer devoid of any human occupation. The excavation at this trench reconfirmed the earlier sequence. The ceramics consist of black and red ware with or without paintings, black ware, red ware, brown ware, pale red ware, etc. along with profuse bone fragments, hopscotch and charcoal.

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS¹

ANDHRA PRADESH

1. ACHYUTARĀYA COPPER-PLATE INSCRIPTIONS, LĒPĀKSHI, DISTRICT ANANTHAPUR

This copper-plate, presently under the personal custody of P.V. Parabrahma Shastri (originally from Lēpākshi, Hindupur Tāluk) is in Sanskrit language and Nandināgari script. It belongs to the Vijayanagara king Achyutadēvarāya and is dated in Śaka 1455 (1532 CE). It gives the details about different *dānas* viz. *Tulāpurushadāna*, *Kāñchanamērudāna* and *Ānanda-nidhidāna* performed by the king. Further, it records the gift of the villages Kottihālya, Sankidēvanapalli, Chōḷasamudra, Pomnakumta, Vīrasamudra and Śrīvaram in Roddanādu of Penugoṇḍarājya as *Sarvamānya* to Śikhāmanṇi son of Nandila Lakkiśe for providing food offerings and for the maintenance of the Vīrabhadreśvārasvāmi temple in Lēpākshi.

2. VIJAYANAGARA INSCRIPTION, MUTTALŪRU, DISTRICT KADAPA

This stone inscription is fixed in front of Mallikārjunaswamy temple in Muttalūru village, is in Telugu language and

script. It belongs to the Vijayanagara king Bukkarāya and is dated in Śaka 1287 (1365 CE). It records the gift of some lands to the gods Mallikārjunadēva and Vīrabhōganāthadēva in Muttalūru by Takkajīya son of Vinakajīya (pl. 63).

KARNATAKA

3. HOYSAḶA INSCRIPTION, HALĒBĪDU, DISTRICT HASSAN

This inscription engraved on a slab kept inside the A.S.I. Office at Halebidu, is in Kannada language and script. It belongs to the reign of the king Vīra Ballala (II) of Hoysala dynasty. It records the gift of 50 house-sites in the presence of Nakhara, to the deity of Śantinātha-basadi by the Palamarasa Daṇḍanāyaka.

4. KRISHNĒVARĀYA INSCRIPTION, KĀMĒDIHAḶḶI, DISTRICT MANDYA

This inscription found engraved on a stone slab lying in front of the Basavanna temple in the village, is in Kannada language and script. It belongs to the Vijayanagara king Krishnadēvarāya of Tuluva dynasty, dated in Śaka 1443 (1521 CE). It registers the gift of land to the two ascetics viz. Tōtadamaṭha Niranjanadēvaru and Mallikārjunadēvara by the queen

¹ Information from Director, Epigraphy Branch of the Survey.

Plate: 63



Muttaluru: Bukkaraya inscription

Chinnādēvi. The gift was made through Sāluva Narasimha Vīrappavodeyanāyaka, Commander-in-chief of Nāgamaṅgala region. (pl. 64)

RAJASTHAN

5. NĀGARĪ INSCRIPTION, GAṆEDI, DISTRICT SIKAR

This inscription engraved on a *Kīrtistambha* fixed in the ground near the Chānd-jī-ki *Chhatrī*, is dated in Vikrama 1843 (1786 CE) is in Nāgarī characters and in the local dialect. It records the construction of the *Chhatrī*, recovered the territory of Kāsālī and the conquest of the country effected by *Mahārāja* Dēvisingh. It also states that the record was composed by Vramdāvana Kāitha and caused it to be engraved by the artisans Manso and Kānhai (pl. 65).

TAMILNADU

6. CHOLA INSCRIPTION, NAGAPATTINAM, DISTRICT NAGAPATTINAM

This inscription found engraved on the western basement of the sanctum sanctorum of Agnīśvara temple is in Tamil language and characters of the 11th century CE. This record belongs to the Chōḷa king Vīrarājēndra. It records the gift of land for conducting worship and offerings to the god Tiruvakkiṇīśvaramudaiyār by the brāhmaṇas residing at Kulōttuṅgachōḷapuram.

7. BILINGUAL INSCRIPTION, TIRUNALLĀDAI, DISTRICT NAGAPATTINAM

This bilingual inscription found engraved on the western basement of the central shrine in the Agnīśvara temple is in Tamil and Sanskrit languages and Tamil and

Grantha characters of the 12th century CE. It records the construction of the temple and also performance of Kumbhābhishēka (Tiruppaṇi seyvittār) by the temple supervisors (Śrīmahēśvarakaṇkāṇi-seyvārkaḷ) of Kulōttuṅgachōḷapuram. Further, it states that Śivabrāhmaṇas made a gift of 62 *kalam* of paddy for the performance of various ritual and services at the temple.

8. CHOLA INSCRIPTION, TIRUMERRALIGAI, DISTRICT THANJAVUR

This inscription found engraved on a loose stone lying under the debris of a ruined Śiva temple, is in Tamil language and characters. Dated in the 17th regnal year of Chōḷa king Rājakēsarivarman (888 CE). It records that the Chōḷa queen Aḷisi Kāṭṭadigaḷ made gift of 20 kaḷaṅju of gold for burning a perpetual lamp to the god of Tiruchchōmīśvaram at Tirukkudmukkil for the merit of her mother.

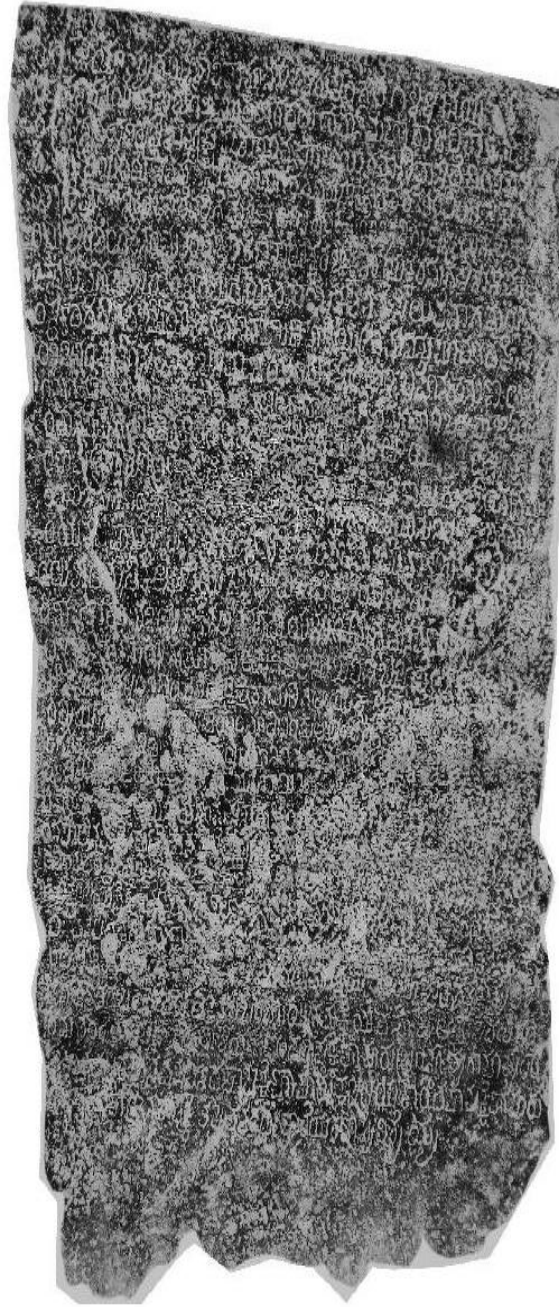
9. CHOLA INSCRIPTION, NĀLŪR, DISTRICT THANJAVUR

This inscription found engraved on the right door jamb of the central shrine of Pallavanēśvara (Śiva) temple is in Tamil language and characters. Dated in the 28th regnal year of Chōḷa king Parāntaka I (945 CE), it records the gift of 92 sheep by a merchant Nakkaṇ Ādittaṇ for burning a perpetual lamp to the god Sambarīśvarattu Purunaṇādigal of Nālūr, a *brahmadēyam* of Śēṇṇūr- kūrṇam.

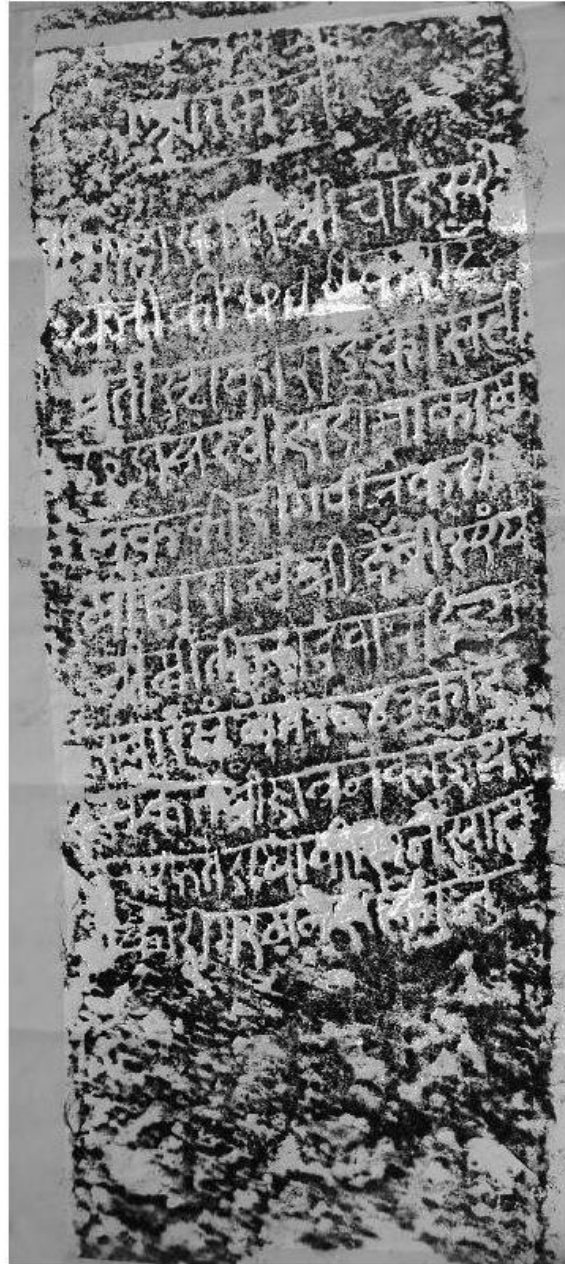
10. STONE INSCRIPTION FROM TIRUVIRĀMĒŚVARAM, DISTRICT THANJAVUR

This inscription found engraved on the doorjamb of the *gōpura* at the main

Plate: 64



Kamedihalli: Krishnadevaraya inscription



Ganedi: Nagari inscription

entrance of Rāmanāthasvāmi temple is in Tamil language and characters of about 14th-15th century CE. It records the construction of doorjambs and steps at the main entrance of the temple by a certain Rāmasvāmiayan, one of the temple servants.

11. CHOLA INSCRIPTION, KILSIRUPAKKAM, DISTRICT TIRUVANNAMALAI

This inscription found engraved on a loose stone slab erected on the eastern side of the bank of a tank is in Tamil language and characters. Dated in the 15th regnal year of Chōḷa king Parakēsarivarmman (922 CE). It records that Nāganandai Nandi Podaiyāṇ of Attipākkam in Vāṇagappādi made a grant of land (called Puttarai) after reclamation for the maintenance of a tank.

12. CHOLA INSCRIPTION, KILSIRUPAKKAM, DISTRICT TIRUVANNAMALAI

This inscription found engraved on a stone set up on the side of the bank situated near Vēdiyappaṇ temple is in Tamil

language and characters. Dated in the 15th regnal year of Chōḷa king Parakēsarivarmman (922 CE), it records that an individual Tāḷi Nīlaṇ, a native of Āvūr (situated) on the northern bank of (the river) Peṇṇai in Vāṇagōppādi endowed a land after reclamation for the maintenance of a tank (pl. 66).

13. PALLAVA INSCRIPTION, AGARAMSERI, DISTRICT VELLORE

This Tamil inscription engraved on a stone slab erected in the temple complex of Śrī Pārakkēśvaran, is in Vaṭṭeluttu characters of about the 6th century CE. It is dated in the 19th regnal year of Viśaiya Parumār (who may be identified with the early Pallava king Simhavishṇu (549 CE). It records that Mādapperutirai Ariāśan, a servant of Gaṅgadi Ariāśan (Gaṅga king) was killed when Ilāvaraisan and Maḷavaraisan invaded and fought a battle at Pidimannēri in Tagadur (pl. 67).

ARABIC AND PERSIAN INSCRIPTIONS ¹

TAMILNADU

14. MISCELLANEOUS INSCRIPTION FROM CHENGALPATTU, DISTRICT KANCHIPURAM

This Persian record from the *dargah* complex of Uthman Wali, mentions the demise of a saintly figure Masum, a devout of Hadrat Uthman Wali, in AH 1117 (1705 CE). The text containing Persian verse is written in *Nasta'liq* style of calligraphy.

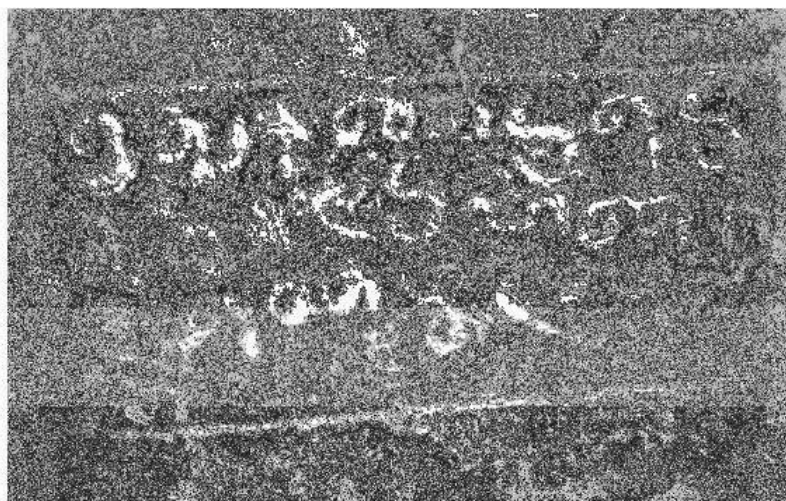
15. EPITAPH FROM KOVALAM, DISTRICT KANCHIPURAM

This epitaph from a grave in the cemetery attached to *dargah* of *Sahabi-i-Rasul* (i.e. companion of Prophet), registers the demise of one Husain, who is mentioned as *hakim-i-shara* (i.e. the judicial officer), in AH 1137 (1724-25 CE). The Persian verses are composed by Zain-ul-Abidin who also

1. Information from G. S. Khwaja, Director (Epigraphy) I/C, Arabic and Persian Inscriptions, assisted by M. A. Zeya of the Epigraphy Branch, Nagpur. This Branch copied and examined 43 Arabic and Persian inscriptions during this year out of which few important ones are being highlighted here.



A



B

Kilsirupakkam: A-B, Chola inscription

Plate: 67



Agaramseri: Pallava Simhavishnu inscription

devised in the form of last hemistich of the metrical text the chronogram for the date.

16. MISCELLANEOUS INSCRIPTION FROM WALAJAHABAD, DISTRICT KANCHIPURAM

This record in Arabic prose and verse from the Jami Masjid records its erection in AH 1319 (1901-02 CE). The style of writing of this construction record is in Naskh.

UTTAR PRADESH

17. MISCELLANEOUS INSCRIPTIONS FROM DEWA, DISTRICT BARABANKI

Two records from the *dargah* of famous saint Hadrat Sabir Piya have been copied. They refer to the demise of the saint and construction of his tomb.

The first record in Arabic refers to the demise of saint Sayyid Warith Ali, composed in a chronogram by Abdul Wase al-Warithi which yields the year AH 1323 (1905-06 CE) (pl. 68A).

The second record in Persian verse from the same place registers the completion of the tomb (*rauda*) of the saint in AH 1330 (1911-12 CE).

18. EPITAPHS FROM JAUNPUR, DISTRICT JAUNPUR

Many epitaphs have been copied this year from Jaunpur, the erstwhile seat of Sharqi Sultans. Jaunpur was given an epithet of '*Shiraz-i-Hind*' (i.e. Shiraz of India) because of being a centre of learning. This is why many scholars and saints preferred to settle down here. Famous work by Iqbal Ahmad, *Tarikh-i-Shiraz-i-Hind Jaunpur* (Jaunpur, 1963) contains many references to

this effect. Saint Shaikh Muhammad Rashid is one of those saints of Jaunpur laying buried in Diara-i-Rashidiya, along with his disciples and spiritual successors (pl. 68B).

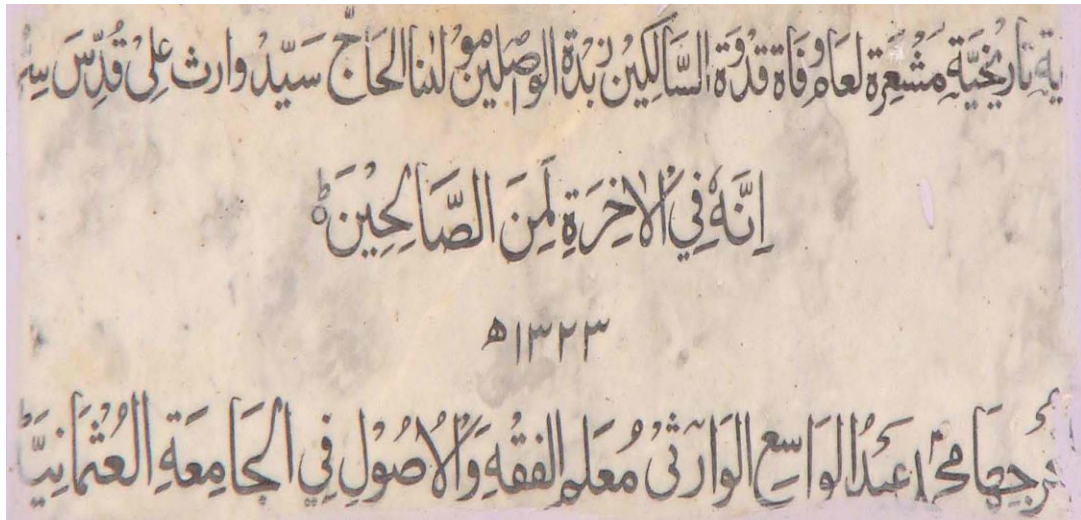
An epitaph from *Daira-i-Rashidiya*, Jaunpur, fixed on the grave of a saintly person, records the demise of *Qutb-ul-Aqtab* (i.e., Pole-star of the Pole-stars), *Shams-ul-Haq* (i.e. Sun of the Truth) Hadrat Shaikh Muhammad Rashid popularly known as *Diwanji*, in AH 1083 (1672 CE). It also contains the date of birth of the saint as AH 1000 (1592 CE). Apart from obituary notice in Persian prose this epitaph contains two verses in Persian referring to the saint's religious stature. The last hemistich forms a chronogram for the date of the demise through Abjad system.

Another record is a headstone of a grave mentioning the death of Hadrat Muhammad Arshad Rashid popularly known as *Diwan Sahab*. He was a disciple of Shaikh Muhammad Rashid, who breathed his last in AH 1113 (1701-02 CE) and lies buried in the vicinity of his spiritual mentor. This record mentions also the year of birth of the saint as AH 1041 (1631-32 CE).

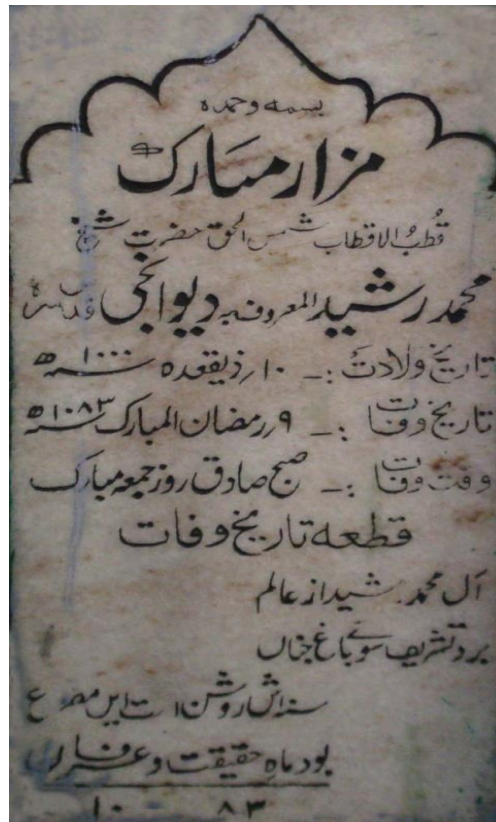
The third record of this series is an epitaph from a grave in the same cemetery which mentions the death of another saint Hadrat *Qamar-ul-Haq*, spiritual successor to Hadrat Shaikh Muhammad Rashid.

This record in Persian prose and verse registers the death of the above mentioned saint in AH 1167 (1753 CE). The deceased has been mentioned as *Ghulam-i-Rashid* (i.e. servant of Rashid) a

Plate: 68



A



B

Dewa: A, epitaph of Saint Sayyid Warith Ali
 Jaunpur: B, epitaph of Saint Shaikh Muhammad Rashid

reference of his being a disciple of the Shaikh. Similar to the earlier record, the last hemistich of the text in Persian verse forms the chronogram of the date of demise. One more headstone from *Daira-i-Rashidiya* records the death of *Mahbub-ul-Haq* (i.e., beloved of Allah), Hadrat Shah *Fasih-ud-Din* in AH 1206 (1791-92 CE). This record in Urdu prose and Persian verse contains a chronogram for the above year of Hijri era.

One more headstone of this series is from the grave of Hadrat *Amiru-ud-Din* who left this world in AH 1265 (1848 CE). The obituary notice in Urdu and Persian verse contains chronogram for the above date. The style of writing of this record is *Nasta'liq*.

19. EPITAPH FROM ZAFARABAD, DISTRICT JAUNPUR.

An epitaph from Mohalla Sayyid Alipur in Zafarabad records the death of Shaikh Haji Ismail in AH 1125 (1714-15 CE). The language of this record is a mixture of Persian and Arabic prose written in *Nasta'liq* style.

20. MISCELLANEOUS INSCRIPTION FROM LUCKNOW, DISTRICT LUCKNOW

This construction record from a mosque in Qaiser Bagh mentions that Dhu'lfaqar Ali, a *sufi*, erected this mosque for prayer of the devotees of *Rab* (i.e., Allah) in AH 1241 (1825-26 CE). The date of this event is also recorded in the last hemistich of the Persian verses as a chronogram which yielded the above date. It is written in *Nasta'liq* character.

III. OTHER IMPORTANT DISCOVERIES

ARUNACHAL PRADESH

1. SAMTHEN YANGCHA MONASTERY, DISTRICT WEST SIANG

State Department of Archaeology located one of the oldest monasteries of Mechuka Sub-Division. It was constructed about 200 years ago in traditional architectural design. Due to landslide, the monastery was damaged. Subsequently, the villagers retrieved some antiquities from the ravaged site and kept them in a newly constructed monastery at Lharce Laa hill. The traces of the old monastery still exist in ruins on the bank of river Yarkap Chu.

2. MENHIRS IN DISTRICT WEST SIANG

State Department Archeology discovered some menhirs at Mechuka and Dorjeeling villages of Mechuka Sub-Division. These are locally known as 'Do'. Although 'Do' or menhirs exist at Memba villages, but the villagers never worshiped nor showed any respect for these menhirs. It seems the Membas are not the author of these menhirs and some other group of people might have settled here before the migration of the Membas.

3. ROCK ART OF MECHUKA, DISTRICT WEST SIANG

Traces of old rock art are found at Mani Pege hill of Mechuka 6km away from the town by the State Department Archaeology. The rock art is noticed on the rock near an old foot track, which connects

Dorjeeling village with Mechuka. On the rock, holy Buddhist *mantra* "Om Mane Padme Hum" and a picture of a stupa is depicted.

4. KALAYINJONG, DISTRICT UPPER SIANG

The State Department of Archaeology located an old Gompa in ruins situated on the left bank of the river Siang of Tuting in Upper Siang District by the State Department of Archaeology. The Gompa was set up by Lama Jalwa Phagpalha about 300 years ago. It is confirmed from the existing ruins that once it was constructed with local materials, such as stone, wood and bamboo etc. Now, remnants are scattered over an extensive area. The plinth measures 14.20 x 13 x 1.8m.

5. RUINS OF DUMA CHALANG, DISTRICT WEST KAMENG

Ruins of Duma Chalang (plinth of religious structure) are found at Samphung village about 8km away from Kalaktang township of West Kameng District by the State Department of Archaeology. Doyu Tenzing (stone engraver) lived at Duma Chalang about 300 years back. Three courses from the plinth of Duma Chalang are found in Kalaktangs measuring 17.60 x 8.00 x 1.5 x 1m. The third plinth is too small and identified as the meditation place of stone engraver.

6. MEGALITHIC REMAINS AT SHERGAON, DISTRICT WEST KAMENG

Few megalithic remains were discovered at two places of Shergaon, West Kameng District, on the bank of the river Choskorang and the Daflo Kho by the State Department of Archaeology. On the right bank of river Choskorang, three megalithic stones were found. Another megalithic site of Shergaon is situated on the left bank of river Daflo Kho. The measurements of Choskorang menhirs are central big upright stone are 1.40 x 0.40 x 0.40m; medium size upright stone, 0.75 x 0.20m; and smaller size upright stone, 0.50 x 0.20m.

The measurement of Lungzukthung/Daflo Kho, menhirs are 1.70 x 0.52 x 0.18m, 1.35 x 0.50 x 0.18m, 0.95 x 0.49 x 0.18m, 0.50 x 0.25 x 0.18m, 0.63 x 0.36 x 0.17m, 0.73 x 0.32 x 0.15m and 0.37 x 0.16 x 0.11m.

7. REMAINS OF GOMPA, DISTRICT WEST KAMENG

The State Department of Archaeology found a huge brick built Gumpa in ruins in the south-east direction of Shergaon reserve forest. The ruins are scattered on the slope of Kamchayam hill, about 800m away from Shergaon–Tenzegaon road. The local people have identified the ruins as the remnants of old Thungri Gumpa. Besides, there are traces of dwelling house of lama or temple priest. The plinth area of Gumpa measures 6.90 x 6.90m.

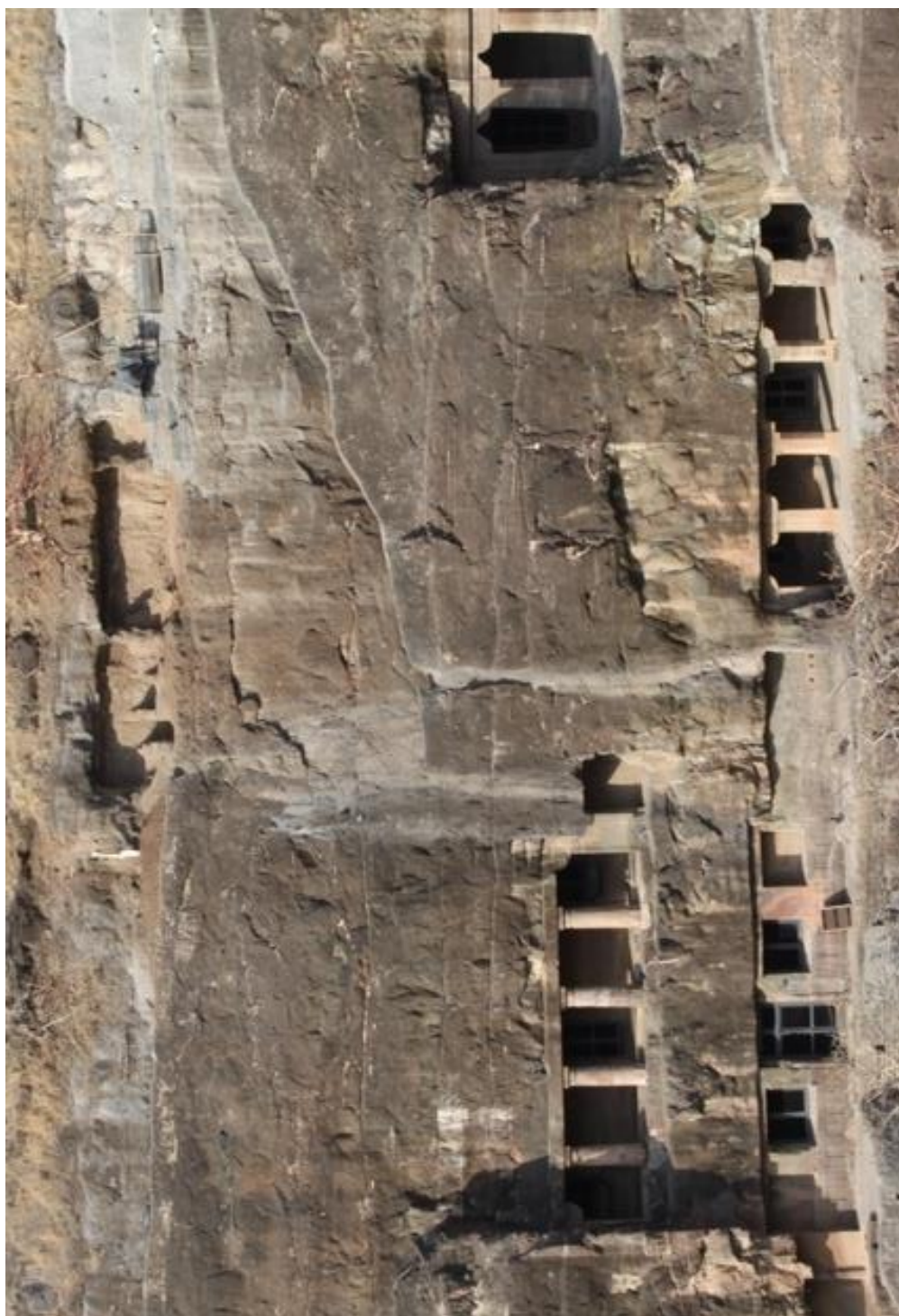
MAHARASHTRA

8. DISCOVERY OF ROCK-CUT CAVES, AJANTA, DISTRICT AURANGABAD

Aurangabad Circle of the Survey has discovered two unfinished cells above Caves

5 and 6 at Ajanta Caves while carrying out clearance operation to fill up the voids above Cave 1 to 6. The presence of voids accumulated deposition of earth and debris which facilitated the penetration of water into the rock mass and further caves below. Hence, the loose earth and rock mass present in the voids were removed first in order to fill them with random rubble masonry walls duly provided with sufficient number of weep-holes to drain off any trapped water from within. It was during this cleaning operation two rock-cut cells were discovered (pl. 69). These unfinished caves revealed distinctive chisel marks of various dimensions which indicated their sudden abandonment. Apparently, there appears to two separate cells, but, on close observation, it can be deduced that an attempt was made to carve a facade which is almost 11m in width and at the centre a thick wall separates there it into two distinct divisions named as cell 1 and cell 2. The cell 1 is roughly rectangular in shape. The length of the wall is 5.40m. The overhanging rock mass is 1.20m wide. The side wall to the west is 1.80m long and the wall separating the two cells is 2.70m in length and 0.5m thick. The maximum of the cell is 2.10m. The dividing wall varies in thickness from 0.17m to 0.4m. It is narrow at the back while thick on the front. Cell 2 is a rectangular excavation facing south. Its inner back wall is 4.80m long and 5.90m after including the thickness of the side walls. Its eastern side wall is 2.40m while western side wall is 3.10m long. Debris consists of stone flakes and loose soil accumulated on the floor in front of the cells. A burnt brick and a glass bangle fragment were also found in the deposit. The

Plate: 69



Ajanta Caves: location of the newly discovered rock-cut caves

brick measures 43 x 23 x 9.5cm in size. This brick size well corresponds to brick revealed in the excavations carried out on the right bank of Waghora river and in front of Cave 8 in the field season of 2000-01. The bricks of 41.5 x 24 x 7.4cm size were reported from deposits belonging to 4th-5th century CE (2000-01: 92 - 97).

PUDDUCHERY

9. BURIALS AT MANAVELI, PUDUCHERRY (UT)

An Urn burial and Sarcophagus along with grave goods were noticed during house construction at Manaveli, Pondicherry. These burials were scientifically excavated. On the south eastern side of the site a trench having a depth of 90 cm had already been dug for raising the foundation and in section a partially exposed large sized urn was found. With an aim to study and retrieve the partially exposed large urn, a trench was laid enclose to the urn. During excavation, an urn with a height of 125cm and 290cm circumference, terracotta tub shaped sarcophagus enclosed with a lid (height: 60 cm, length 160cm, width 55cm) having 16 cone shaped hollow legs was found. Black and red ware plates bowls, one tumbler, a small pot, a sager based pot of red ware, a pot of red ware inside of which was found two tumblers of black and red ware with few badly preserved bone pieces were recovered (pl. 70).

UTTARAKHAND

10. STONE IMAGES, UPRAULI DISTRICT DEHRADUN

Dehradun Circle of the Survey discovered seven stone sculptures from Uprauli, tehsil Kalsi during digging of the foundation of a temple by villagers. Out of these, image of Mahisasuramardini, Surya and Saptamatrika panel are assignable to circa 9th-10th century CE while image of Sheshasahi Vishnu, Ganesa, Harihara and headless stone image of *Surya* probably belongs to 13th-14th century CE. The image of Mahisasuramardini and Surya are broken into pieces. The interesting figure is that of Saptamatrika panel made of red sandstone probably brought from Mathura region, appears to be early among all (pls. 71-73). In addition a few *amalaka* and dressed stone blocks were also available at the site suggesting that there must have been a group of temples existing at the site in the past.

11. SCULPTURES, RUDRANATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI

Dehradun Circle of the Survey carried out documentation of loose and fix sculptures in the temple premises. This is one of the old and tallest Siva temples in the Central Himalayan region. There are 71 stone sculptures in temple premises, 24 are fixed in different location and are under worship while remaining are stored in one of the rooms of Rawal Niwas of the temple. These images are assignable to 6th-7th to 12th-13th century CE. Among Matrika images are the oldest, unique and throw light on the religious practices in Central Himalaya in early days.

Plate: 70



A



B



C



D

Manaveli, Puduchery: A, urn with sarcophagus; B, urn; C-D, grave pots inside the urn



A



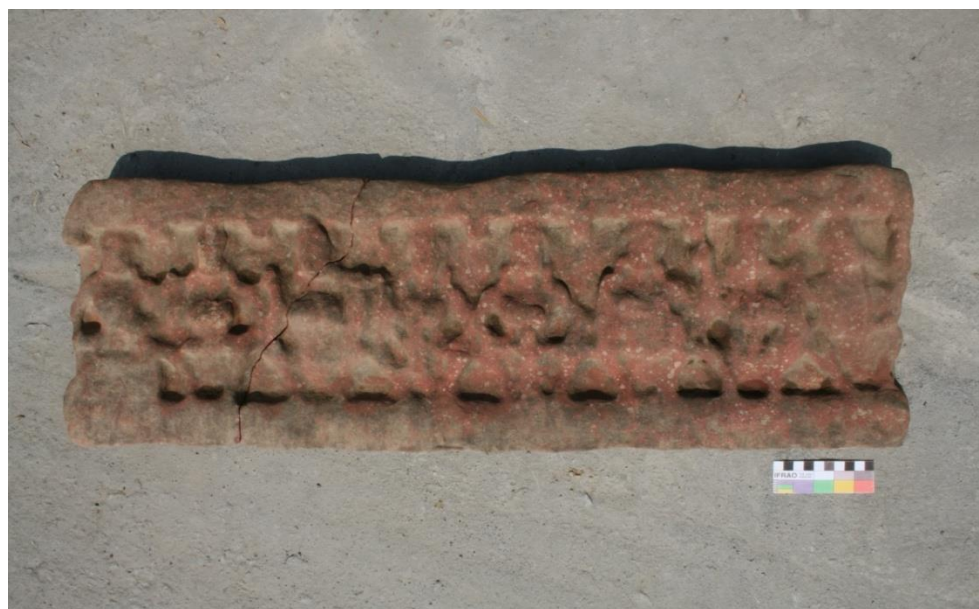
B

Uprauli, Kalsi: A, Mahishasuramardini and B, headless Surya

Plate: 72



A



B

Uprauli, Kalsi: A, Surya and B, Saptamatrika panel



A



B



C

Uprauli, Kalsi: A, Sheshasahi Vishnu; B, Ganesha and C, Harihar

IV. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS¹

Birbal Sahni Institute of Palaeobotany, Lucknow, conducted study on the botanical remains recovered from the excavations at ancient Kanmer, District Kachchh in Gujarat; Hetapatti, District Allahabad and Ancient Ahichchhatra, District Bareilly in Uttar Pradesh. The excavation of Harappan site Kanmer, a joint venture of the Institute of Rajasthan Studies, JRN Rajasthan Vidyapeeth, Udaipur (Rajasthan), the Gujarat State Department of Archaeology and the Research Institute for Humanity and Nature, Kyoto (Japan), was carried out systematically under the supervision of J.S. Kharakwal and Hetapatti was excavated by J. N. Pal, Allahabad University, Allahabad. Botanical remains were collected by water floatation during course of excavations by Anil K. Pokharia. Excavations at Ahichchhatra, District Bareilly, Uttar Pradesh were conducted by Agra Circle of the Survey. Systematic floatation recovery of botanical remains from the site was put into effect jointly by Chanchala Srivastava and Anil K. Pokharia.

GUJARAT

1. KANMER, DISTRICT KACHCHH

The data sets produced till date from Kanmer (23° 23' N; 70° 52' E) surmise that the

sign of substantial change or diversification in crop has in fact, witnessed from the Mature Harappan phase, and shows a mixed cropping system of winter crops and summer crops. Late Harappan phase represents a continuation of Mature Harappan, featuring a year-round occupation. However, the evidence of winter oriented cultivation in Late Harappan phase is not as good as in Early and Mature occupational phases. Dominance of millets and rice, which are significant as summer, monsoon-watered, cereals in contrast to the winter crops during late phase gives an impression that these are results of the Harappan agriculture practices in which the control and management of water for irrigation might have been the important factors in the Rann of Kachchh.

UTTAR PRADESH

2. HETAPATTI, DISTRICT ALLAHABAD

Further studies were continued on samples of carbonized remains from Neolithic Hetapatti (25° 49' 39" N; 81° 91' 68" E) Assemblage of cereals (*Oryza sativa*, *Hordeum vulgare*, *Triticum aestivum*); pulses (*Vigna radiata*,

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

(*Oryza sativa*, *Hordeum vulgare*, *Triticum aestivum*); pulses (*Vigna radiate*, *Macrotyloma uniflorum*, *Lathyrus sativus*, *Pisum arvense*); oil seeds (*Linum usitatissimum*, *Sesamum indicum*) and fibre crop (*Gossypium arboreum/herbaceum*) have been encountered during investigation. Remains of weeds and other wild taxa such as *Oryza* cf. *rufipogon*, *Setaria* sp., *Trianthema triquetra*, *polygonum* sp., *Vicia sativa*, *Rumex dentatus*, *Cyperus* sp., *Chenopodium album*, *Echinochloa* sp., *Ziziphus nimmularia* and *Cannabis Sativa* were also encountered as an admixture reflecting the ecological condition and ground vegetation near the ancient settlement.

3. AHICHCHHATRA, DISTRICT BAREILLY

To study the plant economy of the ancient settlers at Ahichchhatra (28° 22' N; 79° 08' 12" E), 14km north of Aonla, a tehsil headquarter in district Bareilly; palaeo-ethnobotanical investigations were carried out from PGW, NBPW, Kushana and Mauryan levels. The site lies between the Ramganga and Gagan Rivers. The botanical remains were retrieved by water floatation technique from two trenches viz, B x 78 x 28 (Qd. 3 and 4) and B x 50 x 75 (Qd. 3). Floatation allowed recovery of all size classes of botanical material preserved in the sediment, making qualitative and quantitative analysis possible. Recovery of plant remains such as charred seeds and

fruits have been found mixed with little charcoal pieces. This has provided material evidence to reconstruct the model of agriculture and ecological surroundings of the ancient settlement.

The samples comprised rich organic content of 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., *Horedeum 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 radiate* (Green gram), *Vigna mungo* (Black gram), *Cajanus cajan* (Pigeon pea), *Setaria* sp. (Italian millet), etc. and a number of weeds associated with winter and summer season crops as well as wild taxa viz. *Eleusine Indica* (Goose Grass), *Andropogon* sp. (Blue stem grass), *Poa* sp. (Blue or meadow grass), *Carex* sp., *Fimbristylis sedge*, *Cyperus* sp. (Flat sedge), *Panicum* sp., *Chenopodium* sp. (White Goose foot/ Bathua), *Cleome* sp. (Hurhur), *Ziziphus* sp. (Jujube), *Coix lachrymal-jobi* (Job's tear), *Echinochloa crus-galli* (Barnyard/sawan), *Polygonum barbatum*, *Anagallis arvensis* (Pimpernel/Jonkh-mari), *Desmodium gangeticum* (Tick clover), *Panicum* sp. (Panicum grass), and *Elaeocharis* sp. (Spikerush sedge) of palaeo-ethnobotanical significance.

V. MUSEUMS

1. PERIOD MUSEUM, DEEG BHAWAN, DEEG

Wooden railing has been provided to the galleries of Gopal and Kishan Bhawan. New carpet has been provided to the Royal Portrait Gallery. All the missing or badly damaged wooden doors and windows of Sharad Khana have been repaired.

2. SALAR JUNG MUSEUM, HYDERABAD

During the period under review, the museum organized many exhibitions, seminars, workshops and lectures.

Exhibition on Bhagwan Mahaveer Peaceful Liberator; Bharat Ratna Dr. B. R. Ambedkar; Portraits of Princes; 300 years of *Gurta Gaddi* of Sri Guru Granth Sahibji; Birth Enlightenment and *Mahaparinirvana* of the Lord Buddha as seen through Buddhist Sculptural Art; *Gulistan-e-Urdu*; the Filigree Works in Salar Jung Museum; Life and Times of Nawab Mir Yousuf Ali Khan: As seen through his collections; *Moulood-e-Kaaba Hazrat-e-Ali*; Milestones in the Indian Freedom Movement - as seen through Engravings; Sri Ganesa- Collection in the Salar Jung Museum; the Glorious Quran; Exegesis of Holy Quran; Muslim Contribution to Indian Society; Palamuru Contemporary Paintings; Mahatma - Man of the Millennium; Lights of Happiness; Glimpses of Sufi Poets; Bidri Ware - The Art of Bidar; Arabic Calligraphy and Indian Muslim Religious Posters and Calendar Art; Children's Creativity; Zardozi and Built

Heritage; Salar Jung Museum Then and Now; Museum in India with special reference to some premier National Institutions; Shrines of martyrs of Karbala; Indian Life and Landscape by Western Artists paintings and drawings from the V and A 1790-1927; the Sundhya, "Art Camp for School Children" on 6th March, 2010 have been organized.

Lectures have been arranged on History of Astronomy to Cosmology - East West Orientation by Vidyarthi Nanduri; Conservation of Islamic Miniature Paintings at Victoria and Albert Museum, London by Mike Wheeler; From Precious Stones to Serpent's Bones: Indian Jewellery in the collection of Victoria and Albert Museum, London by Nick Bernard; the Role of Andhra Buddhism in developing the Buddhist Architecture – A Case Study by Babji Rao, Asstt. Archaeologist, ASI, Hyderabad Circle; Islamic Art in India by Kandregula Nageshwar Rao; Salar Jung Museum from its Inception by Museum retired two officers i.e., D. Bhasker Rao, Keeper (Education) (Retd.) and B. Kotaiah, Dy. Keeper (Retd.); the Glorious Iranian (Parsi) History and The Religion of Prophet Zarathushtra by Ervad Mehernosh H. Bharucha; Buddhist Pagodas and Antiques of Japan by Anuradha Reddy; Charminar - Icon of Hyderabad by Khalid Mohiuddin, Architect, JNTU; Journey to Moon-Chandrayaan I (Talk as part of United Nation World Space Week) by N.

Raghunandan Kumar; Bidri Sanath (Craftsmanship) by M. A Qayym; Cannons in Deccan Forts – The Neglected Beauties of India by S. Jaikishan; Constitution Dedication Day by G. Shanker; A Pictorial Introduction of Ramayana, Buddhist and Colonial Sites in Sri Lanka by V.V. Krishna Sastry and Anuradha Reddy; Historical Society of Hyderabad and SJM jointly organised a special lecture on Indian Epigraphy and its Development by C.A. Padmanabha Shastry and Salar Jung Museum and Historical Society of India has organized a film show on “Rise and Fall of Vijayanagara Empire” which was screened.

Museum has also organized Workshops on Karimnagar Filigree Art; Bidri Ware -The Art of Bidar; Zardozi and one day national seminar on “Sri Guru Granth Sahib Ji – A Spiritual Guide” on 26th April, 2009.

3. ARCHAEOLOGICAL SITE MUSEUM, KALIBANGAN

Wall showcases with false wall towards northern side of Gallery 2 for the display of published antiquities was prepared. Laminated wooden tiles on the floor of all the three galleries after removing the damaged tiles were provided. Stone built direction signage, bilingual name plates for museum collection, stone benches, 7 and stone built suggestion box, translite of proto-historic sites, write-ups on the site and museum, distemper of museum building and development of garden, etc. besides upgradation of the ladies toilet with modern facilities was completed.

4. ARCHAEOLOGICAL MUSEUM, KONARK

Bilingual brochures (English and Odia) on Museum have been published. Three slider doors with see through glass in the aluminium frame in between passages of galleries have been provided for effective air conditioning in the galleries. New lighting arrangement in the museum premises and outside open air sculptural shed area has been provided for security. Bi-lingual glow signage with galvanised iron frames has been prepared for installation. In order to improve the view of the museum, 38 masonry pedestal veneering with khondalite stone for displaying architectural/ sculptural fragments on the rear side and right side of the museum building have been done. Minor repairing and providing synthetic enamel paint after one coat of primer on MS grill over enclosure wall and 3 entrance mild steel grill gates of the museum was completed. 25 numbers of colour blow ups of centrally protected monuments and sites has been fixed on the walls of the corridor and *verandah*. Laying of terracotta lime cement tiles to the outer periphery of publication store building has been done. Installation of street lights from second gate of Museum to the residential complex for security reasons has been done. Minor repairing of doors, windows walls and painting of reserve collection building has been done. Minor repairing, fixing wire net, painting of museum office doors and windows have been done.

5. ARCHAEOLOGICAL SITE MUSEUM, LOTHAL

The work of providing new waterproof ply and sunmica in Gallery 3 and 4 of the museum is completed, and new cloth is provided in all showcases. Old

doors which were not in good condition are replaced with new ones at the entrance of the museum building. New vitrified tiles are provided in Gallery 1 to 4. Old write ups and labels which had become pale and worn-out are replaced with new ones.

6. ARCHAEOLOGICAL MUSEUM, OLD GOA

Stone pathway has been provided all around the area where mill stones of the gun powder factory were displayed and barricading the entire area to prevent the entry of visitors near the displayed antiquities was done. The heavy stone antiquities accumulated over the years in the store room, were shifted for display in the open air. Damaged vertical blinds were replaced with new one to regulate the automatic entry of air and light. Furniture was provided in the portrait gallery for visitors matching the ambience of museum.

7. ARCHAEOLOGICAL MUSEUM, RATNAGIRI

False ceiling of office room and inspection room has been done. Bi-lingual glow signage with galvanised iron frames have been prepared for installation. 20 colour blow ups of centrally protected monuments and sites has been fixed on the walls of the corridor and *verandah*. Glass showcases for Gallery 3 and 4 for display of

antiquities have been prepared. Installation of sculptures on already prepared pedestals in the rear side of the *verandah* including two of iron grills for security point of view was done. Laying of vitrified tiles on the remaining portions of the museum was completed. False ceiling, repairing with weather coat painting has been provided to the conference hall. Camouflaging of the wiring, lighting system including wall fans to the conference hall was provided. Visitor bench have been provided. Minor repairing of windows, grills of the museum building has been done. Repairing of the entrance facade of the museum and repairing and providing cudappah stone veneering to the existing damaged steps of the main approach of the museum was completed.

8. ARCHAEOLOGICAL MUSEUM, SRI SURYA PAHAR

The work relating to re-organization of the Archaeological Museum at Sri Surya Pahar like fixing of tiles after removing the stone slabs on the floor was completed. The extension work of the museum building at the back side has been taken up.

Documentation of 174 numbers of antiquities has been completed under National Mission on Monuments and Antiquities programme.

VI. ARCHITECTURAL SURVEY

TEMPLE SURVEY, NORTH

Documentation of temples of Kadwaha, District Ashok Nagar, Madhya Pradesh was carried out by the Temple Survey Project, Northern Region of the Survey under the direction of K. Lourduswamy, assisted by M. C. Joshi, S. K. Bajpai, A. Vyas, S. K. Shrivastava and K. R. Malviya.

Kadwaha (24° 55' N; 77° 55' E) is located about 16km north of Isagarh Tahsil and about 40km from Chanderi on northwestern side in the District Ashok Nagar. Kadwaha is a small village with a population of about five thousand and is well connected with Ashok Nagar, Guna, Shivpuri, etc. by motorable road. The nearest railway station and airport are Ashok Nagar and Gwalior respectively. Altogether, fifteen temples, made of sandstone. The surface morphology of the region is more or less plain. Presently, most of the temples are located around the cultivated land. Temples are grouped into various names i.e., *Ekla*, *Pachhali* (A, B), *Chandla*, *Bag* Group (A, B), *Marghat*, *Talao* Group (A, B), Group 7 (A, B, C), *Khirna* Group (A, B) and *Garhi*.

Temples at Kadwaha appear to have been constructed in three phases. In the earliest phase, the temples are simple and plain in terms of sculptural art, ground plan and elevation. *Vedibandha* of the temple is also plain. In the second phase, temples are decorated and sculptures are

shown in panels on the exterior of the temple. Mouldings of *Vedibandha* also increase. In the third phase, there is only one temple known as Siva Temple Talao Group 'A' which is decorated with mouldings of various designs and height of these temples has been increased considerably with curvilinear *sikhara*.

The main features of temples at Kadwaha are plain square or rectangular *garbhagriha* with a small porch which is supported on low height pillars in front and plasters at the rear. They are decorated with vase-foliage motifs with plain brackets. The most common feature is the door-sill which is decorated with fighting scene of elephant with lion on both the corners. In between the figures of *Udadhi kumaras* seated over *makara* with *kalasa* have been carved out elegantly.

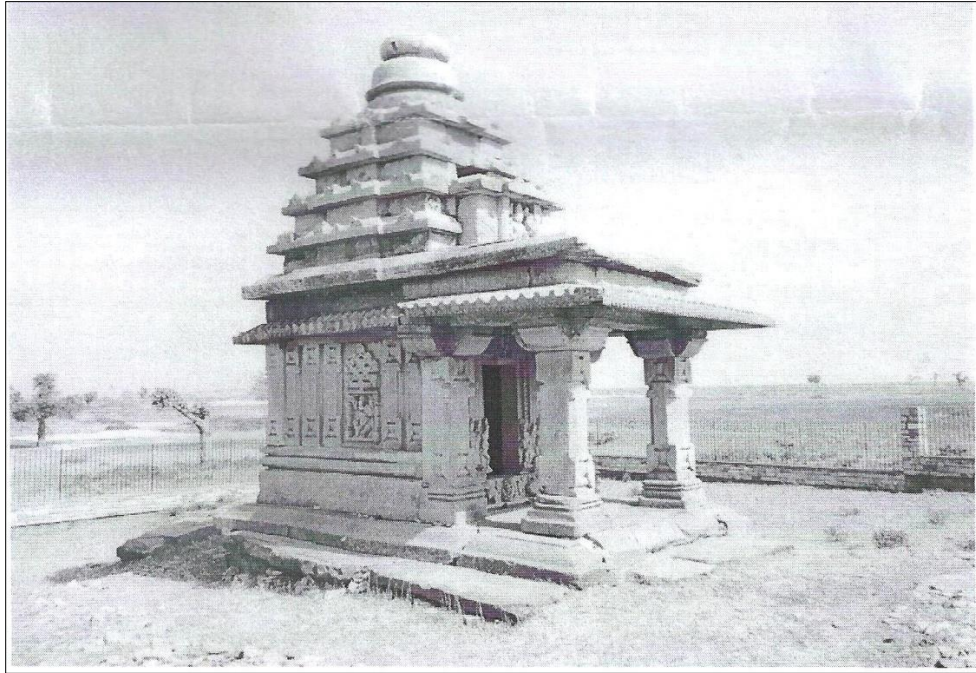
Chandla Temple, locally known as Chandala, is located at the western-most part of the village. This east facing temple was probably constructed in the earliest phase of temple architecture at Kadwaha. It is dedicated to lord Siva and is directly elevated from the *jadyakumbha*. Most striking feature is its pyramidal *sikhara* which is similar to the Dravidian style with bell-top. *Sikhara* is decorated with *Chaitya-arch* motifs. Exterior of the *jangha* is adorned with the sculptures of Surya, Chamunda and Ganesa in three sides in shallow niches. *Sukanasika* is

shown with a seated figure of lord Siva (pl. 74A).

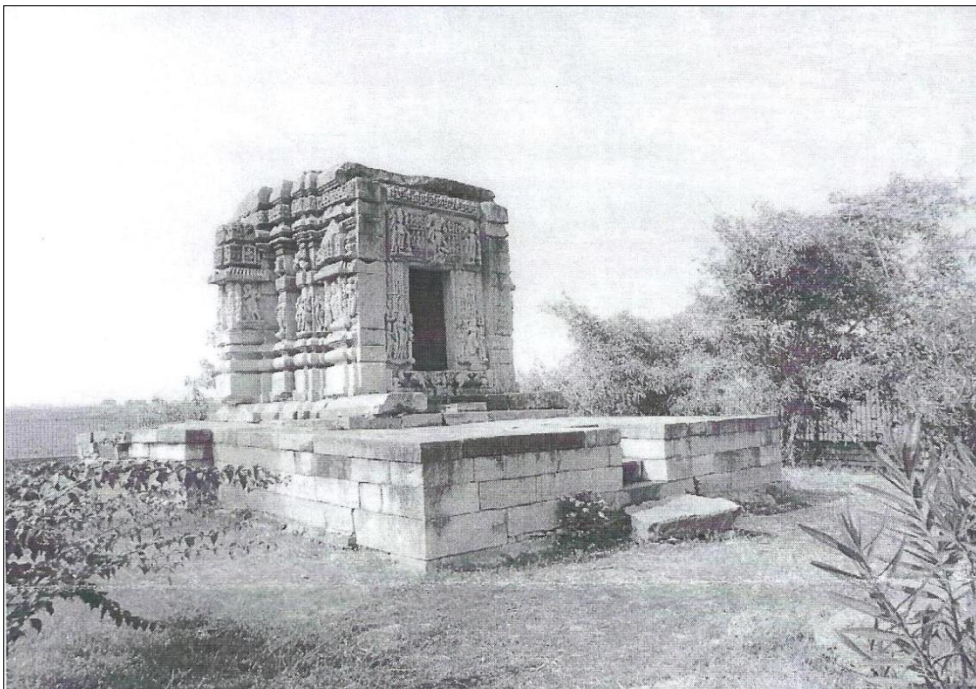
Ekla Temple represents the second phase of development of temple architecture at Kadwaha. The temple is surrounded by a compound wall, having *tri-ratha* plan, facing east, stands upon a low and plain *jagati* which is approachable through a flight of three steps on the eastern side. The temple is dedicated to lord Vishnu. At a later date, a Siva-linga with *yonipitha* was established in the sanctum. The temple consists of a square *garbhagriha*. The pillared porch and *sikhara* of the temple are lost. The southern side interior wall of the *garbhagriha* possess panels depicting *seshasayi* Vishnu and mother with child (probably Krishna-birth) while mother and child in standing posture has been shown on the northern wall of the *garbhagriha*. The ceiling of the *garbhagriha* is adorned with full blown lotus in a square border. Door-jamb of the *garbhagriha* is decorated with various divinities and sculptures. *Lalatabimba* is shown with lord Vishnu seated over Garuda and figures of Brahma and Siva have been depicted in the terminal points. Recesses show friezes of *navagrahas* and *matrikas*. The architrave of the door-jamb is depicted with a row of Ekadasha Rudra in seated posture. On the pedestals, the river goddess Ganga and Yamuna are shown holding water pots on the right and left side respectively. The vehicles *makara* and *kurma* are carved prominently below the river goddess respectively. The anthropomorphized *nagas* standing on the *rupa sakha* (human figures) are depicted in *anjali* pose. Door

sill is adorned with a scrolled *mandaraka* in the centre and fighting scene of elephant with a lion at both the ends. Further, a pair of foliage or *Udadhi kumaras* holding *purna kalasa* on either side is noticed on the door sill. *Jangha* portion starts from above the plain *pitha*. A *jadyakumbha* forming *pitha* and usual *vedhibandha* is consisting of *khura*, *khumbha* mouldings. *Bhadra* projection is given more prominence as a projecting sub-shrine occupying almost full height of the *jangha*. The *prahirathas* and *karnas* of the lower *jangha* display figures of *apsaras* and *dikpalas* and the upper row shows Surya figures including *mithunas*, while *salilantaras* shelter *vyalas* and *apsaras*. *Kapili* at the south preserves the image of Brahma. *Bhadra* niches in all three sides are empty and a *pranala* is shown on the northern side of the temple (pl. 74B; fig. 28).

Siva temple at Garhi area, at present is located in a deep dried up tank or dug out area surrounded by a rectangular stone wall. Dedicated to lord Siva, this temple represents the second phase of temple architecture at Kadwaha. Its front view is hampered due to a mosque probably constructed by Ala-ud-din-Khilji as there is an inscription found on the floor of this temple, datable to *Samvat* 1366 refers to the name of Ala-ud-din-Khilji. The temple consists of a rectangular *garbhagriha* and a small porch. *Sikhara* of the temple is missing. The temple stands upon a *jadyakumbha pitha* above which the *khura*, *kumbha* moldings adorned with small sculptured niches on each projection. *Garbhagriha* enshrines a *linga* which is



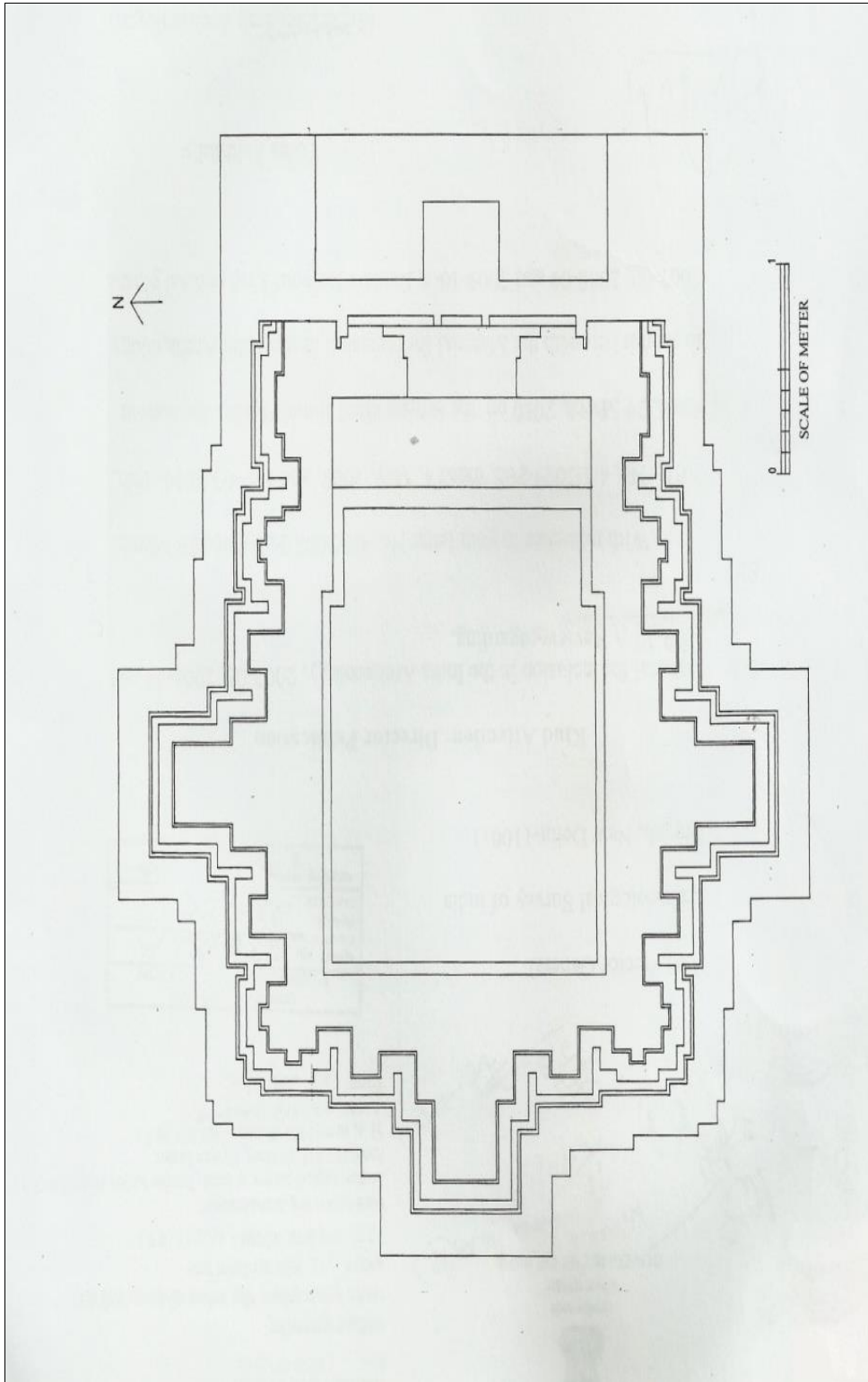
A



B

Kadwaha: A, Chandla temple and B, Ekla temple

Fig. 28



Kadwaha: Ekla temple plan

planted in a high *yonipitha*. The door frame is decorated with *panchasakhas*. The *mandapa* has a pair of heavy pillars and pilasters ornamented with *patravalli*, *kirtimukhas* and *kumara* brackets. Pillars are decorated with *purna ghatapallava* on the top and below portions. Base of the pillar is square having *khura*, *kumbha* moldings. The *khura* bears four miniature niched sculpture on each cardinal direction having figures of dancers. *Jangha* is divided into two rows by a medial *pattika* of *tamalapatras* but shows a single row of sculpture. The *pratirathas* and *salilantaras* possess the figures of deities, *naikas*, *vyalas*. While the *karnas* show *dikpalas*. *Kapili*-portion has deities in niches with *kutachhadyas* whose crowning *udgamas* occupy the upper register of the *jangha* (pl. 75A).

Siva temple, Talao group, 'A' facing east is located in the eastern-most part of the village near by a dried-up tank and belongs to the developed phase of temple architecture at Kadwaha. This temple can be approached through a flight of steps on the eastern side. The artists made utmost efforts in this temple to reach the zenith of temple architecture. The temple consists of a *garbhagriha* with a Siva-*linga* and a porch in front. *garbhagriha* is plain but *dwarsakha* of the main doorjamb is attractive which is adorned with *tri-deva* along with their consorts. The most striking element of the temple is the ceiling of the decorated porch which has a full blown lotus. The porch of

the temple is provided with high *kakshasanas* with various inscriptions. The corner projections of the *sikhara* consist of *antarpatta* at alternate height and the *jangha* portion rests upon an elaborately moulded base and large numbers of images are carved elegantly around it (pl. 75B).

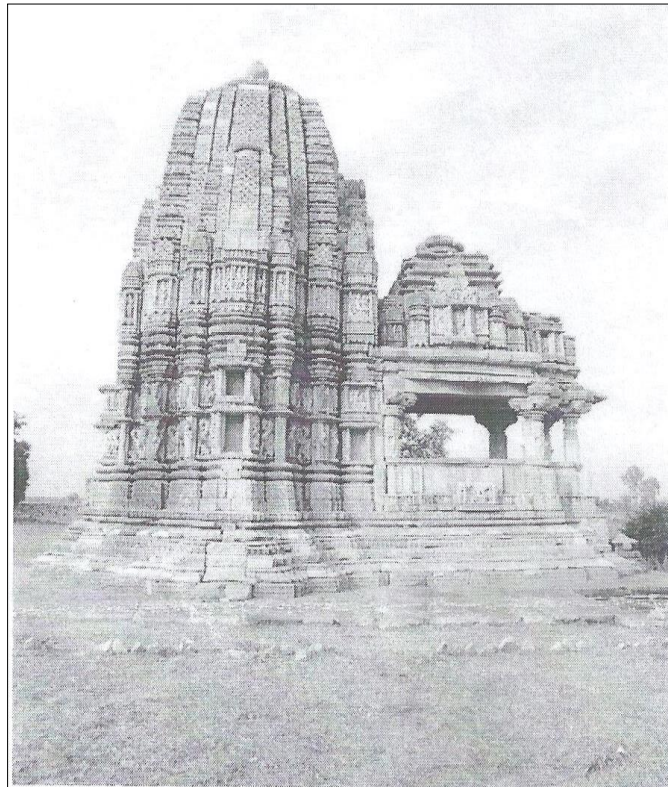
A good number of sculptures of deities of Brahmanical pantheon are found in Kachhapaghata temples at Kadwaha. Sculptures at the temples are mainly forms of Siva, Vishnu, Ganesa, Surya, *dikpalas*, etc. Besides, there are the figures of Brahma and female deities i.e., Chamunda, Saraswati, Lakshmi, Saptamatrikas, etc. The doorways are very attractive in terms of sculptural representation in which the *lalatabimba* is shown with the deity to which the temple is dedicated. In some cases, deity on *lalatabimba* is flanked by the *tri-devas* with their consorts. Normally Brahma, Vishnu and Mahesa are depicted on top of the *dwarsakha*. In addition, there are the figures of Ganga-Yamuna, *apsaras*, *nafikas*, *vyalas*, wrestlers, etc.

The temples of Kadwaha possess the same elements as those of temples as Survaya, Terehi, etc. The temples are datable to 10th- 12th century CE. Kadwaha is not only important from the point of view of temples but there is a lot of scope for excavations in and around which can shed new light on the chronological history of this region in Central India. The temples of Kadwaha are embellished with detailed iconography of Vaisnava and Saiva sculptures.

Plate: 75



A



B

Garhi: A, Siva temple and Kadwaha: B, Siva temple, Talao group, 'A'

TEMPLE SURVEY, SOUTH

The Temple Survey Project, Southern Region of Survey has taken up extensive documentation of the Cave Temples of Pandyas, Muttaraiyars, Atiyamans and other feudatories in Tamilnadu, under the direction of D. Dayalan, assisted by A. Anil Kumar, S. Ashok Kumar, A. Palanivel, T. Samuel Joshuva and T. S. Balasubramanian.

The cave art creations of Pandyas, Muttaraiyas, Atiyamans and other feudatories in Tamilnadu are indeed a significant chapter in the assimilation and linking of art and cultural trends of other parts of the peninsular India into the native genius of Tamilnadu. They are the largest corpus of the early art creations in rock and their classic iconographic richness in the rock-cut caves shows its distinct characteristic feature. Majority of the cave temples of this category are roughly placed between *circa* 650 CE and 825 CE, whereas, the Pallava rock-art tradition had completely vanished in the second part of 8th century itself. The Pandya cave temples reveal several cult representations; many of the divinities represented are depicted for the first time in their earliest form in the cave temples of Pandyas and not even in the Pallava corpus of cave art.

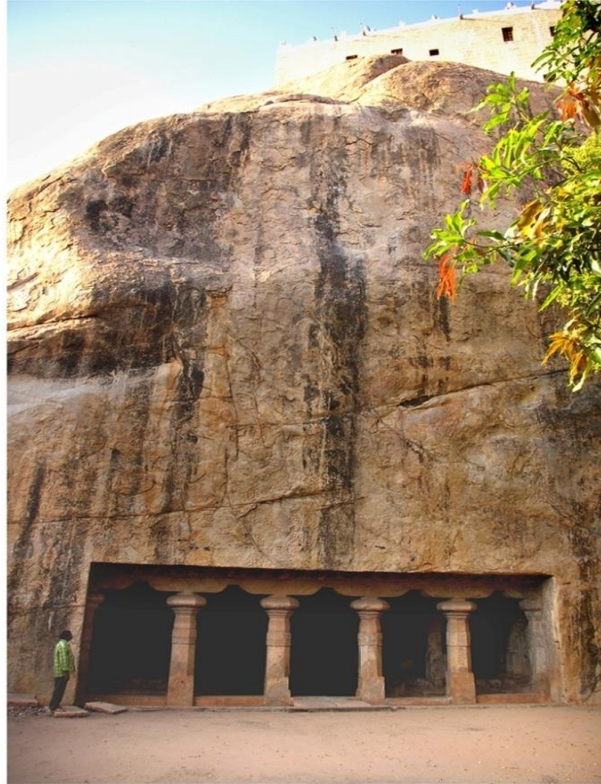
The cave temples are peculiar in many respects in comparison with the Pallava counterparts in the northern part of Tamilnadu. Many of the cave temples have rock-cut Siva-*linga* with rock-cut *pitha*; they are either square, octagonal or circular in shape. There is also rock-cut cistern in many of the cave temples to collect the *abhisheka* water and also rock-cut Nandi. Interestingly, some of the cave temples like Kudimiyanmalai, Malayakkoyil and Tirumayam have musical inscriptions of identical nature. The varieties of iconographical representation of various divinities is also a remarkable feature of these cave temples.

Around 75 examples of rock-cut cave temples and the solitary monolithic model have been listed and extensive documentation of the cave temples in Pudukkottai, Tiruchirappalli and Sivaganga districts has been completed (pls. 76-78).

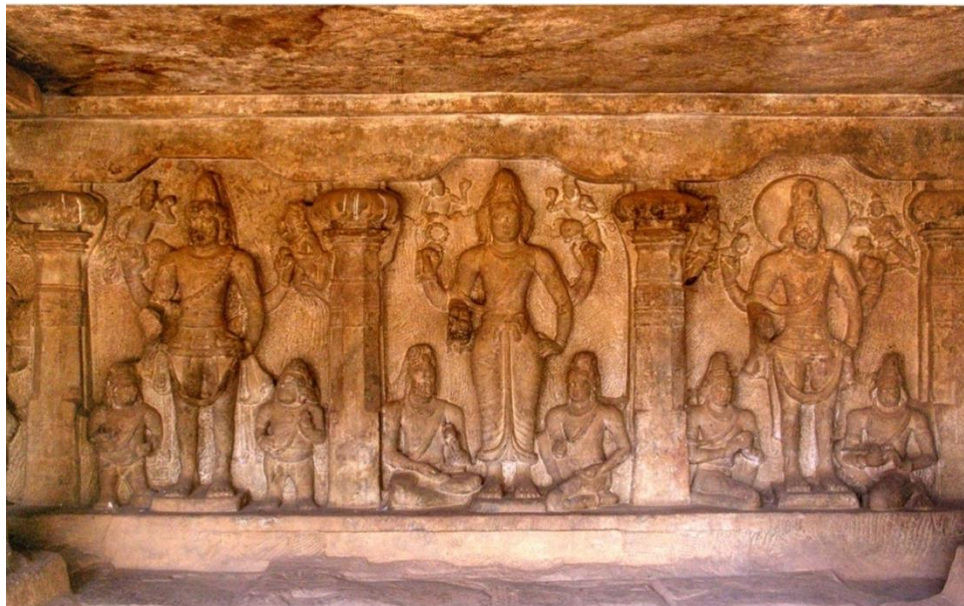
All the sites are geo-registered and distribution map has been prepared. The documentation of the caves with necessary drawings on scale is being prepared for all the caves, besides detailed digital photo-documentation of all the caves. The list of cave temples studied in detail is shown below in the form of a table.

<i>Rock-Cut Cave Temple</i>	<i>Place</i>	<i>Taluk</i>	<i>District</i>	<i>Latitude /Longitude</i>
Lower Rock-cut Cave Temple	Tirucchiarpalli	Tirucchirappalli	Tirucchirappalli	10° 49' 40.1" N; 78° 41' 46.3" E
Unfinished Rock-cut Cave Temple	Tiruvellarai	Mannaccanallur	Tirucchirappalli	10° 57' 21.5" N; 78° 40' 21.7" E
Siva Cave temple				

Siva Cave Temple	Tirupainjili	Mannaccanallur	Tiruchchirappalli	10° 56' 05.1" N; 78° 40' 41.7" E
Vishnu Cave Temple	Malaiyatippatti	Kulattur	Pudukkottai	10° 39' 14.9" N; 78° 53' 49.1" E
Siva (Vagasvara) Cave Temple				
Parvatagirisvarar Cave Temple	Kunnandarkoil	Kulattur	Pudukkottai	10° 34' 55.4" N; 78° 53' 52.1" E
Vishnu Cave Temple	Narttamalai	Kulattur	Pudukkottai	10° 30' 17.1" N; 78° 45' 27.0" E
Paliyili-Esvaram Cave Temple				
Arivarkoyil (Jaina Cave Temple)	Sittannavasal	Iluppur	Pudukkottai	10° 27' 20.7" N; 78° 43' 30.7" E
Unfinished Cave Temple	Mankuti	Iluppur	Pudukkottai	10° 24' 51.9" N; 78° 42' 54.5" E
Melaikkoyil (Tirumerrali) Cave Temple	Kutumiyanmalai	Iluppur	Pudukkottai	10° 24' 58.8" N; 78° 39' 31.1" E
Kokarnesvara Cave Temple	Tirukokarnam	Pudukkottai	Pudukkottai	10° 23' 25.8" N; 78° 48' 01.5" E
Siva Cave Temple	Tevarmalai	Tirumayam	Pudukkottai	10° 21' 11.9" N; 78° 44' 14.8" E
Eastern Siva Cave Temple	Malaiyakkoyil	Tirumayam	Pudukkottai	10° 20' 06.7" N; 78° 42' 45.8" E
Southern Siva Cave Temple				
Pushpavanesvara Cave temple	Puvalaikkuti	Ponnamaravati	Pudukkottai	10° 20' 01.5" N; 78° 37' 32.8" E
Satyagirisvara or lower Siva Cave Temple	Tirumayam	Tirumayam	Pudukkottai	10° 14' 49.6" N; 78° 45' 06.5" E
Upper Rock-cut Siva Cave Temple				
Vishnu Cave Temple				
Siva Cave Temple,	Kulalakkottaiyur	Tirumayam	Pudukkottai	10° 15' 03.6" N; 78° 47' 50.7" E
Malaikkoluntesvara Cave Temple,	Ayinkuti	Tirumayam	Pudukkottai	10° 14' 20.9" N; 78° 48' 29.8" E
Cave Temples	Kunrakkuti	Tiruppattur	Sivaganga	10° 06' 52.8" N; 78° 41' 55.0" E



A



B

Tiruchirappalli: Lower rock-cut cave temple: A, general view and B, sculpture panel

Plate: 77



A



B

Tiruvellarai: Unfinished rock-cut cave temple: A-B, general view



A



B

Tirumayam: A, Siva cave temple, view of the facade and B, Siva-linga

BUILDING SURVEY PROJECT

The Building Survey Project of the Survey took up study of the architecture of the secular heritage buildings in the city of Varanasi, under the direction of C.B. Misra assisted by Pradeep Kumar Pandey, S. K. Dixit, Shakeel Ahmad and Jatinder Kumar with the main objective to study and document the Colonial and other old buildings, *ghats* and other secular structures which were constructed during 17th-19th century CE, in the holy city of Varanasi.

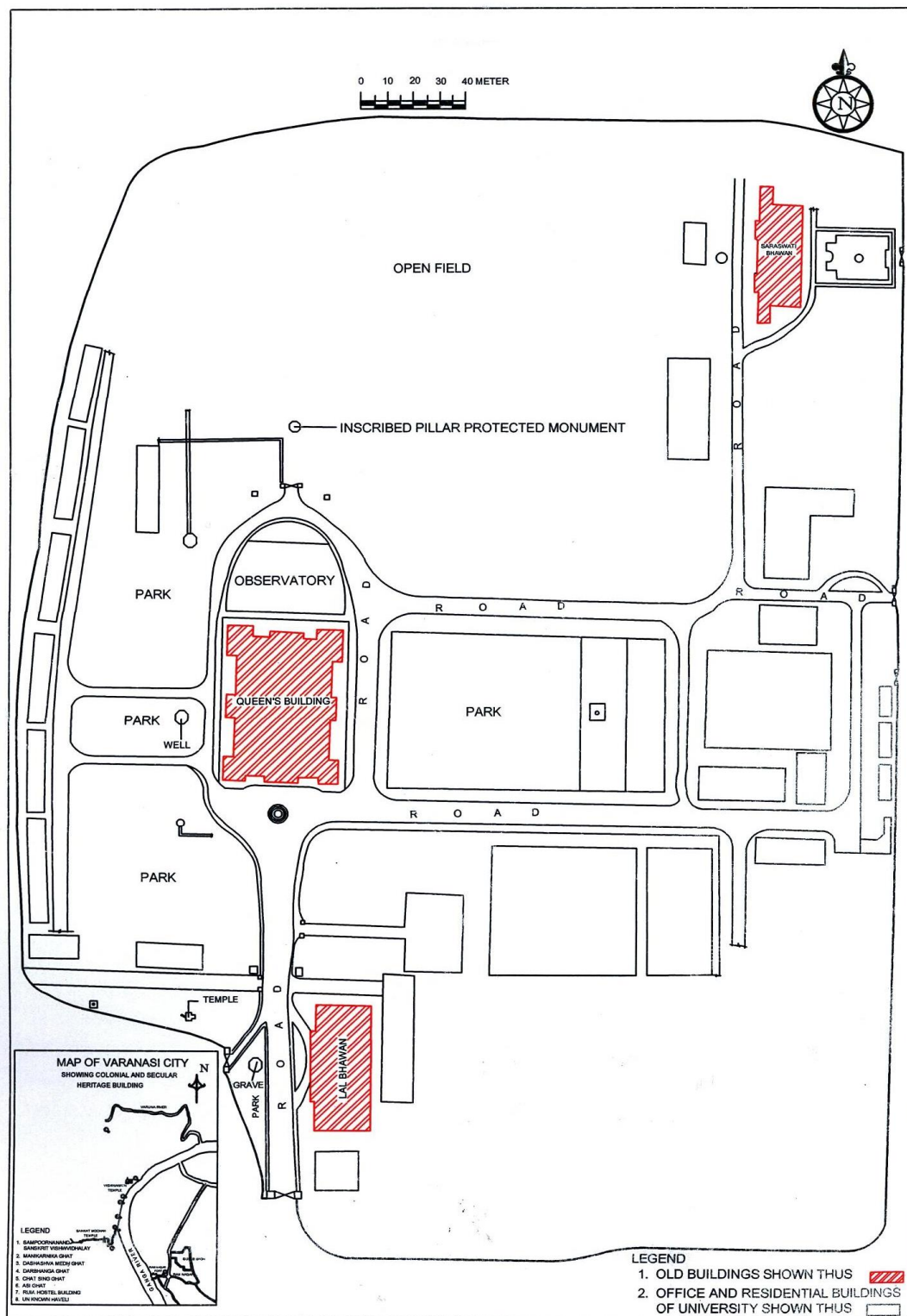
The survey was started from south to north along the river and in the city. There are several *ghats* along the river and these *ghats* from Asi *ghat* in the south to Adi Keshava in the north are having high mansions or magnificent temples. Over 40 secular buildings have been identified in Varanasi in the first field season. Out of these, three buildings located in the premises of Sampooranand Sanskrit University have been thoroughly documented by way of preparing drawings including plan, elevation and photographs. These secular buildings belong to 17th-19th century CE and constructed by the native Hindu rulers of the country and also under the British rule.

Sampooranand Sanskrit University: Located about 3km away from Cantt. Railway station in the suburb of Varanasi, it is one of the finest colonial buildings of this period. Originally, there are three main buildings viz. Queens Building or Main Building with two lateral guard rooms, Lal Bhawan and Saraswati Bhawan. Now, several new constructions have come up in

due course of time in the University premises, which cater to accommodate the national and international students.

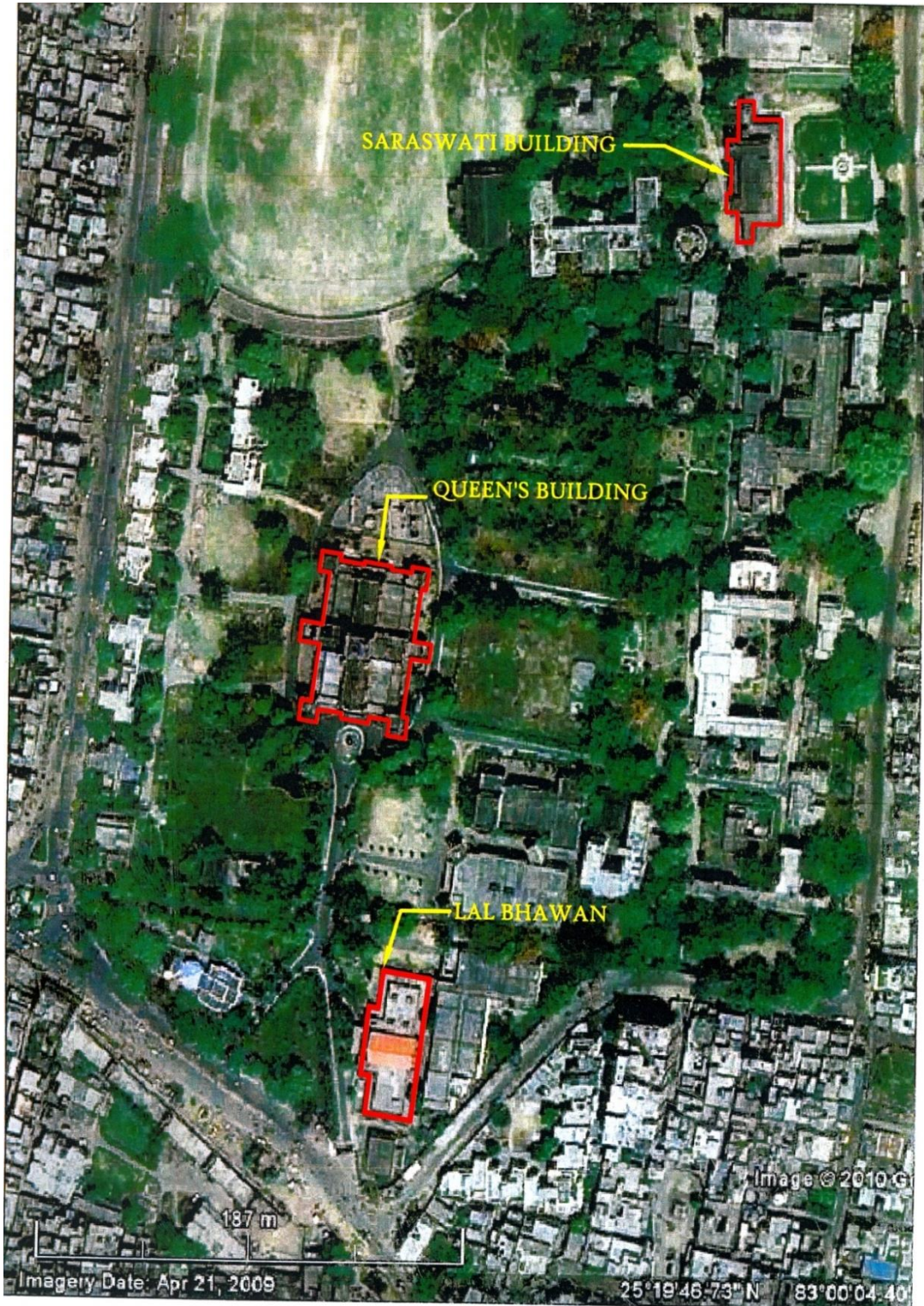
The Sampooranand Sanskrit University has a great history of about more than 200 years. In other words, the history of the Sampooranand Sanskrit University (fig. 29; pl. 79) symbolizes history of the Sanskrit education in India. The history of the Government Sanskrit College goes back to the last quarter of the 18th century CE. Under a proposal of Jonathan Duncan, the Govt. Sanskrit College was established in 1791. Pt. Kashinath was its first teacher and *Acharya*. At that point of time, there was an arrangement for the teaching of subjects such as *Vedas*, *Vedanta*, *Purana*, *Ayurveda*, *Sahitya*, astrology, theology, *Mimamsa*, *Nyaya*, etc. The college was managed with the surplus revenue of the Benares State. At present, the Sampooranand Sanskrit University has a number of faculties and departments dedicated to the study of various disciplines of humanities and other related science. In 1844, Sir J. Muir, ICS, was made its first Principal who made efforts to develop the college in various respects. Dr. J. R. Valentine developed the spirit of a comparative study of oriental and occidental classics and specific Sanskrit texts were translated into English in order to achieve this goal. Dr. Valentine established an Anglo-Sanskrit Department with this end in view. In 1861, Dr. R. T. H. Griffith was appointed its Principal. He was the first scholar who translated the *Valmiki Ramayana* into English verses. A reasonable achievement was made in the

Fig. 29



Sampoorananand Sanskrit University: layout plan

Plate: 79



Sampurnanand Sanskrit University Campus: Google imagery

direction of development preservation and advancement of Sanskrit learning during his principalship. The publication of '*The Pandit*'- '*Kashi Vishva Sudhanidhi*' was launched which contained translations of many rare Sanskrit texts. The publication of this magazine continued till 1916. During the principalship of G. Theibo, the system of oral examination was abolished and the system of written examination as well the issue of certificates and degrees was started.

The Sampooranand Sanskrit University (Vishwavidyalaya) was founded on 22 March, 1958 by the then Chief Minister Sampooranand and Education Minister Pt. Kamalapati Tripathi, with the name of 'Varanaseya Sanskrit Vishwavidyalaya'. A. N. Jha was its first Vice-chancellor. After that it was renamed as Sampooranand Sanskrit University under the Uttar Pradesh State University Act, 1973 w.e.f. 16th Dec. 1974.

Queen's Building (Main Building): Standing majestically in the centre of Sampooranand Sanskrit University campus, this architectural marvel was built in 1853 purely in Gothic style. It is designed and built by Major Markham Kittoe (1848-1852) (figs. 30-33). It is constructed in mixed masonry of stone, wood and bricks. Largely sandstone has been used in the construction but the main walls are made of bricks laid in lime mortar and plastered with lime. However, the entire decoration is made of stone and wood. The building was constructed for establishment of a Sanskrit College in

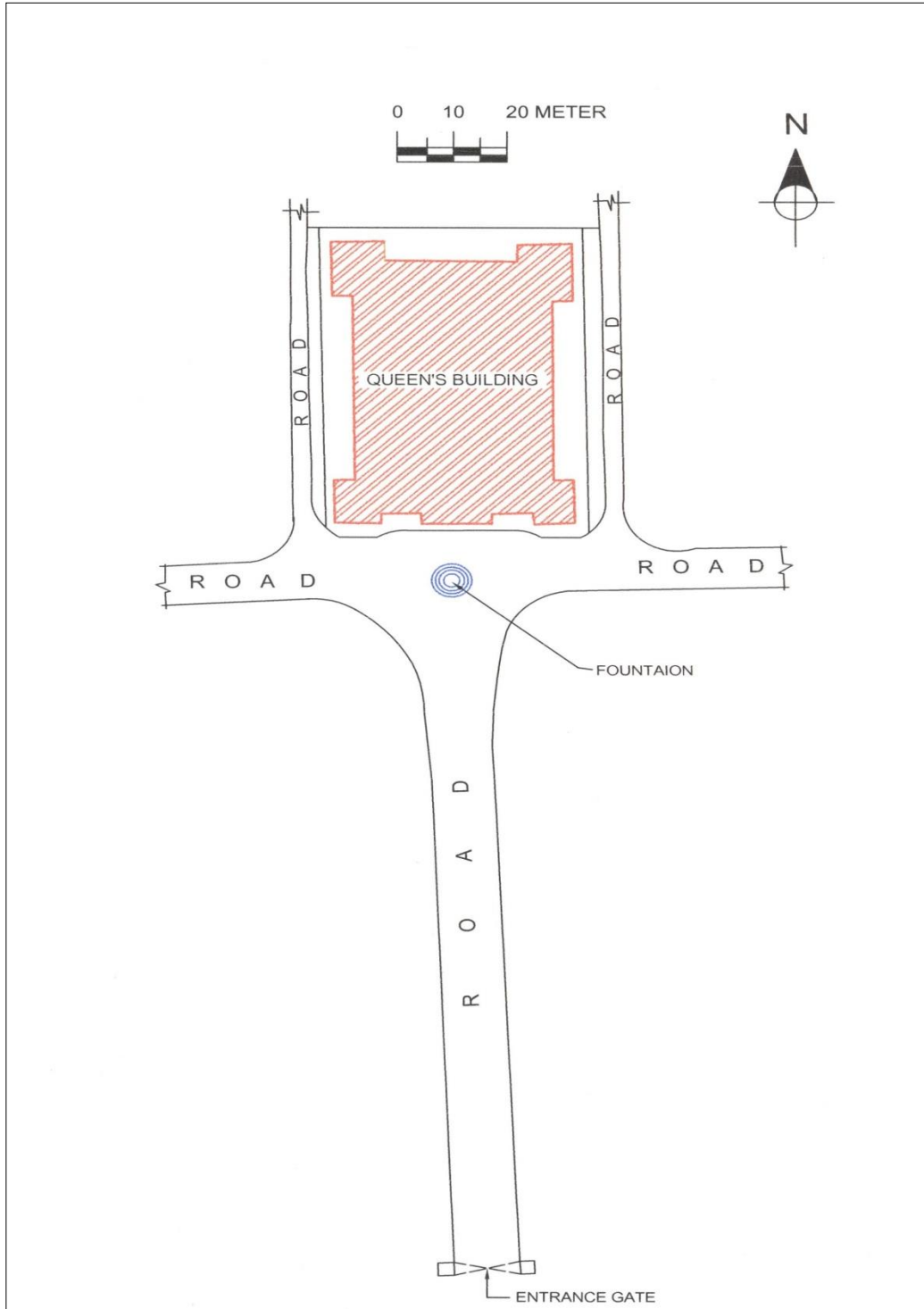
Varanasi which was earlier called as Queen's College (pls. 80-81).

Facing south, the building is rectangular on plan having four square corner towers and two pillared porticos on the east and west. It is a single story mansion fabulously designed on Gothic architecture with exquisite workmanship to accommodate the students. There are three halls in a series which divide the building into two halves, each having eight rectangular rooms and a square hall in the centre. The square rooms have been provided with high arched openings from inside and small arched openings through pillared portico on the east and west respectively. There are two staircases located behind the pillared portico leading to the roof. Besides, each of the corner towers has been provided with spiral staircases to get access to the first floor.

The building is a single-storied structure except the superstructure of the central main hall which has lofty high rising shaft giving an appearance of three-storied structure.

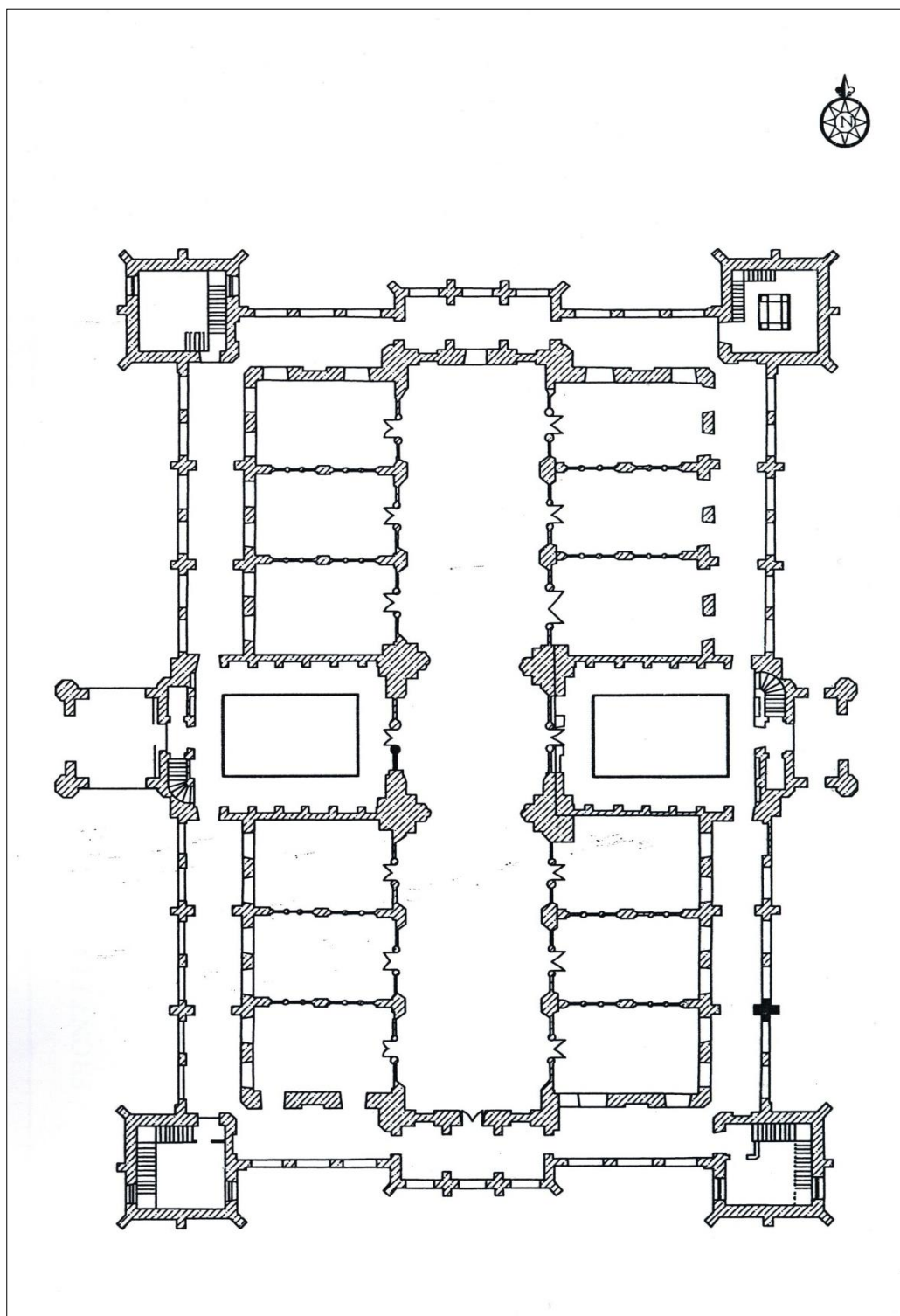
It is profusely decorated with side arched oriel windows fitted with blue and green coloured glasses. The exterior of the building is executed in such a manner that it gives a magnificent towering look from all sides, embellished with corner towers, turrets and side buttresses on each pillar. The outer walls are decorated with recessed rectangular alcoves having cusped arches with lofty finials on the top. At the height of the roof, it is having a band of trefoil design all around the building and

Fig. 30



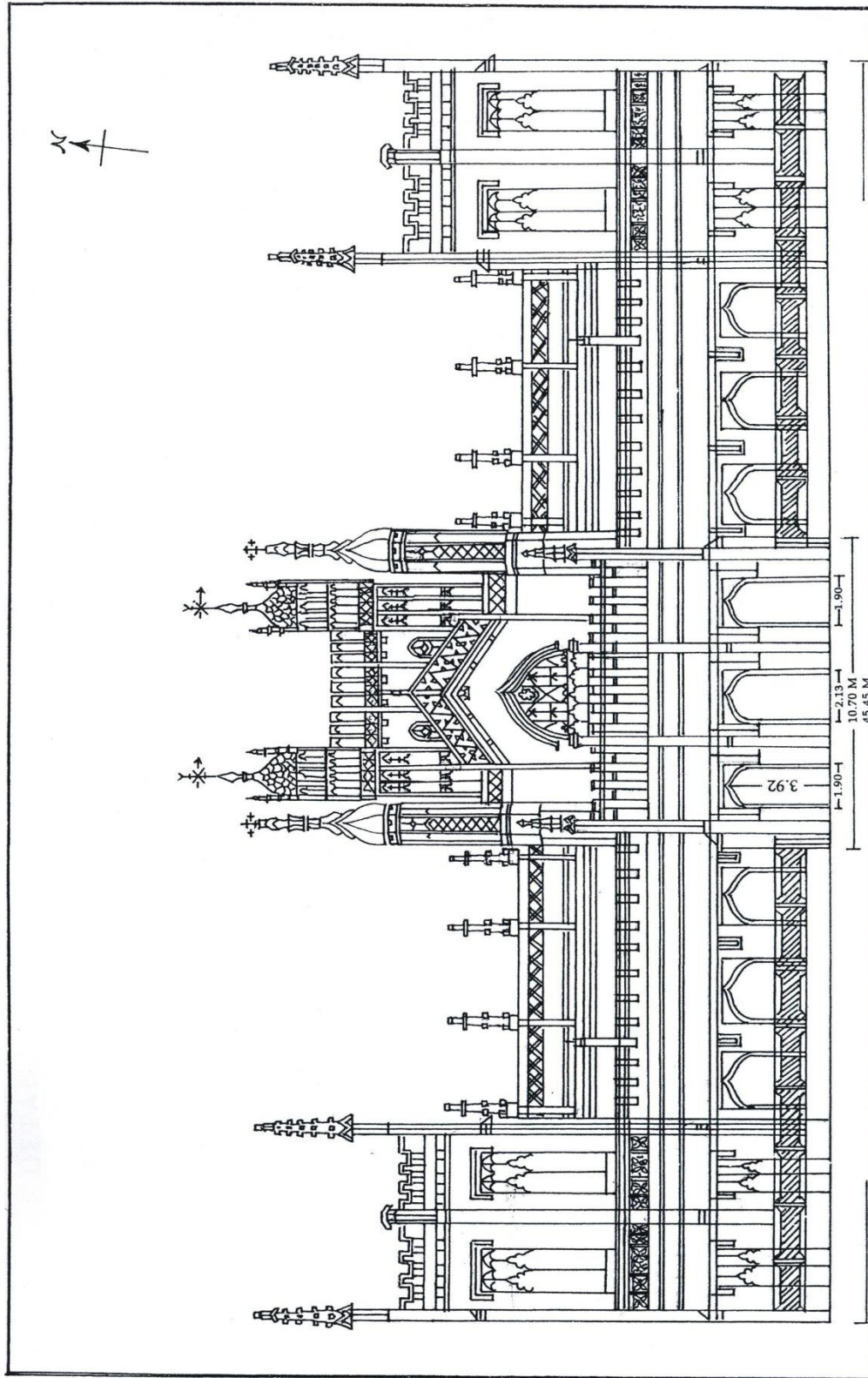
Sampoornanand Sanskrit University: site plan of Queen's Building

Fig. 31



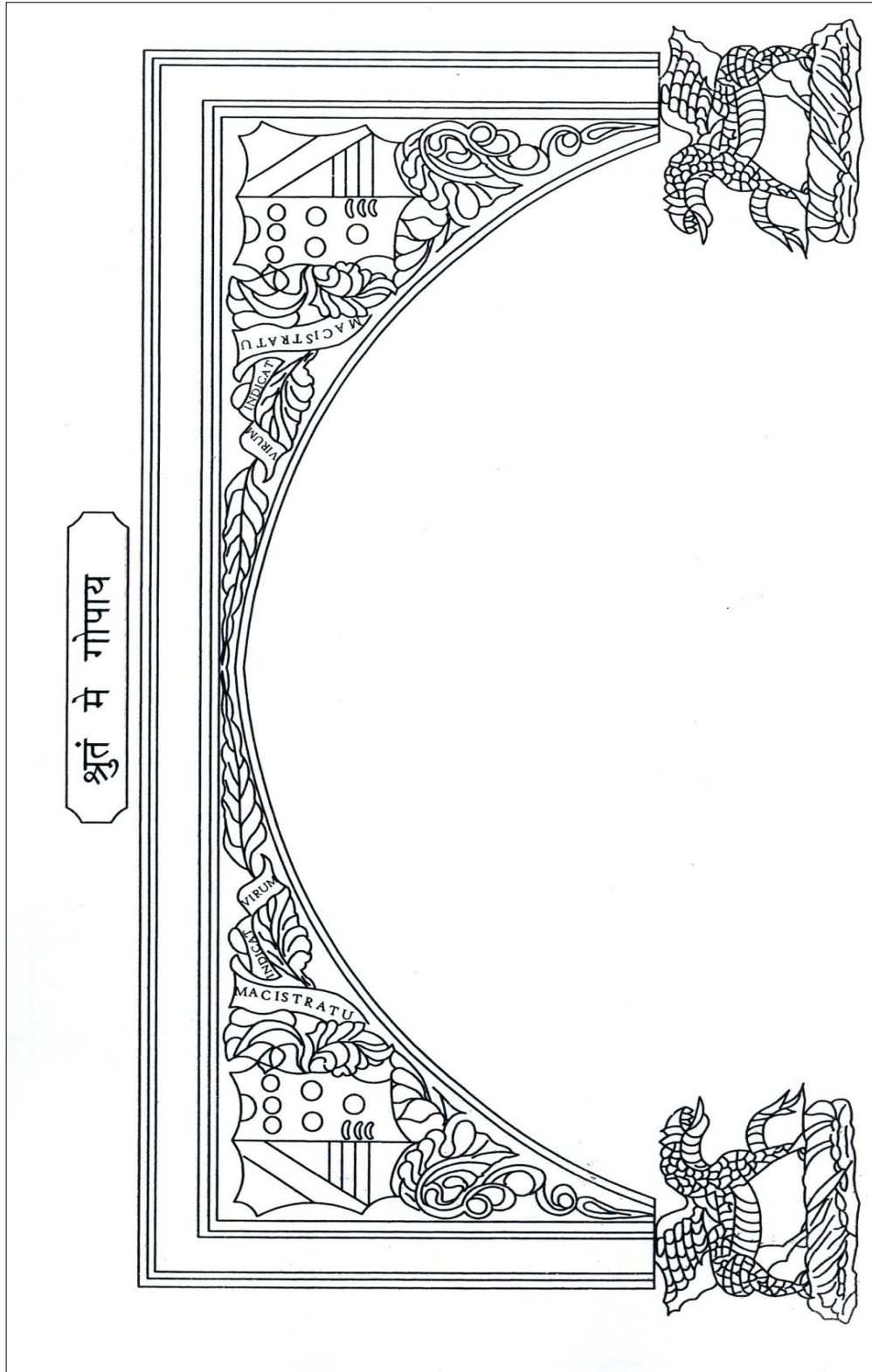
Sampurnanand Sanskrit University: ground floor plan of Queen's Building

Fig. 32



Sampurnanand Sanskrit University: front elevation of Queen's Building

Fig. 33



Main hall of Queen's Building: details of carving on the main entrance

Plate: 80

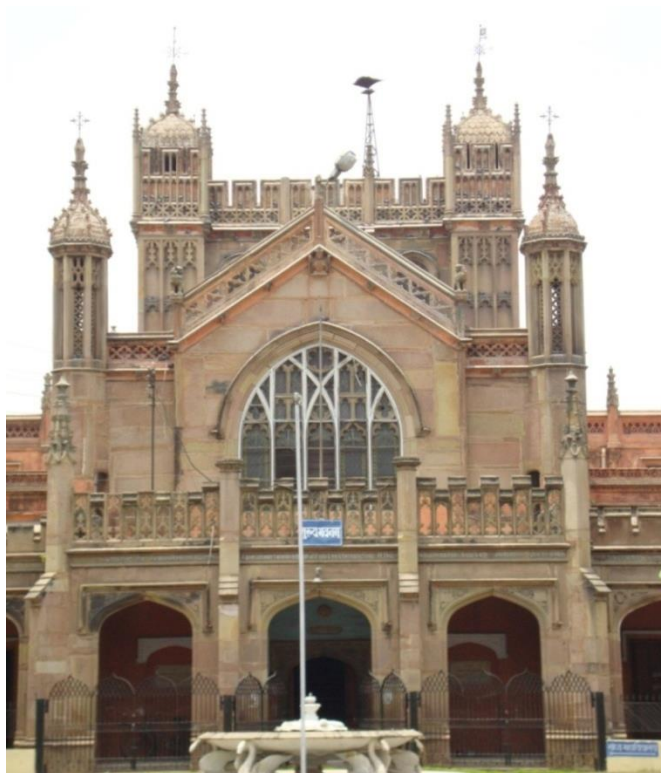


A



B

Sampurnanand Sanskrit University: Queen's Building: A-B, general view, north-western side



A



B

Sampoornanand Sanskrit University, Queen's Building: A-B, front close-up view, northern side

just below it there is inscribed frieze depicting *devanagri* verses. Above the decorative band, a chain of merlon in Gothic style with small arched decorations is provided over the outer walls of the corner towers, whereas there are plain merlons over the main buildings. The side buttresses reach up to the height of roof and they culminate in the form of a minaret, having square barb denticulations. These square barbed minarets form the typical feature of the Gothic style.

The super structure over the main hall of the building is having a high arched façade with triangular pediment in the centre as crowning member, flanked by octagonal turrets on four corners with domical roof having long finials. It is having a roof made of GI sheets supported on wooden rafters and on the inner side is provided with false ceiling. The corner turrets are hollow and filled with lattice screen from all eight sides. Whereas, the third floor of the building is raised upward with vertical shaft having no projections, but sides are filled with arched windows to facilitate ventilation in the main building. Square on plan, it has four corner turrets, with each one being different from the other and embellished with recessed arched decoration arranged in two tiers. The top of the minarets has domical ceiling with elongated finial covered with fish scale decoration of stone tiles. The entire building is having pillared *verandah* with arched openings on all four sides having slanting roof apparently made of stone planks.

The main entrance of the building

is from the south, through an arched doorway embellished with Gothic mythological symbols and figures labeled with inscriptions. An inscription engraved in bold relief records that it is a '*The Gift of Robert Lobth*' and just above it, there is a white marble slab fixed later which records '*Shrutam me Gopaya*' in *Devnagari*. A mythical winged animal is carved on either side of doorway. The main entrance leads to the main hall which has high roof of galvanized iron sheets and is provided with false ceiling. Below the ceiling, are wooden battens and horizontal beams decorated with lotus pendentives. The side walls of the hall have arched openings on the sides provided with windows which were meant for light and ventilation. The side rooms are used as official chambers of professors of various departments. An arch divides the main hall from the central hall, is decorated with border of Persian verses in Nasta'liq character. Besides, all the side arched entrances of the building are decorated with scroll, animal motifs and others are plain. The western entrance of the portico is mentioned to be donated by G. M. Voff. MD as engraved over the lintel and its sides are decorated in with verses in *Devanagri* in high relief. The building is provided with gargoyles, varied forms of animal heads mainly those of *makara* and cow.

There are two guard-rooms which are now abandoned, constructed on either side of the main road leading to the main building. It is double-storied structure with pillared portico on two sides i.e., on the front and north. A crescent-shaped parapet

with short octagonal post is provided in the front portico. It is designed in Gothic style and harmonizes with Queen's building. This is meant for housing guards, but left side building was previously used by the security officer as shown by a stone tablet fixed over the doorway. There are two rooms on the ground floor and one octagonal chamber on the first floor. The roof of first floor is supported on jack-arched mild steel girder and side top is provided with merlon and dwarf octagonal turrets. It is made of stone and brick masonry plastered with lime plaster and wash. The side walls and pillars are supported with buttresses as in the Queen's Building. A band of latticed *jalis* are provided in the parapet of first floor.

On the basis of the architecture, artistic decorations and planning this building can be said to be one of the gems of colonial buildings built in Gothic style in Varanasi. It is carved in a beautiful manner with all elements of Gothic architecture combining indigenous traits within. The carving of *Devnagari* verses in high relief on stone and *pranalas* provide an elegant look to the edifice (pl. 82).

Lal Bhawan: Situated just abutting to the southern entrance of Sampurnanand Sanskrit University on the right side is a building known as Lal Bhawan. It is made of mixed masonry of stone and bricks. Sandstone is profusely used in corner buttresses, pillars, turrets and lattice works while the main walls are made of brick work laid in lime mortar and plastered with lime (pl. 83).

Facing west, this single storey building is rectangular on plan and is having a large hall in the centre and chambers on either side. It has pillared portico and pillared *verandah* on the front. It is standing on low plinth and is designed in Gothic style and is accessible by a flight of steps from the portico. The name of the builder cannot be ascertained but it seems that it is contemporary to the Queen's Building because both are similar in architectural style. The building is having plain exterior and interior except for the buttresses provided at intervals and especially at the corners to provide strength to the masonry wall.

The facade of the building is having triangular pediment in the centre as crowning member, flanked by octagonal turrets, two on either side at different levels. The triangular pediment is having separate denticulate turrets similar to Queen's building. The side parapet wall is decorated with tapering merlons at the top while lower parapet is decorated with stone *jali* (pl. 84).

The building is entered through a three arched opening with a high arched doorway connecting it to the main hall. The hall has high plain walls covered with Mangalore tiles supported on mild steel girder and wooden rafters. The side rooms and doorway connecting it to the main hall. The hall has high plain walls covered with Mangalore tiles supported on mild steel girder and wooden rafters. The side rooms and *verandah* of the buildings are having half-jack arched roof supported on mild steel girder. A rectangular shaft is open in

Plate: 82



A



B

Sampoornanand Sanskrit University: Queen's Building: A, rear view with observatory in fore-ground and B, general view, north-western flank



A



B

Sampoornanand Sanskrit University: A-B, Lal Bhawan, general view

Plate: 84



Sampurnanand Sanskrit University: Lal Bhawan, view of south-west corner

the centre of each hall for providing air and light in the classrooms. Presently, this building is used for running B.Ed. classes.

Saraswati Bhawan: Situated on the north-western corner of the campus and standing separately on a low lying area. This library building was designed and meant for keeping old Sanskrit manuscripts and books. Presently, this building preserves and publishes Sanskrit manuscripts resulting in the establishment of the "Saraswati Bhavana" library, which has become one of the most reputed and well known centres in the whole world (pl. 85). During the principalship of Ganga Nath Jha (1918-1923) the publication of "Saraswati Bhavana Granthamala" and "Saraswati Bhavana Studies" was started and specific Sanskrit texts based on extensive researches were published which marked a remarkable approach in the direction of study and dissemination of knowledge inherent in Sanskrit texts.

Facing east, the building is made of mixed masonry of stone and brick work. It was built by Arthur Venis, Principal, Sanskrit College (1888-1918) under his supervision in 1922 as revealed from the stone tablet fixed on the front wall of the library (pl. 86).

Largely designed in Indo-Islamic architecture and laid out on a rectangular

plan with side projections on the north and south directions, it has front dwarf portico supported on two pairs of composite pillars with a staircase leading to the verandah. The long verandah is having half jack-arched roof supported with mild steel girder resting on square stone pillars. Behind there is another recessed hall with a verandah supported on pillars. The pillars of the verandah stand over the square cushion base having square shaft and are crowned with square drum decorated with lotus. The pillars are having broad brackets with lotus pendentives similar to Indo-Islamic architecture of Rajasthan (pl. 87). The decoration of projected windows and pillar capitals are having affinity with the pillars of *Diwan-i-Aam* of Amber and other buildings of Jaipur.

A broad stair case is provided on the northern flank to access the first floor of the building. There is a large hall with front pillared portico on the first floor repeating the part plan of ground floor. The entire building is having side projected *chhajjas* supported on prominent brackets and projected windows supported on square pillars all around. The rear side verandah is fitted with wooden windows with glass panels, which seem to have been added later. Besides, the building is plain from exterior and interior. This building exhibits beautiful synthesis of Indo-Islamic features.

Plate: 85



A



B

Sampoornanand Sanskrit University: A-B Saraswati Bhawan, general view

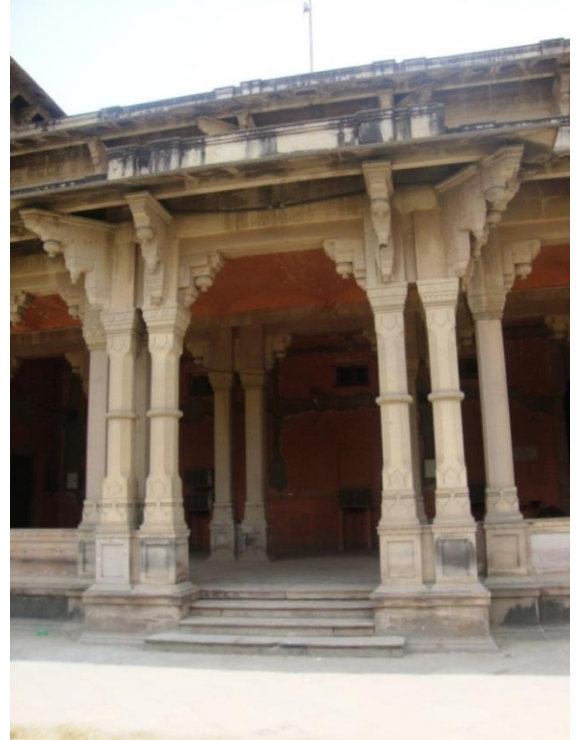


Sampurnanand Sanskrit University: Saraswati Bhawan, rear view

Plate: 87



A



B

Sampoornanand Sanskrit University: Saraswati Bhawan: A-B, view of brackets and entrance gate

VII. PRESERVATION OF MONUMENTS

MONUMENTS OF NATIONAL IMPORTANCE

AURANGABAD CIRCLE

MAHARASHTRA

1. TOMB OF NIZAM AHMEDSHAH, AHMEDNAGAR, DISTRICT AHMEDNAGAR

The tomb of Nizam Ahmedshah is located in the north-western part of Ahmednagar city and is enclosed by a high enclosure wall, many portions of which 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-west 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.

The damaged enclosure wall was reset and reconstructed with available and fresh stones. A large portion of the south western arm was completely reconstructed with lime mortar. A plinth protection was provided all around the tomb to stop the ingress of water into the foundation. The large trees and vegetation on the structures were removed; out of plumb steps were reset. The exterior of the dome was completely re-plastered after removal of loose and pulverized lime plaster. In addition to the main tomb, one of the four subsidiary tombs to the east of the Tomb of Nizam Ahmedshah was also provided with fresh lime plaster after

removing the loose and pulverized old plaster.

2. GROUP OF TEMPLES, KAIGAON TOKA, DISTRICT AHMEDNAGAR

The archaeological area was provided with chain-link fencing at the entrance and a gate to prevent unauthorized construction/erection of sheds by villagers. The reconstruction of fallen retaining wall of the eastern side of the temple with the available stone members by using fresh binding material including filling the core was taken up. The out of plumb wall of the northern side of the temple of Siddheshwar Mahadev was re- construction with core filling and completed. The work of providing prop with brick masonry to prevent further deterioration and disturbance to the balconies on the eastern side was also completed.

3. AMRITESHWAR TEMPLE, RATANWADI, DISTRICT AHMEDNAGAR

The removal of damaged and broken Shahabad stone slabs which was provided all around the temple was completely removed and a fresh layer of basalt stone flooring was provided.

4. TANK WITH TEMPLE, SONAI BRAHMANI, DISTRICT AHMEDNAGAR

An enclosure wall was provided in UCR masonry on the eastern and southern side of the temple. The work of reconstruction of the missing stone steps with new stone members leading to the tank was taken up and completed along with dismantling of the out of plumb veneering stone walls of the tank and re-constructing the same (pl. 88).

5. ASADGADH FORT, AKOLA, DISTRICT AKOLA

The fortification wall of the fort locally known as Asadgadha 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 re-construction of the fallen portion of the fortification wall. The work is under progress.

6. CITY WALL OF NAWAB ISMAIL KHAN, ACHALPUR, DISTRICT AMRAVATI

A dwarf wall in UCR and erecting chain-link fencing around the available area of the city of Nawab Ismail Khan was constructed to prevent encroachment in the archaeological site was carried out.

7. LAL KHAN TOMB, AMNER, DISTRICT AMRAVATI

The synthetic colours provided by the locals over the ancient plaster was carefully removed and fresh plaster along with proper finishing was provided matching with original surface. The removal of debris from the tank located in front of the mosque was carried out and strengthening of the damaged portions of the same was also executed.

8. AURANGABAD CAVES, AURANGABAD, DISTRICT AURANGABAD

The voids present above caves were threat to further seepage of rainwater into the rock matrix thereby posing a problem of water seepage into the caves located down below. The existing drain was found broken at several places. Repairing of the existing water drainage was taken up. After dismantling the decayed stone masonry wall, the work of providing coping in using 20mm size hard trap stone metal has been completed. The construction of UCR stone masonry in using available hard trap stone metal has been completed. The work of providing and laying two line dressed stone slabs in trap stones in front of Caves 2 to 5 with required slope and finishing with dry joints was taken up and completed (pl. 89). The work of removal of the damaged pathway and providing fresh dressed stone slabs over a layer of concrete bed along with construction of the retaining wall including parapet wall from booking office to Cave 8 (Group II) is in progress. A hume pipe culvert is also provided along with the stream to drain the water from the caves.

9. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD

The Geological Survey of India (GSI) recommended construction of a contour drain (LD4) at a higher level than that of the existing drain and at the base of hill above the Ajanta scarps to stop further water seepage inside the caves. The proposed drain measured nearly 440m. The layout of the drain was made as per the path suggested by the GSI and design provided by Central Water and Power Research Station (CWPRS), Pune. The sufficient earth and rock excavation was carried out to provide proper base. After completion of laying of



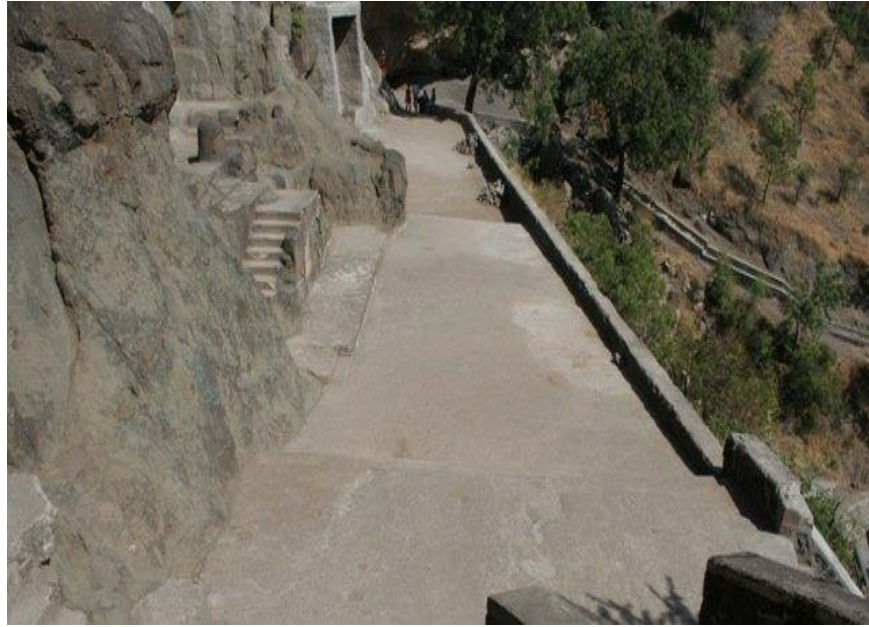
A



B

Sonai Bamini: A, before and B, after reconstruction of steps

Plate: 89



A



B

Aurangabad Caves: A, before and B, after laying stone pathway in front of Cave 2-5

the cement concrete for the foundation bed, the work of construction of UCR stone masonry wall on either side of the drain and fixing of Shahabad stones is completed.

The basaltic rock formation at Ajanta has several voids and overhangs at many locations, some of which are directly above the caves. One such long and continuous void is noticed on top of the Caves 1-6. It has been observed in the past that these cavities and the debris filled in it are very good water retaining sources which gradually let out the moisture and water thereby affecting the caves. The seepage noticed in the ceiling of rear aisle of Cave 1 is also due to these voids. Hence, it was recommended that on a trial basis, a portion of the cavity will be filled up and provided with proper drainage for water. After successful trial work above the cave 1 in the previous year the work of filling the cavities in UCR masonry set with cement mortar and plastering the exterior surface including finishing as rock texture above cave 2-6 was taken up and the work is in progress. During the course of clearance work for the filling up of voids above cave 6, an unfinished rock cut cave was also discovered.

In order to divert the attention of the tourists from the pointed caves and also to enable a less tedious approach to the caves as the present ascend is a steep one, alternate pathway was suggested along the right bank of River Waghora connecting the foothill of the caves. It is with this objective, two pedestrian footbridges were constructed in the Phase I of project funded by Japan International Cooperation Agency (JICA). To facilitate the visitors circulation to the

caves, the stone paved pathway was constructed on the right bank of River Waghora connecting the pedestrian footbridges.

**10. BIBI-KA-MAQBARA, AURANGABAD,
DISTRICT AURANGABAD**

The work of removal of deteriorated pulverized and peeled out lime plaster over the exposed surface of south-east minaret was completed. The re-plastering of exposed surface in lime mortar has been completed in continuation of previous years work. The work of applying sunla finishing plaster on the surface in thin coat by mixing grinded sand, lime, marble powder etc is in progress (pl. 90).

The work of repairing the underground cells of the main mausoleum is in progress. After the removal of deteriorated pulverized and peeled out lime plaster over masonry walls in south east corner of the cell was completed. The exposed surface was re-plastered in lime mortar and finally the work of applying sunla finishing over the finished plaster surface in thin coat by mixing grinded sand, lime, marble powder, etc. was completed.

The repairs to the main mausoleum of Bibi-ka-Maqbara have been taken up. The pulverized and peeling out lime plaster of lower western side masjid facing north, south and west was removed and re-plastered with fresh lime mortar as per existing pattern.

The work of pointing the joints of the dome of the main mausoleum in lime mortar mixed with water proof compound to stop the rain water entering inside the monument

has been taken up and the work is in progress. The work of mending the damaged small merlons and minarets of the parapet as per the existing pattern is in progress.

The work of construction of UCR stone masonry compound wall on the eastern side of the office building to prevent unauthorized entry into the archaeological area was completed.

11. DAULATABAD FORT, DAULATABAD, 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 the roofs have collapsed due to presence of dead load. The work of restoration of the Rangmahal is in progress in continuation of previous year's work. In addition, providing of the missing wooden pillars, brackets, lintels and beams as per the evidences available in the south-eastern, south-western and eastern rooms was also taken up and work is in progress.

12. ELLORA CAVES, ELLORA, AURANGABAD

The reconstruction of the 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. The work of dismantling the old fallen parapet wall was completed. The construction of UCR stone masonry parapet wall in cement mortar is in progress. The work of providing pointing to the exposed surface of stone masonry wall in cement mortar is in progress.

For easy approach to the caves, construction of a footbridge across the stream from Caves 16 to 18 which was taken up previous year was completed during the period under review. The work of providing and fixing teak wood planks over the walkway of the bridge was completed.

13. GHRISHNESHWAR TEMPLE, ELLORA, DISTRICT AURANGABAD

The eastern *prakara* wall of the temple was restored of dismantling out of plumb portion of wall matching of the original. The plastering work of the arch portion over the steps leading to the stepped well in lime is in progress (pl. 91).

14. MALIK AMBER TOMB, KHULDABAD, DISTRICT AURANGABAD

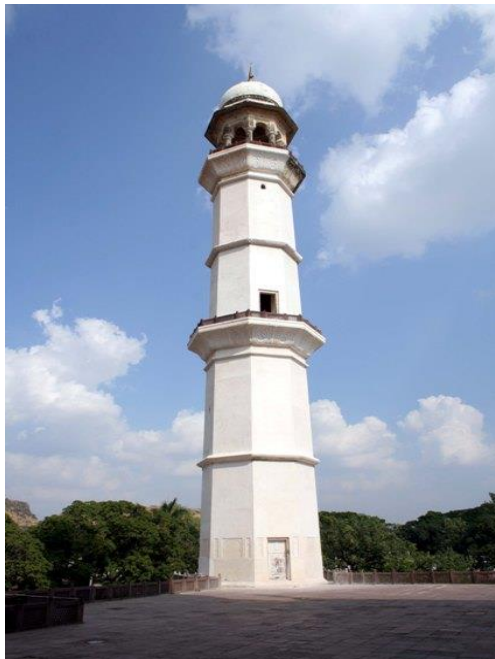
The excavation for laying stone pavement for plinth protection of tomb was carried out. The work of laying bed admixture of trap rubble stone, trap stone chips and murrum was taken up and completed.

The dismantling of old, fallen and out of plumb compound wall in UCR stone masonry and re-construction of the same was taken up. The work of providing coping in brick masonry work over compound wall in cement mortar and plastering of the exposed surface was completed. The construction of fallen stone members of the compound wall using stone was set in lime mortar and core filling in between the veneering stones with rubble stones was completed.

15. UKKHADESHWAR MAHADEVA TEMPLE, BEED, DISTRICT BEED



A



B

Bibi-ka-Maqbara: A, before and B, after repairing of the minaret

Plate: 91



A



B

Ghrishneshwar Temple, Ellora: A, before and B, during reconstruction of enclosure wall

The temple was provided with G.I chain-link fencing on angle iron posts over dwarf masonry wall, and with a grill gate for the main entrance to stop trespassing.

16. LONAR GROUP OF TEMPLES, LONAR, DISTRICT BULDHANA

The existing steps leading to Kumareshwar temple from Gaimukha temple were dilapidated and had fallen at many places along with the retaining wall. The damaged steps and out of plumb retaining wall were carefully dismantled and same is being constructed using old as well as fresh stones by providing concrete base along with the construction of parapet wall. The work is in progress (pl. 92).

The work of removing debris and cleaning the surrounding area for exposing the original layout of the temple is in progress. During the clearance work, the original features of the square tank and adjoining structures of the western side of the temple have been noticed and the debris accumulated in the tank has been removed. The re-construction of the fallen water tank's north-western wall with the available stone members using suitable binding materials after strengthening the foundation is in progress.

17. BALLARSHA FORT, BALLARSHA, DISTRICT CHANDRAPUR

The fallen inner veneering wall of the fort on the northern side and facing towards south has been taken for repairs. The work has been carried out by providing suitable foundation. After dressing of the stones, the construction of missing veneering walls by

using sandstone block with hydrated lime is in progress.

18. TEMPLE OF MAHADEVA, MAHADWARI, DISTRICT CHANDRAPUR

The area around the temple was enclosed by erecting a chain link fencing over the dwarf stone masonry wall including racking out the joints, curing, etc. was completed.

19. CHANGDEO TEMPLE, CHANGDEO, DISTRICT JALGAON

The work of removing the existing dead plaster carefully and fresh re-pointing with lime mortar is in progress. Further, the clearance of the surrounding area for exposing the original floor level of the temple work is also in progress.

20. PANDAVLENA CAVES, PATHARDI, DISTRICT NASIK

The work of laying the dressed stones over pathway in front of caves and repairs to the stone steps leading to the caves is in progress.

BANGALORE CIRCLE

KARNATAKA

21. FORT, DEVANAHALLI, DISTRICT BANGALORE

The fallen portion of the fortification wall on the southern and northern sides was reconstructed with available stone members in mud and lime mortar. Core filling has been done with stone boulders and lime mortar. The top surface was provided with a weather proof course in lime mortar (pl. 93).

22. WELL, VISHNU TEMPLE, KAMALAPURA (HAMPI), DISTRICT BELLARY

Plate: 92



A



B

Gaimukha Temple, Lonar: A, before and B, after restoration of the steps



A



B

Devanahalli Fort: A, before and B, after conservation

By clearing the debris inside the Vishnu temple complex near the Elephant's stable a well (measuring 2.00 x 2.00 x 9.00m) of the temple has been rendered functional.

23. FORTIFICATION WALL, VITTHALA TEMPLE, VENKATAPURA (HAMPI), DISTRICT BELLARY

The out of plumb and dislodged fortification wall all along the river bank on the western side has been dismantled and reconstructed in conformity with the original (pl. 94).

24. KRISHNA BAZAAR, KRISHNAPURA (HAMPI), DISTRICT BELLARY

The out of plumb and over hanging architectural members of the *mandapas* on the southern wing of the bazaar have been dismantled and restored after removing the accumulated debris for exposing the plinth of the bazaar *mandapas*.

25. DANNAYAKA'S ENCLOSURE, KAMALAPURA, DISTRICT BELLARY

Accumulated debris on the north-western corner of the basement of Dannayaka's palace has been removed. The height of enclosure wall in the north-western corner has been raised by using available stones.

26. BHIMA'S GATE, KAMALAPURA, DISTRICT BELLARY

On either side of the main entrance stone masonry retaining wall has been provided to arrest the soil erosion and landslides.

27. FORT, BELLARY, DISTRICT BELLARY

The Archaeological area has been fenced with crimped mesh over dwarf wall on the eastern side of the hill.

28. FORT, CHITRADURGA, DISTRICT CHITRADURGA

Fallen portion of the fort wall on the north-eastern side has been restored with lime mortar. Dressed stone slab approach pathway were laid to various structures from the Kamanabagilu entrance (pl. 95).

29. FORT, CHANNAGIRI, DISTRICT DAVANAGERE

The archaeological area is fenced with barbed wire set in mild steel iron angle posts over dwarf compound wall. The top surface of the fort wall is watertightened with fresh lime concrete.

30. FORT AND RUINED PALACE, UCHCHANGIDURGA, DISTRICT DAVANAGERE

Missing portions of the fort wall and bastions have been reconstructed with available stone members in lime mortar. The Basavanna *mandapa* has been provided with schist stone flooring and the damaged roof of the *mandapa* has been provided with fresh weather proof course to arrest the leakages.

31. LAKSHMINARASIMHA TEMPLE, NUGGEHALLI, DISTRICT HASSAN

The damaged roof of the temple was placed with fresh weather proof course.

32. LAKSHMIDEVI TEMPLE, DODDAGADDAVALLI, DISTRICT HASSAN

Undulated stone flooring of the *prākāra* was dismantled and reset over the sand bed after proper leveling.

33. AMRITESWARA TEMPLE, AMRITAPURA, DISTRICT HASSAN

Fresh stone apron has been provided around the temple to prevent water stagnation.

34. VINDHYAGIRI, SHRAVANABELAGOLA, DISTRICT HASSAN



A



B

Vitthala Temple, Venkatapura: A, before and B, after conservation

Plate: 95



A



B

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

The fallen portions of the fort wall in the Vindhyagiri hill has been reconstructed as per the original using available stones in combination of mud and lime mortar.

35. LAKSHMINARAYANA TEMPLE, SINDHAGHATTA, DISTRICT MANDYA

The out of plumb, disturbed *garbhagriha* and *maha-dwara-mandapa* were dismantled and reconstructed using the same architectural members.

36. SRI RANGANATHASWAMY TEMPLE, SRIRANGAPATNA, DISTRICT MANDYA

Part of the Sunken and bulged outer *prākāra* wall at the north-eastern corner was dismantled after proper documentation and restored as per original

37. KESHAVA TEMPLE, SOMANATHAPURA, DISTRICT MYSORE

The sunken and out of plumb cloister *mandapa* on the southern side was dismantled after proper documentation. The foundation is properly strengthened. The restoration work is in progress.

38. KIRTINARAYANA TEMPLE, TALAKAD, DISTRICT MYSORE

The *prākāra* wall on the north-eastern side of the temple complex has been reconstructed to arrest the land sliding into the temple premises.

39. SEVENTEEN JAINA TOMBS, MODABIDRI, DISTRICT UDUPI

The damaged, disturbed ancient water tank has been reconstructed as per the original using with available lateritic stone blocks.

BHOPAL CIRCLE

MADHYA PRADESH

40. KARAN TEMPLE, AMARKANTAKA, DISTRICT ANNUPPUR

A pathway was provided towards south-west of the temple. The construction of the dwarf wall around the monument was completed.

41. PATALESHWAR TEMPLE, AMARKANTAKA, DISTRICT ANNUPPUR

Conservation work was carried out over *sikhara* portion by way of providing missing stones in place of voids for stability. Dwarf wall along with mild steel grill was raised around the temple. Lime plastering work is in progress. Staff quarters were constructed and the basement is being converted in to a sculpture shed.

42. SIVA TEMPLE, AMARKANTAKA, DISTRICT ANNUPPUR

A dwarf wall is being provided around the temple.

43. CHANDERI FORT, CHANDERI, DISTRICT ASHOKNAGAR

The fortification wall near the Quila Kothi was restored. Conservation works like recess pointing, plastering and underpinning were carried out at various structures located inside the fort. Ongoing stone masonry work at Navakhanda *mahal* has been completed. Damaged fortification wall at various places have been restored. Flooring of southern side wall of Navakhanda *mahal* (first floor) has been completed while the same work at second floor is being continued. Pointing work was carried out towards the west side of Khilji mosque. CR masonry work has been completed at Khilji mosque, Hawapour

fortification wall and the eastern side of the fort near Quila Kothi. Providing and fixing stone beam on the first floor, to the south of Navakhanla *mahal* has been completed. Uneven surface around the fort complex was leveled and dressed. Provision of stone roofing with suitable stone beams at Navakhanda *mahal* is in progress.

44. BADAL MAHAL, CHANDERI, DISTRICT ASHOKNAGAR

Settled debris and vegetation growth were removed from the premises of Badal mahal. Pointing work on the exterior side of wall was carried out. Flag stone flooring around the Badal mahal gate has been completed. Stone masonry on newly exposed *baoli* has been provided along with lime concrete flooring.

45. BADA MADRASA, CHANDERI, DISTRICT ASHOKNAGAR

Flag stone flooring was provided around the monument. Ashlar stone masonry and random rubble stone masonry work around the verandah of the monument and pointing work inside the complex is in progress.

46. NIZAMUDDIN TOMB, CHANDERI, DISTRICT ASHOKNAGAR

Flag stone flooring on the base of lime mortar has been completed towards the north side. The uneven area around the tomb was leveled by filling of soil. CR masonry work was provided near Badal *mahal* bastion along the road of Nizamuddin tomb. Dwarf wall with MS grill was provided around the monument. CR stone masonry work was provided above the leveled flooring. Pointing work was taken up at various places.

47. KOSHAK MAHAL, CHANDERI, DISTRICT ASHOKNAGAR

Ashlar stone masonry was provided to strengthen the structure. R. R. stone masonry wall in front of Koshak and on both side of the pathway was removed. The work of providing apron is in progress. Pointing work on ashlar stone masonry is in process. Flag stone flooring above the lime concrete base has been completed.

48. LANGI FORT, LANJI, DISTRICT BALAGHAT

The work of providing stone flooring at the sculpture shed has been completed.

49. BRICK TEMPLE, KHERAT, DISTRICT BHIND

During the period under review, restoration of the temple, platform, providing and fixing of stone beams, roof slabs, re-erection of pillars and columns including the brick masonry work was taken up and is in progress.

50. KAMALAPATI PALACE, BHOPAL, DISTRICT BHOPAL

The documentation of structure including conditional mapping, plan, elevation and section has been completed and conservation of structures i.e., Panchaki and Samar palace are in progress.

51. OLD FORT, BURHANPUR, DISTRICT BURHANPUR

Pointing, plastering and underpinning works were taken up to strengthen the fort wall. Accumulated debris was removed from the north side area of the fort.

52. EXCAVATED SITE, BIJAMANDAL, KHAJURAHO, DISTRICT CHHATARPUR

A compound wall was provided for safety and security of excavated remains.

53. DEVI JAGDAMBA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

Flag stone flooring on the platform of the temple was completed.

54. LALGUAN MAHADEVA, KHAJURAHO, DISTRICT CHHATARPUR

The work of constructing compound wall and RR stone masonry work is in progress.

55. DULHA DEO TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

The construction of the boundary wall in RR and CR stone masonry is in progress.

56. KHAKKHARA MATH, KHAJURAHO, DISTRICT CHHATARPUR

The construction of boundary wall in RR and CR stone masonry is in progress.

57. DEOGARH FORT, DEOGARH, DISTRICT CHHINDWARA

The damaged fortification wall has been restored with RR masonry at various locations. Lime flooring has been provided to various structures located inside the fort. Vegetation clearance was carried out around the fort.

58. SIVA TEMPLE, NOHTA, DISTRICT DAMOH

Angle iron was provided over the boundary wall of the temple for its safety and security.

59. SIVA TEMPLE, SAKHAR, DISTRICT DAMOH

Ashlar stone masonry in lime mortar was provided to strengthen the temple.

60. JAHAZ MAHAL, MANDU, DISTRICT DHAR

The work of providing *chhajja* stones on the eastern side of Jahaz mahal was taken up during the period under review. Dressing work of stones on the platform towards northern side is in progress. Sandstone *dasa* was fixed over the *chhajja* on the eastern and southern side of the verandah.

61. LAL BAGH, MANDU, DISTRICT DHAR

Scientific clearance work is carried out to expose the buried remains. The work has revealed evidences of water structures including fountains etc. The work is in progress.

62. JAL MAHAL, MANDU, DISTRICT DHAR

The dressing of the stone of the facade such as column and beam is in progress.

63. CHAUSATH YOGINI TEMPLE, BHERAGHAT, DISTRICT JABALPUR

A dwarf wall was provided after removing the barbed wire fencing.

64. MADAN MAHAL QUILA, JABALPUR, DISTRICT JABALPUR

Ashlar stone dressing and flag stone flooring works are taken up and is in progress. The concrete work on approach road has been completed.

65. KANKALI MATA MANDIR, TIGWA, DISTRICT KATNI

A sculpture shed was constructed during the period under review. The construction of the dwarf wall in CR stone masonry including fixing of MS grill railing has been completed.

66. VISHNU VARAH TEMPLE, KARITALIA, DISTRICT KATNI

The work of fine chisel dressing of ashlar stones and fixing them at appropriate place where it was missing was carried out.

67. CHOUBARA DERA 2, UN, DISTRICT KHARGONE

Restoration of roof and platform of the temple was carried out. Stone blocks are being dressed at the site itself and are being fixed as per requirement. A new apron was provided around the monument.

68. MAHAKALESHWAR TEMPLE 1, UN, DISTRICT KHARGONE

Fine dressed stones were laid over the platform inside the *antarala* part. Pointing work has also been taken up at various places of the monument. Towards north side, dressed stones were fixed on the platform. To the south of the temple ashlar stone apron was provided.

69. SHAH BURJ AND SATKHANDA FORT, DISTRICT MANDALA

During the period under review restoration of *chhajja* and brick structures was taken up. Brick masonry structures were plastered with traditional lime mortar.

70. GROUP OF TEMPLES AND DHONDAMATH TEMPLE, BATESHWAR, DISTRICT MORENA

The work of chiseling and dressing of new pillars, beams, roof slabs, etc. are being carried out at the site. The work of scientific clearance on the upper side of Complex II was taken up. Restoration and resetting of fallen members of the temples, after proper documentation, is in progress. Lime concrete was provided at the complex area. Ashlar stone masonry with fine dressed and chiseled cut sandstones has been provided to

the platform with steel clamps and pointing with lime mortar. Filling of earth and boulders all around the platform wall is in progress.

Removal of tree roots and vegetation inside and over the temple premises has been undertaken. Lifting and lowering down of bulged fallen stones pillars and architectural parts of temples after their proper documentation and refitting the dislocated components are in progress. Resetting of structural members of temple remains is in progress. Platform wall of Dhondamath temple was restored. Dismantling of flag stone slab flooring and resetting them over the concrete new flag stone slab is in progress. Lowering down of stone members from collapsed structures, repairs of steps of *baoli* including pointing, mending, clamping are in progress.

71. CHAUMUKHNATH TEMPLE, NACHNA, DISTRICT PANNA

Dwarf wall with MS grill was provided around the monument and sculpture shed. Recessed pointing with lime mortar was also undertaken. The work of providing new pathway from the main gate to the temple and water tightening were completed.

72. AJAYGARH FORT, AJAYGARH, DISTRICT PANNA

Staff quarters were constructed at Ajaygarh. Ancient collapsed platform was repaired, at temple 2.

73. BUDDHIST MONUMENTS, SANCHI, DISTRICT RAISEN

Edging stones have been provided on both sides of the pathway leading to Stupa 1.

Stone apron was provided around the railing of stupa. Lime concrete was provided outside the Monastery 51. The work of providing apron around the Gupta temple was completed. Edging, flooring and concrete work have also been carried out in the temple. New flooring was provided at the missing portion of the *pradakshinapath* of Stupa 4.

74. BUDDHIST STUPAS, SONARI, DISTRICT RAISEN

The work of construction of pathway by lying and fixing of dressed stone blocks, between Stupa 1 and 2 is in progress. Providing missing stones in the *pradakshinapath* of stupa and restoration work of *anda* (dome) portion of the stupa has been completed. Providing of new floor at the missing part of lower *pradakshinapath* of Stupa 1 is in progress. Restoration of the compound wall and watertightening of the monastery has been completed.

75. BUDDHIST STUPA AND REMAINS, BARHAT, DISTRICT REWA

Boundary wall was constructed around the complex for safety and security of the monument.

76. BUDDHIST STUPA AND MONASTERY, DEOKOTHAR, BARHAT, DISTRICT REWA

The work of setting up of Interpretation Center was taken up during the period under review and same is in progress.

77. SIVA TEMPLE, BHURMA, DISTRICT SATNA

A dwarf wall and an apron were provided around the monument and flooring work is in progress.

78. SMALL SIVA TEMPLE, MAHUA, DISTRICT SHIVPURI

Restoration works of temple including pointing, mending of beams, columns, slabs and re-erection of architectural members were carried out. Dwarf wall with MS grill was provided around the temple.

79. LARGE SIVA TEMPLE, MAHNA, DISTRICT SHIVPURI

Ashlar stone masonry was provided to the platform and staircase of the temple. RR stone masonry has been provided over the existing wall of foundation around the temple.

80. GARHI, SURWAYA, DISTRICT SHIVPURI

Structural restoration, such as mending of the broken architectural members, providing of roof, slab and beams, re-erection of pillars, pointing of walls were carried out at the monastery located inside the *Garhi*.

81. SIVA TEMPLE AND MONASTERY, CHANDREH, DISTRICT SIDHI

Stone apron around the temple was provided to avoid water stagnation around the temple structure. The platform of the temple was also restored.

82. GROUP OF MONUMENT, PATHARI, DISTRICT VIDISHA

Dwarf wall was provided around the protected limits of the monument.

83. HIDOLA TORAN, GYARASPUR, DISTRICT VIDISHA

The work of constructing CR stone masonry and fixing of MS grill was carried out at the monument.

84. SIVA TEMPLE, UDAIPUR, DISTRICT VIDISHA

Providing of CR masonry and fixing MS grill were over the dwarf wall towards southern side of the temple has been completed.

BHUBANESWAR CIRCLE

ODISHA

85. BHRINGESVARA MAHADEVA TEMPLE, BAJRAKOT, DISTRICT ANGUL

In continuation of previous year's work, the approach pathway/apron work of the temple has been completed by way of laying flag sandstones. Structural repair to the temple has been taken up by way of pointing, sealing the joints with the help of traditional lime mortar.

86. NILAMADHAVA AND SIDDHESVARA TEMPLES, GANDHARADI, DISTRICT BOUDH

In continuation of previous years work, the structural repair to the common platform of the temple has been partially completed and the construction of boundary wall along with providing MS grill is in progress (pl. 96).

87. BARABATI FORT, CUTTACK, DISTRICT CUTTACK

In continuation of previous year's work, the restoration work of moat wall (inner portion) is taken up by way of replacing decayed stone blocks with new dressed laterite stone blocks in traditional lime mortar. The work is in progress.

88. EXCAVATED BUDDHIST SITE, LALITGIRI, DISTRICT CUTTACK

Conservation of shrine chamber of monastery 2 and laying of lime concrete to the cells has been completed. Resetting of the out of plumb portion of the brick stupa

within the apsidal *chaityagriha* area has been taken up and the work is in progress (pl. 97).

89. SIMHANATH TEMPLE, GOPINATHPUR, DISTRICT CUTTACK

The renovation of the collapsed compound wall of the temple complex has been completed.

90. CHANDRASEKHAR JEW TEMPLE, KAPILAS, DISTRICT DHENKANAL

In continuation of previous year's work, the retaining wall and restoration of damaged, missing sandstone steps leading to the temple is in progress. Repairing of guard wall over hill top with RR stone masonry is in progress.

91. KANAKESVARA MAHADEVA TEMPLE, KUALO, DISTRICT DHENKANAL

In continuation of previous year's works, the restoration work of the sunken floor of the main temple and other sub- shrines is taken up by way of relaying the dressed khondolite stone blocks on a coarse sand cushion. The work is in progress. The plinth of the original compound wall of the temple complex has been exposed and its conservation is in progress by way of resetting the original architectural members and newly carved khondolite stones at the missing place with traditional lime mortar.

92. ANNAKOTESVARA MAHADEVA TEMPLE, LATADEIPUR, DISTRICT DHENKANAL

The conservation work of the *mandapa* of the temple has been completed by way of dismantling the tiles and damaged wooden members for replacement with the new one.

Plate: 96



A



B

Nilamadhava and Siddhesvara temples, Gandharadi: A, before and B, after conservation

Plate: 97



A



B

Lalitgiri: excavated Buddhist site: A, before and B, after conservation

93. TRILOCHANESVARA TEMPLE, JAJPUR TOWN, DISTRICT JAJPUR

The work of providing of dwarf wall with MS grill around the protected area and laying out of laterite stones to the approach pathway are in progress.

94. SUB SHRINE TRILOCHANESVARA TEMPLE COMPLEX, JAJPUR TOWN, DISTRICT JAJPUR

The restoration work of the sub shrine near the main temple is taken up. Most of the architectural members were out of plumb and few of them fell down. All the architectural members were documented and taken out very carefully. The work is in progress.

95. EXCAVATED BUDDHIST SITE, RATNAGIRI, DISTRICT JAJPUR

The flooring of the compound is in progress by laying out khondalite stones. Construction of retaining wall around the Mahakal temple is in progress.

96. EXCAVATED BUDDHIST SITE, UDAYAGIRI 2, DISTRICT JAJPUR

In continuation of previous year's works the restoration work of the brick walls of the shrine complex is in progress. The conservation work of the dilapidated stone paved floor level in front of the monastery of Udayagiri-2 is taken up by way of replacing the decayed stones with the new dressed khondalite stone blocks in traditional lime mortar.

97. JAGANNATHA TEMPLE, JAJPUR, DISTRICT JAJPUR

The work of dismantling the later additions to the platform in front of the *natamandapa* of the temple has been completed, which

brought to light the original carved and moulded walls. The laying of khondalite stone apron from the approach pathway to *snanabedi* is in progress. The restoration work of the compound wall is in progress.

98. KHANDAGIRI AND UDAYAGIRI CAVES, BHUBANESWAR, DISTRICT KHURDA

The repair work of the ancient steps is taken up by way of replacing the decayed stone with new one with traditional lime mortar as per the archaeological norms. The compound wall of the staff quarter has been completed.

99. LINGARAJ TEMPLE, BHUBANESWAR, DISTRICT KHURDA

The Anantesvara Temple adjacent to the main temple was taken up for conservation by way of consolidating and restoring the plinth portion with the help of available architectural blocks as per original. The work has been completed. The *dhenkisala* near kitchen is taken up for repair by way of pointing and sealing the conservation work of a miniature shrine behind the Ganesa temple (right side of main entrance) has been completed by way of pointing with traditional lime mortar. The conservation work of a miniature shrine to the north of Lingaraj temple has been taken up by way of dismantling the dilapidated stone members and resetting again as per original structure. The work is in progress

100. RAMESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

Laying of the approach pathway to the temple has been completed.

101. ANANTAVASUDEVA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

In continuation of previous year's work, sandstone flooring is provided around the temple using the 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 work is in progress.

102. ANCIENT SITE, SISUPALGARH, BHUBANESWAR, DISTRICT KHURDA

Resetting of the dislodged and out of plumb in the retaining wall southern wing of the western gateway is taken up by way of resetting the missing structures with the original stone blocks unearthed during the clearance work with traditional lime mortar as per the original.

103. ANCIENT SITE, HARIPURGARH, DISTRICT MAYURBHANJ

Repair to the brick structures are in progress by way of pointing and replacing the decayed bricks with new ones. Construction of dwarf wall with MS grill is in progress.

104. SRI JAGANNATHA TEMPLE, PURI, DISTRICT PURI

The work of providing khondalite stone flooring in north-west corner of the temple has been completed. The repairing work to Nilamadhaba temple has been completed. Water tightening of the *kshetrapala* temple inside Lord Jagannatha temple is in progress. Repairing work to *bhetamandapa* and *chahanimandapa* has been completed. Repair to the sub-shrines outside the *kurmibedha* has been taken up by way of pointing; sealing the joints, water tightening with traditional lime mortar. The laying of stone flooring on the northern side of the temple is in progress. Structural repair to the

shrines located in between *meghanada prachira* and *kurmibedha* are in progress.

105. SUN TEMPLE, KONARK, DISTRICT PURI

The khondalite stone flooring around the horse platform is completed. Consolidation of the *pidha* stones in south and south-west sides of *jagamohana* is in progress. Flooring work of the *mandapa* on the western side has been completed (pl. 98).

CHANDIGARH CIRCLE

PUNJAB

106. SUMMER PALACE, MAHARAJA RANJIT SINGH, AMRITSAR, DISTRICT AMRITSAR

Replacement of the damaged wooden roof with new wooden roof and tile flooring with lime mortar was taken up at *Machhighar*. Cement plaster was replaced with traditional plaster providing of apron, fixing of wooden door at Watch Tower have been completed. Repairs of the Burji has been taken and grill fencing around 3 watch towers has been provided (pl. 99).

107. RAM BAGH GATE, AMRITSAR, DISTRICT AMRITSAR

Red sandstone *jali* at Baradari was provided. Repair of corner *chhatris* with *Lakhauri* and red sandstone have been completed.

108. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA

Underpinning, pointing, edging and repairing of rooms on the Ist, IInd and IIIRD floor, besides concreting and tile flooring has been completed (pl. 100).

109. ANCIENT SITE, SANGHOL, DISTRICT FATEHGARH SAHIB



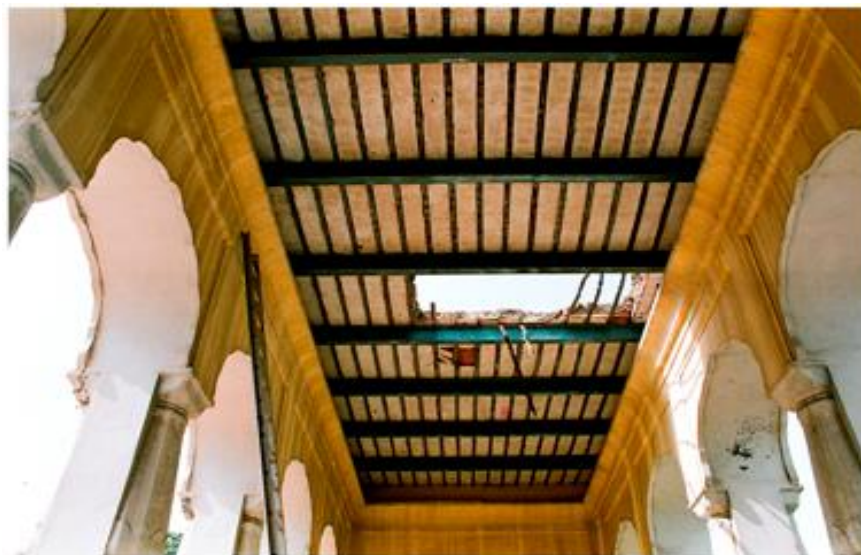
A



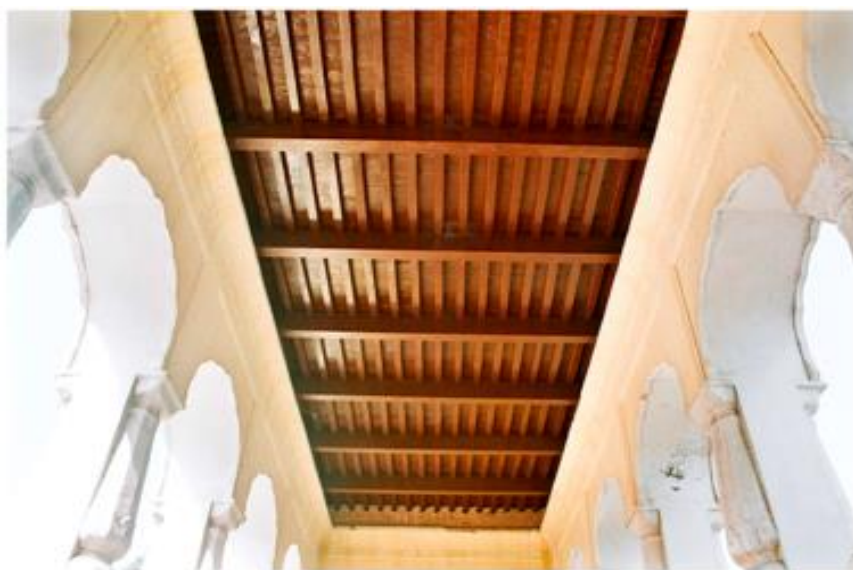
B

Sun Temple, Konark: A, before and B, after flooring work of the mandapa

Plate: 99



A

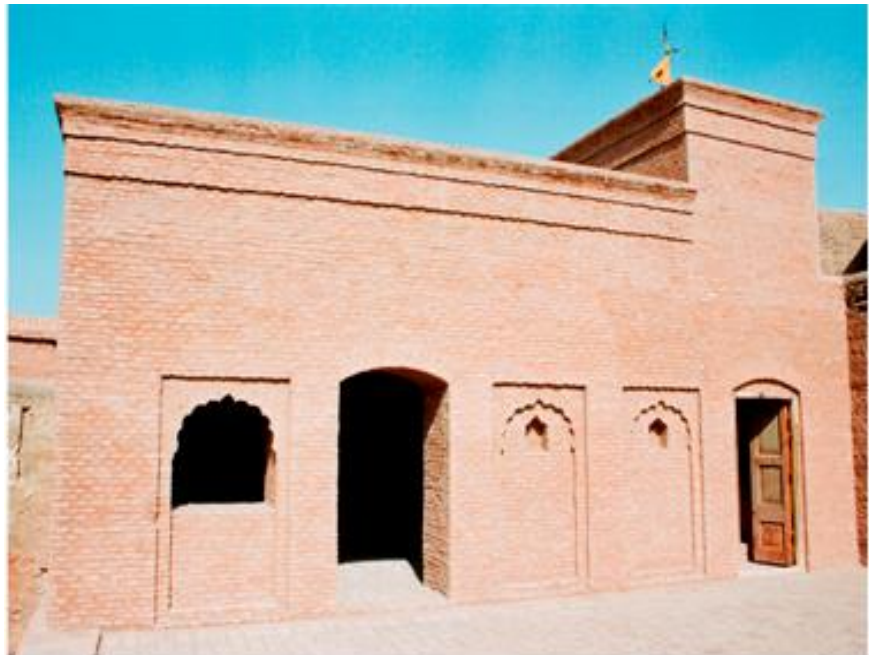


B

Machhighar: A, before and B, after conservation of the roof



A



B

Bhatinda Fort: A, before and B, after conservation

Grill fencing over dwarf wall all around the SGL-11 was undertaken and completed.

110. MUD FORT, ABOHAR, DISTRICT FIROZPUR

Grill-fencing over dwarf wall of the vacated portion of the encroached area of the ancient site was completed.

111. ANARKALI BARADARI, BATALA, DISTRICT GURDASPUR

Portion of steps of Anarkali *baradari* has been restored through underpinning, pointing and also provided grill fencing over dwarf wall.

112. SHAMSHER KHAN'S TOMB, BATALA, DISTRICT GURDASPUR

Structural repairs of the monument and its grill fencing on dwarf wall were undertaken and have been completed (pl. 101).

113. DAKHNI SARAI, DAKHNI, DISTRICT JALANDHAR

Restoration of the cells through underpinning, pointing and concreting was done with traditional material. The exterior of the *sarai* has been restored through underpinning, pointing and edging.

114. NURMAHAL SARAI, NURMAHAL, DISTRICT JALANDHAR

Restoration of southern side cells and its apron was undertaken and the work has been completed. The first floor of Rang mahal of Nurmahal *sarai* has been taken up for conservation through underpinning, pointing, concreting and tile flooring. The work is in progress (pl. 102).

115. MOHAMAD MOMIN'S AND HAZI JAMAL'S TOMBS, NAKODAR, DISTRICT JALANDHAR

Grill-fencing over dwarf wall all around the

monument was undertaken and has been completed (pl. 103).

116. NALAGARH KOTHI, ROPAR, DISTRICT RUPNAGAR

Repair to the Nalagarh Kothi was taken up by way of providing wooden roof. Grill fencing over dwarf wall has been completed.

117. SARAI AMANAT KHAN, DISTRICT TARAN

Restoration of cells of sarai, removal of debris, pointing, tile-flooring and repair of burjis has been completed.

HARYANA

118. GROUP OF TOMBS, JHAJJAR, DISTRICT JHAJJAR

RR stone masonry, lime concreting, grill fencing and pointing work has been undertaken. Lime kankar stone masonry, *Lakhauri* brick masonry, lime concreting and plastering work have been executed.

119. SHEIKH CHILLI'S TOMB, THANESAR, DISTRICT KURUKSHETRA

Taking out of bulged masonry from the northern side of the monument and re-setting of the same has been taken up and completed. The work of restoration of the western bridge and remaining portion of Sheikh Chilli's tomb has been completed.

120. HARSH KA TILLA, THANESAR, DISTRICT KURUKSHETRA

Restoration work of the excavated remains was done. Besides, grill-fencing over dwarf wall around the site was provided.

121. NABHA HOUSE, KURUKSHETRA, DISTRICT KURUKSHETRA

Restoration of inner cells was taken up.



A



B

Shamsheer Khan's Tomb, Batala: A, before and B, after conservation

Plate: 102



A



B

Nurmahal Sarai, Nurmahal: A, before and B, after conservation of Sarai Cells



A



B

Group of Tombs, Nakodar: A, before and B, after grill fencing with dwarf wall

Besides brick tile flooring has been provided and work has been completed.

122. JAL MAHAL, NARNAUL, DISTRICT MAHINDERGARH

Pathway at Jal Mahal was provided with random rubble masonry.

123. SHAH IBRAHIM TOMB, NARNAUL, DISTRICT MAHINDERGARH

Provision of stone *jali* and repairs of Shah Ibrahim Tomb, Narnaul was completed.

124. KALA AMB, PANIPAT, DISTRICT PANIPAT

Grill fencing, cement concreting, red sandstone floor, random rubble stone masonry has been provided and the work has been completed.

125. KABULI BAGH MOSQUE, PANIPAT, DISTRICT PANIPAT

Brick masonry, brick tile masonry work, lime concreting, grill fencing, pointing, etc. has been provided.

126. ANCIENT SITE, KHOKRAKOT, DISTRICT ROHTAK

Dwarf wall with grill fencing at vacant portion of encroached site has been provided.

127. KHWAJA KHIZIR'S TOMB, SONEPAT, DISTRICT SONEPAT

Earth work concreting and red sandstone flooring around the tomb and platform was provided. Restoration of boundary wall of the tomb was also attended.

128. ANCIENT SITE, ADI BADRI, DISTRICT YAMUNANAGAR

Earth work, concreting and providing of red sandstone flooring was completed.

CHENNAI CIRCLE

TAMILNADU

129. BRIHADISVARA TEMPLE, ARIYALUR, DISTRICT GANGAIKONDACHOLAPURAM

The work of providing brick apron around the main shrine is in progress.

130. FORT ST. GEORGE, CHENNAI, DISTRICT CHENNAI

The work of removing the damaged wooden members of Clive's House and providing new ones in the first floor has been completed. The work of relaying the damaged flooring on the western side of the Clive's house has been completed. The work of conserving the sky light windows was carried out. The work of clearing the vegetation growth in the southern side of the fort and strengthening of the outer moat wall has been completed. The debris, wastages, scraps, etc. from inside the moat has been removed. The work of repairs to the platform over the inner rampart wall in front of building was taken up, in addition clearing the debris, wastages, scraps, etc., accumulated on the east and west side have been removed. Vegetation growth over this building has been attended.

131. SRI DHENUPURISWARA TEMPLE, MADAMBAKKAM, DISTRICT KANCHIPURAM

The work of conserving the leaky terrace of the temple has been completed.

132. SHRI VENKATESAPERUMAL TEMPLE, THIRUMUKKUDAL, DISTRICT KANCHIPURAM

The work of watertightening of the *mandapa* and providing apron around the main shrine and sub-shrine and laying stone flooring has been completed.

**133. MEGALITHIC CISTS AND CAIRNS,
SETTUPATTU, DISTRICT KANCHIPURAM**

The work of fencing the site has been completed.

**134. ROCK-CUT CAVES, NARASAMANGALAM
AND MAMANDUR, DISTRICT KANCHIPURAM**

The work of fencing of the eastern side of the monument has been completed.

**135. EXCAVATED SITE, SALUVANKUPPAM,
DISTRICT KANCHIPURAM**

The work of removing the accumulated sea sand and stacked brickbats from northern and eastern side of the excavated site has been completed.

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

The work of fencing on the western side of the shore temple has been completed. The work of providing the fencing to the east and north of the car parking area has been completed.

**137. EXCAVATED SITE, MELAIYUR,
KAVERIPUMPATTINAM, DISTRICT
NAGAPATTINAM**

The work of providing fencing to the excavated site has been completed

**138. FORT AND TEMPLES, THIRUMAYAM,
DISTRICT PUDUKKOTTAI**

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

**139. SIKKANATHASWAMY TEMPLE,
KUDUMIYANMALAI, DISTRICT PUDUKKOTTAI**

The work of providing stone flooring after removing old damaged ones on the southern side of 1000 pillared *mandapa* has been completed. The work of conserving the *madapalli* has been completed. The work of water tightening of the *mukhamandapa* of the temple is in progress.

**140. ROCK CUT SIVA TEMPLE,
KADAMBARKOVIL, NARTAMALAI, DISTRICT
PUDUKKOTTAI**

The work of conserving the southern and eastern corridor and *Tirumadil* is in progress.

**141. FORT WITH BUILDINGS, ATTUR, DISTRICT
SALEM**

The work of fencing around the *vasantha mandapa* and clearing the accumulated earth in the *mandapa* has been completed.

**142. FORT AND TEMPLES,
CHINNAKAVANDANUR, DISTRICT SALEM**

The work of conserving the bastion of the fort wall using old stones on the southern side, in between III and IV bastion wall base on the northern side has been completed. The work of providing fencing on the eastern side of the protected area has been completed. The work of watertightening of the top portion of the bastion and fort wall on the southern side of the main entrance and plastering the top surface has been completed. The work of laying new stone flooring slab on the north-east corner of the main shrine in the Varadaraja Perumal temple has been completed. The work of conserving the tank by way of desalting and conserving the fortification wall on the northern side has been completed.

143. BRIHADISVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR

Repair to the northern corridor and water tightening the terrace was completed. The work of conserving brick floor on the south-west corner of the temple has been taken and completed.

144. SRI SUGRISWARA TEMPLE, SIRCARPERIYAPALAYAM, DISTRICT TIRUPPUR

The work of fencing around the temple has been completed. The work of providing apron with dressed stone slabs around the main shrine, Amman shrine and main entrance has been completed.

145. SRI MURUGUNATHASWAMY TEMPLE, THIRUMURUGANPOONDI, DISTRICT TIRUPPUR

The work of applying colour wash to the *prakara* wall of Balasubramaniya temple and front *mandapa* has been completed (pl. 104).

146. FORT AND LOWER MOAT WALL, VELLORE, DISTRICT VELLORE

The work of repairing of the breached outer and fallen lower moat wall and brick platform on the northern side of the fort has been completed.

147. ROCK-CUT SIVA TEMPLE, VILAPAKKAM, DISTRICT VELLORE

The work of providing fencing on the eastern side of the site has been completed. The work of repairs to the steps in front of the cave, laying the path way from entrance to the cave has been completed. The work of conserving the fallen revetment wall around the pond has been completed. Retaining wall on top of the hill to avoid the erosion of the earth has been provided.

148. FORT GINGEE, GINGEE, DISTRICT VILLUPURAM

The work of repairs to the fortification wall on the top of Krishnagiri fort and inner fortification wall on the northern side has been completed. The work of strengthening the fort wall by giving invisible toe wall to the lower rampart on the west has been completed. The work of pointing of the outer fortification wall on the eastern and western sides has been completed. The water tightening of the upper and lower rampart has been completed. The work of providing the stone steps leading to the ticket counter has been completed. Water tightening of the *mandapa* and terrace of 2nd *mandapa* on the eastern pathway has been attended.

PUDUCHERRY (UT)**149. SWAYABUNATHASAMY TEMPLE, KARAİKAL, DISTRICT NEDUNGADU**

The work of removing the undiluted stone flooring and relaying with new one in the *ardhamandapa* has been completed. The work of re-plastering the old damaged plastering on the arches and pillars has been completed. The work of providing apron with dressed stone slabs around the main shrine and sub shrines has been completed. The work of lying garden in front of Rajagopuram on the south and north side has been completed.

DEHRADUN CIRCLE**UTTARAKHAND****150. MANIYAN GROUP OF TEMPLE, DWARHAT, DISTRICT ALMORA**

There are total seven temples in the group.



A



B

Sri Muruganathaswamy temple, Thirumuruganpoondi: A, before and B, after colour wash

The lower half of three temples stands on the western part was buried. Extra earth filling from this area was removed and temples were brought to their original ground level. In addition, remains of two more shrines were exposed during the course of removal of debris. Now there are total nine temples in the premises. Entire area was dressed, leveled and proper drainages have been provided. Besides, left out portion of the boundary wall has also been completed.

151. PUSTIDEVI GROUP OF TEMPLE JAGESHWAR, DISTRICT ALMORA

In continuation of the previous year's work, repairs to the remaining three shrines were taken up. Dilapidated miniature shrine abutting to Pustidevi temple was repaired. It was completely dismantled after proper documentation and reset as per original. In addition, decayed and broken architectural members of the remaining two shrines in the complex were replaced.

152. DANDESHWAR GROUP OF TEMPLE, JAGESHWAR, DISTRICT ALMORA

Left out portion of the boundary along the road side has been completed. A low parapet wall in stone masonry with iron grill on the top has been raised along the edge of the platform of the temple to avoid any untoward incident to the visitors. In addition, stone floor around the main temple has also been repaired by way of replacing the damaged stones slabs with new one.

153. SUN TEMPLE, KATARMAL, DISTRICT ALMORA

Remaining compound wall on the rear side of the temple complex has been completed.

A high raised wall originally constructed from the east was eroded in the passage of time and damaged at several places. This damaged retaining wall has been repaired, by way of providing additional mortar on the core to make it stronger and avoid further damage.

154. BALJNATH GROUP OF TEMPLES, BALJNATH, DISTRICT BAGESHWAR

Stone flooring was completed on the rear side of the complex. In addition, the boundary wall was also raised to prevent theft of the sculptures stored in one of the temples.

155. RUDRANATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI

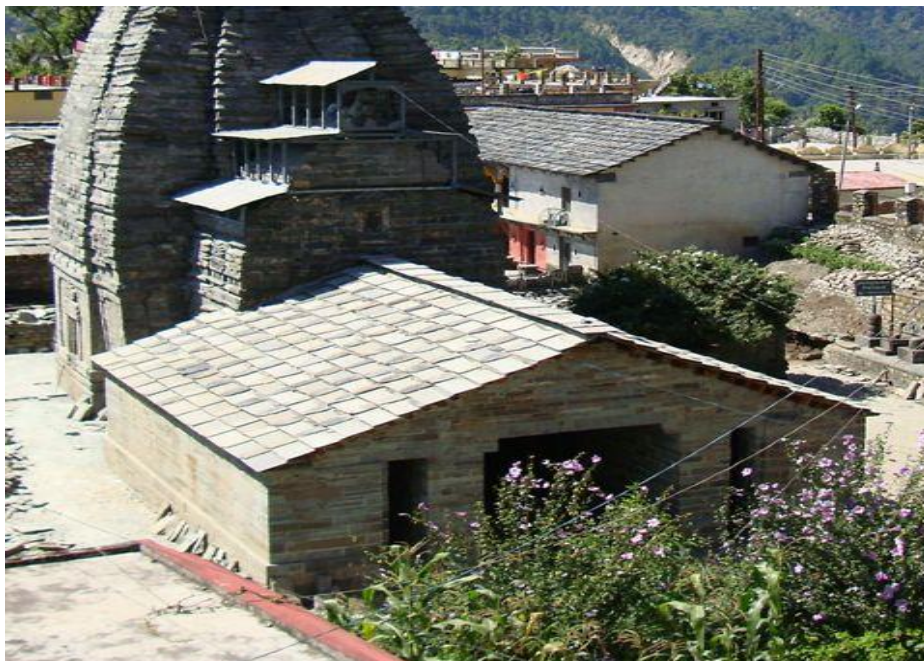
The *mandapa* of the main shrine was in a dilapidated condition. Both the sides walls were out of plumb, stone slabs of the roof were broken in to pieces and wooden beams on which roof was supported had completely decayed. The bulged outside walls were completely dismantled and reconstructed, decayed wooden beams were replaced with new one and finally new stone slabs were provided on the roof matching to the fabric of original stone slabs. In addition, the left out portion of the retaining wall on the right side of the main temple was restored. The work of repair to the stone floor around the temple has also been started and work is in progress (pl.105).

156. CHANDPUR GARHI FORT, KHAL, DISTRICT CHAMOLI

In continuation of the previous year's work, repair of the ancient structures were taken up in traditional method. While clearing the debris some more remains including one



A



B

Rudranath Temple, Gopeshwar: A, before and B, after conservation

circular structure within the complex was exposed. The interior of this circular structure contained thick lime plaster with flight of steps leading to the bottom. The way of construction of this structure suggests that it might have been used for storage purpose probably for granary. Remaining exposed structures were also conserved (pl. 106).

157. TWO TEMPLES, PANDUKESHWAR, DISTRICT CHAMOLI

In addition to Yogebadri and Vasudev Temple, there is another shrine comparatively smaller in size on the right side of the complex; locally known as Laxmi-Narayan temple. It was taken up for repair. Major part of this shrine was buried and a thatched roof structure was raised over it in the recent past by the locals for preparing *prasad* for the deity. Temporary structure raised over the old shrine was removed and the buried portion all around was exposed up to the original ground level. After exposing the complete shrine, it was noticed that all four walls of the shrine were out of plumb and it became necessary to restore the same in its original shape. All architectural members of the shrine were taken out and again replaced in their original place in proper alignment. The *jangha* portion has been completed while repair to *sikhara* is in progress (pl. 107).

158. MAHASUDEVTA TEMPLE, HANOL, DISTRICT DEHRADUN

Bhogshala of Mahasudevta temple, Hanol was repaired during the period under review originally. It was constructed with wooden beams and planks with stone slabs on the roof. Most of the wooden beams and planks

were completely decayed and decomposed. However, before replacing them stone slabs of the roof of *bhogshala* were removed and accordingly new wooden beam and planks were provided in place of the old one finally stone slabs were provided on the roof (pl. 108).

159. SIVA TEMPLE LAKHAMANDAL, DISTRICT DEHRADUN

A group of miniature shrines on the right of the temple complex was exposed in the past. Some of the miniature shrines could not be exposed completely as they were partially hanging on the section. Since there was no further scope of expansion due to hilly slope, it became essential to provide retaining wall along the slope to avoid further erosion from hill top. Accordingly partly exposed miniature shrines hanging on the section were relocated to the nearby place and the retaining wall was constructed matching the exposed structure (pl. 109).

160. ASHOKA ROCK EDICT, KALSI, DISTRICT DEHRADUN

The dilapidated retaining wall of the approached pathway leading from road site of the inscription was repaired.

161. BRITISH CEMETERY, RORKEE, DISTRICT HARIDWAR

Missing and damaged old brick compound wall of the cemetery area has been repaired. In addition, a few graves which were in a dilapidated condition were also repaired. Besides, the main entrance of the cemetery complex was face lifted.



A



B

Chandpur Garhi, Chamoli: A, before and B, during exposition

Plate: 107



A

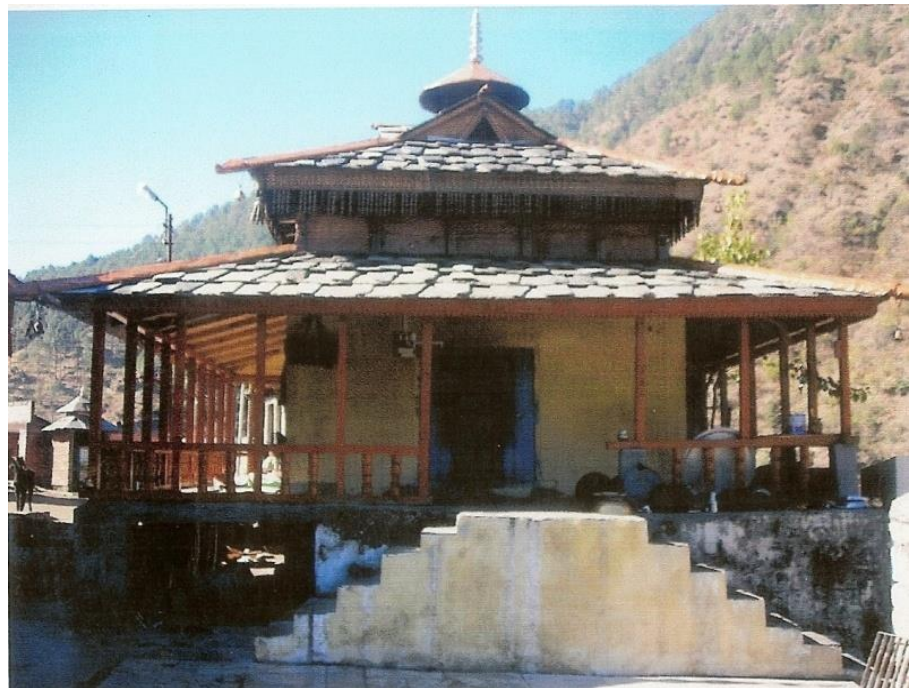


B

Miniature Shrine, Pandukeshwar: A, before and B, after conservation



A



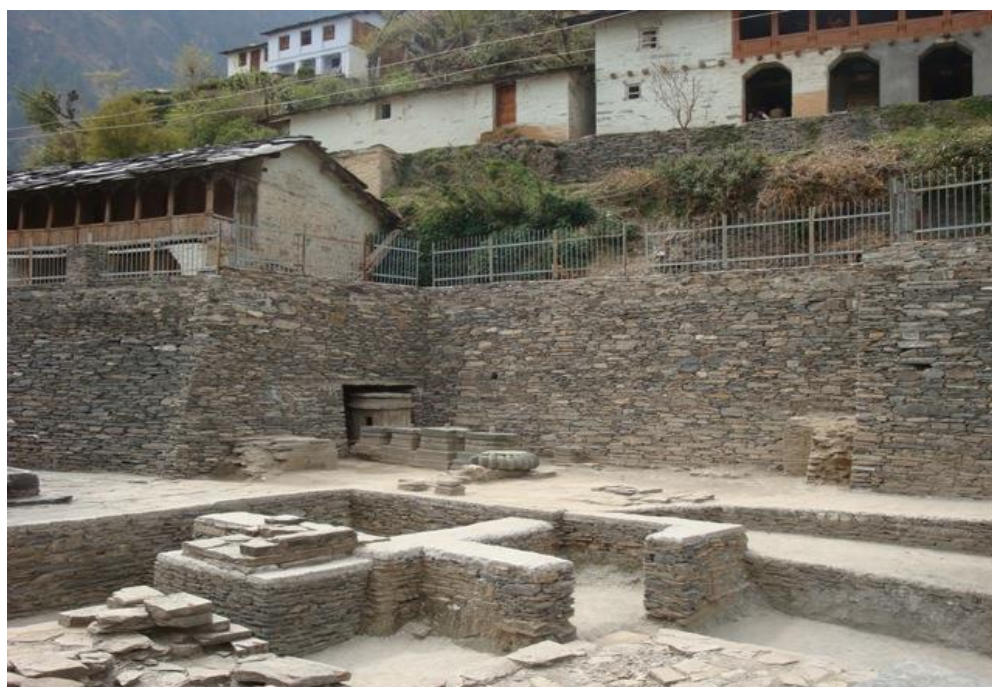
B

Bhogshala, Mahasudeva Temple: A, before and B, during conservation

Plate: 109



A



B

Lakhamandal: A, before and B, after conservation

**162. EXCAVATED SITE GOVISHANA MOUND,
KASIPUR, DISTRICT UDHAM SINGH NAGAR**

In continuation of the previous year's work further extension of the boundary wall was made in brick masonry with MS grill.

DHARWAD CIRCLE

KARNATAKA

**163. JYOTIRLINGA TEMPLE, AIHOLE,
BAGALKOT**

The dismantled out of plumb portion of the ancient well has been reconstructed after providing new stone block for the missing portions as per original and the top was provided with coping stones with necessary moldings (pl. 110).

**164. RAMESHWAR TEMPLE, BEVOOR, DISTRICT
BAGALKOT**

The compound wall has been constructed on the northern side with sandstone slabs and MS grill over it to match the ambience.

**165. DURGA TEMPLE COMPLEX, AIHOLE,
DISTRICT BAGALKOT**

Pathways have been laid out with sandstone slabs to the temple complex. The out of plumb portion of the Veerswamy temple has been dismantled and reconstructed as per original after duly document each stone members by way of drawing, photography, etc. (pls. 111-112).

**166. HUCHAPPAYYA TEMPLE, AIHOLE,
DISTRICT BAGALKOT**

The out of plumb portion of the fort wall has been dismantled and reconstructed using new stone blocks where ever the stones were missing over firm concrete bed. The work is in progress.

**167. MALAGITTI SHIVALAYA FORTIFICATION
WALL, BADAMI, DISTRICT BAGALKOT**

The inner side, out of plumb and damaged fortification wall is being dismantled for reconstruction.

168. CAVE I, BADAMI, DISTRICT BAGALKOT

Dismantling and reconstruction of the out of plumb portion of the fortification wall on the western side of the Agastheerta tank is in progress.

**169. GALAGNATH TEMPLE, PATTADAKAL,
DISTRICT BAGALKOT**

The huge debris near Mallikarjuna temple has been removed and leveled. The work for laying apron taken and is in progress.

**170. GROUP OF TEMPLES, PATTADAKAL,
DISTRICT BAGALKOT**

Earth work excavation was done for laying concrete bed for the pathways with sandstone slabs is in progress.

171. GAGAN MAHAL, BIDAR, DISTRICT BIDAR

Re-plastering of the peeled off and dead plaster and applying a fresh lime mortar to the wall surface and finishing of the top surface is in progress. Applying OBD coats to the interior wall surface is also in progress.

**172. BARID SHAHI TOMBS (GATEWAY AND
MOSQUE AT ALI BARID), BIDAR, DISTRICT
BIDAR**

Earth work excavation and construction of trap stone masonry for foundation is in progress.

**173. BARID SHAHI TOMBS (NORTH AND SOUTH
OF ALI BARID), BIDAR, DISTRICT BIDAR**

Plate: 110



A



B

Jyotirlinga temple complex, Aihole: A, before and B, after during resetting of well



A



B

Durga Temple Complex, Aihole: A, before and B, during resetting

Plate: 112



A



B

Durga Temple Complex, Aihole (Veerswamy Temple): A, before and B, after conservation

Construction of trap stone masonry extra earth from the area was removed. Erection of the super structure of the missing portion is in progress.

174. BARID SHAHI TOMBS (EAST AND WEST OF ALI BARID), BIDAR, DISTRICT BIDAR

Earth work excavation and construction of trap stone masonry for foundation is taken up and work is in progress.

175. BAHMANI TOMBS, ASHTUR, DISTRICT BIDAR

Providing and fixing of MS grills to the open arches to stop the entry of anti-social elements is in progress.

176. AINUL MULK TOMB, AINAPUR, DISTRICT BIJAPUR

Construction of the compound wall using UCR trap stone in cement mortar including PCC, DPC, coping and pointing has been completed. Stone apron using trap stone slabs and fixing curb stones around the main structures to prevent seepage of rain water has been laid.

177. GATES, WALLS OF CITY AND CITADEL, BIJAPUR, DISTRICT BIJAPUR

Reconstruction of the fallen and damaged fortification wall using trap stone blocks in lime mortar and core filling with UCR stones and earth as per original is in progress.

178. GOL GUMBAZ, BIJAPUR, DISTRICT BIJAPUR

Providing un-shatter ancient barrier wall using trap stone blocks in lime mortar and core filing with UCR trap stone is in progress. Construction of the fallen mud mortar compound wall with new UCR stone

in cement mortar including pointing and coping has been completed.

179. FORT WALL, BIJAPUR, DISTRICT BIJAPUR

Reconstruction of the ancient fallen and damaged fort wall in trap stone blocks by using lime mortar and core with UCR stone and earth as per original is in progress.

180. IBRAHIM RAUZA, BIJAPUR, DISTRICT BIJAPUR

Leveling and lowering of the protected area by way of providing drainage in-front to drain-out the stagnated water accumulation during rainy season was completed.

181. KARIMUDDIN MOSQUE, BIJAPUR, DISTRICT BIJAPUR

Construction of the compound wall using UCR trap stone in cement mortar, DPC, coping and pointing was completed.

182. MUSTAFA KHAN MOSQUE AND MECCA GATE, BIJAPUR, DISTRICT BIJAPUR

MS grills have been provided to the open arches to stop human vandalism.

183. ALI ROUZA I, BIJAPUR, DISTRICT BIJAPUR

Construction of the compound wall using UCR trap stone in cement mortar over the existing foundation wall with DPC, coping and pointing and providing MS grills over it was completed. The open arches of the main structure have been provided with MS grills for security of the structure.

184. GALGESHWARA TEMPLE, GALAGANATHA, DISTRICT HAVERI

The sunken and dislodged sub-shrine has been dismantled and re-set using available stone block in tradition mortar has been

completed. Construction of the outer veneering wall and laying lime, sand and brick jelly concrete to the roof was attended. Construction of the compound wall with rubble masonry on the north-western side of the sub-shrine is in progress. Teak wood doors have been provided as per old design to the monument.

185. SOMESWARA TEMPLE, HARLAHALLI, DISTRICT HAVERI

Construction of compound wall is in progress. Teak wood doors have been provided to the monument for security measures.

186. RAMALINGESHWAR TEMPLE, BALAMBEEDU, DISTRICT HAVERI

Retaining wall and compound wall around the monument along with MS grills over it has been completed. Schist stone cladding to the rear side of the compound wall has also been completed. Schist stone apron has been provided around the monument. RCC spun pipes have been provided to the culvert to drain out the channel water and thus, prevent them from eroding the earth adjacent to the monument.

187. TARKESWARA TEMPLE, HANGAL, DISTRICT HAVERI

Dismantling and resetting of the out of plumb portion of the *mandapa* is in progress. The construction of inner veneering wall is completed.

188. KADAMBESHWAR TEMPLE, RATTIHALI, DISTRICT HAVERI

The rubble masonry wall of the *mandapa* has been removed and pillars of the *mandapa* have been exposed. Schist stone

blocks have been provided at missing portion of the roof parapet of the main temple. Teak wood doors have been provided to the monument for security purpose.

189. MUKTESHWAR TEMPLE, CHAUDADANAPUR, DISTRICT HAVERI

Construction of the compound wall to the east of the temple is in progress. The area around the temple has been leveled for developing lawns.

190. NAGARESHWARA TEMPLE, BANKAPUR, DISTRICT HAVERI

Teak wood doors have been provided to the monuments for security purpose. The work of removal of dead lime concrete of the roof is in progress.

191. MADHUKESHWAR TEMPLE, BANAVASI, DISTRICT UTTARA-KANNADA

The dead lime concrete of the roof has been removed and re-laid with fresh lime concrete, brick jelly with sufficient gradient for easy flow of rain water. The top of the roof has been watertightened (pl. 113).

192. FORT, MIRJAN, DISTRICT UTTARA-KANNADA

Reconstruction of the dismantled portion of the bastions with old and new laterite blocks as per the original is in progress.

193. ANCIENT SITE, GUDNAPUR, DISTRICT UTTARA-KANNADA

Construction of laterite stone masonry compound wall and supporting wall of the existing structure of Veerbhadreshwar temple has been attended. MS grill over the dwarf compound wall has been fixed. The



A



B



C



D

Madhukeshwara temple, Banavasi: A-C, before, during and B-D, after conservation

damaged roof has been re-laid with lime concrete.

GOA CIRCLE

GOA

194. CHURCH OF ST. FRANCIS OF ASSISI, OLD GOA, NORTH GOA

The work of repairing to the wooden windows was taken up and completed. Iron mesh was provided to the wooden windows to prevent entry of bats and birds. The dead plaster was removed and re-plastered with lime mortar and white washed. The original ground level on the back side was exposed and provided with RCC curtain wall to arrest the seepage of ground water into the walls. Laterite stone apron was also provided.

195. SE' CATHEDRAL, OLD GOA, NORTH GOA

The dwarf wall on the eastern side which had collapsed during rainy season was reconstructed. The iron grill barricades, gates were repainted. The damaged wooden pulpit was repaired. The cracks in the finial were attended to by stitching and fixing properly.

196. ASI MUSEUM, OLD GOA, NORTH GOA

GI sheet gutters was provided at the roof level for proper drainage of rain water. Original ground level at backside of Museum was exposed to arrest the seepage of ground water into the walls.

197. CHAPEL OF ST. CATHERINE, OLD GOA, NORTH GOA

White washing over the external and internal walls of the monument and pointing works with lime mortar was attended.

198. SAFA MASJID, PONDA, GOA

The work of providing laterite stone pathway, construction of laterite stone channel for draining out of rain water and pointing over the walls of the ancient tank was attended.

199. ST. PAUL GATE, OLD GOA, NORTH GOA

Colour washing of the monument, compound wall and painting over the iron grill and gate was completed.

200. ST. AUGUSTINE CHURCH, OLD GOA, NORTH GOA

Removal of the debris from within the complex, restoration of existing laterite stone outer wall of Novitiate cloister and cuddapah stone pathway was attended. The work of providing flush pointing over the laterite wall on top surface was completed.

201. BASILICA OF BOM JESUS, OLD GOA, NORTH GOA

The work of painting the interior surface of the walls of quadrangle was completed.

202. ST. CAJETAN CHURCH, OLD GOA, NORTH GOA

The work of removing the old dead plaster and re-plastering and painting with two coats of paint over the re-plastered surface was completed.

203. FORT, AGUADA, CANDOLIM, NORTH GOA

The work of restoration of existing bastion, parapet wall of the lower fort was attended and the entire area was flush pointed. The work of filling the cavities of the natural rock of the outer moat wall and pointing with lime mortar of upper fort has been completed. Grill fencing has been provided.

204. CHURCH OF OUR LADY OF ROSARY, NORTH GOA

The wall surface was provided with flush pointing. The old damaged GI sheet gutters were removed and fixed with new ones.

GUWAHATI CIRCLE

ASSAM

205. CACHARI RUINS, KHASPUR, DISTRICT CACHAR

Watertightening of the Ranachandi temple removing the dead plaster and reproduction of ornamental work as per original with lime-*surkhi* mortar has been completed.

Besides, restoration of the natural water body surrounding the Baradwari with brick lining for its safeguard has also been completed.

206. IDGAH, RANGAMATI HILL, DISTRICT DHUBRI

Lime-*surkhi*-brick jelly flooring, lime-*surkhi* plastering on the ancient wall and *mehrab* has been completed.

207. SRI SURYAPAHAR RUINS, GOALPARA, DISTRICT GOALPARA

Lime concrete flooring in the excavated remains and random rubble stone work in the ancient water channel are in progress.

208. MONOLITHS, KASOMARI PATHAR, DISTRICT GOLAGHAT

Vegetation clearance of the site has been carried out and stone pitching work matching with the monument has been completed.

209. SIVADOL TEMPLE, NEIGHERITING, DISTRICT GOLAGHAT

Resetting of ancient steps and relaying of the damaged concrete steps are in progress.

210. HAYAGRIVA MADHAVA TEMPLE, HAJO, DISTRICT KAMRUP

Stone pitching around the temple to check soil erosion, construction of retaining wall in the front of the temple and painting to the roof of the *mandapa* has been completed. Lime-*surkhi* plastering on the main temple (pl. 114) and providing of pipe railing for the safety of the visitors in the front of the temple have been completed.

211. KEDAR TEMPLE, HAJO, DISTRICT KAMRUP

Plastering of the *natyamandapa*, construction of the retaining wall in the north-west corner, providing of pipe railings at the slopes for the safety of the visitors, laying of stone apron around the temple and seating arrangements for the visitors has been completed. Work for drinking water facility for the visitors has also been completed.

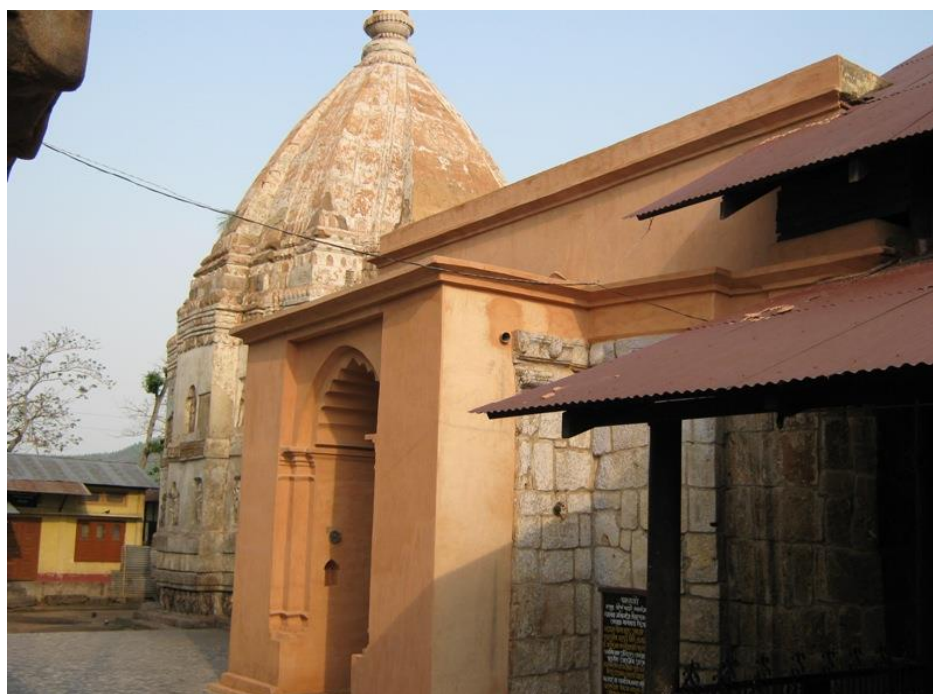
212. KAMESWAR TEMPLE, HAJO, DISTRICT KAMRUP

Brick-on-edge apron around the temple, repairing of the damaged floor of the *natyamandapa*, repairing of lime concrete floor of *mukhamandapa*, roof terracing, construction of tree round, fixing of seating benches and dressing and leveling of the undulating ground has been completed. Lime-*surkhi* plastering on the main temple (pl. 115), pipe railing at the slopes for the safety of the visitors, dwarf wall with chain link fencing and arrangement for drinking water facility for the visitors has been completed.

Plate: 114



A



B

Hayagriva Madhava temple, Hajo: A, before and B, after re- plastering



A



B

Kameswar temple, Hajo: A, before and B, after re- plastering of the main temple

213. GANESH TEMPLE, HAJO, DISTRICT KAMRUP

Laying of brick-on-edge apron around the temple has been completed. Plastering on the main temple (pl. 116) and repairing of lime concrete floor and seating arrangements for the visitors has also been completed.

214. DEVIDOL, GAURISAGAR, DISTRICT SIVASAGAR

Construction of a toilet block for the visitors has been completed and vegetation clearance of the site was also carried out.

215. GROUP OF FOUR MAIDAMS, CHARAIDEO, DISTRICT SIVASAGAR

Construction of retaining wall in the excavated *maidam* to check soil erosion is in progress.

216. GARHGAON RAJA'S PALACE (AHOM RAJA'S PALACE), GARHGAON, DISTRICT SIVASAGAR

Construction of a toilet block for the visitors and water connectivity work has been completed.

217. KARENGHAR OF THE AHOM KINGS (TALATALGHAR), DISTRICT SIVASAGAR

Vegetation clearance of the site was carried out. Removal of damaged concrete floor and re-flooring of the same with brick jelly lime concrete and provision to drain out rain water has been completed. Stucco and plastering work has also been completed.

218. RANGHAR RUINS, JOYSAGAR, DISTRICT SIVASAGAR

Vegetation clearance of the site has been carried out and restoration of the ancient

boundary wall with special size bricks at the back side of the monument has been completed. Construction of toilet blocks for the visitors has also been completed.

219. SIVADOL, SIVASAGAR DISTRICT SIVASAGAR

Vegetation clearance of the site and cleaning of moss and lichen of the monument has been carried out.

220. VISHNUDOL, SIVASAGAR, DISTRICT SIVASAGAR

Removal of the old damaged pathways around the temple and relaying of the same and painting of the GI roof has been completed.

221. DEVIDOL, JOYSAGAR, DISTRICT SIVASAGAR

Removal of the old decayed plaster and re-plastering with lime-*surkhi* on the back side of the main temple and inner side of the *antarala* has been completed. Re-flooring of the damaged floor of the *mukhamandapa* and *antarala* with brick jelly lime concrete has also been completed.

222. MASONRY REMAINS ON THE BAMUNI HILL, TEZPUR, DISTRICT SONITPUR

Construction of approach road and barbed wire fencing has been completed.

223. RUINS, SINGRI, DISTRICT SONITPUR

Construction of dwarf wall and barbed wire fencing has been completed.

224. THE ROCK KNOWN AS "SAKRESWAR", DISTRICT SONITPUR

Construction of dwarf wall and barbed wire fencing has been completed.



A



B

Ganesh temple, Hajo: A, before and B, after re-plastering of the main temple

225. THE MOUND AND RUINS OF THE STONE TEMPLE, PARBATIYA, DISTRICT SONITPUR

Fabrication of MS grill to fix over the dwarf wall is in progress.

MANIPUR

226. TEMPLE OF VISHNU, BISHNUPUR, DISTRICT BISHENPUR

Lime-*surkhi* plastering of the main temple, compound wall including MS grill railing over it and repairing of the approach pathway has been completed.

MEGHALAYA

227. STONE MEMORIAL OF U-MAW-THODUR-BREW, DISTRICT JAINTIA HILLS

Construction of random rubble stone retaining wall for the safety of the monolithic stones has been completed and vegetation clearance of the site has also been attended.

TRIPURA

228. SCULPTURES AND ROCK-CUT RELIEFS OF THE UNAKOTITIRTHA, UNAKOTI, DISTRICT NORTH TRIPURA

Construction of random rubble stone retaining wall for the safeguard of approach road and the sculpture shed has been completed.

229. ANCIENT MOUND CALLED THAKURANI TILLA, JOLAIBARI, DISTRICT SOUTH TRIPURA

Vegetation clearance inside the monument has been carried out and construction of sculpture shed and toilet block for the visitors is in progress.

230. ANCIENT MOUND CALLED SHYAM SUNDAR TILA, JOLAIBARI, DISTRICT SOUTH TRIPURA

Re-setting of the exposed brick structure with special size bricks and watertightening

of the same has been completed.

231. BHUBANESWARI TEMPLE, RAJNAGAR, DISTRICT SOUTH TRIPURA

Construction of a retaining wall to stop soil erosion has been completed.

232. ANCIENT REMAINS AT BAKSHANAGAR, DISTRICT WEST TRIPURA

Watertightening of the upper surface of the exposed brick structure with special size bricks with tradition mortar has been completed. Construction of compound wall, approach pathway and earth filling to low laying area and leveling of the same has also been completed. Brick-on-edge plinth protection was provided in the remaining part around the excavated stupa. Besides, lime concrete work in another excavated structure and painting of the grill has been completed.

JAIPUR CIRCLE

RAJASTHAN

233. ANCIENT SITE, BHANGARH, DISTRICT ALWAR

The debris clearance was carried out with the objective to expose the buried structures and other archaeological remains of the complex. During the clearance work the remains of the shops in two rows locally known as Johari Bazaar area has been exposed. The same were restored as per the extant plan and elevation by using the available original members. The disturbed and out of plumb walls of the structures were reset to the required height with rubbles set in lime mortar and the joint were

recess pointed along with watertightening the top. The collapsed and badly damaged portion of the fortification wall between Ajmeri gate to Delhi gate were carefully cleared and the useful rubble stones were utilized during the restoration of the wall matching as per the original in combination mortar. The fallen, dislodged and out of plumb cells towards hill side of the *mahal* area were carefully dismantled and reset with the help of traditional mortar as per the original, using the available architecture members. Roof was made watertight. Basic facilities like drinking water, toilet, bilingual notification tablet, bilingual cultural notice boards in matching sandstone, rainbow type stone benches, stone built suggestions boxes, slogans boards, and direction boards in matching sandstone were provided for tourist.

234. SIVA TEMPLE, NEELKANTH, DISTRICT ALWAR

The dislodged and out of plumb members of the second platform of Battakh-ki-deori shrine were carefully dismantled and reset as per the originals with the help of available architectural members, after giving proper strengthening to the base. The unevenly sunken steps leading to the upper platform were removed and re-laid as per the original, after leveling the surrounding area. The dislodged and out of plumb outer veneering members of the platform were carefully dismantled and reset as per the original. The badly damaged apron of the Hanuman-ki-Deori was restored with the help of traditional material to restrict the flow of rain water in to the foundation.

235. SIVA TEMPLE AND RUINS, ARTHUNA, DISTRICT BANSWARA

Dismantling and resetting of Khanda Dera temple has been completed with the help of new as well as old stone members with traditional materials while copper dowels were used in place of iron (pl. 117). The out of plumb and bulged out plinth and platform of the temple has been also dismantled and re-set, after strengthening the foundation. Besides an apron was also provided around the structure to restrict the direct entry of rainy water into the foundation. The restoration work of steps leading to the temple is in progress.

The remains of a miniature shrines in the Someshwar temple complex was restored with the help of old as well as new members in traditional material and matched them as per the original. The *jagati* portion of the shrine has been restored in combination of traditional materials. The old drainage system of the complex has been revived after proper repair work while the base portion of the *torana-dwara* of the complex has been placed on its original position. Dwarf wall with M.S. railing around the protected area of the Mandleswar temple complex has been provided. Exposing and re-setting of buried structure in the complex is in progress.

Dwarf wall with MS grill railing around the protected area of the Chuasath Yogini temple complex has been completed. The missing and badly damaged stone of the *mukhamandap* has been replaced with new ones as per the original. The restoration work of the platform of the Kumbheswar temple is in progress by using old as well as new architectural members in traditional mortar. Some important sculptures of the

Plate: 117



A



B

Siva Temple and Ruins, Arthuna: A, before and B, after conservation

site were displayed on masonry pedestal in newly constructed hall attached to the sculpture shed. In addition, basic facilities like drinking water, toilet, bilingual notification tablets, and rainbow type stone benches, stone built suggestion box, slogans boards were also provided.

236. AKBAR'S CHHATRI, BAYANA, DISTRICT BHARATPUR

During the documentation of the site (both photo and drawing), it was noticed that the plinth portion of the structure is dislocated from original structure. He same was dismantled up to the foundation level and resetting of the *chhatri* with the help of new as well as old members was completed after strengthening the foundation. The rusted iron dowels were replaced by copper dowels (pl. 118).

237. BAYANA FORT, BAYANA, DISTRICT BHARATPUR

The un-even and sunken stone flooring in front of second gateway of the fort was removed and fresh stone flooring was laid with the help of new as well as old stones in lime mortar, after strengthening the base of the floor. A guard wall was also constructed to safe guard the tourist all along the approach pathway. The badly damaged, dislodged and undulated stone masonry pathway has been re-laid. The replacement work of badly damaged pillars and beams of the first gateway of the fort is in progress.

238. CHAURASI KHAMBHA TEMPLE, KAMAN, DISTRICT BHARATPUR

The missing *chhajja* stones including brackets and damaged architectural

members of the façade of the gate way of the temple have been replaced with new one as per the original. Copper dowels were used in place of rusted iron dowels (pl. 119). All the missing *chhajja* stones and brackets of the northern side have been replaced by new one, matching with the original. The detached and out of plumb portion of the western side wall has been dismantled and reset with the help of traditional materials. Basic amenities like dust bins, bilingual notification boards stone benches and suggestions box were provided.

239. FORT, BHARATPUR, DISTRICT BHARATPUR

The missing and badly damaged brick edge pathway from metal-led road to the main entrance of the complex has been restored with the *Lakhauri* bricks in lime mortar as per the original. Enclosure wall on *Lakhauri* bricks has been further raised to restrict the erosion of earth. The work like pointing, underpinning and water tightening was also attended. MS grill gate has been provided to the compound at the entrance to restrict the entry of the animals, etc. The work of pointing and underpinning of traditional wall was done with the RR stone masonry in traditional mortar. The missing and badly damaged portion of wall of the Horse stable was restored with the help of traditional materials as per the original.

240. LAL MAHAL, ROOPWAS, DISTRICT BHARATPUR

The un-even and badly damaged sunken stone flooring was removed and new stone slabs were laid, after giving proper slope for draining of rain water.

Plate: 118



A



B

Akbar's Chhatri, Bayana: A, before and B, after resetting of the Chhatri



A



B

Chaurasi Khambha Temple, Kaman: A, before and B, after conservation

241. DEEG PALACES, DEEG, DISTRICT BHARATPUR

The missing and badly damaged sandstone railing (*jali*) of open pavilion facing Roop Sagar has been replaced by new one matching with the original. The rusted iron dowels were also replaced with copper one. A fresh lime plaster has been provided to the outer wall of Nayayalaya *Bhawan* (Nursery side) after removing the dead and decayed plaster. Missing *kangooras* were replaced with new ones as per the original. Moulded plaster work of left wing of Kishan *bhawan* has been completed, as per original after removing the dead plaster. The dismantling work of the damaged *chhajja* stones, brackets and daub stones to the south-west corner of the Nand *bhavan* has been completed and resetting work of the same with the help of new as well as old members to its original position is in progress. The rusted iron dowels were replaced by stainless steel dowels (pl. 120). The basic facilities like drinking water, toilet, dust bins, bilingual notification boards suggestions box have been provided.

242. FORT, CHITTAURGARH, DISTRICT CHITTAURGARH

The missing and badly damaged *kangooras* of the *chhatra* Padmini Palace have been restored as per the original. The dead and decayed lime plaster of the *chhatra's* dome was removed and a fresh lime plaster has been provided as per the original. In addition, the damaged portion of the base of the *chhatra* has been restored. The uneven and sunken stone flooring of the Northern side gate was removed and fresh stone slabs were laid after giving proper slope as per the

original. The works of stitching of cracks, under pinning and watertightening was done wherever necessary. MS grill gate was provided as per the matching design of the arch, to restrict the entry of animals and unwanted elements. The dilapidated and badly damaged portion of the fortification wall between *Mriga-Van* to northern side was restored as per the original. The pointing was done from inner side of the fortification wall while top portion was watertightened, after removing the vegetation.

243. MAHANAL TEMPLE, MENAL, DISTRICT CHITTAURGARH

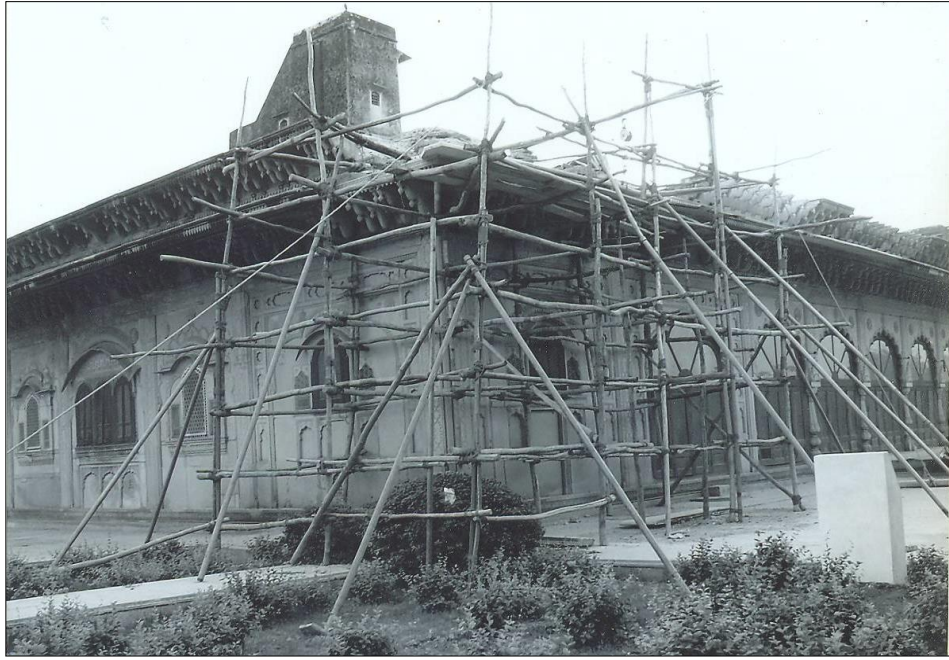
Restoration works of damaged prakara wall along with bastions were taken for repair and completed matching to the original.

244. BAORI, ABHANERI, DISTRICT DAUSA

The laying of stone slabs on the top surface of the courtyard has been taken up and work is in progress besides painting of MS railings and gates of the compound also attended.

245. BHATNER FORT, BHATNER, DISTRICT HANUMANGARH

Damaged and missing portion of the ancient drainage system (storm water drain) between bastions 24 and 25 was repaired as per the original. The collapsed and bulged out portions of the fortification wall between bastions 22 and 23 were restored by using old bricks in lime mortar matching to the original. The missing and badly damaged lower part of the bastion 23 has been restored. The works like re-setting of bulged portion, underpinning and pointing were undertaken to bastion 24 and 25, wherever



A



B

Deeg Palaces, Bharatpur: A, during and B, after conservation of Chhajjas of Nand Bhavan

necessary with the help of *Lakhauri* brick in lime mortar. The damaged portion of the bastion 11 was restored by way of underpinning and pointing. The collapsed and out of plumb fortification wall of the fort between bastions 11 and 12 were restored with the help of sorted out *Lakhauri* bricks collected from the debris and reset in lime mortar as per the original. The out of plumb and collapsed portion of the bastion 12 was undertaken by way of underpinning, resetting and watertightening. The pointing and water tightening was also done from bastion 10 to 18. The remaining restoration work of the bastion 18 was completed as per the original. The basic facilities like drinking water, toilet, dust bins, bilingual notification board and cultural notice boards, benches and suggestion boxes, slogan boards were provided.

246. RANTHAMBOR FORT, SAWAI, DISTRICT MADHOPUR

The out of plumb portion of the double-storied structure of the Raghunath temple was dismantled and re-constructed as per the original, after replacing the broken roof slabs, beams and *chhajja* stones. The water tightening work of the roof is in progress. An apron was provided all around the temple in RR stone and the joint were pointed. The platform of the temple was also restored in its original condition. The dead and detached lime plaster of the *verandah* has been re-plastered as per the original, after removing the dead and decayed plaster. MS grill has been provided to all the openings of the *verandah* to restrict the entry of animals. The RR Stone masonry pathway between gate 1 to 2 was completed, after removing of the vegetation.

The out of plumb and badly damaged portion of the fortification wall (inner side) toward forest area was restored as per original. The fallen and washed out material (approx. 2m) accumulated at the east side gate was completely removed and a retaining wall of was constructed to restrict further erosion of the earth towards hill side. However, the restoration work of east gate of the Sat Pol gate is in progress. GI pipe railing has been provided between *Naulakha* gate to *Andheri* gate for the easy movement of tourist. The approach pathway between Hathi Pol and Ganesh Pol was widened and two resting places were developed on either side of the pathway. The replacement of missing and badly damaged *chhajja* stones Digamber Jain Temple is in progress. The dead and decayed lime plaster of the *prakara* wall was removed carefully and re-plasters of the same is in progress. The uneven and sunken portion of the ramp in front of the main entrance of the Hamir *Mahal* was restored. The construction of apron of the palace is in progress. Basic facilities like toilet, bilingual notification board and bilingual cultural notice boards, stone benches, suggestions box and slogans boards were provided.

247. FORT, KUMBHALGARH, DISTRICT RAJSAMAND

The bulged and out of plumb wall of the Badva *baoli* has been dismantled and re-set using of new as well as old stones matching to the original. However, the debris clearance work was undertaken towards north-east corner of the *baoli* and found the remains of water tank for animals (locally called *Kheli*), which was also restored. The missing and badly damaged steps of the

Reservoir 2 have been restored, while the bulged out portion of the wall were dismantled and reset as per the original. The badly damaged support wall was also repaired. Basic facilities like drinking water, toilet, bilingual notification tablet, bilingual cultural notice boards stone benches, and suggestions boxes, slogans boards, direction boards were put up.

KOLKATA CIRCLE

WEST BENGAL

248. RASMANCHA, BISHNUPUR, DISTRICT BANKURA

Preservation of existing old plaster and pointing of open brick joints on and around pyramidal roof have been completed.

249. SANTINIKETAN, BOLPUR, DISTRICT BIRBHUM

Re-plastering of the damaged portion of the walls, repairing of damaged roof and damaged brackets and sunshades, surface finishing of interior wall, repairing of doors and windows and polishing of the same after removal of old and blistered paint layers have been taken up at “Udichi” in Uttarayan Complex and completed (pl.121). At “Malancha” removal of damaged plasters from walls and ceilings and re-plastering of the same in lime sand mortar as per original, removal of superficial layers from roof and resurfacing followed by replacement of damaged beams and rafters by new one, repairing of doors and windows have been completed (pl. 122). At “Dwij Biram” the original ground level by removing earth deposits, relaying of damaged tiled roofs, removal of damaged floors and relaying in lime mortar as per original, renewal of

surface drainage system and repairing of wall surface and re-plastering of the same in lime sand mortar have been done (pl. 123).

250. BANGARH, RAJIBPUR, DISTRICT DAKSHIN DINAJPUR

Restoration of missing portions of collapsed brick walls, water tightening work to top of walls of the temple complex have been carried out. Appropriate surface drainage for rain water has also been done.

251. DUPLEIX PALACE, CHANDANNAGAR, DISTRICT HOOGHLY

Repairing of the walls and finishing of the surface has been completed.

252. BETH-EL-SYNAGOGUE, KOLKATA, DISTRICT KOLKATA

Re-plastering of the walls, re-surfacing of roof has been completed.

253. CURRENCY BUILDING, KOLKATA, DISTRICT KOLKATA

Re-plastering of the walls, repairing of wooden doors and windows and repairing of old wooden staircases has been done.

254. METCALFE HALL, KOLKATA, DISTRICT KOLKATA

After careful removal of distressed masonry of the front portico, rebuilding of the same have been carried out along with necessary repairing of damaged capital of pillars followed by relaying of damaged roof.

255. VICTORIA MEMORIAL HALL, KOLKATA, DISTRICT KOLKATA

Resurfacing of gravel road, renewal of surface finishing of walls around the domed roof has been completed.

Plate: 121



A



B

Udichi, Santiniketan: A, during and B, after conservation



A



B

Malancha, Santiniketan: A, before and B, after conservation

Plate: 123



A



B

Dwija Baram, Santiniketan: A, before and B, after conservation

256. ADINA MASJID, PANDUA, DISTRICT MALDAH

Restoration of missing portion of brick walls, pointing of brick joints and stitching of cracks have been carried out at required places.

257. BAISGAZI WALL, GAUR, DISTRICT MALDAH

Restoration of missing brick masonry of different portions of the wall, repairing of cracks, watertightening of the wall and restoration of missing floral border of the wall has been done.

258. HAZARDUARI PALACE, MURSHIDABAD, DISTRICT MURSHIDABAD

Repairing of the central roof of the dome has been completed.

259. IMAMBARA, MURSHIDABAD, DISTRICT MURSHIDABAD

Relaying of damaged floor, restoration of missing wooden weather boards, resurfacing of roofs, fencing of rear side of the monument have been done.

260. HASTING'S HOUSE, BARASAT, DISTRICT NORTH 24 PARGANAS

Relaying of roof on the central portion of building with necessary replacement of damaged wooden beams and rafters have been completed.

261. SIVA TEMPLES, KHARDAH, DISTRICT NORTH 24 PARGANAS

Relaying of lime concrete atop terraced floors and repairing of damaged wooden doors have been completed.

262. GROUP OF TEMPLES, PATHRA, DISTRICT PASCHIM MEDINIPUR

Repairing of the damaged portions of

existing lime concrete roof, re-plastering of walls, repairing of damaged floors etc. have been done.

SIKKIM

263. RABDENTSE SITE OF ANCIENT CAPITAL OF SIKKIM, FOREST AREA OF PEMAYANGTSE MONASTERY, DISTRICT WEST SIKKIM

Pointing to stone joints of walls and pathway, strengthening of foundation of terraced wall on rear side, electricity connection of the monument have been done.

LUCKNOW CIRCLE

UTTAR PRADESH

264. GARHWA FORT, SHEORAJPUR, DISTRICT ALLAHABAD

Restoration work of the missing part of the railing of south-western bastion was done as per the original and after removal of the damaged plaster; new plaster in lime-*surkhi* mortar was provided as per the original (pl. 124).

265. EXCAVATED SITE, BHITA, DISTRICT ALLAHABAD

Re-setting work of the foundation walls of the excavated structures along with recess pointing and watertightening work was done (pl. 125).

266. EXCAVATED SITE, SRINGAVERPUR, DISTRICT ALLAHABAD

Dismantling and restoration work of the walls of excavated Tank-B was done as per the original. Underpinning and pointing work at required places have also been done.

267. TWO CHANDELLA TEMPLE, GONDA, DISTRICT BANDA

Plate: 124



A



B

Garhwa Fort, Sheorajpur: A, before and B, after conservation



A



B

Excavated site, Bhita: A, before and B, after conservation

Re-setting work of the platform of the temple in the northern side was done as per the original. Pathway in ashlar stone masonry matching with the original was provided.

268. KOTITEERTH TALAB, KALINJAR FORT, DISTRICT BANDA

After opening of the stairs and wall of stone in the eastern side of the *talab*, re-setting work as per original was completed in ashlar stone masonry along with water tightening work (pl. 126).

269. LARGE TEMPLE, RAMNAGAR, CHITRAKOOT

After dismantling, the temple was re-set and missing stones were replaced with new ones in ashlar stone masonry as per original. Water tightening and pointing work was also taken up (pl. 127).

270. GULABBARI, DISTRICT FAIZABAD

The old damaged plaster and flooring, was removed and new plaster in lime-*surkhi* mortar and flooring in lime-*surkhi*-concrete mortar have been provided as per the original to the structure adjoining the main entrance of the Gulabbari on the first floor (pl. 128).

271. BANI KHANAM TOMB, DISTRICT FAIZABAD

The old damaged flooring and plaster on the parapet wall was removed and flooring work in lime-*surkhi*-concrete mortar and plastering work in lime-*surkhi* mortar was done as per the original on the first floor of the tomb.

272. TEMPLE, KURARI, DISTRICT FATEHPUR

The weathered bricks and plaster, decorated

bricks were removed and replaced as per the original. Re-setting of the platform and stairs was also done. Watertightening and pointing work has also been done in the temple and platform (pl. 129).

273. LARGE PALACE COMPLEX, DISTRICT GANWARIA

The Palace complex was conserved by resetting/ underpinning after dismantling the disturbed and cracked wall of back portion. Watertightening and pointing work was also done to consolidate the structure.

274. TOMB OF NAWAB DILER KHAN, SAHABAD, DISTRICT HARDOI

The mosque was conserved after removing porous and dead plaster from the wall. The cracks were repaired through underpinning. The flag stone flooring was also provided.

275. NAWAB SADAR JAHAN (PIHANI), DISTRICT HARDOI

Restoration work of the main dome with *lakhauri* bricks and lime-*surkhi* mortar was done as per original. Lime concrete flooring was laid on the octagonal portion beside the dome. Restoration work of the missing molded and carved pillars was also done. The carved trabeate arch on pillar supporting the stone beam has been repaired.

276. JAGANNATH TEMPLE, BEHTA, DISTRICT KANPUR DEHAT

Scientific clearance outside the temple was carried out to expose the original floor level. Brick flooring was provided around the temple and watertightening work was done. Eastern and southern gates of the temple were repaired and re-setting work of the stairs was undertaken.



A



B

Kotiteerth Talab, Kalinjar Fort, Banda: A, before and B, after conservation

Plate: 127



A



B

Large Temple, Ramnagar, Chitrakoot: A, before and B, after conservation



A



B

Gullabari, Faizabad: A, before and B, after conservation

Plate: 129



A



B

Temple at Kurari, Fatehpur: A, before and B, after conservation

277. TEMPLE AT BILMORI, CHANDPUR, DISTRICT LALITPUR

Re-setting work of the temple was done and flooring in flag stone have been provided at the platform on the backside of the temple. After the removal of earth filling in the front side floor, stairs and boundary wall were provided in ashlar stone masonry. Water tightening work was done.

278. TEMPLE, SAURAI, DISTRICT LALITPUR

Stone flooring has been provided on the platform of the temple. Recess pointing work was done in the whole temple complex while underpinning work was undertaken in the *sikhara*. Pathway has also been provided for proper approach.

279. PALACE INSIDE TALBEHAT FORT, DISTRICT LALITPUR

After removal of the old decayed flooring, new flooring in lime-*surkhi*-concrete mortar has been provided on the first floor as per the original. A wall has also been re-set and plastered with lime-*surkhi* mortar. Plastering of the adjoining walls have also been carried out. Flooring and plastering of the ceiling were done inside the hall at first floor (pl. 130).

280. NAHARGHAT, DEOGARH, DISTRICT LALITPUR

New dressed stone stairs in lime-*surkhi*-concrete mortar have been provided at Naharghati, Deogarh matching with the original.

281. VARAHA TEMPLE AT CHANDPUR, DISTRICT LALITPUR

The loose stone slabs at the western side outer wall were removed. Dilapidated

portion of the stone at the western part of the platform has been removed for resetting as per original. Further, the area of the foundation has been consolidated with RR masonry with lime and finally completed by laying the dressed stone slabs in lime as per original.

282. RESIDENCY COMPLEX, DISTRICT LUCKNOW

The conservation work of the boundary wall has been completed by *Lakhauri* bricks with lime-*surkhi* mortar. The main building of residency was conserved by way of underpinning, pointing and water tightening. The mosque and adjoining structures were conserved as per original by underpinning and pointing. The cracks were repaired through underpinning and lime plaster was also done as per original.

283. DILKUSHA BUILDING, DISTRICT LUCKNOW

Structural conservation work was completed. The cracks were repaired through underpinning. The flooring was re-laid in original material by following the existing pattern.

284. ALAMBAGH CEMETERY, DISTRICT LUCKNOW

The old boundary wall was conserved by way of pointing and underpinning. The flag stone flooring was also provided.

285. KAZMAIN BUILDING, DISTRICT LUCKNOW

All the four minarets of the building were painted as per the original after the plastering work at required places. Flooring around the building and pathway in red sandstone were also provided (pl. 131).

Plate: 130



A



B

Fort Talbehat, Lalitpur: A, before and B, after conservation



A



B

Kazmain Building, Lucknow: A, during and B, after conservation

286. WESTERN GATE, KAZMAIN BUILDING, DISTRICT LUCKNOW

After removal of the old decayed plaster, fresh plaster with moldings and carvings as per original in lime-*surkhi* mortar has been provided. Re-setting work of stairs and stone flooring in front of the gate were also undertaken. Watertightening work of the floor was also completed (pl. 132).

287. RESTORATION OF CEILING OF 1ST HALL, BARA IMAMBARA, DISTRICT LUCKNOW

After removal of cracked plaster, new lime plaster, mixing with traditional material and matching with the existing design, have been provided on the ceiling of the 1st hall. Missing wooden window grills have also been provided as per original at Shah Nasheen hall. Lighting arrangement has also been made by providing LED lights at required places.

288. SHAHI MOSQUE, SIKANDAR BAGH GATE, DISTRICT LUCKNOW

The conservation and repair work has been taken up in the entire prayer hall, minarets and domes. Original water melon design has been conserved maintaining its colour and texture. Watertightening of roof terrace has also been completed.

289. BRAHMANICAL TEMPLE, SUKURA, DISTRICT MAHOBA

Re-setting work of the temple was done and missing stone blocks were provided at places matching with the original. Floor in ashlar stone masonry was provided around the temple. Water tightening and pointing work were also undertaken in the temple (pl.133).

290. TEMPLE, RAHELIYA, DISTRICT MAHOBA

Re-setting work of the *sikhara* and walls of the *mandapa* was done with ornamental ashlar stone as per the original. Pointing and water tightening work was also taken up.

291. MAIN STUPA, PIPRAHWA, DISTRICT SIDDHARTH NAGAR

The ancient brick platform around *stupa* was opened and re-setting work was done as per the original. A path way in brick around *stupa* was provided. Pointing and water tightening work was also done (pl. 134).

292. KACHCHI KUTI, MAHET, DISTRICT SRAVASTI

After dismantling the damaged and disturbed wall in back portion of structure, resetting, watertightening and pointing work was done as per original (pl. 135).

293. PAKKI KUTI, MAHET, DISTRICT SRAVASTI

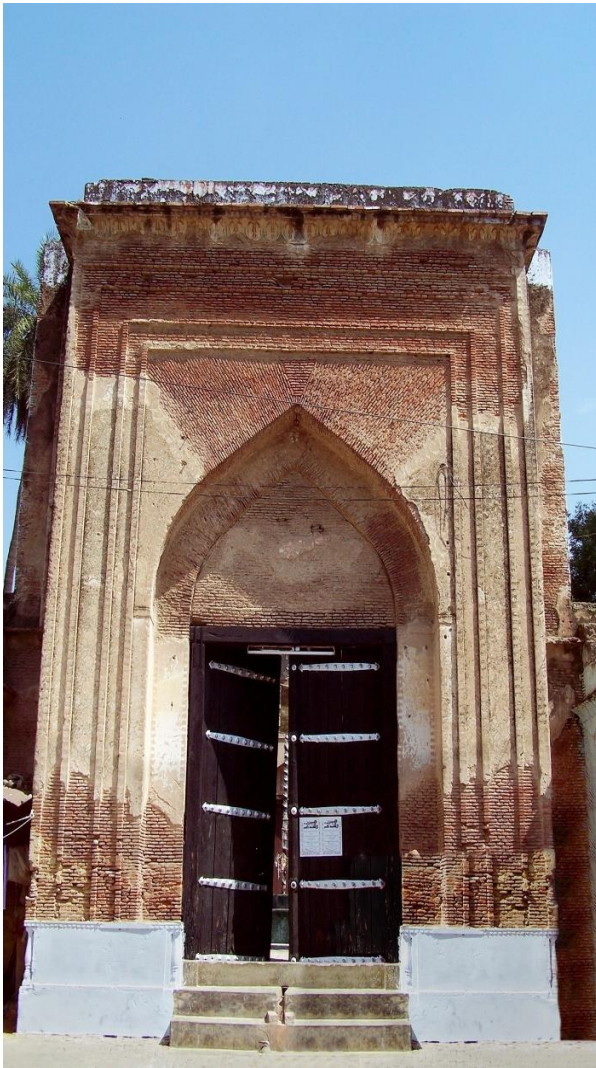
After opening the bulged and cracked portion of the wall, re-setting, watertightening and pointing work was done to consolidate the structure.

294. MAHASTUPA COMPLEX, SAHET, DISTRICT SRAVASTI

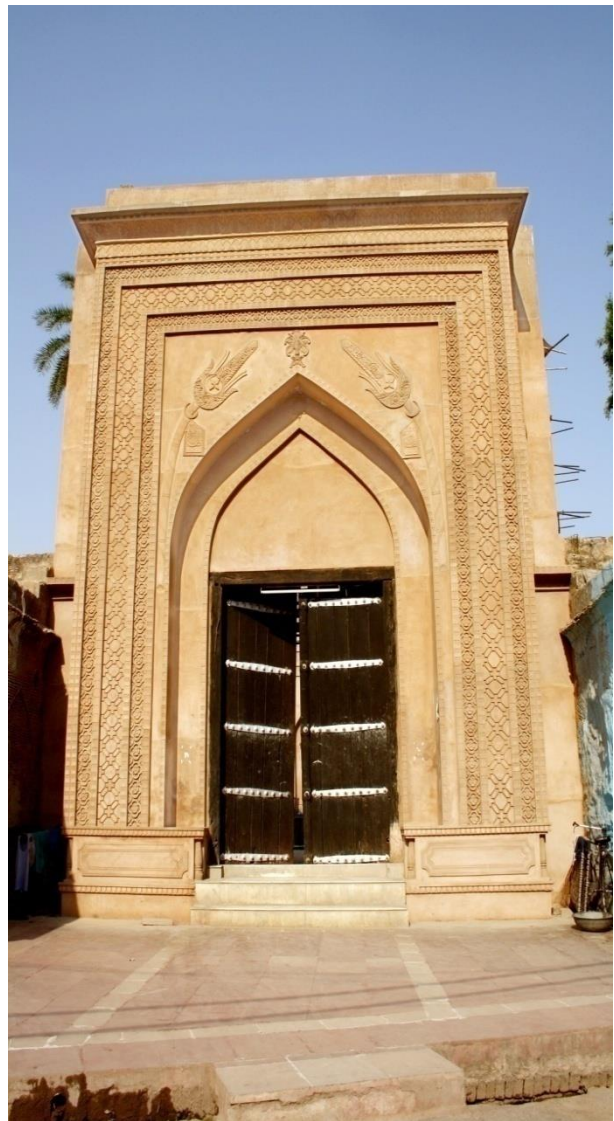
The excavated remains at the southern side of the complex were opened and re-setting work was done as per the original. Watertightening and pointing works were also taken up and done.

295. STUPA 8, SAHET, DISTRICT SRAVASTI

The brick platform around *stupa* and cells were opened and conserved by re-setting. Watertightening, providing and laying lime concrete brick flooring and pointing work has also been taken up to consolidate the structure.



A



B

Kazmain Building, Lucknow: A, before and B, after conservation of western gate

Plate: 133



A



B

Brahmanical Temple, Sukura: A, before and B, after conservation



A



B

Stupa, Piparhwa: A, before and B, after conservation

Plate: 135



A



B

Kachchi Kuti, Sravasti: A, before and B, after conservation

296. TELIGARHI, BHAGUPUR, DISTRICT SULTANPUR

The surroundings of the temple were improved by scientific clearance. Plinths and foundations of brick temples were exposed. The damaged plinth of the main temple was repaired by lime concrete. The old boundary wall was conserved by way of underpinning and pointing.

MUMBAI CIRCLE

MAHARASHTRA

297. KONDIVATE CAVES, DISTRICT MUMBAI

Construction of UCR masonry dwarf compound wall with the fixing of MS grill fencing in between the stone pillars has been executed on the periphery of the protected boundary of the Caves.

298. MANDAPESHWAR CAVES, DISTRICT MUMBAI

Dismantling the undulated flooring and the entry steps at the frontage of the caves has been completed. Drainage system has been made functional after clearing the blockages and the drain has been provided RCC cover slabs in front of the cave. Strengthening of the standing walls of the Portuguese structure has been executed. The compound wall on the periphery of the complex was constructed with stone masonry in lime mortar.

299. SION FORT, DISTRICT MUMBAI

Strengthening of the Portuguese brick structure with the UCR stones in lime mortar has been completed. Inserting *sal* wood lintels in the missing places was completed. Plastering the wall surfaces with the lime mortar both inner and outer has

been completed. The disintegrated flooring has been dismantled and laid a fresh with brick jelly concrete and the top was finished with lime mortar.

300. LEYNADRI CAVES, DISTRICT PUNE

Stone pathway was provided in front of booking counter over the stone jelly concrete.

301. LOHAGAD FORT, DISTRICT PUNE

The undulated approach stone steps inside the Ganesh gate has been dismantled and with the UCR stone over the base concrete and pointing of the joints of the stones with the combination mortar was completed.

302. PATALESHWAR CAVES, DISTRICT PUNE

Fixing of the teak wood frame work paneling in between the pillars of the caves has been completed to prevent the unauthorized entry inside the monument. Dwarf compound wall with the MS grill fencing to the open area of the monument was provided to regulate the visiting public.

303. SHANIWARWADA, DISTRICT PUNE

Reconstruction of the brick masonry of *mastani* bastion on the eastern side with new/old bricks with lime mortar 1:3, after filling the necessary core with brick jelly concrete and joins of the brick structure with lime mortar 1:2 after necessary colour matching the original structure was completed.

304. SHELARWADI CAVES, DISTRICT PUNE

Damaged approach stone steps have been dismantled and reset in position over the concrete base. The retaining parapet wall with the UCR stone masonry for guarding

the edge of the steps has been executed for the safety of the visitors.

305. JANJIRA FORT, DISTRICT RAIGAD

The debris inside the fort Complex has been removed to expose the hidden structure (pl. 136).

306. KHOKARI GUMBAJ, RAJAPURI, DISTRICT RAIGAD

Providing Trap stone flooring around the tomb, over brick jelly concrete, has been executed. Watertightening of the leaking terrace of the mosque has been executed (pl. 137).

307. KOLABA FORT, KOLABA, DISTRICT RAIGAD

Re-construction of the fallen portion of the outer veneering wall of the fort including the bastion with stone blocks with proper core filling on the eastern side as per original shape has been completed. Trap stone flooring pathway in front of Ganesh temple has been provided. Kerb stones on the edges of the pathway right from entrance of the monument to the toilet block has been completed.

308. KORLAI FORT, KORLAI, DISTRICT RAIGAD

Re-setting of the Bulged out outer veneer of the fort wall after filling the cavities with proper core filling on the eastern side of entrance has been provided. The joints of the veneer stone wall have also been filled up.

309. RAIGAD FORT, DISTRICT RAIGAD

The brick structure around the Taksal has been repaired as per the original. The bulged out portion of the stone veneering wall of Taksal on the western side, the

flooring in front of the Mughal Khan and holy channel were repaired with the trap stone. The stone masonry parapet wall with coping stone on the eastern side from the booking office to the main gate has been executed. The Trap stone flooring over the stone jelly concrete inside the *dharamashala* on the northern side has been executed. The terrace of the *dharmashala* has been watertighten with the brick jelly concrete after removing the disintegrated weathering coarse. The area on the south-eastern side of the *Chhatrapati Shivaji Maharaja Samadhi* has been given a face-lift by landscaping and planting grass and flowerbeds.

310. WADA OF DANCING GIRL, CHEUL, DISTRICT RAIGAD

The brick jelly concrete flooring inside the Wada has been completed.

311. SHOLAPUR FORT, DISTRICT SHOLAPUR

The fallen inner veneer stones of the fortification wall has been reconstructed with new stones in the lime mortar after filling the core, and the joints of the stones have been recess pointed (pl. 138).

RAIPUR CIRCLE

CHHATTISGARH

312. NARAYAN TEMPLE, NARAYANPAL, DISTRICT BASTAR

To avoid water stagnation around the temple and for the easy movement of visitors within the premise stone apron was provided.

313. BHAI RAMMDEO TEMPLE, BHAI RAMGARH, DISTRICT BIJAPUR

For the safety and security of the monument



A



C



B



D

Janjira Fort, Raigad: A-B, before and C-D, after conservation

Plate: 137



A



B

Khokari Gumbaj, Raigad: A, before and B, after conservation



A



B

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

MS grill fencing was provided around the protected limit.

314. RATANPUR FORT, RATANPUR, DISTRICT BILASPUR

The fort located at the centre of the town was taken up for structural restoration during the period under report. Missing veneering members of Gate 1 and 2 were replaced with new matching members, ornamental arches were repaired and restored and cracks were filled to strengthen the structures. Underpinning and plastering work were carried out. Besides, to beautify the fort complex landscaping is being done and gardens are being developed. In addition to this pathways are being provided within the fort area for easy movement of visitors.

315. DANTESHWARI TEMPLE, DANTEWADA, DISTRICT DANTEWADA

During the period under review re-plastering with traditionally prepared lime mortar was carried out after removing the dead, decayed and pulverized plaster from the wall surfaces. For the safety and security of the monument, grills were fixed over the existing compound wall.

316. CHANDRADITYA TEMPLE, BARSOOR, DISTRICT DANTEWADA

For the safety and security of the monument, a dwarf compound wall was provided within the protected limit.

317. MEGALITHIC SITE, GAMMEWADA, DISTRICT DANTEWADA

For the safety and security of the monument, a dwarf compound wall was provided within the protected limit.

318. KOTAGARH FORT, DISTRICT KOTAGARH

The fort gate was in a ruined state of preservation. Veneering stones were missing and making the structure very weak. While conserving the structure all missing and damaged stones were replaced by new matching stones besides the recess pointing and watertightening of the whole structure has been taken up as required.

319. EXCAVATED SIVA TEMPLE, SIRPUR, DISTRICT MAHASAMUND

The excavated temple remains locally known as Baleshwar Mahadev was in a dilapidated condition. The plinth including part of the platform was bulged at many places. To strengthen the same plinth has been reset to its originality after dismantling the bulged and out of plumb portion. New matching stones with traditional lime mortar have been used for the restoration work. The super structure has been restored with specially designed bricks with lime mortar. Besides, stone apron has been provided around the monument to avoid water stagnation.

320. EXCAVATED BUDDHIST VIHARA, SIRPUR, DISTRICT MAHASAMUND

During the period under review, restoration of the exterior portion of the excavated Buddhist *vihara* popularly known as Padmapani *vihara* complex which is constructed with burnt bricks has been taken up for repair. The out of plumb portion of walls were taken out and reset as per original. Specially designed bricks with traditionally prepared lime mortar were utilized for the conservation works.

321. RAMA TEMPLE, SIRPUR, DISTRICT MAHASAMUND

In continuation of earlier works, re-setting of the plinth part of the temple. Underpinning and watertightening of the excavated structures were carried out. Besides, stone apron has been provided around the monument to avoid water stagnation.

322. BUDDHIST MONASTERY, SIRPUR, DISTRICT MAHASAMUND

The excavated monastery popularly known as *Tivara Dev Vihara* is known for its monastic cells and a large image of Buddha, placed in a shrine chamber were taken up for repair. Re-setting of brick walls of various monastic cells and the shrine chamber, providing decorative mouldings above the plinth level of brick wall as per available evidence besides consolidation of basement all around the monastery etc. were carried out.

323. LAXMAN TEMPLE, SIRPUR, DISTRICT MAHASAMUND

Desiltation of the water body located in front of Laxman temple was carried out.

324. HARSHGUPTA VIHARA, SIRPUR, DISTRICT MAHASAMUND

Resetting of the damaged stone pavement in front of the Harshagupta Vihara monastery was carried out according to evidences retrieved from the scientific clearance work.

325. EXCAVATED STRUCTURES, SIRPUR, DISTRICT MAHASAMUND

Various excavated brick structures known as Siva Temple 4, 6 and SRP-13 were conserved with newly prepared bricks and traditionally prepared lime-mortar. For the safety and security of the monument and to

avoid trace passing etc. grills were fixed over the existing compound wall at SRP-16, Siva Temple 2, 17. To avoid stagnation of rain water as well as easy movement of visitors stone apron was provided all around the excavated structure at Sasai vihara, priest house of Laxman Temple and Siva Temple 6.

SHIMLA CIRCLE

HIMACHAL PRADESH

326. CHAMPAVATI TEMPLE, CHAMBA, DISTRICT CHAMBA

The damage and uneven flooring of the area around the temple has been provided with flag stone flooring in traditional mortar along with restoration of the retaining wall. Damaged door has been replaced with a new one.

327. SHAKTI DEVI TEMPLE, BHARMAUR, DISTRICT CHAMBA

Restoration of the damaged stone wall (Dhajji wall) has been done with stone and deodar wooden rafters along with mud plaster to match with the original.

328. KATOCH PALACE, TIRA SUJANPUR, DISTRICT HAMIRPUR

The missing wooden roof of the palace has been provided as per original. The scientific clearance in front of the *mahal* has also been done to expose the buried structure. Work is in progress.

329. KANGRA FORT, KANGRA, DISTRICT KANGRA

The original pathway has been exposed near Andheri gate by way of scientific clearance and temporary wooden path has been

provided for the easy movement at tourist. The restoration of the bastion facing the south east side and some portion of the fortification wall facing north side was carried out. The MS railing over dwarf wall all-around the C.A. office and museum has been provided for the safety.

330. NURPUR FORT, NURPUR, DISTRICT KANGRA

The cracked and damaged bastion on the left side of the ancient tank was taken up. Wooden doors, windows and wooden *chowkhat* at the entrance of the Rani Mahal have been provided. The lime plaster and lime punning has also been taken. The work is in progress.

SRINAGAR CIRCLE

JAMMU AND KASHMIR

331. MUGHAL ARCADE, VERINAG, DISTRICT ANANTNAG

Restoration of arched/domes in special size *Lakhaury* at Cell 5 and 6 on north side of the spring was completed.

332. KHANPUR SARAI, KHANPUR, DISTRICT BUDGAM

Restoration of cells, arches on south side in *Lakhaury* brick tiles in traditional mortar is in progress.

333. GROUP OF TEMPLES AT NARANAG, DISTRICT GANDREBAL

Resetting of miniature shrine in ashlar stone masonry at 1st Group of temples is in progress.

334. HIGH COURT BUILDING, MUBARAK MANDI COMPLEX, JAMMU, DISTRICT JAMMU

Dismantling of out of plumb, cracked and closed brick masonry along with underpinning, stitching of cracks and restoration of jack arch roof in brick masonry with traditional mortar including laying of lime concrete is in progress. Also dressing work as well as restoration of highly ornamental and molded stone work for front facade, stair case central towers, arches and wood work for doors and windows is in progress (pls. 139-140).

335. AKHNOOR FORT, AKHNOOR, DISTRICT JAMMU

Restoration of missing weathered and out of plumb fortification wall on the eastern side (facing river Chenab) in brick coarse rubble stone masonry is in progress.

336. SIVA TEMPLE, BILLAWAR, DISTRICT KATHUA

Dressing of stone slabs and fixing on the pathway of the temple is in progress.

337. PHYANG MONASTERY, PHYANG, DISTRICT LEH

Providing of wooden rack for display of antiquities and wall to wall modi carpet in Dukhang is in progress.

338. DUKHANG AT ALCHI, DISTRICT LEH

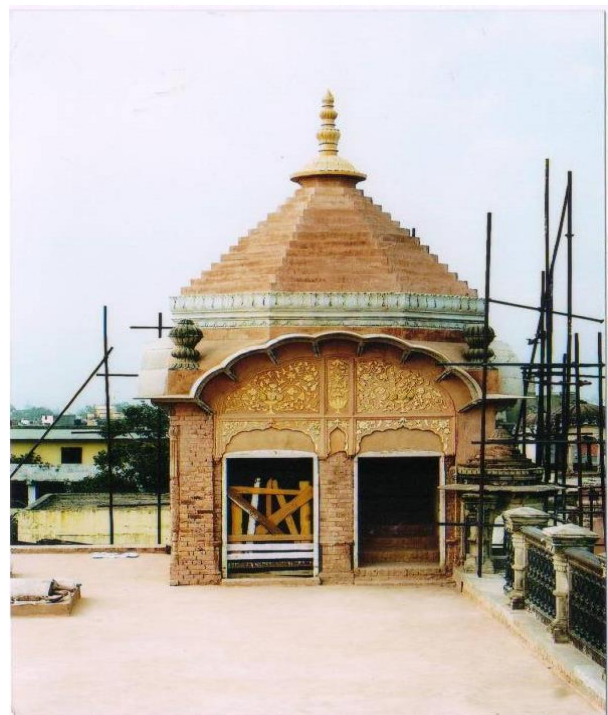
Restoration of main wall adjoining the path on west side in coarse rubble stone masonry including stone paved path leading to the monastery with mud mortar is in progress.

339. LEH PALACE, LEH, DISTRICT LEH

Sundried mud brick masonry in mud mortar at level 5 is in progress. Providing of wood work i.e. beams, brackets, posts, poplar poles, twigs and mud concreting is in progress.



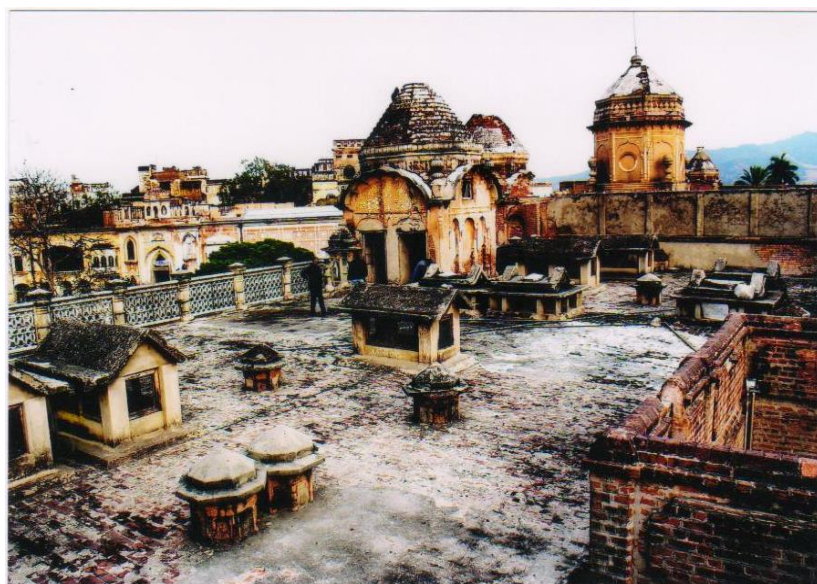
A



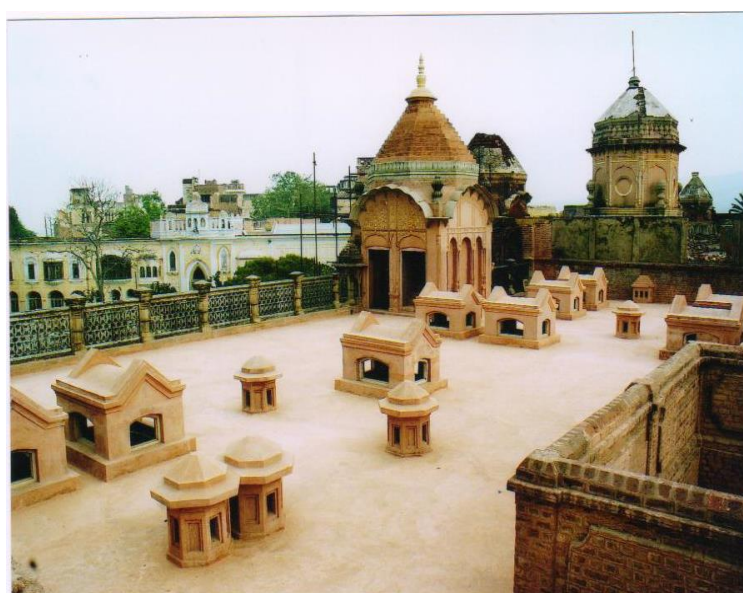
B

High Court Building, Mubarak Mandi complex: A, before and B, during conservation

Plate: 140



A



B

High Court Building, Mubarak Mandi complex: A, before and B, after conservation

340. OLD CASTLE AT TSEMO HILL, LEH, DISTRICT LEH

Construction of retaining wall in rubble stone masonry including strengthening the upper path leading to the monastery in mud mortar is in progress.

341. AKHOON MULLA SHAH MOSQUE, SRINAGAR, DISTRICT SRINAGAR

Exposing of buried structures by way of scientific clearance from eastern and south-eastern side of the monument including restoration of exposed structures in brick and RR stone masonry with lime-*surkhi* mortar and water tightening by providing brick concrete is in progress.

342. KATHI DARWAZA, SRINAGAR, DISTRICT SRINAGAR

Restoration of fortification wall in RR stone in traditional mortar. Pointing in lime-*surkhi* mortar and chain-link fencing to the open area along with wall has been completed.

343. SANKRACHARYA TEMPLE, SRINAGAR, DISTRICT SRINAGAR

Restoration to staircase in ashlar stone masonry mortar from cave shrine side including fixing of ashlar stone coping over parapet along the pathway has been completed.

344. GROUP OF TEMPLES, KIRAMCHI, DISTRICT UDHAMPUR

Restoration of the missing and weathered portion of the temple 12 with traditional mortar is in progress.

345. DERA TEMPLE, MANWAL, DISTRICT UDHAMPUR

Restoration of the missing and weathered portion for ceiling of main *mandapa* facing west is in progress.

346. ANCIENT PALACE, RAMNAGAR, DISTRICT UDHAMPUR

Accumulated debris on the east/ south side of palace was removed. Restoration of ancient support wall in coarse stone masonry on the back side of old palace facing south/east side was done. Providing 18mm average Plain plaster in lime-*surkhi* and sand mixed with jute sun and Fevicol was executed on the middle bastion facing east. Recess pointing on the stone wall in lime-*surkhi* mortar was executed at the old palace.

347. SAMADHI AND FORT, RAMNAGAR, DISTRICT UDHAMPUR

Dismantling of out of plumb cracked weathered stone of south and north bastions and re-setting of the same lime-*surkhi* and sand mortar has been executed. Lime concrete flooring has been executed on main entrance *deodi* under stone flooring. Stone slab flooring in lime-*surkhi* and coarse sand has been executed on main entrance towards east side. Plain plaster in lime-*surkhi* and sand mortar has been executed on the top of fortification wall and *samadhi*.

THRISSUR CIRCLE

KERALA

348. ST. FRANCIS CHURCH, FORT KOCHI, DISTRICT ERNAKULAM

Leaking tiled roof of St. Francis church on the northern side has been relayed after thorough repairing works.

**349. ARCHAEOLOGICAL MUSEUM,
MATTANCHERRY, KOCHI, DISTRICT
ERNAKULAM**

Damaged floor of the coronation hall and Ramayana hall has been removed and restored back like the original wooden floor by repairing and replacing the damaged teak wood beam and planks. Cement plaster of the wall was removed and re-plastered with lime mortar. Approach road was laid with laterite stone masonry.

350. ST. ANGELO FORT, DISTRICT KANNUR

Eroded and worn out laterite blocks of the moat wall was removed and repaired with new one. Missing and fallen laterite blocks in the fort wall was repaired in laterite masonry in traditional mortar and finally scaling with recess pointing in tune with matching colour. Approach road was laid with laterite stone masonry. The missing portion of the rampart wall, protection wall on south-east corner was restored in laterite stone masonry as per original, keeping the merlon/cannon, gunpoint hole, and top covered with laterite stones.

**351. BEKAL FORT, PALLIKKARE, DISTRICT
KASARGOD**

Underpinning and strengthening to the watch tower by removing the worn out stones and restoring them with new stones, filling the cavities with stones, stitching the top layer, water tightening with laterite stones and finally recess pointing etc were carried out. Watertightening of the top layer of fort wall on eastern side bastion 3 and 4 was done by removing the dilapidated stones and relaying with new stone in traditional mortar was carried out. Stainless steel

railing on either side of approach road was fixed.

**352. ROCK CUT CAVE, VIZHINJAM, DISTRICT
THIRUVANANTHAPURAM**

The fallen compound wall on north-east side was reconstructed as per the original. MS grill and the gate were fixed. Cultural notice board was also fixed.

**353. FORT ANJENGO, ANJENGO,
THIRUVANANTHAPURAM**

Fixing MS grill on the northern side of the outer compound wall was carried out.

**354. TENKAILASANATHA TEMPLE,
VADAKKUMNATHAN, DISTRICT THRISSUR**

A portion of the roof of northern and north-eastern wing of *chuttambalam* was completely dismantled after proper documentation. The out of plumb *adhithana* of the *chuttambalam* was also dismantled and reconstructed as per the original. The north-east and northern portion of the roof of *chuttambalam* was also completely restored by using new teak wood members including repairing wood ceiling and M.P. tile. The northern wing of the dilapidated wall of *chuttambalam* was restored in laterite masonry and plastered with combination mortar.

**355. SIVA TEMPLE, PALLIMANAH, DISTRICT
THRISSUR**

The dilapidated roof of *thidappally* was completely dismantled after proper documentation. Damaged wooden roof members were replaced by new one as per the original. The old available rafters and beams were repaired and strengthened by insertion of new pieces as per the original.

356. SIVA TEMPLE, PERUVANAM, DISTRICT THRISSUR

Dilapidated roof of the structure adjacent to western *gopura* was dismantled after thorough documentation. The rotten and damaged roof members were replaced with new ones as per the original design. The available old roof members were repaired and strengthened by insertion of new pieces in the damaged portions. The entire roof was restored in proper position in original design and roofed with M.P. tiles.

357. SIVA TEMPLE, THIRUVANCHIKULAM, DISTRICT THRISSUR

The western portion of the collapsed *prakara* wall of the temple has been reconstructed by new laterite stone in combination mortar. The oil spilling over the plinth stone from the lamps fixed in vilakkumadam was arrested by fixing special type stainless steel tray on the lower row of the vilakkumadam.

TAMILNADU

358. VATTAKKOTTAI FORT, VATTAKKOTTA, DISTRICT KANYAKUMARI

Outer granite fortification wall was restored as per the original. Eastern side of the outer fortification wall has been pointed. Toilet block was also constructed and CNB has been fixed at appropriate location.

359. SRI BHAGAVATHY TEMPLE, CHITRAL, DISTRICT KANYAKUMARI

Providing of entrance gate is in progress and fixing of CNB is in progress.

360. SRI PARTHASARTHI AND KRISHNA TEMPLE, PARTHIVAPURAM, DISTRICT KANYAKUMARI

Providing country wood temple type door in *Sastha* shrine is in progress. Fixing the CNB is in progress.

361. SRI BHAKTAVATSALA TEMPLE, CHERANMAHADEVI, DISTRICT THIRUNALVELI

Chain-link fence was provided over the dwarf wall in north and south side of the temple complex. Damaged wooden ceiling of *garbhagriha* of the main shrine was removed and re-laid as per the original.

Pathway on the main entrance was provided. To expose the original level of the outer compound, the accumulated earth was removed. A gate was fixed on the northern side of the temple complex. Construction of a toilet block for visitor's convenience is in progress.

362. SRI VALISWARA TEMPLE, TIRUVALISWARAM, DISTRICT THIRUNALVELI

The outer *prakara* was reconstructed as per the original. Stone floor of inside the Amman shrine and *mandapa* in north of the main shrine has been re-laid as per the original. Damaged and weathered roof members of Ganesa and Subrahmanya sub-shrine have been removed and water tightened with lime mortar. The damaged stone beam of the Subrahmanya sub-shrine was removed and a new one was fixed as per the original.

363. ANCIENT SITE AT KUNNATHUR, DISTRICT THIRUNELVELI

Construction of the dwarf wall and fixing of MS angle and laying barbed wire on the eastern side is in progress. Fixing of CNB is in progress.

VADODARA CIRCLE

DAMAN AND DIU

364. FORT WALLS, MOTI DAMAN, DISTRICT DAMAN

A part of the fort wall was cleared from vegetation and the work of re-plastering as per original is in progress.

365. TIAGO BASTION, FORT, DISTRICT DIU

Weathered and cracked *bela* stone masonry was dismantled and reset, together with hearting, with the help of newly-dressed *bela* stones. The work is in progress.

366. WALL NEAR ST. PHILLIP'S BASTION, FORT, DIU

Weathered and cracked *bela* stone masonry of the bastion was dismantled and reset using newly dressed stones. Besides, replacement of weathered stone masonry of the fort wall between St. Phillips bastion and St. Nicholas bastion with newly dressed yellowish *bela* stones is being carried out. The work is in progress.

GUJARAT

367. MUHAFIZ KHAN MOSQUE, DISTRICT AHMEDABAD

In continuation of previous year's work, fresh lime concrete was provided for watertightening of the leaking roof of the mosque and tomb after removing dead lime concrete. The work has been complete.

368. GREAT TANK, SARKHEJ, DISTRICT AHMEDABAD

Dilapidated portion of the tank has been dismantled and re-erected maintaining the original look of the structure. In addition,

the bulged ashlar stone masonry wall of the tank below the brick structures was dismantled and re-set as per the original pattern. Missing and broken stones of *chhajjas* and *kanguras* were also replaced with newly dressed and carved stones matching with the original. Besides, reconstruction of the missing retaining wall of the tank which included two top carved layers of stones is completed.

369. MANSAR TANK AND SHRINES, VIRANGAM, DISTRICT AHMEDABAD

In continuation of previous year's work, the remaining work of restoration of the missing flight of steps, landing, upper floor and retaining wall of the missing portion of the tank have been attended in order to prevent further damage to the tank and nuisance of animal bathing etc. The work has been completed (pl. 141).

370. JAMI MASJID, DHOLKA, DISTRICT AHMEDABAD

The dead lime concrete of the terrace and dome and a fresh lime concrete is re-laid as per original to prevent water seepage and further possible damage to the structure.

371. ANCIENT SITE, LOTHAL, DISTRICT AHMEDABAD

A brick masonry dwarf wall, mounted with iron grill fencing, is provided for the purpose of safely and security to the monument.

372. JAMI MASJID, KHAMBHAT, DISTRICT ANAND

In continuation of previous year's work, the remaining work of providing chain-link fencing on brick masonry dwarf



A



B

Mansar tank and shrines, Virangam: A, before and B, after conservation

wall, with sliding entrance gate, has been completed.

373. DWARKADHISH GROUP OF TEMPLES, DWARKA, DISTRICT JAMNAGAR

The Purushottamji lintel above the door was carefully removed and replaced with new lintel as per original. In addition, worn out stones of the outer face of the temple along with its steps were removed and replaced with new ones.

374. KALIKAMATA TEMPLE, DHREWAD, DISTRICT JAMNAGAR

The work of providing RR stone masonry compound wall, with an MS gate, has been provided for safety and security to the monument.

375. RUKMINI TEMPLE, DWARKA, JAMNAGAR

For securing the protected land and to prevent other animals from entering the temple premises, an RR stone masonry compound wall, with an MS gate has been provided.

376. ASOKAN ROCK EDICTS, JUNAGADH, DISTRICT JUNAGADH

Oil paint was applied over the doors, windows, and railings around the Asokan rock edicts. Besides, drinking water facility has been provided for the visitors. The work of repairing damaged floor stones in front of the structure near the entrance. The work providing booking counter is in progress.

377. BUDDHISTIC CAVES, JUNAGADH, DISTRICT JUNAGADH

Vegetation clearance, providing a stone pathway including flooring over lime

concrete bed near the booking counter was undertaken and completed.

378. JAMI MASJID, MANGROL, DISTRICT JUNAGADH

Additional layers of lime concrete on the roof terrace and dome laid in the post added excess load resulted multiple wide cracks on the roof. To arrest the seepage and reduce the load, dead lime concrete was removed and replaced with fresh one as per original. The work of stone flooring is in progress.

379. RANCHHODRAYAJI TEMPLE, MUL-DWARKA, KODINAR, DISTRICT JUNAGADH

The damaged ashlar stone masonry of the temple was dismantled after proper documentation and were carefully stacked at suitable place for reuse. The work is in progress.

380. EXCAVATED SITE, DHOLAVIRA, DISTRICT KACHCHH

The conservation works included dismantling and resetting the bulged stone masonry walls in lime mortar in accordance with original pattern and style at middle town of Dholavira were taken up and is in progress.

381. RAO LAKHA CHHATRI, BHUJ, DISTRICT KACHCHH

In continuation of previous year's work, Rao Lathe Chari (also called the Lakhpatji *Chhatri*), the work of dressing, molding and carving of architectural members of the main *chhatri*, was continued, and *khumbi*, pillars, capitals, etc. are set as per original. The work is in progress.

382. BRICK DOME (NEAR VADA TALAO), CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The Brick dome which was in a dilapidated condition was taken up for repairs. Underpinning of the entire brick structure, dome and northern and southern side of the parapet wall in lime mortar, followed by lime plaster as per original, has been completed.

383. ATAK GATE, CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

An approach pathway was provided between the upper and lower gates of the Atak gate. Further, at the side of the lower gate, missing RR stone masonry was provided to prevent erosion of the soil.

384. CITADEL WALLS, CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The walls of the citadel have developed bulges, and part of it have been collapsed. The work of providing ashlar stone masonry on the inner and outer face of the eastern wall has been completed.

385. CITY GATE, CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The collapsed arch of the gate was re-erected as per original replacing with damaged architectural members like *kumbhi*, pilaster, capital and other stones bloke.

386. EK MINAR KI MASJID, CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The collapsed back wall of the *Masjid* has been re-constructed in brick masonry as per original. An approach stone pathway was provided in lime concrete based from main entrance to the *Masjid*. The rubble stone

masonry and the damaged lime plaster of the *vaju hauz* (ablution tank) has been taken for repairs. The work is in progress.

387. KAMANI MASJID, CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of re-erection of fallen arches with duly-dressed ashlar stones, set in lime mortar, has been completed. Re-construction of missing ashlar stone masonry of northern side wall has also completed as per original with using old and new stones.

388. SADAN SHAH GATE, CHAMPANER-PAVAGADH ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The bulged-out masonry wall of the Sadan Shah Gate (Gate No. 4) is located on the hill at a strategic point. was dismantled and is reset. The damaged and fallen RR masonry of compound wall of the mint has taken up for repair. The work is in progress. The damaged and worn-out approach pathway has been re-laid with new stones (pl. 142).

389. SAHASTRALINGA TANK, DISTRICT PATAN

To arrest the erosion of embankment of the tank, a low-height RR masonry wall was constructed, after excavation and laying foundation in lime concrete, on top and bottom. The tank was de-silted in order to expose the buried structural remains. The work is in progress (pl. 143).

390. GROUP OF TEMPLES (KHED-RODA), DISTRICT SABARKANTHA

Due to settlement of ground, the temples developed the vertical cracks and consequent. In order to prevent further damage, the Siva Temple was dismantled

Plate: 142



A



B

Sadan Shah Gate, Champaner: A, before and B, after repairs to the damaged and worn-out pathway



A



C



B



D

Sahastralinga Tank, Patan: A-B, before, and C-D, after conservation

upto the ground level, and re-set as per original, including replacing broken architectural members with newly dressed *dhrangadhra* stones. The work is in progress (pl. 144).

391. RUINED SHRINES AT NAVLAKHA TEMPLE, SEJAKPUR, DISTRICT SURENDRANAGAR

In continuation of previous year's work, the documentation of temple continued, followed by its complete dismantling up to the base, stacking properly architectural members and sculptures at suitable place for re-use. Reconstruction of the shrine providing appropriate base, including providing ashlar stone masonry with necessary newly-dressed *dhrangadhra* stones is undertaken.

392. HIRA GATE AND ADJOINING CONSTRUCTION, DABHOI, DISTRICT VADODARA

In continuation of previous year's work, resetting of the fallen and dismantled ashlar stone masonry, including architectural members like pillars, capitals, *chhajja* stones, lintels, brackets, *kakshsana* stones, of the gate is in progress.

393. QUTUBUDDIN MOHAMMAD KHAN'S TOMB (HAZIRA), DISTRICT VADODARA

The work of providing stone pathway with newly dressed *dhrangadhra* stones, connecting between the road and the tomb, is in progress. In addition, fixing of chain-link fencing on a brick masonry dwarf wall has been completed.

394. SAIFEE VILLA AT DANDI, DISTRICT NAVSARI

The Saifee Villa, representing a good example of vernacular architecture, is a

moderate-sized double-storied residential building in village Dandi. Repairs and restorations of the villa were carried out over the years by the PWD, who were hitherto maintaining the building. These additions and alterations as per modern methods caused the villa to lose its original look. Before venturing into the conservation work, archival information about the Villa was gathered by way of collecting old books, photographs, pamphlets, etc. besides laying 14 Test Trenches for scientific clearance at different locations in and around the Saifee Villa. Based on inputs thus received, the conservation work was planned which consisted of removal of old dead plaster from walls very carefully, and staking the debris for disposal away from the site; stitching all vertical zigzag cracks that have developed across the brick-walls; lime plastering, including finishing with marble powder and lime slurry; dismantling the ground and first floor stone-flooring of rooms and *verandahs*; leveling the sagging and tilted first floor wooden *verandah* after removing the modern mosaic tiles, bricks and lime mortar underlying the bricks and providing wooden planks, rafters, etc. in place of decayed ones as per original; removing the red sandstone and concrete block-paved flooring of the courtyard all around the main building; including pointing and polishing; removing of old Mangalore roof tiles, including stacking the same, for reuse and display, and throwing unserviceable material/debris away from the site; providing and laying Mangalore tiled-roof, including replacing the decayed and damaged underlying teak wood batten; camouflage of the Mangalore



A



B

Group of Temples, Khed-Roda: A, before and B, after repairs to the temple

tilled-roof over the RCC roof of the store-room which is a later addition; careful removal of false ceiling from ground and first floor, and stacking useful material; and minor repairs to doors, windows, ventilators,

staircase, balcony, etc, including change of hinges, providing glasses after removing cement sheets as per original. The work is in progress (pls. 145-146).



A



B

Saifee Villa, Dandi: A, before and B, after conservation of the northern side

Plate: 146



A



B

Saifee Villa, Dandi: A, during and B, after conservation of the northern side

VIII. ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS¹

ANDHRA PRADESH

1. SRI SIDDESWARA SWAMY TEMPLE, HEMAVATHI, DISTRICT ANANTAPUR

The conservation treatment and preservation works had been taken up for removal of the micro-vegetation growth, dust, dirt, tenacious coats of lime/cement flow marks, red ochre and iron stains, oily stains and greasy matter/soot deposition from interior surfaces of the temple and outer *prakara* wall mainly made of granite and lime plaster. The main conservation problem was micro-vegetation growth along with dust and dirt on the walls. Lime coat, iron stains, etc. from outer and inner wall and pillars of the temple, oil stains, greasy matter, soot from the interior surface. Micro-vegetation growth was removed using a mixture of 3% liquid ammonia and non-ionic detergent in the ratio of 3:1 followed by gentle brushing with nylon brushes of different sizes and shapes. Lime coats were removed by chemico-mechanical method by using 3-5% solution of glacial acetic acid in aqueous medium. Iron stains were removed by using 5 % oxalic acid solution followed by thorough wash with normal plain water. Oil, soot, dust deposit from the interior surfaces were removed by using the clay pack method with fullers earth charged with 5% sodium

carbonate, bicarbonate, little ammonia and non-ionic detergent. On drying, the surface was washed with plenty of normal water. Outer *prakara* wall was given a coat of 2% sodiumpentachlorophenate as fungicide in aqueous medium and a mixture of Wacker BS -290 with mineral turpentine oil was applied as protective coating. Work has been completed.

2. SRI VEERABHADRA SWAMY TEMPLE, LEPAKSHI, DISTRICT ANANTAPUR

This temple is having murals executed on lime made surface over 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, etc. 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 have been removed by using a mixture of 2-ethoxy ethanol, toluene (sulphur free) and tri-ethanolamine. 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

¹Information from: Director (Science), ASI, Dehradun; Department of Archaeology and Museum, Rajasthan, Jaipur; Archaeological Survey of India, Dehradun Circle, Uttarakhand; Archaeological Survey of India, Lucknow Circle, Uttar Pradesh; Archaeological Survey of India, Thrissur Circle, Kerala and Archaeological Survey of India, Srinagar Circle, Jammu and Kashmir.

cleaned with the mixture of methanol and isopropanol with cotton swabs. Work is in progress.

3. SRI VEERABHADRA SWAMY TEMPLE, LEPAKSHI, DISTRICT ANANTAPUR

This temple is made up of granite and the main conservation problem was on the *prakara* wall and other structures. The conservation problems include removal of lime, red ochre, oil stains, settled dust etc., from the pillars and walls of *prakara* wall. Micro-vegetation growth was removed 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 by chemico-mechanical treatment by using 3-5% solution of glacial acetic acid in aqueous medium, followed by thorough wash with plenty of plain water. Work is in progress.

4. MUSEUM OBJECTS, CHANDRAGIRI MUSEUM, CHANDRAGIRI, DISTRICT CHITTOOR

The bronze and brass sculptures of this museum were heavily incrustated with copper chlorides and sulphates. In some places oily accretions were also found. The sculptures were covered with paper pulp charged with sodium/ hexametaphosphate (3%) for removal of hard mud adhering to sculptures. The paper was removed on drying. The sculptures were thoroughly washed with distilled water and dipped in mixture of 5% sesquicarbonate (ammonium carbonate and ammonium bicarbonate) aqueous solutions. The sculptures were subsequently washed with plain water. Then the cleaned sculptures were kept in 2% benzotriazole in methanol and stabilized. The sculptures were finely given

1% coat of polyvinyl acetate in toluene as a preservative.

5. TRIKOTESHWARA AND BHEEMESWARA TEMPLE, PUSHPAGIRI, DISTRICT CUDDAPAH

Sri Trikoteswara and Bheemeswara temples are living ones. The conservation problems include 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 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 sculpture were removed by using aqueous solutions of acetic acid with 2-3% dilution. 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. All the treated and dried surfaces were given a coat of 2% of sodiumpentachlorophenate in aqueous medium as fungicide and a mixture of Wacker BS-290 in mineral turpentine oil as a protective coat. Work is in progress.

6. SRI BHEEMESWARA SWAMY TEMPLE, DRAKSHARAMA, DISTRICT EAST GODAVARI

The Gopuram of this temple was covered with micro-vegetation growth stone surface was covered with lime coats, dust and dirt. Micro-vegetation growth along with dust and dirt were removed using 2-3% solution of liquid ammonia mixed with non-ionic liquid detergent in the ratio of 3:1 followed by gentle brushing with different nylon brushes. Lime accretions from the stone surface were

removed by using aqueous solutions of acetic acid with 2-3% dilution. Remnant of acids if any was neutralized with dilute ammonia solution followed by thorough wash with plenty of plain water. All the treated and dried surfaces were given a coat of 2% of sodiumpentachlorophenate in aqueous medium as fungicide and a mixture of Wacker BS-290 in mineral turpentine oil as a preservative coat. Work has been completed.

7. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD

The main conservation problem was on the parapet walls connecting NE-SE, NE-SW, SW-NW, NW-NE minarets and mosque floor of Charminar. Scientific conservation was taken up for the removal of micro-vegetation growth, soot, dust, dirt, bird and bats excreta from the surface by using 3% solution of ammonia added with non-ionic detergent in aqueous medium followed by gentle brushing with soft brushes with the utmost care. Dark and deep stains from the surface were removed by sodium carbonate and sodium bicarbonate with the help of fuller's earth. Little ammonia and non-ionic detergent was also used in the above mixture. After drying the surface was washed thoroughly with plenty of plain water. The cleaned areas were coated with 2% sodiumpentachlorophenate as fungicide. On drying the surface was preserved with SMK-1311 in water.

8. GOLCONDA FORT, HYDERABAD, DISTRICT HYDERABAD

The scientific conservation work was taken up for the loose structure of Bagmati palace and other ruined structures for the removal of micro-vegetation growth along with lime accretion. The micro-vegetation growth was

removed using a mixture of 2-3% ammonia and non-ionic detergent followed by gentle brushing with nylon brushes along with thorough washing with plain water. Lime accretions were removed by chemico-mechanical methods using 3% acetic acid solution in aqueous medium. The surface was then given a wash with dilute ammonia solution for neutralizing the remnants of acid present if any. This was followed by a thorough wash with plain water. The entire treated and dried surfaces were given a coat of 2% sodiumpentachlorophenate as fungicide in aqueous medium. Finally the surface was preserved with Wacker BS-290 and mineral turpentine oil, which is water repellent.

9. TARAKA BRAHAMA, KANCHI KAMESWARA AND BALA BRAHMESWARA SWAMY TEMPLE, ALAMPUR, DISTRICT MAHABOBNAGAR

The scientific conservation work was taken up for the ceilings, pillars, *mandapa*, an outer wall which is made up of sandstone and slate. The main conservation problem was micro-vegetation growth along with dust and dirt, lime wash, red ochre, soot and oil stains, iron stains, etc. Micro-vegetation growth was removed using a mixture of 3% aqueous ammonia solution and non-ionic liquid detergent followed by gentle brushing with nylon brushes. Lime and red ochre stains were removed by chemico-mechanical method by using 3-5% aqueous solution of glacial acetic acid followed by thorough washing with plain water. Iron stains were removed by using 5% solution of oxalic acid in aqueous medium followed by washing with plenty of water. The entire treated surface was given a coat of 2% sodiumpentachlorophenate as fungicide in aqueous medium and a mixture of Wacker BS-290 in mineral

turpentine oil as protective coat. Work has been completed.

10. SRI RAMAPPA TEMPLE, PALAMPET, DISTRICT WARANGAL

This temple is made up of sandstone, granite, basalt, and brick. The conservation work was taken up on Goupram and stone parts of the main temple. The Goupram was covered with dust, dirt, micro-vegetation growth and the stone surface was covered with dust, dirt and lime accretions. Micro-vegetation growth was removed using 2-3% ammonical solution mixed with non-ionic liquid detergent followed by gentle brushing with soft nylon brushes the tenacious deposits of calcareous matter were removed by chemico-mechanical means by using 2-3% aqueous solution of acetic acid followed by thorough washing with plenty of water. Remnants of acid if any were neutralized with ammonical water followed by thorough washing with water. The entire treated exterior surface was given a coat of 2% sodiumpentachlorophenate as biocide in aqueous medium. Finally, a mixture of SMK-1311 in water was applied to the stucco surface and Wacker BS-290 and mineral turpentine oil were applied to the stone surface as protective coat. Work is in progress.

ASSAM

11. SIVADOL TEMPLE NEIGHERTING, DISTRICT GOLAGHAT

The lime plastered Sivadol a shrine having stone sculpture at mid level at Neigherting was subjected to scientific conservation during the year for eradication of micro-vegetation growth, dirt, dust, bats dropping and smoke deposition, etc. by using a mixture of ammonia water and non-ionic detergent.

Treated and cleaned surface was given fungicidal treatment after completed drying with aqueous dilute solution of santobrite, followed by application of Wacker BS-290 in mineral turpentine oil as preservative coatings. The work has been completed.

12. GROUP OF SHRINES, SIBSAGAR, DISTRICT SIBSAGAR

The interior lime plaster surface including stone structure inside the Sivadol, Vishnudol and Devidol Shrines at Sibsagar was for the first time taken up for scientific treatment and preservation for removal of microbiological growth, dirt, dust, bats excreta, smoke, etc. were removed using suitable chemical with the help of specially designed soft nylon brushes. The areas so cleaned were given fungicidal treatment with dilute solution of santobrite in water following by application of preservative coatings (double coat) silicone based Wacker BS-290 in mineral turpentine oil wet on wet. The work has been completed.

13. GROUP OF SHRINES, JOYSAGAR, DISTRICT SIVSAGAR

Partly stone and lime plastered interior of the Joysagar group of shrines was for the first time taken up for chemical treatment and preservation during the year for the eradication of microbiological growth, dirt, dust, birds droppings and smoke deposition etc. by using dilute ammonia, teepol and organic solvents. The surface so cleaned and dried was subjected to fungicidal treatment with dilute aqueous sodiumpentachlorophenate solution followed by application of two coats of silicone based Wacker BS-290 in mineral turpentine oil as preservative. The loose and fragile surface

was strengthened with an ethyl silicate based Wacker OH-100.

BIHAR

14. MAHABODHI MAHAVIHARA COMPLEX, BODHGAYA, DISTRICT GAYA

Sandstone, votive stupas inside Mahabodhi Mahavihara Complex at Bodhgaya was undertaken for scientific conservation for eradication of micro-vegetation growth, dirt, dust, birds excreta, smoke, greasy deposition, etc. using ammonia and extraneous mixture with the help of soft nylon brushes. The surface so cleaned and free from all accretionary deposits was given fungicidal treatment with very dilute aqueous sodiumpentachlorophenate solution followed by application of a silicone based water repellent Wacker BS-290 in mineral turpentine oil. The work is in progress.

CHHATTISGARH

15. SITA DEVI TEMPLE, DEORBIJA, DISTRICT DURG

During the period under review, the scientific conservation work was carried out for micro-vegetation growth including dust and dirt accretions, etc. which were cleaned by using 2% aqueous ammonia solution mixed with non-ionic detergent on its outer wall as well as in the *garbhagriha*. Lime residue was removed by physico-chemical means by using 2% acetic acid and further neutralization by ammonia solution. Chemical treatment was followed by consolidation of fragile stone members with ethyl silicate based stone strengthener Wacker OH-100 and application of fungicide coat of 2% sodiumpentachlorophenate. Finally Wacker BS-290 with dilution of mineral turpentine oil

has been applied on dried stone surface as the preservative.

DELHI

16. SAFDARJUNG TOMB, NEW DELHI

The chemical treatment and preservation work to paintings of gateways of Safdarjung Tomb was an ongoing work commenced in November 2008 and was completed in June 2009. The chemical treatment of the stone surface was carried out with 3% aqueous ammonia and non-ionic detergent for removal of dust, dirt and superficial accretions. Sodiumpentachlorophenate was applied as fungicide on the chemically treated area. Finally the entire stone surface was preserved by applying Wacker BS-290, diluted in mineral turpentine oil. Painted surface was initially cleaned with toluene to remove polyvinyl acetate previously applied over it. Treatment of the painted surface was carried out with organic solvents. Pointing, modeling and retouching of paintings were also carried out. Finally, the paintings were preserved with 1% polyvinyl acetate diluted in toluene. Work has been completed.

17. BADE KHAN TOMB, SOUTH EX-1, NEW DELHI

The chemical treatment and preservation to the interior of Bade Khan Tomb was taken up for the removal of dust, dirt, smoke, soot, bird dropping, etc. Sandstone surface inside the tomb bears the wrath of human vandalism and scribbling of names in ink, paint, pencil, stains of palm grease was also present on the surface due to constant touching by visitors. The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% non-ionic detergent for removal of the superficially

adhering dust, dirt, smoke and soot pollutants. Clay packs treatment using fuller's earth with 3% sodium carbonate (by weight). The sandstone was given to remove hard accretionary deposits of dust, dirt, soot and atmospheric pollutants from sandstone. Work is in progress.

18. WAZIRPUR-KA-GUMBAD, MUNIRIKA, NEW DELHI

The chemical treatment and preservation of *Wazirpur-ka-Gumbad* which is made up of lime plaster, sandstone/quartzite surface was taken up for the removal of deposition of dust, dirt, soot and other pollutants. The lime plaster surface of the tomb of main drum and dome was affected by abundant growth of micro-vegetation. The chemical treatment of the sandstone and lime plaster structure was carried out with a mixture of 5% ammonia solution and 2-5% non-ionic detergent for the removal of superficially adherent dusts, dirt, smoke and soot. Lime plaster surface was subjected to bleaching powder treatment. After chemical treatment, fungicide sodiumpentachlorophenate was applied on all surfaces except marble and preserved with a coating of water repellent Wacker BS-290 diluted in mineral turpentine oil on lime plaster and stone surface. Work was completed (pl. 147).

19. ALAI DARWAZA AND PAVILLIONS QUTB COMPLEX, MEHRAULI, NEW DELHI

The chemical treatment and preservation work of the Alai Darwaza and pavilions at Qutb complex made of sandstone, lime plaster, marble and quartzite surface was undertaken during the period under review. The exterior of the three-sided wall of the mosque was affected due to deposition of

dust, dirt, cobwebs, soot, tarry matter and other pollutants over a period of time. The lime plaster surface of the dome was affected with tremendous growth of micro-vegetation. The chemical treatment of the sandstone/quartzite, lime plaster and marble surface was carried out with a mixture of 3% ammonia solution and 2-5% non-ionic detergent for the removal of superficially adherent dusts, dirt, smoke and soot pollutants. Lime plaster surface of the dome 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 3% sodium carbonate. After chemical treatment, fungicide sodiumpentachlorophenate was applied all over the exterior surface except marble and finally preserved with a coating of silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellent on exterior lime plaster and stone surface.

The chemical treatment and preservation of Quwatul-Islam Mosque, Qutb complex was taken up to remove the growth of micro-vegetation along with thick deposition of dust, dirt, soot, bird excreta and other atmospheric pollutants from over the lime plaster surface and stone (quartzite), limestone (marble) surface. The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 5% ammonia solution and 2-5% non-ionic detergent for the removal of superficially adherent dusts 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



A



B

Wazirpur-ka-Gumbad, Munirika: A, before and B, after scientific treatment

and atmospheric pollutants from marble /limestone surface using fuller's earth with 3% sodium carbonate. Sandstone with flaking, scaling and exfoliating surface was consolidated with Wacker OH-100 an ethyl silicate based stone strengthener. After chemical treatment, fungicide sodiumpentachlorophenate was applied on exterior surface and finally preserved with a coating of a silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellant on exterior lime plaster and stone surface. The work has been completed.

20. BARAKHAMBHA, NIZAMUDDIN, DELHI

The chemical treatment and preservation of exterior of Barakhamba, comprising lime plaster and stone surface was taken up for removal of tremendous growth of micro-vegetation along with thick deposition of dust, dirt, soot, birds' excreta and other atmospheric pollutants. The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% 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 sandstone surface using fuller's earth with 3% sodium carbonate. After chemical treatment, fungicide sodiumpentachlorophenate was applied all over the surfaces and finally preserved with a coating of silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellant on lime plaster and stone surface. Work is in progress.

21. RED FORT, DELHI

The chemical treatment and preservation of Rampart wall facing Ring Road (Mumtaz Mahal Museum to Shah Burj) comprises of red sandstone and marble was undertaken for the removal of 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 marble surface was carried out with a mixture of 3% ammonia solution and 2-5% 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 over the marble surface using fuller's earth with 3% sodium carbonate. Sandstone with flaking, scaling and exfoliating surface was consolidated with an ethyl silicate based Wacker OH-100 stone strengthener. After chemical treatment fungicide sodiumpentachlorophenate was applied all over the surfaces except marble and finally preserved with a coating of silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellant in on stone surface.

22. GHYASUDDIN TOMB, TUGULAKABAD, NEW DELHI

The Chemical treatment and Preservation work to Interior of Ghyasuddin Tomb, was taken up for the removal of dust, dirt, soot and other pollutants over the sandstone and marble surface. Marble surface inside the tomb has deposition of tarry matter, dust and dirt. The chemical treatment was carried out for removal of dust, dirt and superficial marks by using 3% aqueous ammonia and nonionic

detergent solution for stone and marble surface. Clay-pack treatment was applied on marble surface using fuller's earth with 2-5% sodium carbonate. Work is in progress.

23. MOHMMADI WALI MOSQUE, SIRI FORT, NEW DELHI

The chemical treatment and preservation work to Mohmmad wali Mosque, was taken up for the removal of 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 mosque is made up of sandstone, lime plaster and is having some painted surface. The chemical treatment of sandstone and lime plaster structure was carried out with a mixture of 5% ammonia solution and 2-5% non-ionic detergent for the removal of superficially adherent dust, 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 sodiumpentachlorophenate was applied all over the exterior surface and finally preserved with a coating of silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellent on lime plaster and stone surface. Work is in progress.

24. AJMERI GATE, DELHI

The chemical treatment and preservation work of Ajmeri Gate was taken up for the removal of dust, dirt, soot and other pollutants. This is made up of quartzite/sandstone, and lime plaster. The chemical treatment of sandstone and lime plaster surface was carried out with a mixture of 3% ammonia solution and 2-5% non-ionic

detergent for the removal of superficially adherent dust, dirt, smoke and soot pollutants. Sandstone with flaking, scaling and exfoliating surface was consolidated with an ethyl silicate based Wacker OH-100 stone strengthener. After chemical treatment, fungicide sodiumpentachlorophenate was applied all over the surface and finally preserved with a coating of silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellent on stone surface. Work has been completed.

25. KASHMERE GATE, DELHI

The chemical treatment and preservation work on Kashmere Gate was taken up for the removal of dust, dirt, soot and other pollutants. The structure is of sand stone/brick surface, and lime plaster. 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% non-ionic detergent for the removal of superficially adherent dust, dirt, smoke and soot pollutants. After chemical treatment fungicide sodiumpentachlorophenate was applied all over the surfaces and finally preserved with a coating of silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellent on stone and lime plaster surface. Work has been completed.

26. BEGUMPURI MOSQUE, NEW DELHI

The chemical treatment and preservation work to Begumpuri Mosque, was taken up for the removal of dust, dirt, soot and other pollutants from the lime plaster surface, using a mixture of 3% ammonia solution and 2-5% non-ionic detergent. Lime plaster surface was

subjected to bleaching powder treatment. After chemical treatment fungicide sodiumpentachlorophenate was applied all over the exterior surface and finally preserved with a coating of silicone based Wacker BS-290 diluted in mineral turpentine oil as water repellent.

GOA

27. ST. AUGUSTINE CHURCH, OLD GOA

This church is made of laterite stone and lime plaster. The main conservation problem was accumulation of dust, dirt, birds' excreta and extensive micro-vegetation growth, weathering of plaster fragments and laterite stone surface. The scientific conservation work was carried out for the removal of cemented dust, dirt, birds' excreta and thick micro-vegetation with the help of 3 to 4% aqueous solution of ammonia +1% non-ionic detergent with gentle brushing, followed by thorough washing with copious volume of water. Wacker OH-100 (one coat) was given to the cleaned and fragile parts to give strength. A silicone based water repellent Wacker BS-290 diluted in mineral turpentine oil was applied on cleaned and dried fungicidal treated surface. Work has been completed.

28. ST. FRANCIS OF ASSISI CHURCH, OLD GOA

The scientific conservation work was taken up for a big canvas painting supported on panel and displayed near the entrance to the church. Superficial accretion like dust and dirt had accumulated over the painted surface and the painting was peeling out at many places. During previous interventions many copper nails/ iron nails had been fixed on it perhaps to avoid peeling of canvas painting. The

painting was brought down and flattened to carry out the conservation work. Maximum iron nails/ copper nails were removed with utmost care to avoid spreading of corrosion materials on to the painted surface. Some of the copper nails were pushed in the panel so that wax and rosin mixture was inserted into the holes of the painting and wooden support and the painting was fixed on the wooden support with the help of hot spatula and tissue paper and excess of wax and rosin mixture was removed with the help of cotton swabs dipped in acetone. When the whole painting was fixed and flattened on the wooden support, it was cleaned with mild organic solvents and was allowed to dry completely. A coat of picture varnish was applied on the cleaned and dried surface.

GUJARAT

29. RANI SIPRI'S MOSQUE, DISTRICT AHMEDABAD

This sandstone monument is having thick deposition of soot, dust and dirt on the interior surfaces and micro-vegetation growth and dust on exteriors. It is observed that deterioration and pulverization of stone was in the beginning stage. Thick soot and other superficial accretion were removed by using 3% ammonia and 1% non-ionic detergent in water with the aid of soft nylon brushes. Clay pack treatment method was also employed for removal of superficial accretions from over the inner surface. The consolidation treatment work was carried out by using stone strengthener Wacker OH-100 in the fragile area. Fungicidal treatment was given to the exterior surface by using 2% solution of sodiumpentachlorophenate in aqueous medium. Finally on fungicidal treated and

dried surface, Wacker BS-290 in mineral turpentine oil was applied as hydrophobic treatment.

30. MAC MURIDO BUILDING, DISTRICT ANJAR

This monument 10th century monument has murals in one of the halls. The techniques of these paintings are of 'tempra' type. Pigments of black, brown, yellow, red, green and white colors are used in the paintings. 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 of paint layer was observed. Conservation problem involves chemical cleaning, fixing, filleting and colour reintegration and insect activity, i.e., cobwebs, silver fish, etc. on mural paintings. Cleaning of paintings and removal of dust, dirt and other accretions from the paint layer were removed by using organic solvents such as methanol, 2-ethoxyethanol, diacetonealcohol, butylacetate, triethanolamine, turpentine (camlin) and butyl amine. Fixing and filleting were carried out. Post termite treatment measures were carried out in association with PCI for arresting the termite entry from the surroundings. Work is in progress.

31. MAHADEVA TEMPLE, DISTRICT BAVKA

The octagonal *mandapa*, single stone lintel supported by octagonal pillars and sculptors showing erotic scenes are the specialties of this monument. This monument is also known as Khajuraho of Gujarat. The main conservation problem was deposition of micro-vegetation growth along with dust, dirt and lime coat. The stone of the pillars, walls and some sculptures had deteriorated due to

weathering. Removal of micro-vegetation growth and superficial accretions from the stone surface was carried out by using 2-3% ammonia solution and 1 % non-ionic detergent followed by brushing with soft nylon brushes. Lime coats were removed using 1-2 % of acetic acid solution in aqueous medium followed by thorough washing with plenty of plane water. The pulverized stone part of the temple were consolidated with ethyl silicate based Wacker OH-100 stone strengthener and left for few days. In order to arrest the re-growth of micro-vegetation, 2% solution of sodiumpentachlorophenate in water was applied by spraying on the clean and dry surface. Finally a silicone based Wacker BS-290 in mineral turpentine oil was applied as water repellent on the exterior areas. Work has been completed.

32. RAMA-LAXMAN TEMPLES, BARADIA, DISTRICT JAMNAGAR

The Rama temple stands on a raised platform. It has a small porch, domed *antarala* and *garbhagriha*. In front of this temple, there is another similar temple called Laxman temple. The temple is made up of sandstone and is affected with salts. White patches on the stone surfaces were formed as a result of crystallization of dissolved salts in summer. The sandstone surfaces at several places have deteriorated due to weathering. Removal of micro-vegetation growth along with dust, dirt and other accretion from the stone surface was carried out using 2-3% ammonia solution and 1% non-ionic detergent in water. Soluble salts from the stone surface were removed by paper pulp treatment. Consolidation of weathered and pulverized stone was carried out by applying Wacker OH-100 on the affected surface. Where ever

pulverization was in advanced stage, the consolidation was carried out first before the paper pulp treatment and chemical cleaning. The entire treated surfaces were given fungicidal coat with 2% solution of sodiumpentachlorophenate in water. Finally, water repellent coating was applied with mixture of Wacker BS-290 and mineral turpentine oil as preservative. Work has been completed.

33. DWARKADHISH TEMPLE COMPLEX, DWARKA, DISTRICT JAMNAGAR

The Temple of Dwarakadhish is built with baradia limestone. The temple complex consists of several sub shrines. The *garbhagriha* outer wall and its *parikramapath* of the main shrine and interiors of sun shrines Pradhumana temple, Pushottam temple, Balarama temple, Madhav Raiji temple and Devimata temple were taken for (chemical treatment and preservation) work. The main temple and its shrines were covered with micro-vegetation growth and depositions of soot, dust and dirt. Thick lime coats were also present on the interior of the sub-shrines and *mandapa* area. Bats and pigeon menace at *sakthisthanak* and *sabhamandapa*; oil, soot and other stains were present on the interior surface of the *garbhagrihas*. Deterioration and pulverization of stone was in the beginning stage. Micro-vegetation growth and other superficial accretion were removed by using 2-3% ammonia and 1% non-ionic detergent in water followed by brushing with soft nylon brushes. Lime coats were removed by physic-chemical method by using 1-2% acetic acid solution. Stone surface affected with bats excretes and pigeon droppings were treated with ammonium bicarbonate and ammonium carbonate solution in water.

Marble surface was treated with clay pack technique by adding sodium bicarbonate, ammonia and non-ionic detergent in fullers' earth as additive. Wooden portion were treated with methanol, toluene and triethanolamine, Silver part was treated with citric acid and sodium potassium tartarate. Consolidation treatment was carried out with stone strengthener Wacker OH-100 in the deteriorated part to arrest further deterioration. Fungicidal treatment was given on *sakthisthanak* by using 2% solution of sodiumpentachlorophenate in water and finally, this area was preserved with Wacker BS-290 in mineral turpentine oil. Work has been completed.

34. JASMEL NATHJI MAHADEV TEMPLE, ASODA, DISTRICT MEHSANA

This temple dedicated to lord Siva; consists of a porch, a *sabhamandapa* and *garbhagriha* surmounted by a *sikhara*. The monument was fully covered with extensive micro-vegetation growth along with dust, dirt, lime coats, sooty oily stains. Carvings were concealed under these accretions. The exterior walls of the temple were highly eroded due to weathering effect. Micro-vegetation growth and other superficial accretion were eroded by using 2-3% ammonia and 1% non-ionic detergents in water with the help of soft nylon brushes. Removal of lime coats from the surface was carried out by chemico-mechanical means by using 1-2% solution of acetic acid followed by thorough washing with plenty of water. Deteriorated and pulverized stone areas were consolidated and strengthened with Wacker OH-100. Fungicidal treatment was given by using 2% solution of sodiumpentachlorophenate in aqueous medium on the clean surface. Finally, Wacker

BS-290 in mineral turpentine oil was applied on the exterior surface as water repellent coat. Work is in progress.

35. MALAIMATA TEMPLE, PALODAR, DISTRICT MEHSANA

The major building material of the monument is sandstone. The east-facing Malaimata Temple stands on a large platform and consists of *mandapa*, *antarala*, *garbhagriha* surmounted by *sikhara*. The monument was covered with micro-vegetation growth and deposition of dust and dirt. Lime coats are also present on the interior and exterior of the main shrine and *mandapa*. It is observed that deterioration and pulverization of stone is in the beginning stage. Micro-vegetation growth and other superficial accretions were removed by using 3% ammonia and 1% non-ionic detergent in water with the aid of soft nylon brushes. Lime coats were removed by using 1-2% acetic acid solution. Consolidation of weak and fragile stone surface were carried out by using Wacker OH-100 and left the surface for few days. On the chemically treated and dried surface, fungicidal treatment was given by using 2% solution of sodiumpentachlorophenate in aqueous medium to arrest the re-growth of micro-vegetation. Finally, after the proper drying of the surface, water repellent was applied by using Wacker BS-290 in mineral turpentine oil as preservative.

36. JAMI MASJID, PAVAGADH, DISTRICT PANCHMAHAL

This mosque has three entrance porches to courtyard. Eastern porch is most remarkable for its intricate carvings and *jali* work. The chemical conservation work was carried out on interior as well as exterior surface. The

domes and courtyard of the *masjid* were covered with micro-vegetation growth. A blackish layer was formed on the exterior surface of the domes and roof due to drying effect of micro-vegetation growth. Lime coats were present on pillars, arches and wall. The yellowish red sandstone of the pillars, arches and lower portion of wall had deteriorated due to weathering effect. Micro-vegetation growth and other superficial accretion were removed by using 3% ammonia and 1% non-ionic detergent in water with the aid of soft nylon brushes. Lime coats were removed by using 1-2% acetic acid solution in aqueous medium followed by thorough washing. Pulverized stone surface were consolidated with an ethyl silicate based stone strengthener Wacker OH-100. Fungicidal treatment was given with 2% solution of sodiumpentachlorophenate in aqueous media in order to arrest re-growth of micro-vegetation. Finally, a silicone based Wacker BS-290 in mineral turpentine oil was applied on all treated surfaces as hydrophobic treatment. Work is still in progress.

37. SAHAR-KI-MASJID, PAVAGADH, DISTRICT PANCHMAHAL

The scientific conservation work was resumed in the inner side of the citadel wall and exterior of the *masjid*. The citadel wall is made up of sandstone. These were covered with dust, dirt micro-vegetation growth. Pulverization was also observed in some portions. Micro-vegetation growth and other superficial accretions were removed by using 3% ammonia and 1% non-ionic detergent in aqueous medium with the aid of soft nylon brushes. Consolidation of weak and fragile stone portions were carried out by using Wacker OH-100 and left the surface for few days. Fungicidal treatment was given with 2%

solution of sodiumpentachlorophenate in aqueous medium to arrest re-growth of micro-vegetation. Finally, after proper drying of the stone surface a silicone based Wacker BS-290 in mineral turpentine oil was applied on entire stone surfaces of *Sahar-ki-masjid* and SMK-1311 in aqueous media on the citadel walls as water repellent treatment. Work has been completed.

38. CHANDRA PRABHU JAIN TEMPLE, PAVAGADH, DISTRICT PANCHMAHAL

From the Group of four Jain Temple, one temple i.e. Chandra Prabhu Jain Temple was taken up for chemical treatment and preservation work during the period under review. This temple is made up of sandstone. The conservation problems include micro-vegetation growth, dust and dirt, grime, oil bond distempers, thick lime coats, etc. At several parts the temple surface were deteriorated due to weathering effect. Micro-vegetation growth and other superficial accretions were removed by using mixture of 2-3% ammonia and 1% non-ionic detergent in water with the help of soft nylon brushes. Hard thick lime coats and oil bond distempers from the surface were removed by chemico-mechanical means by using 2-3% acetic acid solution in water. Works is in progress.

39. RUINS OF RUDRA MAHALAYA TEMPLE, SIDDHPUR, DISTRICT PATAN

The original sandstone temple was destroyed twice and only ruins are present now. The monument was covered with micro-vegetation growth and deposition of dust and dirt. Lime coats, birds' droppings were also present on the interior and exterior of the main shrine, *mandapa*. *Toran* and entrance porches, it is observed that deterioration and

pulverization of stone in the beginning stage. Micro-vegetation growth and other superficial accretions were removed by using 3% ammonia and 1% non-ionic detergent in water with the aid of soft nylon brushes. Lime coats were removed by using 1-2% acetic acid solution. The consolidation treatment was carried out using stone strengthener Wacker OH-100 in the deteriorated part to arrest pulverization of stone. Then fungicidal treatment was given with 2% solution of sodiumpentachlorophenate to arrest re-growth of micro-vegetation. Finally, a silicone based Wacker BS-290 in mineral turpentine oil was applied on all treated and dried surface as hydrophobic treatment. Work has been completed (pls. 148-149).

40. SUN TEMPLE, THAN, DISTRICT SURENDRANAGAR

The chemical treatment and preservation work was carried out during the period under review. The major building material of the temple is sandstone which is porous and in deteriorated state. The temple was fully covered with dust, dirt and extensive micro-vegetation growth. Lime coats, soot and oily stains were present on interior and exterior of main shrine, *mandapa*, *antarala*. The exterior walls were highly eroded. Micro-vegetation growth along with dust and dirt were removed by using 2-3% ammonia solution and 1% non-ionic detergent with the help of soft nylon brushes. Lime coats were removed by chemico-mechanical means using 1-2% acetic acid solution in water, followed by thorough washing with plenty of plane water in order to remove any traces of acidic ions. The consolidation was carried out using stone strengthener Wacker OH-100 in deteriorated



A



B

Rudra Mahalaya Temple, Siddhpur: A, before and B, after scientific treatment

Plate: 149



A



B

Rudra Mahalaya Temple, Siddhpur: A, before and B, after scientific treatment

parts to arrest pulverization of the stone. Then fungicidal treatment was given with 2% solution of sodiumpentachlorophenate and the multiple lime layers were removed by physico-chemical methods. Fixing, filleting and edging of loose and fragile painted plaster and strengthening of frail paintings were carried out using various synthetic adhesive consolidates and fine retouching pastes. Re-integrations of paintings were carried out where ever necessary. Work has been completed.

41. TAMBEKARWADA PAINTINGS, DISTRICT VADODARA

Tambekarwada is situated in the heart of Vadodara city. It is renowned for its beautiful wall paintings. The painted layer was covered with dust, dirt and other accretionary deposits of binding medium fading of pigment layer and flaking of paint layer at some location was observed in some parts. The dust, dirt and old varnish were removed by using suitable organic solvents such as methanol, 2-ethoxyethanol, diacetone alcohol, butyl lactate, tri-ethanolamine, turpentine, butyl amine and toluene with the help of cotton swab. Fragile painted pigments and plaster were consolidated by using synthetic adhesives. Flaking of pigment layer was re-fixed with polyvinyl acetate solution. Finally the paintings were preserved by applying 1-2% polyvinyl acetate solution in toluene. Work has been completed.

HARYANA

42. PATHAR MASJID, THANESAR, DISTRICT KURUKSHETRA

Chemical conservation work was taken up during the period under review. The walls,

pillars and ceiling of the mosque were thickly covered with the deposition of dust, dirt, cobweb and micro-vegetation growth which weakened and weathered the stone surface of the monument. All superficial accretions and micro-vegetation growth were removed with suitable mixture of ammonia and non-ionic detergent followed by application of biocide over treated, cleaned and dried stone 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. Work has been completed.

43. JAL MAHAL, NARNAUL, DISTRICT MAHENDRAGARH

The interior of Jal Mahal having an area of 914sqm was taken up for chemical conservation work. The chambers and plastered surface of the walls was chemically treated for removal of dust, dirt, birds and bats excreta along with other ingrained accretions with suitable mixture of solvents and wetting agents. The geometric and floral designs at some places on the ceiling and walls of the monument were also chemically treated by using different organic solvents followed by preservation. The treated plastered and stone surface was given silane and siloxane based water repellent treatment with two coats of Wacker BS-290 solution in mineral turpentine oil. Work has been completed.

HIMACHAL PRADESH

44. BARJESHWARI TEMPLE, BHARDIATH, DISTRICT CHAMBA

The temple dedicated to goddess Bhagwati was taken up for consolidation, and preservation treatment during the period. The stone surface of the entire temple was chemically treated for removal of dust, dirt, micro-vegetation growth, soot, smoke and grease, accretions and lime wash which was observed at most of the places using different suitable chemicals and solvents. The deteriorated and weathered stone surface was consolidated with ethyl silicate based consolidant followed by biocide treatment spraying 2-3% aqueous solution of sodiumpentachlorophenate. Finally, the silane and siloxane based water repellent treatment was given to the dried stone surface of the monument.

45. BAIJNATH TEMPLE, BAIJNATH, DISTRICT KANGRA

The chemical conservation work on the entire temple and its sub-shrines was taken up during the period. For the removal of harmful and shabby deposition of micro-vegetation growth and other accretions, aqueous solution of ammonia and non-ionic detergent was used. Lime was removed by chemico-mechanical method using aqueous solution of acetic acid. The weak, weathered and fragile stone surface of the monument was consolidated with ethyl silicate based stone strengthener. The biocide treatment was given to the treated and dried stone surface with solution of sodiumpentachlorophenate followed by silane and siloxane based preservative coat. Work has been completed.

46. ASAPURI TEMPLE, ASAPURI, DISTRICT KANGRA

The entire surface of the monument was taken up for consolidation, treatment and

preservation during the period under review. The temple was thickly covered with multiple layers of accretions, thick and old layer of lime wash as well as micro-vegetation growth. The chemical treatment was carried out for the removal of above said accretions and deposition. The weathered and fragile stone surface was consolidated with ethyl silicate based stone strengthener. The entire stone surface of the monument was given fungicidal treatment followed by the silane and siloxane based water repellent treatment on the cleaned and dried stone surface of the monument.

47. RUINED FORT, KANGRA, DISTRICT KANGRA

The front fortification wall of the ruined fort was taken up for chemical conservation during the period under review. The stone surface of the wall 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 biocide treatment was given to the treated and dried stone surface using aqueous solution of sodiumpentachlorophenate followed by silane and siloxane based water repellent treatment. Work has been completed.

48. BAIJNATH TEMPLE COMPLEX, BAIJNATH, DISTRICT KANGRA

Compound and surrounding wall of the temple was taken up for chemical conservation during the period under review. The stone surface was thickly covered with micro-vegetation growth and other ingrained accretions causing the deterioration of the stone. The chemical treatment was carried out

for removal of micro-vegetation 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 sodiumpentachlorophenate followed by silane and siloxane based water repellent treatment providing preservation. Work has been completed.

49. BUDDHIST MONASTERY, TABO, DISTRICT LAHAUL AND SPITI

The beautiful wall painting executed on the southern wall of the Serkhang monastery was taken up for consolidation, chemical treatment and preservation during the period under review. Filleting, filling of the minor and major cracks along with edging of the painted plaster was done followed by chemical treatment using different kind of organic solvents and their mixture. The colour reintegration was carried out by the artist followed by the application of preservative coat using poly vinyl acetate solution in toluene.

50. LAKHANG MONASTERY, TABO, DISTRICT LAHAUL AND SPITI

The wall paintings in this monastery were lost from over the painted plaster, colour and pigments in many places and development of cracks and mud streaks were also observed at many places. Consolidation and filling of crack, edging of the plaster surface have been carried out followed by chemical treatment using judiciously different kind of organic solvents and their mixture for removal of dust, dirt, mud and other accretions. The chemically treated-painted surface was

preserved with 0.5% polyvinyl acetate solution in toluene.

51. VICE REGAL LODGE, DISTRICT SHIMLA

In continuation to previous year's work on western facade wall of monument was taken up for chemical conservation work during the period. The chemical treatment work was executed on the facade wall of the monument to eradicate the enormous growth of micro-vegetation and other accretions using aqueous solution of weak base and non ionic detergent. The treated and dried stone surface of the monument was given the fungicidal treatment using 2-3% aqueous solution of sodiumpentachlorophenate followed by the silane and siloxane based water repellent treatment.

JAMMU AND KASHMIR

52. NAND BABOUR TEMPLE, THALORA (MANWAL), DISTRICT UDHAMPUR

The scientific conservation work of the temple was undertaken for the eradication of micro-vegetation growth, superficial accretions, synthetic paint marks (used for numbering stones), etc. from the exterior as well as from the interior of the temple. Aqueous solution of liquor ammonia and non-ionic detergent (Rankleen Hi-power neutral) was used with brushes with soft bristles of coir/nylon to facilitate the removal of the surface deposits and micro-vegetation growth followed by thorough washing. The paint marks were removed with organic solvents viz., amyl acetate; acetone etc. Weathered and fragile portion of the stone sculptures were consolidated with Wacker OH-100. The stone sculptures of the temple were subjected to fungicidal treatment with 2-3% aqueous

solution of sodiumpentachlorophenate followed by hydrophobic treatment with Wacker BS-290 in mineral turpentine oil.

53. DERA TEMPLE, THALORA (MANWAL), DISTRICT UDHAMPUR

The scientific conservation work of stone sculptures (exterior) of the temple was carried out for removal of dried micro-vegetation growths, lime coatings and other superficial accretions, etc. Micro-vegetation growths, superficial accretionary deposits, etc. were removed using aqueous solution of liquor ammonia and non-ionic detergent (Rankleen Hi-power neutral) with the help of brushing with soft bristles of coir / nylon brushes. The soft bristles of the brush facilitate the removal of the surface deposits and micro-vegetation. The lime coatings at different places were removed with the help of dilute aqueous solution of acetic acid. Weathered and fragile portion of the stone sculptures were consolidated with Wacker OH-100 (pl. 150).

KARNATAKA

54. VIRUPAKSHA TEMPLE, HAMPI, DISTRICT BELLARY

During the period under review, restoration of the paintings in *Rangamandapa* of the temple was undertaken. The paintings were covered with dust, dirt, cobwebs, soot and oily accretion, as the same is a living temple. Organic solvents like ethanol, cellosolve, di-acetone alcohol, butyl lactate were used separately or in a mixture in different proportions. Oil of turpentine was used as colour restrainer. Filleting and fixing of bulged areas were also undertaken. Minimum colour reintegration work was also carried out. The roof of the *Rangamandapa* was

having micro cracks which were filled with Wacker sealant. The entire roof was coated with water repellent Wacker SMK-1311 in two coats on wet on wet basis.

55. LAKSHMI NARASIMHA TEMPLE, MAREHALLI, DISTRICT MANDYA

In continuation of previous year's work, the chemical conservation was carried out for the removal of thick micro-vegetation growth on the outer surface and lime coats and red ochre marks from the inner as well as outer surface. This temple is constructed of granite stone. General cleaning for removal of micro-vegetation was carried out with 2-3% ammonia solution and non-ionic detergent mixture. Lime wash and red ochre coating was removed using 2-3% acetic acid solution by chemico-mechanical method followed by neutralization treatment using dilute ammonia solution. Cleaned surface was given with 2% aqueous solution of sodiumpentachlorophenate as fungicidal treatment. Finally water repellent Wacker SMK-1311 in water was applied over the outer surface, on wet basis in two coats. Work has been completed.

56. DARIA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA

Summer Palace of Tipu Sultan at Dariya Daulat Bagh is full of paintings over the wooden ceiling as well as lime plastered walls. The painting was covered with dust, dirt, cobwebs, and mud pockets of insects. 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



A



B

Dera Temple, Manwal: A, before and B, after conservation

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, bee's wax and sodium pentachlorophenate. Loose canvas was re-fixed to wooden ceiling with animal glue and bee's wax mixture after adding sodiumpentachlorophenate to repel insect attack in future. Mending was also attended by fixing the missing areas using the above mixture. White texture was coated on the surface three times in succession. Minimum colour reintegration work was carried out to give a symmetrical look to the ceiling. Work is in progress (pl. 151).

57. NAMBINARAYANA TEMPLE, THONNUR, DISTRICT MANDYA

This temple is constructed of granite stone and is dedicated to Lord Vishnu. The outer surface of the temple was covered with dust, dirt and thick micro-vegetation growth. The interior of the temple was covered with thick coats of soot, oily accretion as it is a living monument. Many areas of the outer as well as inner surface were covered with 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 with the help of 2-3% dilute acetic acid solution followed by the treatment with dilute ammonia solution to counter act the deleterious effect of acid. Finally, the area was thoroughly washed with plain water. Cleaned areas were treated with anti fungal solution i.e., 2% aqueous solution of sodiumpentachlorophenate. Work is in progress.

58. ANANTHASHAYANA TEMPLE, KARKALA, DISTRICT UDUPI

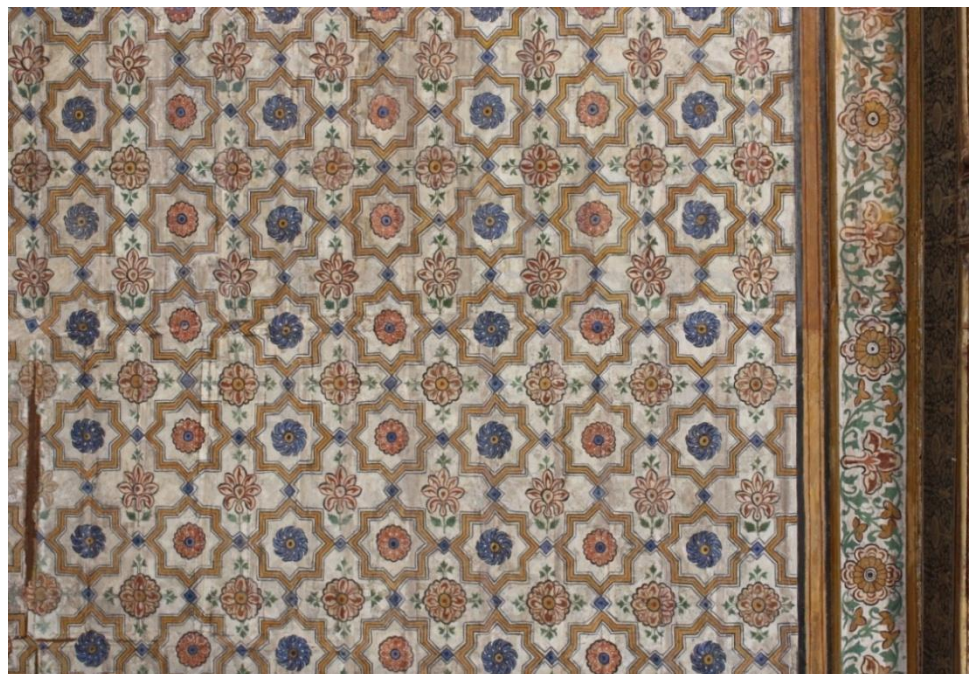
The thick growth of micro-vegetation etc. was found all over the exterior surface. There are some wooden sculptures all round the *vimana*. They are painted and coated with varnish, which is fully covered with dust, dirt, soot, etc. and oily accretion. Some areas were coated with lime wash and red ochre. Removal of red ochre and lime wash was carried out with 2-3% dilute acetic acid solution followed by neutralization treatment with dilute ammonia solution. General cleaning was carried out using dilute ammonia solution in water mixed with non-ionic detergent. The cleaned areas were given a coat with 2% aqueous solution of sodiumpentachlorophenate as fungicidal treatment to arrest re-growth of micro-vegetation. Finally, Wacker SMK-1311 in water was coated over the cleaned surface as a final preservative coating. Wooden sculptures were cleaned with small quantity of non-ionic detergent in ethanol for removal of dust, dirt and oily accretion. Organic solvents like methanol, morpholine, cellosolve, distilled oil of turpentine were used to remove old varnish and other accretion. The cleaned areas were coated with 2% polyvinyl acetate solution in sulphur free toluene. Work is in progress.

59. GOMATESWARA STATUE, KARKALA, DISTRICT UDUPI

This monolithic statue dedicated to Lord Gomateswara and is made up of granite. The main conservation problem of this statue was mainly due to micro-vegetation growth. Removal of micro-vegetation growth over the statue and adjoining areas was carried out using dilute aqueous solution of liquid



A



B

Daria Daulat Bagh, Srirangapatna: A, before and B, after scientific treatment

ammonia mixed with non-ionic detergent. After proper drying, the weak areas were consolidated by using an ethyl silicate based Wacker OH-100. 2% aqueous solution of sodiumpentachlorophenate was sprayed over the cleaned surface to arrest further growth of micro-vegetation. Finally, water repellent Wacker SMK-1311 diluted in water was coated all over the cleaned surface in two coats wet on wet basis. Work has been completed.

KERALA

60. ST. ANGELO FORT, KANNUR, DISTRICT KANNUR

Chemical conservation work was carried out on the eastern side of the parapet wall and outer fort wall up to the church. Micro-vegetation growth over the laterite blocks were removed by using 3:1 solution of ammonium hydroxide and non-ionic detergent and also cleaned thoroughly with water. Two coats of 3% solution of sodiumpentachlorophenate were applied as fungicide. Finally a preservative coat of Wacker BS-290 mineral turpentine oil was applied.

61. ROCK CUT CAVE TEMPLE, VIZHINJAM, DISTRICT THIRUVANANTHAPURAM

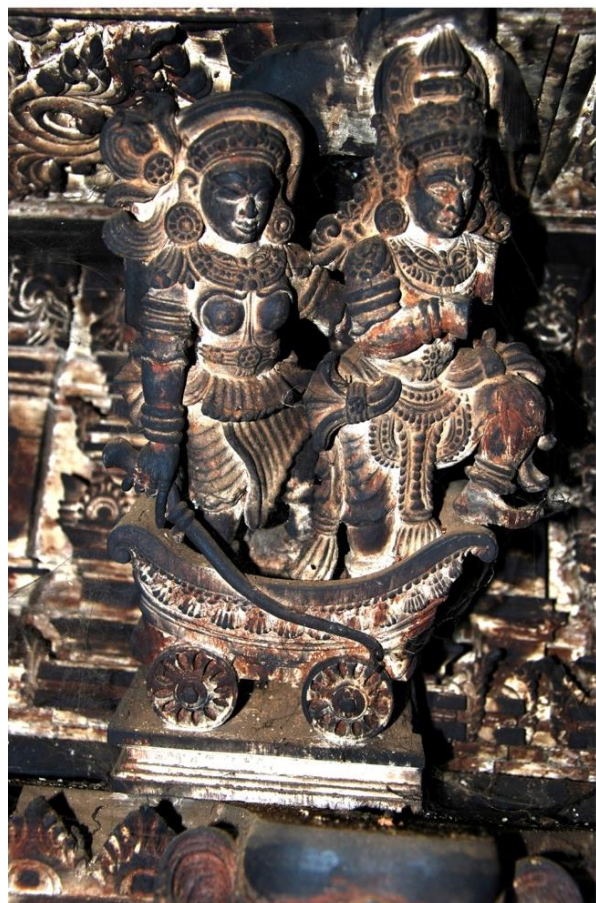
Removed the calcareous accretion and cement from the surface of the rock cut cave chemico-mechanically by using hexa meta phosphate. Wacker OH-100 is applied as stone strengthener on deteriorated areas. After three weeks applied 3% solution of sodiumpentachlorophenate as fungicide and applied a mixture of Wacker BS-290 and mineral turpentine oil as preservative.

62. VADAKKUMNATHA TEMPLE, DISTRICT THRISSUR

Scientific chemical conservation work of murals on the walls of Nandi shrine and *garbhagriha* dedicated to Siva was carried out. Accretion like dust, dirt, soot oily accretion and old preservative coat were removed by using organic solvents like 2-ethoxy ethanol, di-acetone alcohol, toluene, turpentine, tri-ethanol amine, etc. colour re-integrations was carried out and applied preservative of polyvinyl acetate - toluene 2% solution on the paintings. A thick layer of soot and oily accretion was removed from the wooden rafters and ceiling of the main shrine by tri-ethanol, amine, toluene, methanol, ammonia and neutral detergent. Applied insecticide on the wooden area used by flytox and applied preservative coat of polyvinyl acetate-toluene 2% solution. Removed old varnished coat from the granite portion of the shrine of Siva by organic solvents like benzene and acetone and removed oily and soot accretion using ammonia-teepol solution. Stone strengthener of Wacker OH-100 was applied on the deteriorated stone portions.

63. SRI KUDALMANIKKAM TEMPLE, IRINJALAKKUDA, DISTRICT THRISSUR

Chemical conservation was carried out on the wooden ceiling, beams, pillars and wooden carvings of *namaskaramandapa*. To remove the thick layer of soot and accretion organic solvents like methanol, ethanol, tri-ethanol amine, toluene, di-acetone alcohol were used. Old varnish coat, enamel paints, oil and soot accretion on the stone plinth were removed by benzene, acetone, ammonia hydroxide, diluted acetic acid, sodium hydroxide, etc. (pls. 152-153).



A



Kudalmanikkam temple,: A, before and B, after chemical preservation of wooden bracket

Plate: 153



A



B

Kudalmanikkam temple; A, before and B, after chemical preservation of wooden ceiling

MADHYA PRADESH

64. SHIVA TEMPLE, AMARKANTAK, DISTRICT ANUP NAGAR

The monument made up of soft laterite stone was affected by climatic conditions and there were depositions like algae and lichens which were causing decay of the stone surface. Scientific cleaning was done to make the surface free from accretions like dust, dirt and micro biological growth. Biocidal treatment was given to the clean and dry surface for the sustained biological action. Finally, hydrophobic treatment was given using Wacker BS-290 diluted in mineral turpentine oil to impart water repellency to the stone surface.

65. JAMI MASJID, CHANDERI, DISTRICT ASHOK NAGAR

The exterior sandstone walls of the monument were covered with thick deposition of dust, dirt and dried microbiological growth. This was enhancing the process of decay and deterioration of the stone. Scientific cleaning was done to make the surface free from accretions like dust, dirt and micro biological growth. Biocidal treatment was given to the clean and dry surface for the sustained biological action. Finally hydrophobic treatment was given using Wacker BS-290 diluted in mineral turpentine oil to impart water repellency to the stone surface.

66. LAXMAN TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

Laxman Temple, Khajuraho is one of the important temples situated in western group of temples. It is the only complete *panchayatana* style of temple. The temple is made up of buff coloured sandstone. The

temple was covered with thick deposition of microbiological 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. Scientific cleaning was done to remove dust, dirt and dried biological growth from the surface of the monument. Biocidal treatment was given to check the further growth of micro organisms. Finally, hydrophobic treatment was given to prevent the monument from the effect of water.

67. JAGDAMBI TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

The sandstone temple was covered with thick deposition of micro biological 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 whole of the monument was treated scientifically. The steps of scientific conservation are as follows. Scientific cleaning was done to remove dust, dirt and dried biological growth from the surface of the monument. Biocidal treatment was given to check the further growth of micro organisms. Finally, hydrophobic treatment was given to prevent the monument from the effect of water.

68. BEER SINGH DEO PALACE, DISTRICT DATIA

Big and small *chhatris* made of sandstone and lime plaster on the 5th floor are suffering with the thick deposition of microbiological growth. These depositions are harming the stone. The effect of accretions on the plastered surface is more. This causes the decay and deterioration of the monument. The whole of the monument was treated scientifically. The steps of scientific

conservation are as follows. Scientific cleaning was done to remove dust, dirt and dried biological growth from the surface of the monument. Biocidal treatment was given to check the further growth of micro organisms. Finally hydrophobic treatment was given to prevent the monument from the effect of water.

69. SIDDHESHWAR TEMPLE, NEMAWAR, DISTRICT DEWAS

The sandstone temple was covered with thick deposition of micro biological 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* shows the sign of erosion. The whole of the monument was treated scientifically. Scientific cleaning was done to remove dust, dirt and dried biological growth from the surface of the monument. Biocidal treatment was given to check the further growth of micro organisms. The lower portion of *sikhara* has been given strengthening and consolidation treatment using Wacker OH-100. Finally, hydrophobic treatment was given to prevent the monument from the effect of water.

70. ASHARFI MAHAL AND MADARSA, MANDU, DISTRICT DHAR

The exterior wall of the monument was made up of Lime stone and rough marble covered with thick deposition of dust, dirt and dried microbiological growth. This was enhancing the process of decay and deterioration of the stone. The marble portion of the monument has also become pale and black due to the deposition of accretions. The whole of the monument was treated scientifically.

Scientific cleaning was done to remove dust, dirt and dried biological growth from the surface of the monument. Biocidal treatment was given to check the further growth of micro organisms. The marble portion of the monument has been treated by using clay pack method. Finally, hydrophobic treatment was given to prevent the monument from the effect of water.

71. DARIYA KHAN TOMB, MANDU, DISTRICT DHAR

The exterior sandstone wall of the monument was covered with thick deposition of dust, dirt and dried microbiological growth. This was enhancing the process of decay and deterioration of the stone. Scientific cleaning was done to make the surface free from accretions like dust, dirt and micro biological growth biocidal treatment was given to the clean and dry surface for the sustained biological action. Finally, hydrophobic treatment was given using Wacker BS-290 diluted in mineral turpentine oil to impart water repellency to the stone surface.

72. GWALIOR FORT, DISTRICT GWALIOR

These massive rock cut figures of Jaina Tirthankars made up of sandstone are exposed to extreme climatic conditions and during rainy season water flows over most of the figures. Due to this and certain geological features rock surface including sculptures remain wet throughout the year which appears to be the major cause of decay and biological growth. The conservation work for these monuments is mainly concerned for the consolidation and strengthening of the sculptures. Unwanted accretions including biological growth was removed from the surface of the stone. Paper pulp treatment was

given to the salt affected area. Biocidal treatment was given to the clean and dry surface for the sustained biological action. Wacker OH-100 stone strengthener was used for consolidation of relief figures. Finally, silicone based water repellent resin in suitable concentration was applied over the dried exterior surface of the monument for imparting hydrophobic properties to the surface.

73. VIRATESHWAR TEMPLE, SOHAGPUR, DISTRICT SHAHDOL

The exterior sandstone wall of the monument was covered with thick deposition of dust, dirt and dried microbiological growth. This was enhancing the process of decay and deterioration of the stone. The middle portion of *sikhara* is eroded at an alarming stage. The whole of the monument was treated scientifically. Scientific cleaning was done to remove dust, dirt and dried biological growth from the surface of the monument. Biocidal treatment was given to check the further growth of micro organisms. The middle portion of *sikhara* has been given strengthening and consolidation treatment using Wacker OH-100 in order to check further decay. Finally, hydrophobic treatment was given to prevent the monument from the effect of water.

MAHARASHTRA

74. BIBI-KA-MAQBARA, DISTRICT AURANGABAD

Eastern minarets made up of stucco lime plasters have been taken up for the removal of accumulation of superficial accretions like dust, dirt, birds droppings and micro-vegetation growth, bulging and flaking of stucco plaster at some places. Removal of

superficial accretions were carried out with the help of 2 to 3% aqueous solution +1% non-ionic detergent with soft gentle brushing followed by thorough washing with copious volume of water. A thin paste of calcium hypo chlorite was applied on fragile stucco lime plaster followed by thorough washing with copious volume of water 2% aqueous solution of sodiumpentachlorophenate was applied on cleaned stucco plaster. Three coats of silicone based water repellent Wacker BS-290 has been applied diluted with mineral turpentine oil. With 1:13, 1:12, 1:10 proportions wet-on-wet basis as preservative.

75. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD

Dust accumulation on painted surface and sculptures is a big problem at Ajanta. Removal of dust and dirt was carried out on routine basis from paintings and sculptures surface with soft feather brushes, paint brushes, 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/mineral turpentine oil is being sprayed fortnightly only on the unpainted portion of the caves. The temperature and humidity have been monitored and recorded periodically in a number of caves in order to study the effects of microclimatic changes on the painted surface inside the caves. As painted plaster of Ajanta caves is very old, there are several problems of bulging, cracks, gaps, peeling etc. due to variation in humidity and other physic-chemical factors. To arrest the painting deterioration and overcome these problems fixing, filleting and consolidation work was taken up during this period in Cave 1, 6, 9, 11, 17 and 26. Lime plaster close in

composition to ancient plaster was prepared using mixture of lime, marble powder, shell powder and water. 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 is being used with good results. The work is in progress.

Stone surface façade of some caves having beautiful and elaborate carvings, comprising animal figures and geometrical designs in Cave 1, 4, 6 and 11. These portions were covered with black colour deposition of micro-vegetation growth. Bat excreta and tenacious mud were there at several places. Due to weathering of rock cracks, pulverization or exfoliation of the stone surface were also observed at many a place. In order to remove the superficial accretions, and consolidation of loose and weak stone surface, chemical conservation work was taken up during the period under review. Chemical consolidation and mending work was carried out with the help of an ethyl silicate based Wacker OH-100 stone strengthener. At places some drop of hydrogen peroxide was also used in the pulp in order to oxidize the hard brown or black bat excreta and other accretion. Stone surface where paper pulp or clay was applied were left to dry for sufficient time so as to absorb salts from deep of pores of stone and also to soften other hard layers deposited on the stones. These dried paper pulp was removed and the stone surface cleaned with distilled water and soft brushes. After washing repeatedly, surface was left to dry for some days. When surface was completely dried, Wacker BS-290 solution in mineral turpentine oil was applied as a preservative on the

cleaned and dried surface, which gave the stone water repellency and preservative coating with very good result. Work is in progress.

A thick coat of polyvinyl acetate layer is found to be applied on the painted surface of Cave 19. The old polyvinyl acetate coating was removed with the help of suitable organic solvent viz., toluene, di-butyl-phthalate and acetone mixture. The world famous painting of Mahayana period at Cave 7, 9 and 19 were taken up for restoration work during the period under review. Painted surface is covered with very hard accretions of shellac, soot, dust and dirt and old preservative coating applied in the past. In order to remove the hard accretion, old preservatives and soot layers as per requirement in appropriate ratio were used. Polyvinyl acetate in toluene was used as preservative on well-dried and treated painted surface.

One of the main problems associated with the Ajanta is the seepage of water inside the caves, verandah and facades. The percolation of water inside the rock surface is due to the existence of running cracks, cavities and holes. In order to overcome the aforesaid problem a new work for filling of big cracks and cavities in the facades of various caves using lime technology is taken up. Hydrated lime is mixed with stone powder of different microns, brick powder, Kavdi powder, Quartz powder, red ochre colour, and gravels in appropriate ratio. In case the depth of the cavity was 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 solutions

in mineral turpentine oil mixed were applied as a preservative coating.

In order to consolidate the stone sculpture and stone surface in Cave 9, 10, 21 and 26 a new technology/ method was adopted wherein ethyl silicate (Wacker OH-100) was taken as a consolidant and was passed slowly inside the cracks, exfoliated and at other damaged portions with the help of needle-tube attached with a plastic bottle having ethyl silicate hanged on a stand (i.e. by saline method). It is a slow process and the consolidant were allowed to enter inside slowly. The flow of ethyl silicate is regulated time to time as per the need and condition of the portion to be consolidated. Work has been completed.

76. PATANA DEVI TEMPLE, PATANA DEVI, DISTRICT CHALISGOAN

The scientific conservation work was taken up for the removal of deposition of dust, dirt, birds' droppings, micro-vegetation growth etc. Stone fabrics have become very fragile at places due to weathering effect. Superficial accretions were removed with gentle brushing. Application of Wacker OH-100 on fragile stone surface was given to strengthen the surface. Removal of superficial accretions were carried out using 2 to 3% aqueous solution of non-ionic detergent with gentle soft brushing followed by thorough washings with copious volume of water. Tenacious calcareous matter was removed with the help of 1% aqueous solution of acetic acid +1% non-ionic detergent followed by thorough washing with copious volume of water. Application of 2% aqueous solution of sodiumpentachlorophenate was given on cleaned and dried surface. Wacker BS-290 diluted in mineral turpentine oil was applied

as preservative on cleaned and dried surface. Work has been completed.

77. MAHAKALI TEMPLE, 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's excreta, oily smoke and other similar superficial accretions on paintings. Super facial accretions were removed with the help of mixture of suitable organic solvents like di-acetone alcohol, acetone, toluene, n-hexane, ethyl-methyl-ketone, cello solve etc. The work is in progress.

78. GANESH LENI, CAVE 32 AND 33, ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

The main conservation problem was fixing/ filleting of paintings / mud and lime plaster fragments in Cave 32-33 which were mended and fixed and filleted in the compatible materials. The works of *yaksha* figure on the entrance of Cave 4 near flight of steps were taken up for consolidation. The missing portions were reconstructed with ethyl silicate and stone powder by using saline bottle methodology. The stainless steel pins, net, were introduced wherever required. The conservation measures taken were appropriate as there is no change in its visual appearance. Work has been completed.

The scientific conservation work was taken up for the removal of superficial dust, dirt, birds excreta and micro-vegetation growth from exterior surface and bulged out mud plaster and calcareous streaks inside the Cave 6, 8-9 & 16 and sculptures which are carved out in trap basalt rock. Removal of superficial accretions were carried out with the help of

2% aqueous solution of ammonia +1% non-ionic detergent and gentle brushing with nylon brushes, followed by thorough washing with copious volume of water. Tenacious calcareous streaks have been removed with clay pack method using (fuller's earth 2% aqueous solution of ammonia +1% ammonium carbonate +1% sodium bicarbonate + little E.D.T.A. salt paste was applied and left overnight and later washed with copious volumes of water. 2% aqueous sodiumpentachlorophenate was applied on cleaned exterior parts. Fragile portions have been given a coat of Wacker OH-100 an ethyl silicate based stone strengthener for consolidation. Bulged out mud plaster have been fixed and filleted. Application of Wacker BS-290 diluted in mineral turpentine oil was applied on cleaned, dried and fungicidally treated exterior areas as preservative.

79. GRISHNESHWAR TEMPLE, ELLORA, DISTRICT AURANGABAD

The whole temple is constructed of red Basalt except *sikhara* which have bricks and lime plaster surface. The conservation problem is accumulation of dust, dirt, birds' excreta and micro-vegetation growth on exterior areas whereas oily smoke, soot, greasy material etc. in the interior side. Removal of superficial accretions was carried out by gentle brushing, cemented dust, dirt, micro-vegetation growth were removed with the help of 2 to 3% aqueous solution of ammonia + 1% non-ionic detergent followed by thorough washing with copious volume of water. Paintings executed over the lime plaster have been preserved 2% aqueous solution of sodiumpentachlorophenate was applied on cleaned exterior surface. Two coats of

Wacker BS-290 diluted in mineral turpentine oil was applied on cleared and, dried surface wet-on-wet method.

80. 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 was applied on the inside walls of the temple. Nearly 2-3% of acetic acid solution was used for removing the lime. After completion of lime wash the surface was left to dry for some days. The stone surface of main *garbhagriha*, *mandapa* and *varandah*, pillars, beams was covered by thick deposition of oily and sooty deposits. Beams are covered with blackish microbial vegetation, accretions like dust, dirt, lime coats, sindhoor, etc. The thick black and sooty accretions were removed with the help of mixture of organic solvents and finally the adhering accretions were treated with ammonia and non-ionic detergent using nylon brushes and coir scrubbing brushes. When surface was completely dried, Wacker BS-290 mixed in mineral turpentine oil was applied as a preservative coat on the cleaned and dried as a silicone bases water repellent surface. Work has been completed.

81. SHANIWARWADA, PUNE, DISTRICT PUNE

The scientific conservation works was taken up for removal of thick growth of micro-vegetation, thick layer of dust, dirt, bird excreta and other similar accretions on stone. The superficial accretions were removed and the surfaces of brick and old tarry varnish on wooden doors were cleaned using gentle brushing with the help of 2% to 3% aqueous solution of ammonia +1% non-ionic

detergent. Tenacious and calcareous deposits have been removed with the help of 1% solution of acetic acids +1% non-ionic detergent by gentle brushing with nylon brushes followed by thorough washing with copious volume of water. Application of an ethyl silicate based Wacker OH-100 were given for consolidation of fragile stone surface. Application of 2% aqueous solution of sodiumpentachlorophenate was given on cleaned areas of stone and brick wall. Application of a silicon based water repellent Wacker BS-290 diluted in mineral turpentine oil was applied as on cleaned and dried exterior areas of stone/ brick walls. Tarry accretions from wooden door were removed with the help of organic solvents like methanol, acetone of toluene etc. Dilute preservative on cleaned and dried surface was applied on wooden door. Work has been completed.

ODISHA

82. MUKTESWAR AND SIDHESWAR GROUP OF TEMPLES, DISTRICT KHURDA

The temple complex is made of sandstone in ashlar masonry. The chemical conservation work was taken up for the removal of micro-vegetation growth, soot and greasy material, oil deposition from the stone surface. The stone surface was also very fragile in some places due to hydrolysis. Micro-vegetation growth was eradicated by 2% liquid ammonia solution and dust, dirt etc. were removed by non-ionic detergent followed by thorough washing. The weak stone was consolidated by an ethyl silicate based stone strengthener Wacker OH-100 and after 15 days fungicidal application was carried out by spraying 2% aqueous sodiumpentachlorophenate solution.

Finally two coats of a silicone based Wacker BS-290 (wet-on-wet) diluted with mineral turpentine oil was applied as preservative/water repellent. Work is in progress.

83. MARKANDESWAR TEMPLE, BHUBANESWAR, DISTRICT KHURDA

This temple is made of sandstone in ashlar masonry. The main conservation problem was micro-vegetation growth over the stone surface and deterioration of the stone surface. Micro-vegetation growth was removed using 2% liquid ammonia solution. However, dust, dirt, etc. were eradicated by non-ionic detergent using soft brushing. The weak stone surface was consolidated by ethyl silicate. For arresting further micro-vegetation growth, 2% aqueous sodiumpentachlorophenate solution was sprayed on the stone surface after 15 days of the consolidation. Finally two coats of a silicone based Wacker BS-290 (wet-on-wet) diluted with mineral turpentine oil were applied as preservative. Work is in progress.

84. BRAHMESWAR TEMPLE, BHUBANESWAR DISTRICT KHURDA

The main temple and the side temples are made up of sandstone and the masonry is ashlar. Among the dated temples it is the earliest one where iron beams have been used. The chemical conservation work was carried out for the removal of micro-vegetation growth by using 2% liquid ammonia solution. Removal of dust, dirt, soot and oil deposition etc. was done with non-ionic detergent using soft brushing, an ethyl silicate based Wacker OH-100 was applied to give extra strength to stone. Fungicidal application was given by spraying 2% aqueous sodiumpentachlorophenate solution for

arresting further micro-vegetation growth. Finally two coats of silicone based Wacker BS-290 (wet-on-wet) diluted with mineral turpentine oil was applied as preservative

85. SURYANARAYANA TEMPLE, PURI, DISTRICT PURI

The Suryanarayan Temple is situated in the complex of Sri Jagannath Temple. The temple has three parts viz., *vimana*, *jagamohan* and *natamandapa* which is made up of khondalite stone and the masonry is ashlar. The main conservation problem was deterioration of stone due to salt effect, micro-vegetation growth due to high humidity and soot and oil depositions due to living temple. Removal of micro-vegetation growth was removed using 2% liquid ammonia solution. Dust and dirt was removed using and non-ionic detergent and soft brushing. Repeated paper pulp treatment was carried out to remove the soluble salt particles from the pores and the surface of the stone. Ethyl silicate was used for consolidation of weak stone surface. For arresting further micro-vegetation growth, 2% aqueous sodiumpentachlorophenate solution was sprayed over the stone surface after 15 days of the application of consolidant. Finally two coats of a silicone based Wacker BS-290 (wet-on-wet) diluted with mineral turpentine oil was applied as preservative.

86. SUN TEMPLE, KONARK, DISTRICT PURI

The Sun Temple complex consists of *vimana* (*rekha* or *sikhara* structure), *jagamohana* (Pyramidal structure) and *natamandapa* (Pillared apartment) which is made up of khondalite stone, which is a metamorphic rock and the masonry is ashlar. The main constituent minerals are quartz, feldspar, garnet and oxides of iron. The

conservation problem of the temple are deteriorations of stones due to salt deposition, micro-vegetation growth mainly in north direction, loss of cementing materials and accumulation of dust and dirt. To check the deterioration of stone surface, chemical treatment and preservation was carried out by removal of soluble salts from stone surface by repeated paper pulp treatment using de-ionized water. Treatment of micro-vegetation growth dust and dirt was carried out using 2% liquid and non-ionic detergent. Application of Wacker OH-100 (an ethyl silicate) was used as stone strengthener. To check further micro-vegetation growth, 2% solution of sodiumpentachlorophenate in aqueous media was sprayed on the surface. Finally double coat (wet-on-wet) of Wacker BS-290 (mixture of silane and siloxane) diluted with mineral turpentine oil was applied as preservative.

PUDUCHERRY

87. SRI SIVA TEMPLE, MADAGADIPATTU AND SRI PANCHANADISWARA TEMPLE, THIRUVANDARKOIL, DISTRICT PUDUCHERRY

Sri Siva temple also called as “Thirukundangudi Mahadeva” Temple. Madagadipattu is located 24km away from Puducherry. The earliest inscription in this temple belongs to the period of Raja Raja-1 which mentions that this temple was raised in granite stone by Raja Raja Devar and the builder was Puri Bhattan. The scientific conservation work was carried out for the removal of dust, dirt, micro-vegetation growth from exterior surface and dust, dirt and lime wash accretions from inner surface using dilute ammonia, neutral detergent, sodium carbonate, sodium bicarbonate and glacial acetic acid. After removal of these

accretions, 2% solution of sodiumpentachlorophenate was applied as fungicide and finally Wacker SMK-1311 diluted with water was applied as water repellent. Stone strengthener was applied over fragile area to strengthen it.

PUNJAB

88. SHAMSHER KHAN'S TOMB, BATALA, DISTRICT GURDASPUR

The chemical conservation work was carried out on the compound wall of this tomb made up of *lakhauri* bricks. The walls were chemically treated with aqueous solution of weak base and non ionic detergent to remove the micro-vegetation growth and other ingrained accretions. The identified weathered and deteriorated surface was consolidated with stone strengthener. 2-3% aqueous solution of sodiumpentachlorophenate was sprayed on the surface for fungicidal treatment. The final coat of silane and siloxane based water repellent treatment was applied as preservative.

89. NURMAHAL SARAI COMPLEX, NURMAHAL, DISTRICT JALANDHAR

The chemical conservation of this Sarai which is made up of bricks was taken up during the period under review. The brick surface was covered with thick deposit of dust, dirt, micro-vegetation, and other ingrained accretions. The chemical treatment work was executed to remove the above accretions using aqueous solution of ammonia and non-ionic detergent. The 2-3% aqueous solution of sodiumpentachlorophenate was sprayed over the cleaned and dried brick surface followed

by two coats of silane and siloxane based water repellent treatment as preservation.

90. HAJI JAMAL TOMB, NAKODAR, DISTRICT JALANDHAR

The interior portion of the tomb which is made up of mainly lime plastered surface covered with dust, dirt and other accretions was taken up during the period. 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 adhesive. The painted area in interior portion of the tomb was chemically treated by using different organic solvents and preserved with 1% polyvinyl acetate solution in toluene. Finally, the silane and siloxane based water repellent treatment was given to the dried lime plastered surface of the monument.

91. DAKHNI SARAI, DAKHNI, DISTRICT JALANDHAR

In continuation to previous year's work, the exterior surface of eastern gate of this monument was taken up for chemical conservation during the period. The remaining portion was chemically treated for removal of deposited superficial accretions, micro-vegetation growth. The identified deteriorated and weathered area was consolidated with ethyl silicate based stone strengthener. The cleaned and dried plastered and stone surface of the gateway was given fungicidal treatment with 2-3% aqueous solution of sodiumpentachlorophenate. The final coat of silane and siloxane based water repellent treatment was given to the dried plastered surface of the gateway.

92. QILA MUBARAK, PATIALA, DISTRICT PATIALA

The murals of Masnad Hall having multiple problems-loss of colours and pigments, development of cracks, bulging and flaking etc. were taken up for restoration during the period. The painted plaster surface was first consolidated followed by chemical treatment of the beautiful paintings by using different organic solvents viz., methanol, 2 ethoxyethanol, tri-ethanolamine, turpentine oil, dibutylphthalate, etc. and their mixture in appropriate ratios. Colour reintegration work was carried out by the artist wherever required. The consolidated, chemically treated and reintegrated painted surface was preserved with very thin coat of polyvinyl acetate solution in toluene.

RAJASTHAN**93. CHITTAURGARH FORT, DISTRICT CHITTAURGARH**

In continuation of previous year's work the entrance gate and northern exterior portion of Rana Kumbha Palace, was chemically treated and preserved during the year. 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 sodiumpentachlorophenate as fungicidal treatment. The dried surface was then consolidated by using 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 mineral turpentine oil. Exterior walls facing east and south and the walls of

courtyards of Rana Ratan Singh Palace, was taken up for the chemical conservation work. 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 sodiumpentachlorophenate for sustained fungicidal action. The dried surface was then consolidated by using ethyl silicate based stone strengthener Wacker OH-100. Finally, the surface was imparted water repellency by the application of water repellent Wacker BS-290 diluted with mineral turpentine oil.

95. CHAND BAORI, ABHANERI, DISTRICT DAUSA

Chand Baori a stepped well was taken up for chemical treatment and preservation during the year. The surface of the steps was 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, micro-vegetation growth. The cleaned surface was then given fungicidal treatment by the application of 4% aqueous solution of sodiumpentachlorophenate. 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 water repellent Wacker- BS-290, suitably diluted with mineral turpentine oil all over the cleaned, consolidated and dried surface. Work is in progress.

96. KUMBHALGARH FORT, DISTRICT RAJSAMAND

In continuation of previous year's work, the scientific conservation and preservation work of Gole Rao temple 4 and 5 was taken up

during the period under review. The surface was cleaned using ammoniacal water and non-ionic detergent with the help of soft nylon bristle brushes to eradicate the deposits of dust, dirt, dead and living micro-vegetation growth. The cleaned surface was sprayed with 4% aqueous solution of sodiumpentachlorophenate, as fungicidal treatment. The surface was then consolidated using ethyl silicate based stone strengthener Wacker OH-100 wherever required. Finally, the dried and consolidated surface was imparted water repellency by application of silicone based water repellant Wacker BS-290 dissolved in mineral turpentine oil in suitable concentration. Fort wall, gates and shrines between Ram Pole and Nimbu Pole was under taken for the scientific conservation and preservation during the year under review. The surface was carefully cleaned by using solution of ammonia and the non-ionic detergent with the help of soft nylon brushes to eradicate the deposits of dust, dirt dead and living micro-vegetation growth, followed by the fungicidal treatment by spraying 4% aqueous solution of sodiumpentachlorophenate. The surface was then consolidated wherever necessary by using the ethyl silicate based stone strengthener Wacker OH-100. Finally, the dried and consolidated surface was applied with diluted solution of silicone based water repellant Wacker BS-290 with mineral turpentine oil to imparted water repellency to the surface.

Fort wall (Interior portion) and shrines between Kheda Devi Temple and Vijay Pole was taken up for the scientific conservation. The surface of the wall was cleaned chemico-mechanically by using non-ionic detergent

and slightly ammoniacal water with the aid of soft nylon bristle brushes to eradicate the deposits of dust, dirt dead and living micro-vegetation growth, followed by spraying of 4% aqueous solution of sodiumpentachlorophenate as fungicidal treatment. The surface was then consolidated using ethyl silicate based stone strengthener Wacker OH-100 wherever necessary. Finally, water repellant Wacker BS-290 suitably diluted in mineral turpentine oil was applied over the whole cleaned dried and consolidated surface so as to impart the water repellency to the surface.

Fort wall between Vedi Temple and Vijay Pole, Kumbhalgarh Fort was an ongoing work, continued during this year. The surface area was carefully cleaned with the aid of soft nylon bristle brushes using non-ionic detergent and water made slightly alkaline by ammonia solution, so as to remove all unwanted surface deposits such as dead/living micro-vegetation growth, dust, dirt, bird's excreta, etc. The cleaned surface was sprayed with 4% aqueous solution of the sodiumpentachlorophenate as fungicidal treatment. 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 repellant Wacker BS-290, diluted with mineral turpentine oil all over the cleaned, consolidated and dried surface.

96. HADA RANI-KA-KUND, TODA RAI SINGH, DISTRICT TONK

This ongoing work was continued during the year. The surface area was subjected to

cleaning for the removal of accretions with aid of soft nylon bristle brushes using ammonia solution and non-ionic detergent in appropriate ratio. The cleaned surface was applied with 4% aqueous solution of sodiumpentachlorophenate by spraying to stop fungicidal action. The dried surface was then strengthened by application of ethyl silicate based stone strengthener Wacker OH-100, wherever necessary. The surface was then coated with a silicone based water repellent Wacker BS-290 in suitable concentration; mineral turpentine oil had been used as solvent to impart water repellency to the surface (pl. 155).

SIKKIM

97. RUBDENTSE SITE OF ANCIENT CAPITAL, DISTRICT WEST SIKKIM

The ruins of the palace made of random rubble masonry fortification walls in mud mortar, were under taken for scientific conservation first time for eradication of trees, shrubs, micro-vegetation growth, dirt, dust, etc. with non-ionic detergent and aqueous ammonia solution. The surface so cleaned and freed of all accretionary deposits was given fungicidal treatment with 5% aqueous santobrite solution followed by application of double coat of wet on wet silicone based water repellent Wacker BS-290 in mineral turpentine oil as preservative.

TAMILNADU

98. SRI NITHISWARA SWAMY TEMPLE, SRIMUSHNAM, DISTRICT CUDDALORE

The temple, built of granite, is situated in Srimushnam, the older name of which is “Sillivanam”. The scientific conservation

work was taken up for removal of dust, dirt, moss and lichens from exterior surface and dust, dirt, oily and sooty accretions, lime wash, red ochre accretions from interior surface using dilute ammonia, neutral detergent, and glacial acetic acid in appropriate quantity. After thorough washing with plenty of plain water, the dried surface was given fungicidal treatment using 2% solution of sodiumpentachlorophenate and finally Wacker SMK-1311 diluted with water was applied as water repellent over the completely dried surface. Stone strengthener was applied over fragile areas to strengthen it.

99. SRI KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT KANCHIPURAM

The famous Sri Kailasanatha temple, Kanchipuram is built of sandstone and its *vimanas* are decorated with stucco taken up during the reign of Pallava king. Granite slabs are inserted in between sandstone structures. The cells/ sub-shrines around the main temple are embellished with sculptural work with paintings. The scientific conservation of the *vimana* and *gopuram* of this temple for removal of dust, dirt, micro-vegetation growth and consolidation of sculptures was taken up during the period under review. The surface of the sandstone sculptures was in much deteriorated condition. To strengthen the deteriorated surface an ethyl silicate base stone strengthener Wacker OH-100 was applied and left it for sufficient number of days for polymerization. After strengthening, dust, dirt and micro-vegetation growth from the surface was removed using neutral detergent and ammonia solutions. The dried surface was given 2% solution of sodium-



A



B

Hada Rani Ka Kund, Toda Rai Singh: A, before and B, after scientific treatment

pentachlorophenate as fungicide and finally, Wacker SMK-1311 diluted with water in 1:14 ratio was applied as water repellent. The work is in progress. Paintings in the cells were covered with dust, dirt and old preservative coat and these were removed using organic solvents such as sulphur free toluene, ethoxy ethanol, di-acetone alcohol, oil of turpentine, etc. Filleting and edging work wherever required were also attended to prevent flaking of lime plaster. Finally, 1% solution of polyvinyl acetate in sulphur free toluene was applied as preservative coat.

100. SRI DHARMESWARA TEMPLE, MANIMANGALAM, DISTRICT KANCHIPURAM

The temple is made up of granite and the *vimana* is decorated with stucco. The scientific conservation work was taken up for the removal of dust, dirt, moss and lichens from exterior surface and also for removal of dust, dirt, oily and sooty accretions, lime wash splashes from interior area using dilute ammonia, neutral detergent, sodium carbonate, sodium bicarbonate and glacial acetic acid in appropriate ratio. After thorough washing with plenty of plain water, the dried surface was given fungicidal treatment using 2% solution of sodiumpentachlorophenate and finally Wacker SMK-1311 diluted with water was applied as water repellent over the completely dried surface.

101. SHORE TEMPLE, MAHABALIPURAM, DISTRICT KANCHIPURAM

The Shore Temple, Mahabalipuram is built of coarse granite blocks on natural rock bed during Pallava period. Since this temple is very close to sea i.e., Bay of Bengal, the walls and *vimanas* are affected by salt laden wind.

The scientific conservation work was carried out for the removal of dust, dirt, micro-vegetation growth using aqueous ammonia and neutral detergent and soluble salts were exhausted by paper pulp method. After removal of soluble salt 2% solution of sodiumpentachlorophenate was applied as fungicide and finally, Wacker SMK-1311 diluted with water was applied as water repellent over the exterior surface. The work is in progress.

102. ROCK-CUT SIVA TEMPLE, KUNANDAR KOIL, DISTRICT PUDUKKOTTAI

The Siva Temple, Kunandar Koil is located about 28km from Pudukkottai. The temple is carved out of granite rock of a hill and extended walls, pillars and ceiling are built of granite stone and *vimanas* are decorated with stucco plaster. The scientific conservation work was taken up for the removal of dust, dirt, lime wash accretions, moss and lichens from exterior surface and also for removal of dust, dirt, bat's excreta, oily, soot, hard calcareous deposit from interior surface. Stone strengthener Wacker OH-100 was applied over fragile area to strengthen the stone surface. After removal of these accretions with ammonia and non-ionic detergent mixture on the dried and cleaned surface, 2% solution of sodiumpentachlorophenate was applied as fungicide and finally Wacker SMK-1311 diluted with water was applied as water repellent. Recently structurally repaired compound wall was also given fungicidal and water repellent treatment to arrest further growth of micro-vegetation.

103. SRI RAJENDRA CHOLESWARA TEMPLE, PONNAMARAVATHI DISTRICT PUDUKKOTTAI

The scientific conservation work was carried out for the removal of dust, dirt, moss and lichens from exterior surface and dust, dirt, oil and soot and lime accretions from interior area using appropriate quantity of dilute ammonia, neutral detergent, sodium carbonate, sodium bicarbonate, and mild glacial acetic acid as per requirement. Black enamel paint marks on granite blocks were also removed by chemico-mechanical method after removal of these superficial accretions, from over the dried surface.

104. SIVA AND VISHNU TEMPLE, MALAYADIPATTI, DISTRICT PUDUKKOTTAI

The scientific conservation work was carried out for the removal of dust, dirt, micro-vegetation growth from over the exterior surface and dust, dirt bat's excreta, calcareous deposits and lime wash accretions from inner surface using dilute ammonia, neutral detergent, sodium carbonate, sodium-bicarbonate and glacial acetic acid in appropriate ratio. After removal of these accretions, 2% solution of sodiumpentachlorophenate was applied as fungicide and finally Wacker SMK-1311 diluted with water was applied as water repellent on the exterior areas. Stone strengthener was applied over fragile areas to strengthen it. The paintings on the walls and ceiling were covered with dust, dirt and sooty accretions. For removal of these accretions organic solvents like di-acetone alcohol, ethoxy ethanol, and few drops of tri-ethanolamine and turpentine oil were used. Finally, 1% solution of polyvinyl acetate was applied as preservative coat.

105. SIVA TEMPLE, NARTHAMALAI, DISTRICT PUDUKOTTAI

The scientific conservation work was carried out for the removal of dust, dirt, micro-vegetation growth from over the exterior surface and dust, dirt, bat's excreta, calcareous and lime wash accretions from the inner surface using dilute ammonia, neutral detergent, sodium-carbonate, sodium-bicarbonate, sodium-hexa meta phosphate, oxalic acid, hydrogen peroxide and glacial acetic acid in appropriate ratio. After removal of these accretions 2% solution of sodiumpentachlorophenate was applied as fungicide over cleaned and dried surface and finally Wacker SMK-1311 diluted with water was applied as water repellent. Stone strengthener was applied over fragile area. The paintings on the walls were covered with dust, dirt and old preservative coat. For the removal of these superficial accretions, organic solvents such as di-acetone alcohol, ethoxy ethanol, and few drops of tri-ethanolamine, turpentine oil and toluene were used. The work is in progress.

106. SRI BRIHADESWARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR

In continuation with the previous year's work the scientific conservation of the Rajaraja *gopuram* and northern side compound wall was taken up for the removal of dust, dirt and micro- vegetation growth using neutral detergent and ammonia solution. 2% solution of sodiumpentachlorophenate was applied as fungicide and as water repellent Wacker-SMK-1311 in 1:14 ratio with water. Paintings on the western side of the main Siva shrine were covered with dust, dirt and old preservative coat. For the removal of these accretions, various organic solvents like toluene, di-acetone alcohol, few drops tri-ethanolamine, oil of turpentine, etc., were

used. Filleting, edging and fixing of bulging wherever required were also attended using lime and casein mixture. Finally, 1% solution of polyvinyl acetate in sulphur free toluene was applied as preservative coat over the cleaned painted area.

107. SRI BHAKTAVATSALA TEMPLE, CHERMAHADEVI, DISTRICT TIRUNELVELI

Lime and other calcareous accretions from the surface of the *prakara* wall were removed by using dilute acetic acid and sodium-meta-phosphate solution. The moss and dust accretion from the surface of main shrine, north side wall, plinth of *prakara* wall, roof of the *prakara mandapa* by using ammonia and non-ionic detergent. Afterwards, 3% solution of sodiumpentachlorophenate was applied in distilled water as fungicide. Finally, a mixture of Wacker BS-290, SM T.C. was applied as preservative to prevent further deterioration of cleaned area.

108. SRI CHOLESWARA TEMPLE, MELPADI AND SRI RANGANATHA SWAMY TEMPLE, ERUKKAMPATTU, DISTRICT VELLORE

Sri Choleswara temple, Melpadi is constructed out of granite with granite *vimana*. Sri Ranganatha Swamy temple, Erukkampattu is constructed of granite stones with decorated stucco *vimana*. Both are non-living temples, located on the bank of river Ponneri. The scientific conservation work was taken up, for the removal of dust, dirt, micro-vegetation growth from exterior surface and dust, dirt and lime wash accretions from inner surface, dilute ammonia, neutral detergent, and glacial acetic acid were used. The work has been completed.

UTTAR PRADESH

109. TAJ MAHAL, AGRA, DISTRICT AGRA

During the period under review, marble dome and sandstone portion of the mosque was taken up for scientific conservation. The roof top wall and domes of mosque includes one big central dome and two adjacent domes on either sides of central dome. The top portion of all the three domes has metal pinnacles, marble flowers and marble portion. Beneath marble portion there is inlay of marble work in red sandstone. Lower portion of all the three domes is made up of sandstone. There are four *burjis* on four corners of the roof top. They are also made up of marble and sandstone. Roof top of the mosque is surrounded by red sandstone walls. The marble portion of central and adjacent domes had become yellowish due to deposit of smoke, dust, dirt and suspended pollutants emitted in the air from various sources and brought by wind along with grime, grease and other complex matter. The red sandstone portion of the domes and roof top wall also had deposit of dust, dirt and micro-vegetation growth. The marble surface was scientifically treated by applying the paste of fuller's earth containing traces of ammonium carbonate and the sandstone surface was treated by using 2-3% aqueous ammonia solution containing a little liquid non-ionic detergent. The work is in progress.

110. JAMI MASJID, FATEHPUR SIKRI, DISTRICT AGRA

The Jami Masjid is made of red sandstone having inlay work and carvings. On the entrance gate, there is big arch, having paintings on ceiling. Colours used are ultramarine blue, sky blue and brown. Mostly

floral designs are painted on a very thin layer of fine lime plastered base. Only main arch has paintings and rest of the work is basically inlay work of black and white marble. Side arches have impression of paintings. Interior of the dome of the central hall has paintings at many places, rest are impression/marks of painting left on the surface. Main *mehrab* of the central hall has golden painted *ayats* in Arabic (on base of blue colors) which had become faded. The paintings have bulged out at many places and lost its colors due to weathering. Some of the paintings are lost with passage of time, due to seepage of water or due to loss of binding medium as it had a very thin layer as base. The painting was consolidated by means of edging, fixing and filleting along with general cleaning with mild organic solvents. Colour reintegration was also attended to maintain uniformity. Finally, the surface was preserved with 1% solution of polyvinyl acetate in sulphur free toluene. Work is in progress.

111. AKBAR'S TOMB, SIKANDRA, DISTRICT AGRA

In continuation to previous year's work, the scientific treatment and preservation work were taken up for the entire second floor of the mausoleum in two parts i.e. 1- marble and sandstone *burjis* and 2- sandstone portion of second floor, of the mausoleum. The sandstone portion of II-tier Akbar's tomb had become dirty black at many a places due to deposition of dust, dirt and dried micro-vegetation growth. The sandstone portion of II-tier had become dull in appearance and was hiding the original texture underneath. The sandstone surface was treated with 2-3% aqueous ammonia solution containing a little liquid non-ionic

detergent in order to remove dust dirt and micro-vegetation growth on stone surface. The treated surface was given a coat of 2% sodiumpentachlorophenate solution. The surface so prepared was preserved with Wacker BS-290 diluted in mineral turpentine oil. Work is in progress.

112. MOSQUE AND BABUDDIN'S TOMB, FATEHPUR SIKRI, DISTRICT AGRA

The marble surface was scientifically treated by applying the paste of Fuller's earth containing traces of sodium-carbonate while the sandstone surface was treated by using 2-3% aqueous ammonia solution containing a little liquid non-ionic detergent followed by fungicidal treatment. Scientifically treated sandstone surface was preserved with Wacker BS-290 diluted in mineral turpentine oil.

113. MARIAM'S TOMB, SIKANDRA, DISTRICT AGRA

The exterior surface of the tomb had become grey-black at many places due to the deposition of dust, dirt and dried micro-vegetation growth. The stone surface at the bottom, say 2 to 3m from the base had signs of erosion at many places. There was also lime deposit inside some arches of the tomb. The micro-vegetation growth was removed by treating it with 2% aqueous ammonia solution containing a little liquid non-ionic detergent. The plastered surface of the tomb was treated with calcium-hypochlorite. The surface so prepared was given fungicidal treatment followed by application of Wacker BS-290 diluted in mineral turpentine oil.

114. MOTI MASJID, AGRA FORT, DISTRICT AGRA

The exterior port wall on the roof top is made of sandstone and lime plaster. Due to

continuous deposition of accretion like smoke dirt, suspended particulate matter the marble surface had become blackish yellow and the sandstone and lime plaster had become black due to biological accretions. General cleaning of the suspended particulate matter, dirt and dust was carried out by using solution of liquid ammonia and non-ionic liquid detergent. Treatment of marble surface of two side rooms was carried out by using Fuller's earth (clay pack technique). Sandstone surface was treated with ammonia solution with nonionic liquid detergent followed by fungicidal treatment and preservative application with sodiumpentachlorophenate and Wacker BS-290 with mineral turpentine oil respectively.

117. TOMB OF BAHU BEGAM, FAIZABAD, DISTRICT FAIZABAD

In continuation of previous year's work, chemical conservation work was taken up for the four sides of the main wall and four *burjis* including dome, projection, arches above projection and pedestal at first floor of the tomb were cleaned with the help of aqueous solution of ammonia and non-ionic detergent by gentle scrubbing with suitable nylon brushes. A paste of calcium-hydrochloride prepared in water was applied and left for 24 hours. After 24 hours, the paste was removed by using plain water. The cleaned and dried surface was then subjected to fungicidal treatment with sodiumpentachlorophenate followed by application of preservative coating of Wacker BS-290 in mineral turpentine oil (pl. 156).

116. SHUJA-UD-DAULA TOMB, GULAB BARI, FAIZABAD, DISTRICT FAIZABAD

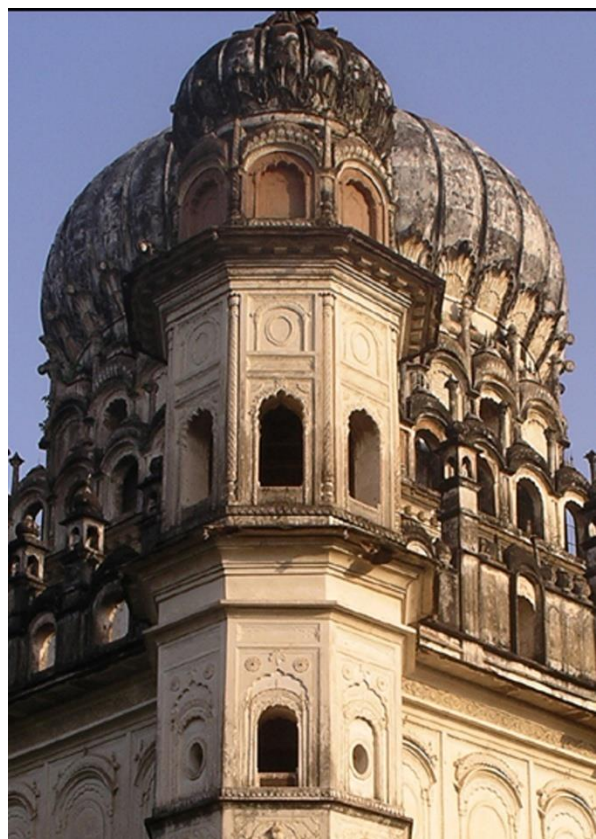
The chemical treatment was carried out for the pinnacles, inverted lotus, the main dome, pedestal of the main dome, parapet wall including *kanguras* towers on top floor and wall above and below *chhajja* at second floor for the removal of dust, dirt and greasy accretions. The aqueous solution of ammonia and non-ionic liquid detergent was applied with gentle scrubbing by suitable nylon brushes to remove all the accretions. After that paste of calcium-hypochlorite prepared in water was applied and left for 24 hours. After 24 hours, the same was washed with plain water. The work is in progress.

119. CHAR ANGUL MOSQUE, JAUNPUR, DISTRICT JAUNPUR

Chunnar sandstone structure Char Angul Mosque was for the first time subjected to chemical treatment and preservation during the year. To remove the micro-biological growth, dirt, dust, bats excreta, etc. the dilute ammonia and teepol mixture was applied gently with very soft nylon brushes. The area so cleaned was given fungicidal treatment with dilute solution of santobrite in water followed by preservative coatings (double coat) wet on wet of silicone based water repellent in mineral turpentine oil. The fragile surface was also re-strengthened with an ethyl silicate bases stone strengthener Wacker OH-100.

118. SITA RAM TEMPLE, SORON, DISTRICT KANSHIRAM NAGAR

It is made up of laterite. The temple had become blackish in appearance due to deposition of dried moss, lichens and bacterial slime and soot. The loose dust and dirt, from the exterior surface was cleaned by using soft brushes. The vegetation and micro-vegetation



A



B

Tomb of Bahu Begum, Faizabad: A, before and B, after chemical treatment

accretions were removed using 2% aqueous ammonia solution containing a little liquid non-ionic detergent. The surface so prepared was given fungicidal treatment followed by application of Wacker BS-290 diluted in mineral turpentine oil.

119. GOVIND DEO TEMPLE, VRINDAVAN, DISTRICT MATHURA

The stone surface of the temple is beautifully carved. The exterior surface of the temple had become grey-black at many places due to the deposition of dust, dirt and dried micro-vegetation growth. The stone surface at the bottom, say 2 to 3m from the base had signs of erosion at many places. The loose dust and dirt, was cleaned by using soft nylon brushes, from the exterior surface of the temple. Micro-vegetation accretions were eradicated by treating with 2% aqueous ammonia solution containing a little liquid non-ionic detergent. Wacker OH-100 treatment was given to the weak and fragile stone surface in order to consolidate them. The surface so prepared was given fungicidal treatment followed by application of Wacker BS-290 diluted in mineral turpentine oil as preservative.

120. IFTIKHAR KHAN TOMB, CHUNNAR, DISTRICT MIRZAPUR

Sandstone structured Iftikhar Khan Tomb at Chunnar was first time taken up for chemically treatment and preservation during this year. Micro-vegetation growth, dirt, dust including birds droppings were cleaned with the help of dilute Ammonia and non-ionic detergent mixture followed by fungicidal treatment to arrest re-growth. Finally, water repellency treatment was given to the entire surface using two coats of Wacker BS-290 in

mineral turpentine oil. The fragile surface was also re-strengthened with an ethyl silicate bases stone strengthener Wacker OH-100.

121. MOSQUE AND TOMB OF SHAH ABDUL RAZAK AND HIS FOUR SONS, JINJH, DISTRICT MUZAFFARNAGAR

This tomb is made up of red sandstone and lime plaster. The east and west walls of the tomb are made of red sandstone while the northern side wall is lime plastered. It has a large dome, without pinnacle, which is lime plastered and has dome tiles work, left only at the base of the dome. The plastered surface of dome which is basically the base for fixing tiles, has become fragile. East side of the tomb has carvings and *jalis* up to 3m. The west and north side have also *jali* work. Adjacent to the tomb there are small tombs having graves of other family members. The dome of the tombs had become blackish in appearance due to deposition of dried micro-vegetation growth over it. The wall of the tomb had become black in appearance at many places due to deposition of soot and smoke. The interior of the tomb have some paintings and impressions of paintings mostly floral designs on the ceiling of the dome. The colours used are blue, maroon and golden. Rest is stone and *jali* work, made up of red sandstone. Due to burning of incense stick etc. the wall of interior side had also become blackish in appearance. Most of the paintings are lost due to seepage of water. There are 4 graves inside the tomb which are made up of marble and had become yellowish in appearance. The loose dust and dirt, was cleaned by using soft brushes. Micro-vegetation accretions were eradicated by treating with 2% aqueous ammonia solution containing a little liquid non-ionic detergent.

The surface so prepared was given fungicidal treatment followed by application of Wacker BS-290 diluted in mineral turpentine oil. Work has been completed. The painting was removed means of edging, fixing and filleting along with general cleaning with mild organic solvents. Finally, the surface was preserved with 1% solution of polyvinyl acetate in sulphur free toluene. Work of painting has also been completed (pl. 157).

122. ANCIENT SITE, NALANDA, DISTRICT NALANDA

In continuation of previous year's work, the brick work Monastery Complex 4 and 5 at Nalanda was under taken for chemical treatment and preservation. The accretionary deposits like micro-biological growth, dirt, dust and birds excreta were removed using suitable chemicals, followed by fungicidal spraying on the cleaned and dried surface using aqueous dilute sodiumpentachlorophenate solution. Finally the entire cleaned surface was preserved using Wacker BS-290 in mineral turpentine oil. (double coat) wet on wet to make the surface water repellent.

123. CHAUKHANDI STUPA, SARNATH, DISTRICT VARANASI

In continuation of previous years work, the brick structured Chaukhandi Stupa at Sarnath was subjected to scientific treatment and preservation. Superficial accretionary deposits like microbiological growth, dirt, dust and birds excreta, etc were chemically removed using a mixture of aqueous ammonia and non-ionic detergent with very soft nylon brushes. The surface so cleaned were allowed to dry up completely and then fungicidal treatment

with 5% aqueous solution was given to arrest re-growth, followed by application of doublecoat of Wacker-BS-290 in mineral turpentine oil wet on wet as preservative.

TREATMENT OF EXCAVATED OBJECT AND MUSEUM EXHIBITS

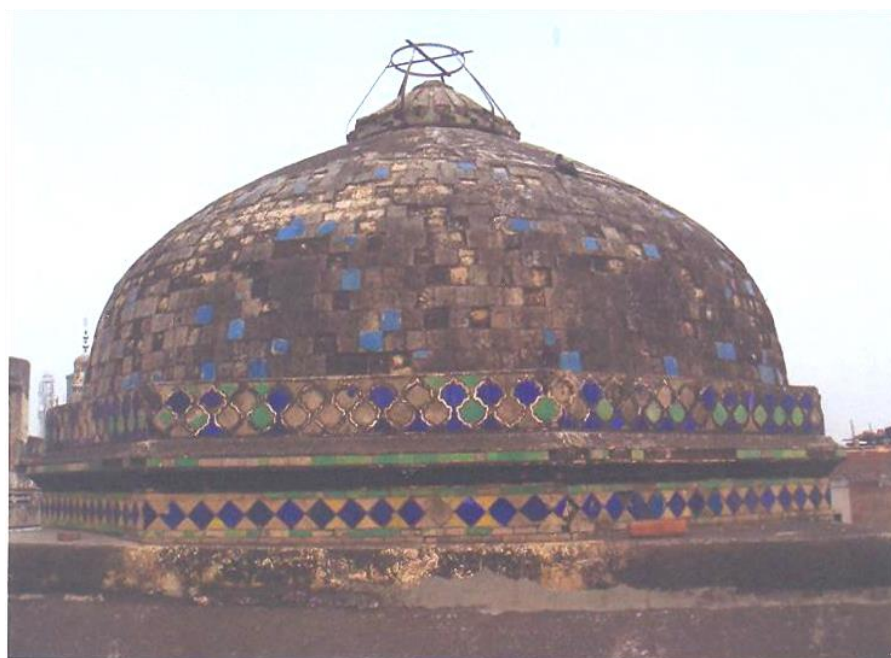
124. Chemical treatments of the antiquities were carried out in Red Fort, Delhi from excavations at Dholavira, Lalkot and CBI confiscated antiquities. The chemicals used for the treatment of the antiquities were Rochelle's salt (alkaline solution of sodium potassium tartarate), dilute solution of ammonia and sodium-hydroxide, etc. Finally these were allowed to dry and then preserved with 2% solution of polyvinyl acetate in toluene (pl. 158).

125. Restoration and preservation of five Arabic/Persian manuscripts, seven wooden objects, one porcelain and one object made of leather housed in C.A.C. Section, Purana Qila, Delhi was carried out.

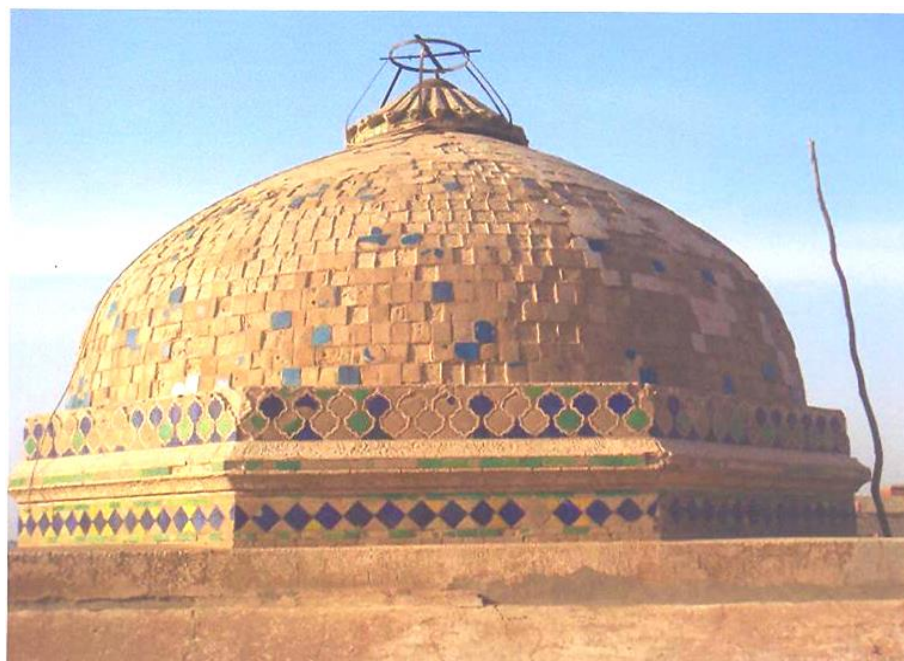
126. Restoration and preservation of Mughal historical document of Shah Alam, Sanad of Mazad-Ud-Daula, Sanad dated 27th regnal year of Shah Jahan issued by Hidayat Ulla and Folio of Chahal Majlis with royal seal and dated signature of Emperor Shah Jahan, manuscript interpreting short autobiography and details of construction of Taj Mahal housed in Taj Museum, Taj Mahal Complex Agra were carried out (pls. 159-160).

127. Some coins received from Jaipur Circle were chemically treated and preserved in the laboratory of Jaipur Zone (pl. 161).

Plate: 157



A



B

Tomb of Shah Abdul Razak and his four sons, Jinjh: A, before and B, after cleaning



A



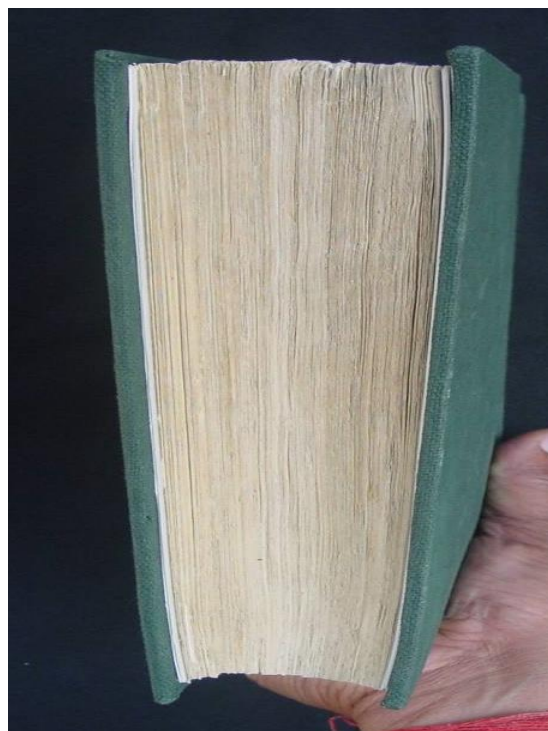
B

Purana Qila, Delhi: A, before and B, after scientific treatment of metal antiquity

Plate: 159

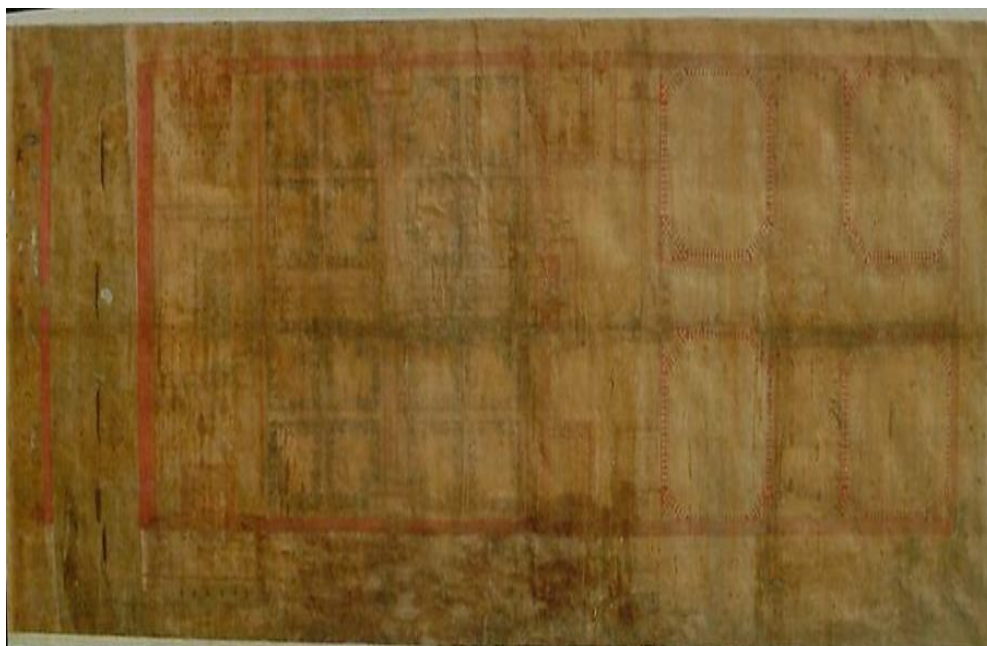


A

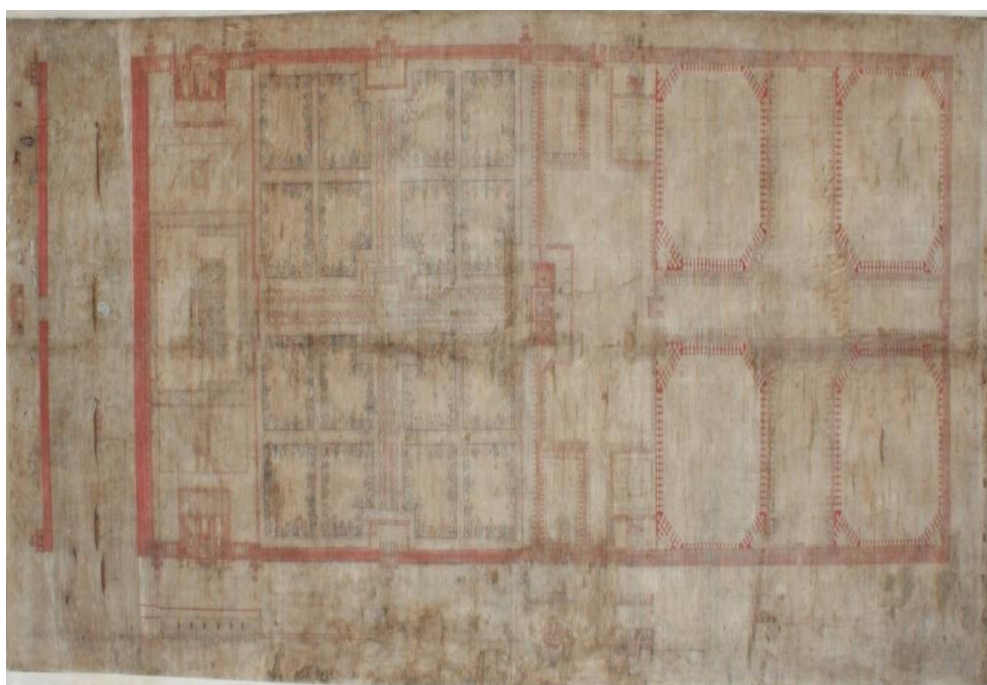


B

Purana Qila, Delhi: A, before and B, after scientific treatment of Arabic manuscript



A



B

Taj Mahal and other buildings: a large size site plan of complex A, before and B, after scientific treatment

Plate: 161



A



B

Jaipur Circle: A, before and B, after scientific treatment of coins

128. One hundred nine artifacts, lithographs and photographs of Bikaner Museum and 3000 coins were chemically cleaned and consolidated. Besides, nine hundred one coins were digitized

MONITORING OF AIR POLLUTION

1. AMBIENT AIR QUALITY MONITORING STATION, TAJ MAHAL AND OTHER MONUMENTS IN AGRA, UTTAR PRADESH

Air pollution monitoring laboratory at Taj Mahal, Agra has been monitoring the presence of sulphur-dioxide and nitrogen-dioxide gases in the ambience of Taj Mahal in addition to suspended particular matter, sulphation rate, dust fall rate and certain meteorological parameters viz. temperature, relative humidity, rain fall, wind speed and wind direction, etc.

(A) CHEMICAL PARAMETERS

There are three major chemical parameters:

Sulphur Dioxide (SO₂): The Modified West and Gaeke method is used for the determination of SO₂ concentration in the ambient air. The sampling of this gaseous pollutant is carried out with the help of Sequential Air Sampler (SAS). The maximum concentration of SO₂ in a day was measured as 10.93 µg/m³ in the month of December 2009 whereas the minimum conc. in a day was measured as 3.00 µg/m³ in several months. The maximum monthly average concentration was measured as 4.45 µg/m³ in the month of December 2009 while minimum monthly average concentration was measured as 3.00 µg/m³ in the month of July, August and September 2009. The annual average concentration of SO₂ for the period from

April 2009 to March 2010 was recorded as 3.31 µg/m³ which are well below the permissible limit i.e. 30 µg/m³ as per National Ambient Air Quality Standards for sensitive area.

(ii) Nitrogen Dioxide (NO₂): The Jacob and Hochneisser or Sodium Arsenite method is used for the determination of NO₂ concentration in the ambient air. The sampling of NO₂ is carried out with the help of Sequential Air Sampler. The maximum concentration of NO₂ in a day was recorded as 20.67 µg/m³ in the month of March 2010 whereas the minimum conc. in a day was measured as 3.00 µg/m³ in the month of May, June, July, September and October 2009. The maximum monthly average concentration was recorded as 13.42 µg/m³ in the month of March 2010, while minimum monthly average concentration was measured as 3.75 µg/m³ in the month of July 2009. The annual average concentration of NO₂ for the period from April 2009 to March 2010 was measured as 7.31 µg/m³ which is well below the permissible limit i.e. 30 µg/m³ as per National Ambient Air Quality Standards for sensitive area.

(iii) Sulphation Rate: The sulphation rate is determined with the help of Lead-Candle method. The conversion of SO₂ into SO₃ which further changes into sulphuric acid by action with water molecules in air in the presence of various catalysts like transition metals is called Sulphation Rate and is expressed in gm SO₃/m²/day. The maximum rate of sulphation was measured as 0.0374 gm SO₃/m²/day and 0.0816gm SO₃/m²/days for the Taj Mahal and Sikandra respectively while the minimum rate of sulphation was

measured as 0.0086gm SO₃/m²/day and 0.0044gm SO₃/m²/days for the Taj Mahal and Sikandra respectively.

(B) PHYSICAL PARAMETERS

There are two major physical parameters.

(i) Dust Fall Rate: Dust is a strong pollutant as it carries within it much of the chemical species in the atmosphere. The dust fall rate is measured on monthly basis. The maximum dust fall rate was measured as 11.11, 8.91 and 8.32 MT/Km²/month for Taj Mahal, Agra Fort and Sikandra respectively while the minimum dust fall rate was measured as 2.02, 2.88 and 1.80 MT/Km²/month for Taj Mahal, Agra Fort and Sikandra respectively.

(ii) Suspended Particulate Matter (SPM): Suspended particulate matter, a finer dust which remains airborne for a longer period has been measured using High Volume Sampler and Reparable Dust Sampler. The concentration of suspended particulate matter has been determined in µg/m³ of air.

(C) METEOROLOGICAL PARAMETERS

The meteorological parameters were recorded on hourly basis through weather Station Wind Monitor, WM-271. The parameters are as follows:

(i) Wind Speed and Wind Direction: During the period under review the wind pattern was as usual in the light air (1-5 Km/h). Light wind was witnessed throughout the year except for the month of April 2009. The direction of wind flow remained variable. In the month of April 2009 the wind mainly blew from S, SSW, SW and WSW direction

to N, NNE, NE and ENE direction respectively. During the months from June to August 2009 the wind blew from E, ENE & NE direction to W, WSW and SW direction respectively. In the second half of the year i.e. September 2009 to March 2010 wind mainly blew from W, WNW and NW direction to E, ESE and SE direction respectively.

(ii) Temperature and Relative Humidity: During the period under review, the maximum temperature was recorded as 43.1⁰C in the month of May 2009 while the minimum temperature was recorded as 6.2⁰C in the month of January 2010. The maximum relative humidity was recorded as 99.5% in the month of January 2010 while the minimum was recorded as 8.0% in the month of March 2010.

(D) RAIN FALL MEASUREMENT

The total rainfall witnessed during the period from April 2009 to March 2010 was 411.9mm. The maximum rainfall was measured as 104.0mm during the month of August 2009.

2. CHARMINAR, HYDERABAD

Monitoring work of Ambient Air Quality around Charminar continue to study the Suspended Particulate Matter (SPM) and important gaseous pollutants in the ambient air around Charminar and their impact on the stability of the structure. A repairable dust sampler of the APM 451 model was commissioned to collect the samples of SPM comprising both fine and coarse particulate matter for 8 hours, during day time, season wise. The collected samples were brought to office laboratory to estimate the levels of SPM by standard methods. The

data generated above, season wise, is being compiled first and then represented, both in tabular and graphical forms.

INSTALLATION OF AUTOMATIC WEATHER STATION AT WORLD HERITAGE SITE

Automatic weather station was installed at Ajanta Caves; Ajanta; Se-Cathedral Church, Velha, Goa; Ellora Caves, Ellora; Elephanta Caves, Mumbai; Fatehpur Sikri, Agra; Sri Brihadeswara Temple, Thanjavur; Red Fort, Delhi and Kevda Masjid, Pavagadh. Automatic weather station generates data on temperature, relative humidity, rainfall, atmospheric pressure, wind speed, wind direction and sun shine. The main objective of these installations is to collect information on climatic events and its impact on world heritage site on a long term basis.

RESEARCH AND ANALYSIS

1. During the period under the review, detailed scientific analysis of stone, soil and water samples of Rani-ki-Vav, Patan was carried out in connection with the submission of nomination dossier to UNESCO to list it in the World Heritage list of monuments. Stone samples analyzed through different instrumental techniques, viz., X-ray diffraction and X-ray fluorescence and Petrography studies to assess the causes of deterioration and to know the nature of stone besides the bedding plane arrangement in the stone. It was found that the soil and water samples were also analyzed. The nature of the soil is alkaline with the predominance of calcareous salts. In water, the Total Dissolve Salts is as high as 2500 $\mu\text{g}/\text{m}^3$.

2. Under scientific research project "Evaluation of efficacy of water repellent

products" for hydrophobization of different building materials for evaluating performance behavior of water repellent products against different kinds of building materials from Archaeological point of view has been under progress.

3. Scientific studies for chemical characterization of building material samples from the excavated sites (Maha stupa and remains), Kanaganahalli (Sanati), Chittapur, District Gulbarg, Karnataka were carried out.

4. Chemical characterization of metal, pigment, coating samples drawn from the wooden chest received from C.A.C. Section, Purana Quila, New Delhi was carried out to enable understanding of the materials employed in its construction and accordingly, the same was restored in the laboratory.

5. Scientific studies of lime plaster samples of Jantar Mantar, Delhi were carried out.

6. Scientific studies of Iron and Copper samples from Bharadwaj Ashram Allahabad received from Excavation Branch, Purana Quila, New Delhi were carried out.

7. Scientific studies for characterization of stone samples from Pittalkhora, Maharashtra and Goa monument were carried out.

8. Scientific studies of stone samples from Mahakali temple, Jogeswari, and Kandivadi Caves, Naggumpha Mumbai were carried out.

9. Scientific studies of excavated pottery samples from Dhalewan, Distt. Man, Punjab were carried out.

10. Chemical characterization of stone samples from Sun temple, Konark and Puri were initiated.

11. Microscopic studies of 3 nos. Dakni Sarai glazed tiles samples received from Chandigarh Zone were carried out.

12. Metallographic studies were carried out in the laboratory of Director (Science), Dehradun. The sword handle sample received from Aurangabad has been subjected for metallographic studies in the laboratory of Director (Science), Dehradun which involved different steps such as documentation, sectioning/drawing of sample, preparation of mold, grinding, polishing and etching of samples etc. The finally prepared sample was then examined under metallographic microscope and the following pictures have been captured (pls. 162-164).

13. Besides petrographic analysis of various stone samples, studies have also been initiated by Stone Conservation Laboratory, Agra Fort, Agra for compressive strength before and after application of consolidant on the red sandstone of Agra Fort and fresh red sandstone. The petrological studies of semiprecious stone samples of Taj Mahal and stone sample of Sun Temple, Konark were

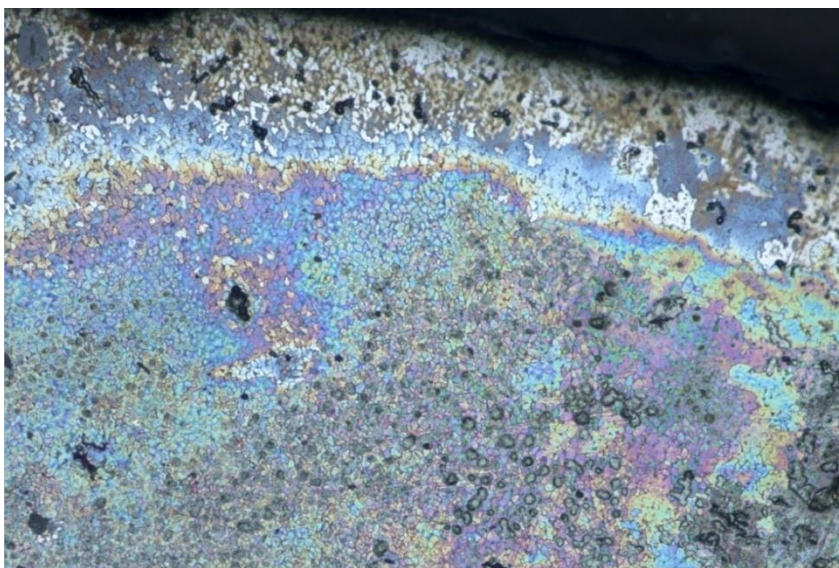
carried out in the Stone Conservation Laboratory. The photomicrographs of these stone samples are showing constituent minerals in following plates (pls. 165-166).

14. Studies in conservation of mural paintings of Ajanta and Ellora Caves in collaboration between ICR, Italy and ASI to conduct non invasive methods for analysis of pigments/materials used from execution of paintings as well as identify conservation problems in Cave 17 of Ajanta Cave.

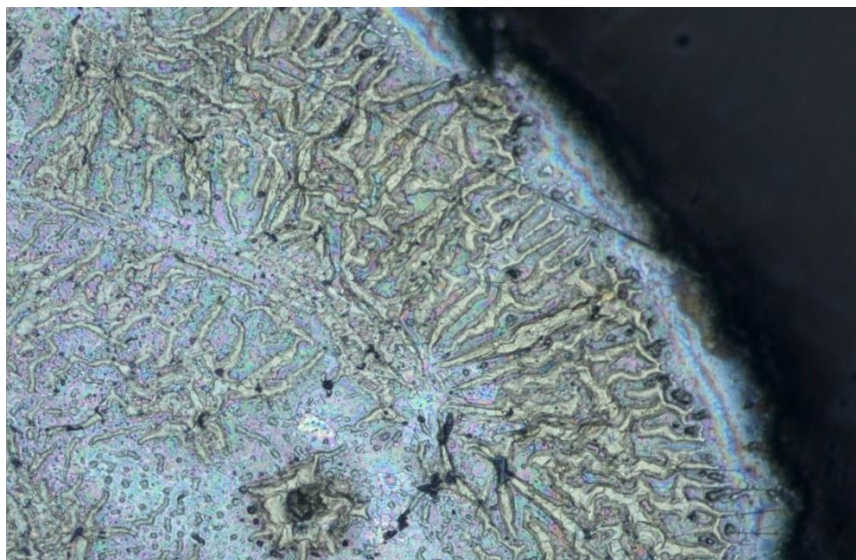
15. A Joint study to create mutual cooperation to promote successful research activities for conservation of outstanding culture heritage of Ajanta between the National Research Institute for Cultural Properties, Tokyo, Japan and ASI is initiated.

16. Joint project between Science Branch ASI, NRLC Lucknow in the fields: (a) Studies on Bio-Deterioration of World Heritage Monuments; (b) Studies on coating materials. Scientific investigation into the materials and techniques of paintings at Daria Daulat Palace, Srirangapatana and Bangalore Palace, Bangalore, Karnataka was done.

Metallographic Studies of the Sword Handle Samples Received from Aurangabad

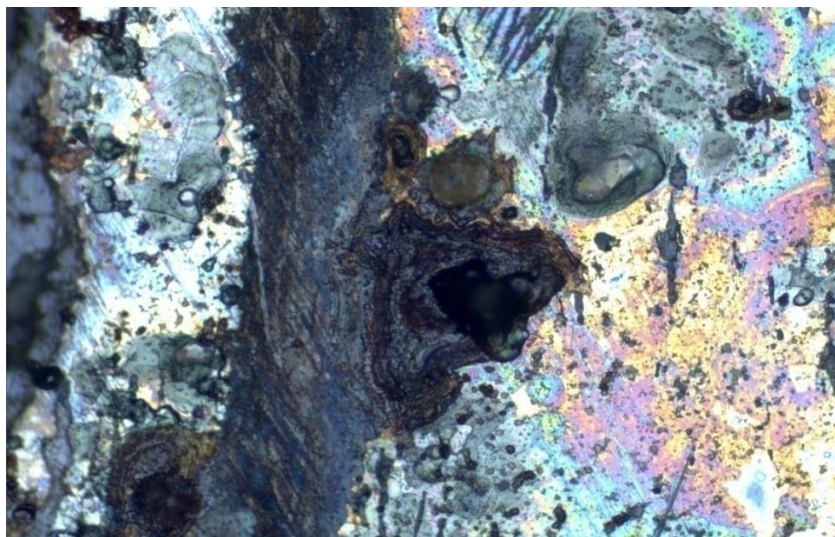


- Sample from sword handle showing metallographic details like sharp grain boundaries of different components with uniform distribution. Some black spots suggest slag inclusions. The image is indicative of manufacturing by cast method.

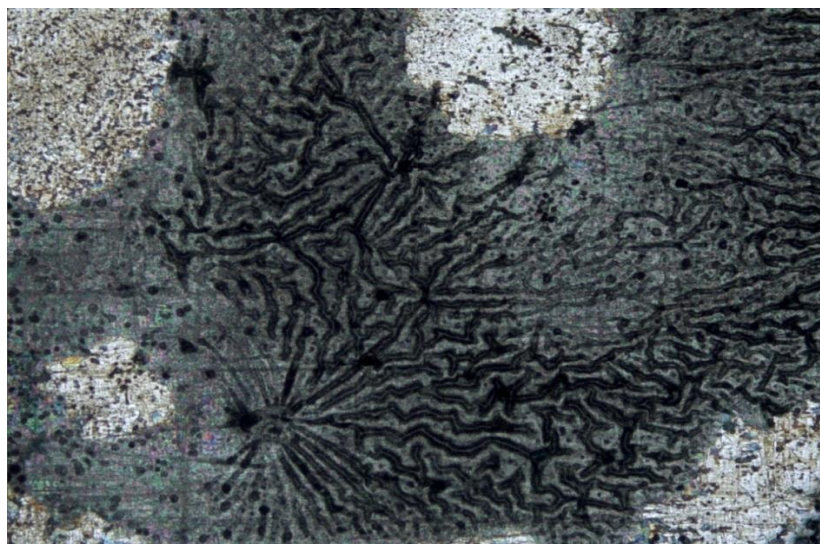


- Sample drawn from sword handle showing the metallographic details such as dendrites with intermittent grain distribution and slag inclusions etc. Its working may be suggested by annealing and beating methods.

Plate: 163



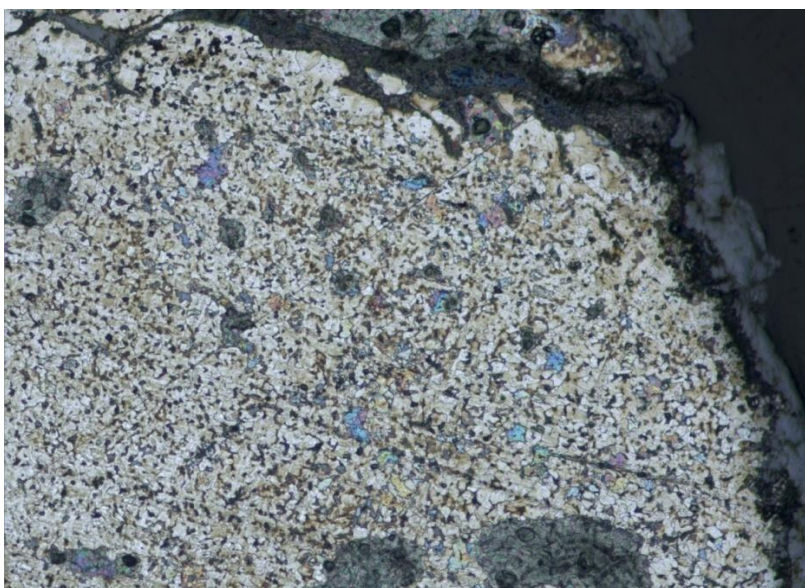
- Sample drawn from sword handle showing the metallographic details such as big cavities with a thick separate layer of one of the components formed during the cooling process due to difference in its freezing point. Cavity might have been formed due to faster rate of corrosion of localized material. Different component phases perhaps did not fuse properly during the working.



- Sample drawn from sword handle showing the metallographic details such as big patches surrounded by dendrites with slag inclusions. The image is showing the distinct phases of component materials which are indicating the cast process of working.



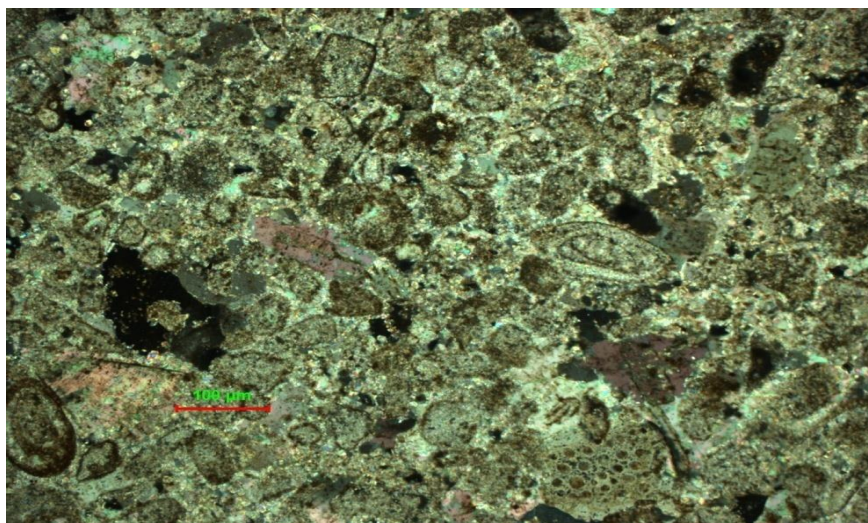
- Sample drawn from sword handle showing the metallographic details such as big patches surrounded by dendrites with slag inclusions. The close up view of the above image is showing the distinct phases of component materials which are indicating the casting process.



- Sample drawn from sword handle showing the metallographic details such as grains of different shape and size representatives of different components which are closely knitted. The outer boundaries showing the corrosion products formed on the outer surface of the object.

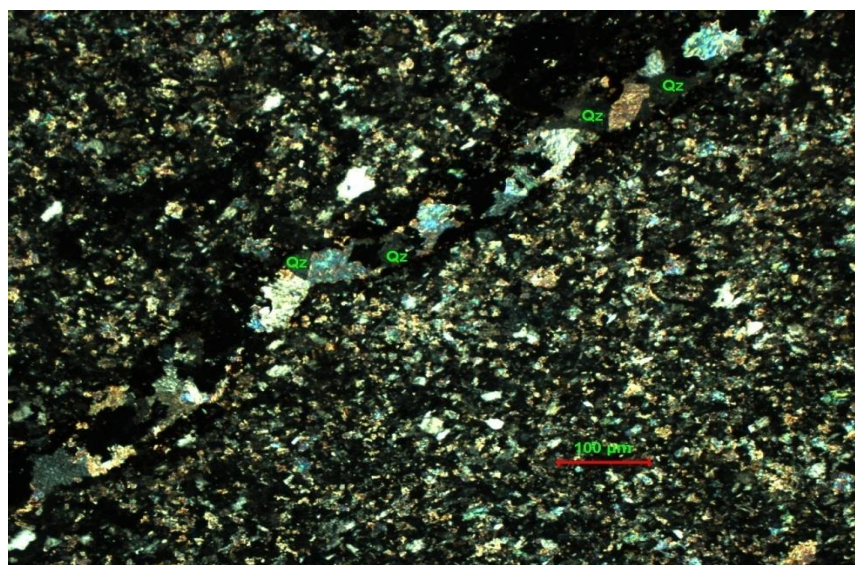
Plate: 165

(1) Yellow semi-precious Stone of Taj Mahal: Biomecrite



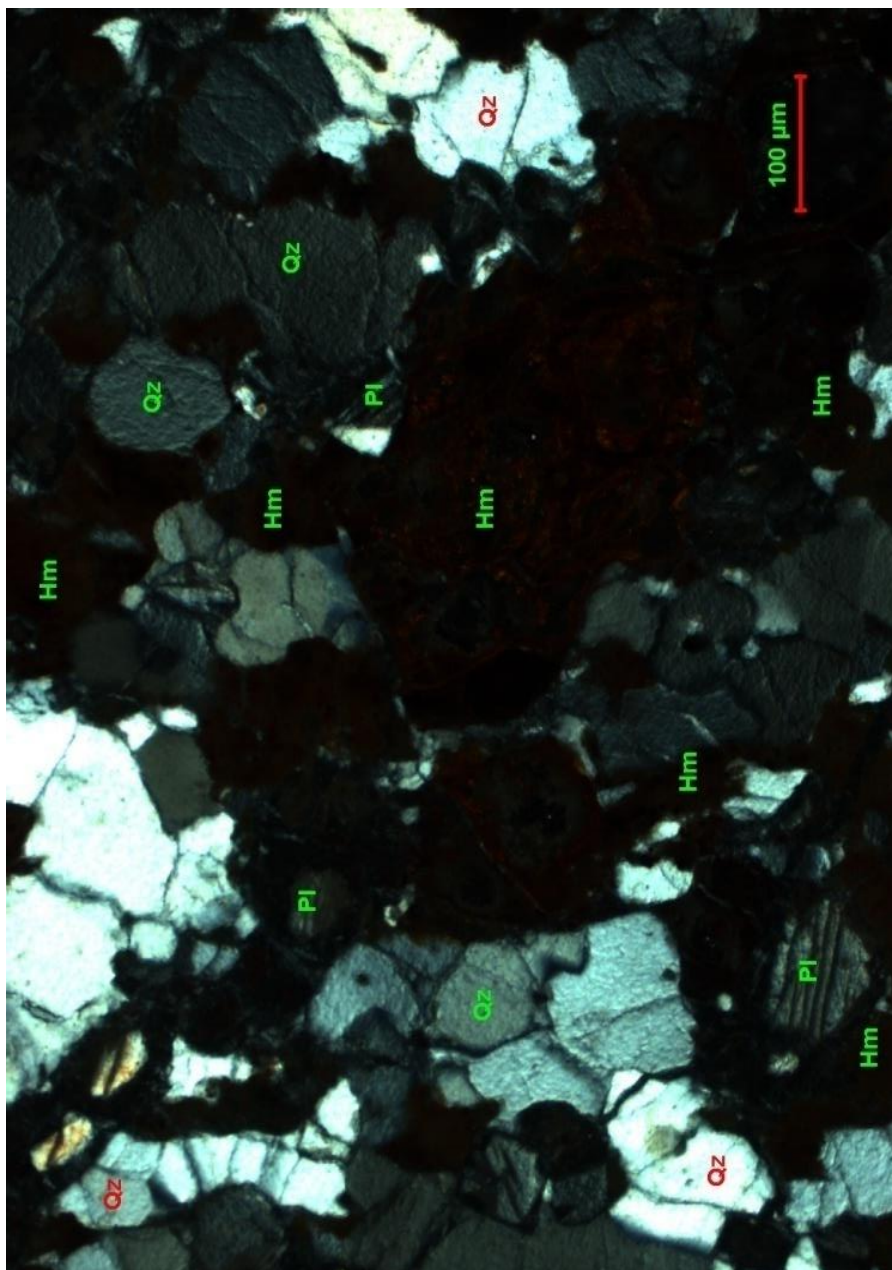
Photomicrograph under high magnification showing abundance of fragments, pellets and sections of fossils embedded in a fine grained carbonate mud. Cross polars, 10 x objectives.

(2) Black semi-precious stone of Taj Mahal: Calcareous Slate



Photomicrograph under higher magnification showing the exact nature of the fine grained matrix constituent's quartz, carbonate, tiny grains of muscovite and granular opaque (mostly hematite). Cross polars, 10 x objectives.

(3) Sun Temple, Konark: Ferruginous Sandstone



Photomicrograph under high magnification is showing abundant medium grained quartz (marked Qz), tiny grains of plagioclase and coarse (marked Pl), patchy hematite (marked Hm). Cross polars, 10 x objectives.

IX. ARCHAEOLOGICAL GARDENS

DELHI

1. SIRI FORT, PANCHSHEEL PARK, NEW DELHI

The long narrow stretch of land on both the sides of Siri Fort Wall in Panchsheel Park area was taken up for environmental development. The area was full of wild vegetation, stones rubble and other debitage. After leveling of the area, grassing was done by spreading good earth and manure in the area. Water facility was provided. Informal garden has been developed with indigenous plants like *Kachnar*, *Arjun*, *Chandni*, *Champa*, *Kund*.

2. KAIRUL MANZIL AND SHER SHAH GATE, NEW DELHI

The lawns of this garden were re- grassed and upgraded. The rusted irrigation pipe-line was replaced with new one. The filling of gaps in shrubbery was taken up.

3. MOHAMMADI WALI MOSQUE, SHAHPUR JAT, NEW DELHI

There is small area around Mohammadi Wali Mosque. The narrow area on three sides of the mosque was taken up for environmental development work after removal of stone and debits from the area. Further work will be taken up once conservation of mosque is completed.

GUJARAT

4. CITADAL WALL SOUTH EASTERN SIDE, CHAMPANER, HALOL, DISTRICT PANCHMAHAL

The environmental development of a vast stretch of land along the south-eastern side citadel wall was taken up. The work is in progress.

5. EK MINAR KI MASJID, PAVAGADH, CHAMPANER, DISTRICT PANCHMAHAL

The work of development of garden was taken up around the open space of monument. The water supply arrangement was made from ancient well built in the area. The wild vegetation and debitage were removed. The grassing has been done. The plants of *Jasminum-pubescens* (*Kund*), *Murraya-exotica* (*Kamini*), *Nerium-indica* (*Kaner-single*), *Caesalpineia-pulcherrima* (*Gultora*), *Plumera-alba* (*Champa*), *Pterospermum-acerifolium* (*Kanak Champa*), *Tabernae-montana-coronaria*(*chandini*), and *Mangifera-indica* (*Am*) were planted.

6. SIKANDER SHAH TOMB, HALOL DISTRICT PANCHMAHAL

The loose stone members were stacked suitably and wild vegetation was cleared. The grassing and plantation was taken up and work is in progress.

7. SHASTRALINGA TALAV, PATAN, DISTRICT PATAN

The area near the entrance was taken up for landscaping. The area is full of Neem trees. An informal garden has been developed with flowering plants, trees and shrubs.

8. SITALA MATA MANDIR, PILUDAR, DISTRICT PATAN

The area is little lower than the surrounding area, therefore, a rain-harvesting pit was made to avoid stagnation of water and to recharge the ground water to improve the quality of the ground water. The informal dot plantation was done. After trenching of the area the plants of *Champa*, *Aam*, *Kachnar*, *Gultora*, *Gurhal*, *Kaner*, *Chandni*, *Harsingar* were planted.

HARYANA

9. SURAJ KUND, MASONARY TANK, LAKHARPUR, DISTRICT FARIDABAD

The garden development work has been completed by planting indigenous plants and raising a lawn in the front area.

10. ANCIENT SITE RAJA KARAN KA TILA, MIRZAPUR, DISTRICT KURUKSHETRA

The landscaping in vast area around the ancient site was taken up after removal of encroachment. The wild vegetation was removed and remaining works are in progress.

11. SHAHJAHAN KI BAOLI, MEHAM, DISTRICT ROHTAK

An informal garden was developed here. The plants of *Gurhal* (*Hibiscus rosasinensis*), *Rat-ki-Rani* (*Cestrum noctranum*), *Kund* (*Jasminum pubescens*), *Kamin Murraya exotica* were planted

HIMACHAL PRADESH

12. ROCK-CUT-TEMPLE WITH SCULPTURES MASRUR, DISTRICT KANGRA

The environmental development work around the open space has been taken up.

The work is in progress.

PUNJAB

13. ANCIENT SITE, ROPAR, DISTRICT ROOPNAGAR

The environmental development works around ancient site was taken up. The work is in progress.

RAJASTHAN

14. SARAI CHHATRI, DISTRICT AJMER

The area was undulated and full with wild vegetation. The level of the inner area was higher therefore the soil up to a depth of 30 cm was removed to bring the area upto the plinth level. The grassing has been done. Plants like *Nerium*, *Lantna* and *kund* is used for plantation.

15. BADSHAHI MAHAL, PUSHKAR, DISTRICT AJMER

The garden development work around Badshahi Mahal was taken up. The arrangement of water supply has been made.

16. RADHEY SHYAM TEMPLE, KRISHNA VILLAS, DISTRICT BARA

The area is undulated and full of wild vegetation. The trees of *palas*, *sagaun*, *papade*, *kajur*, *sitaphal* and *neem* are in abundance. The wild vegetation has been cleared. The trenching and laying of pipeline has been completed. The landscaping and spreading of good earth was taken up.

17. SIVA TEMPLE, KRISHNAVILLAS, DISTRICT BARAN

There is a small area around the temple with few trees. The work of bore well and lying of pipe lines has been completed. The

clearance of wild vegetation, earth work, leveling, spreading, of good earth has been completed.

18. GHAT WITH INSCRIPTION, PAVILLIONS AND TORANS, NAV-CHAUKI, DISTRICT RAJSAMAND

Garden was developed on top of the embankment. The water supply was

arranged from the lake. The old Neem plants are in plenty. The road to the circuit house is passing through the area therefore fencing was raised along the road to prevent cattle. The grassing and plantation of *Rat-ki-Rani*, *Chandni*, *Kaner* were done. The beds are planted with perennial ground covers.

X. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. **MEMOIRS OF THE ARCHAEOLOGICAL SURVEY OF INDIA:-** Two numbers
99- Excavation Report on Tarkhanewala Dera and
101- Excavation Report on Bekal Fort, of the series were brought out.
2. **GUIDE BOOKS:-** Champaner-Pavagadh, Red Fort and Taj Mahal
under World Heritage series were brought out.
Lothal (.....edition) was reprinted.
Monuments of Haryana were also printed.
3. **BROCHURES: -** Ta-Prohm in English, French, Korean and Japanese, was brought out during the period under review.



Archaeological Survey of India

