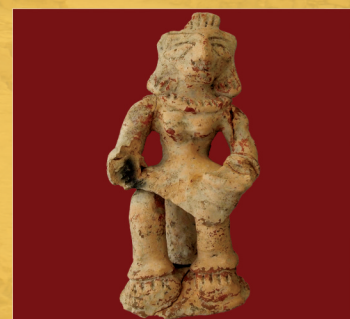
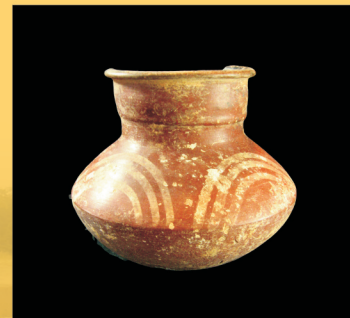


INDIAN ARCHAEOLOGY 2012-13

- A Review



INDIAN ARCHAEOLOGY 2012-13 - A REVIEW

Edited by
Rakesh Tewari
Director General

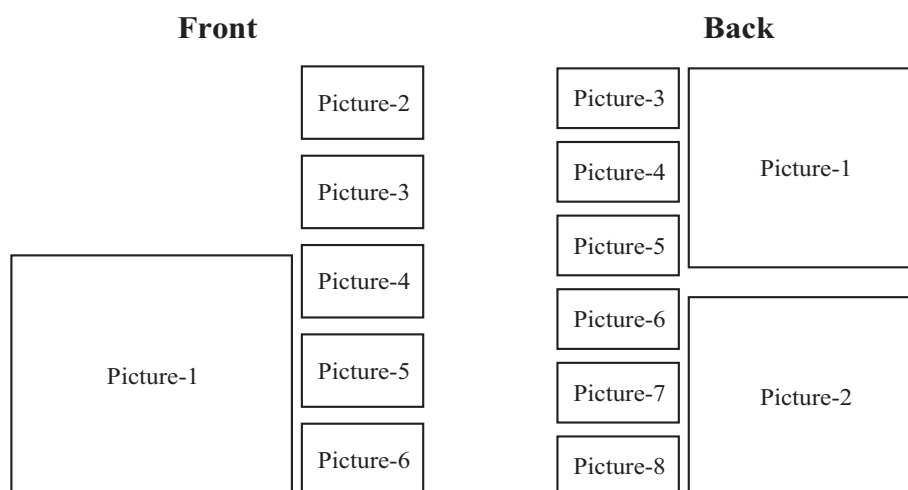
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प्रत्नकीर्तिमपावृणु

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- Front Cover : 1. Dying-vat (Khirsara); 2. Gold plaque (Ahichhatra); 3. Zoomorphic figure of four armed Narasimha (Hampi); 4. Russet coated ware (Kodumanal); 5. Terracotta human figurine (Ganwaria); 6. Puri-Kushana copper coin (Kankia)
- Back Cover : 1 and 2. General Wali kothi (Lucknow), before and after structural preservation ; 3 and 4. Chausathi Yogini temple (Hirapur), before and after chemical treatment ; 5 and 6. Mural painting (Vadakkumnatha temple), before and after chemical treatment; 7 and 8. Taj Mahal (Agra), before and after regrassing of lawn.

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PREFACE

I am indeed happy to present the number of Indian Archaeology 2012-13 - A Review though this has been brought out belatedly. In order to clear all the back logs of the issues of the Review to record the achievement of archaeology of the subcontinent, it was decided in the month of July, 2014 to entrust the work individually to some responsible officer of the Survey. And this presentation is the outcome of such pain staking challenging endeavors.

This issue like all the previous issues includes information of various aspects of archaeology viz; explorations, excavations, epigraphy, numismatics, outstanding discoveries, palaeobotany, museums, structural/chemical conservation as well as horticultural operations of the Archeological Survey of India all over the country and other organizations. I extend my heartiest thanks to all the contributors like all heads of archaeological Organizations in States, Universities, Museums and Research Institutes including our own colleagues in the Survey for their cooperation and adhering the time schedule in bringing out this publication in time. In editing this vast material some errors must have crept in for which I tender my apologies. However, for all information in respect of individual articles, the responsibility rests with the contributors.

I would be failing in my duty if I do not mention my gratitude to Dr. D.N. Dimri, Director (Publications) and his team in the Publications Section for their positive efforts in all respects in bringing out this publication so promptly.

In our endeavors to publish the issue of IAR, I record my appreciation to Dr. Jeeban Kumar Patnaik, Superintending Archaeologist (I/C), Excavation Branch-IV, Bhubaneswar and his staff especially to Ashis Ranjan Sahoo, Assistant Archaeologist, Ajaya Kumar Sasmal, LDC and Barsarani Rout without whose persistent efforts it would not have seen the light of the day who have untiringly compiled, edited and made it press ready in a record time.

Last but not the least, I would like to thankpress, Delhi for bringing out the book in its present shape.

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

(Rakesh Tewari)
Director General
Archaeological Survey of India

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INDIAN ARCHAEOLOGY 2012-13 - A REVIEW

I. EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. SCIENTIFIC CLEARANCE AT THE ANCIENT MOUND AT UPPUGUNDURU, DISTRICT PRAKASAM

In continuation of the previous year's work R. Krishnaiah assisted by D. Kannababu, Ch. Babji Rao, T. Chenchu Ratnam, A. Suresh, V. Kanaka Raju, N. Subba Rao, Ch. Vijayanand and Gopala Rao of the Hyderabad Circle, of the Archaeological Survey of India¹, carried out scientific clearance at the disturbed ancient mound at Uppugunduru (Lat. 15°40'48"N; Long. 80°12'25"E) in the revenue limits of Chinaganjam in Prakasam district of Andhra Pradesh with the objectives to expose and document the extensions of archaeological remains of the site and to conserve the exposed structural remains *in situ*.

The scientific clearance work of this year has resulted in unearthing remains of disturbed/damaged structures, probable part of a large boundary wall (?) a squarish cell, remains of brick built votive stupas, lime plastered trough/tub and remains belong to unidentified structural form of a Buddhist establishment. In continuation of the last years exposition of twin tub/troughs, this year one more lime plastered trough/tub partly disturbed and measuring 1.4 x 1.3m with a total depth of 1.08m has been exposed (**pl.1**). Remains of two rectangular cells and the probable eastern extension of previously exposed portions of se-

ries of cells possibly monastic rooms, yet with missing/damaged portions have been exposed. Interestingly, the south eastern corner cell of the complex has shown the evidence of stone flooring. The remains of the large wall like structure oriented, east- west, is conspicuous by missing portions yet the available extent of the find measure about 34m with 1m width. This wall (?) appears to be southern boundary of a large structure of unknown shape with a lone evidence of a wall of similar thickness intercepting it from the north. Though badly damaged another small extant part of exposed part of a wall of 4m width and 8m length (total measurements could not be ascertained) also appears to belong to this structural phase. The evidence of a votive brick stupa over a square platform was also exposed (**pl.2**). Remains of an externally lime plastered square (?) cell with much of the part damaged was also unearthed on the north of the votive stupa.

The important finds of this season's work include a defaced head of Buddha reported from the surface adjacent to the site (**fig. 1, pl.4**), bangle fragments in shell and glass, beads; and eight coins of which five are reported from the surface while the three coins retrieved from the cuttings. The ceramic evidence with occurrence of medium to fine fabric red ware and coarse fabric ware mostly confined to earthen lamps. The shapes met with are akin to the previous year i.e. storage vase, jar, *handi*, basin, *lota*, etc. Sculptural fragments mostly belong to pillar parts have been reported from surface

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

and regular cuttings as well. Fragment of a dressed rectangular stone pillar and few tiny stone fragments were unearthed. One of the fragments contain fragmentary Brahmi characters datable to Ikshwaku period were also brought to light (pl.3).

ARUNACHAL PRADESH

2. EXPLORATION IN DISTRICT LOHIT

A team consisting of Salam Shyam Singh, Jitumani Das and Pradip Kumar Majumdar of Guwahati Circle of the Survey under the direction of S.S. Gupta conducted exploration in the localities of the Lohit district of Arunachal Pradesh to investigate pre-historic cultural remains. The team explored the river terraces of the Bereng river at Chongkham, Alubari, Kamlang river in the Kamlang reserved forest area, Alubari, Haju river at Paya and Wakro. The prehistoric sites brought to light during the

exploration from the region are as under:

Chongkham (Lat. 27°48'869"N; Long.96°02'130"E) is situated about 16km east of Namsai, a town in the Assam-Arunachal Pradesh border. Two rivers- Bereng and Tereng flow in this area. The terraces on both the banks of Bereng river were selected for exploration. One of the sections on the right side of the river shows loose pebbly bed at the bottom overlain by blackish silt. Two pebble tools (pl.5) have been collected from here.

The site Alubari (Lat.27°50'816"N; Long. 96°01'425"E) is located about 5km towards the north east of Chongkham. The explored area is on the left bank of Kamlang river. The area is dotted with a number of water channels some of them are dried up (pl.6). Although the area is marked with occurrence of rocks such as granite, gneiss, quartz and lime stone but no stone age artifacts were found from this area.

Plate 1



Uppugunduru: close view of exposed lime plastered trough/ tub, See p.1



2



3

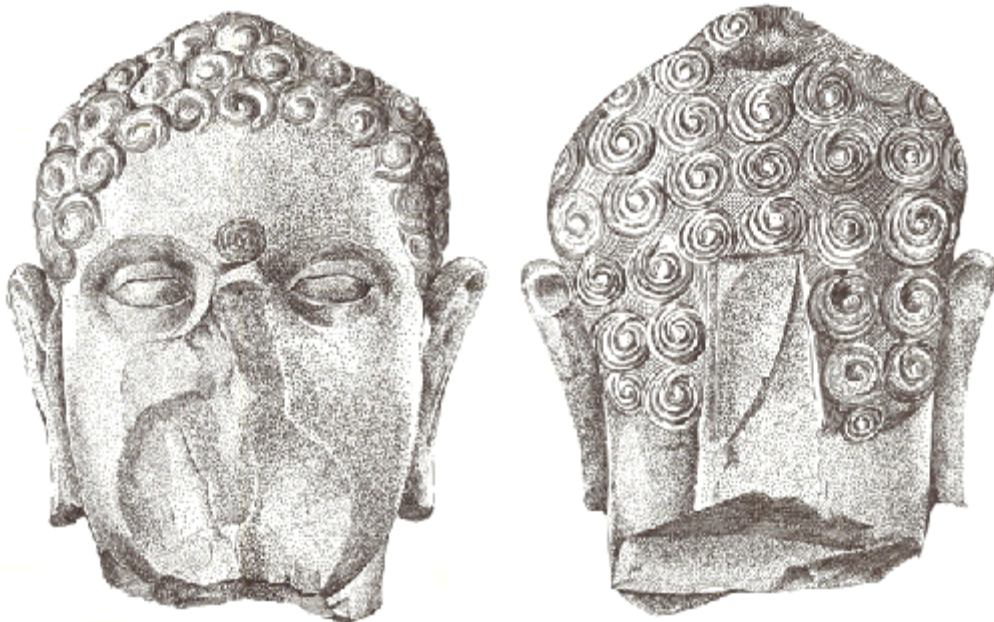
Uppugunduru: 2, exposed votive stupa; 3, inscribed stone fragment bearing brahmi characters, See pp. 1 and 2

Plate 4



4

Fig. 1



Uppugunduru : 4, mutilated head of Buddha figure front and rear sides, See p. 1

Wakro (Lat.27°46' 801"N; Long. 96°21' 211"E) is a sub-division of Lohit district. The Kamlang river has made high terraces in south east of Wakro, which consists of large boulders and pebbles. A lone potsherd with incised decoration on the neck and a borer were collected from a channel made for the construction of a pathway in the east of Wakro near the present BSNL tower (pl.7).

The explored area at Paya (Lat. 27°54'889"N; Long. 96°10'.488"E) was situated about 22km west of Tezu. The exploration was conducted on the left bank of the river Haju, which is covered with large vegetations. The dried channel in the section shows the pebbles and boulders overlain by silt. The area is very potential for further pre-historic investigation as pebble tools, an end-scrapper, one point and two stone axes, etc. have been collected (pl.8). On the basis of the typo-technology, the collected tools may be classified as pebble tools, end-scrapper, point and borer. They are made of quartzite and basalt. These tools are rolled and weathered. It is certain that prehistoric men existed in these areas as evident from these stone tools. These artifacts appear to be of Hoabinian culture (pre-neolithic) wherein people subsisted on wild variety of grains produced on foot hills on the river banks. Same type of stone artifacts though termed them as palaeolithic reported earlier in 1972, by Pre-history Branch of the Survey from Daphabum area.

ASSAM

3. EXPLORATIONS IN THE ASSAM-MEGHALAYA FOOTHILLS, DISTRICT GOALPARA

The Pre-history Branch of the department of Anthropology, Gauhati University, Assam carried out an intensive exploration in the foothills of Assam-Meghalaya by A.A. Ashraf who is assisted by seven students and two research

scholars, Anamika Gogoi Duarah and Rita Deka.

The newly discovered site, Bambooti is situated in between (Lat. 25°55' N; Long. 90°46'E) on the right bank of Bambooti siring (spring). It is located on the slope of Bambooti Abri (hill) on Assam-Meghalaya border in Goalpara district of Assam. Preliminary investigation through the test pits laid down was found undisturbed consisting of implements, this culturally served as 'kitchen-midden' (in local term it is known as Suwapatoni). This garbage-pit yields discarded ground and polished stone implements along with potsherds, charcoal and iron slag(?). The entire collections of artifacts from the 'kitchen-midden' are essentially discarded materials. Interestingly, the site yields a large number of stone abrader which signifies the mode of operation of the other stone artifacts from the kitchen midden. These were frequently used as a day-to-day household apparatus than of being used as a field implement for agricultural purpose. This type of setting for settlement is still preferred by the ethnic communities of the locality.

It is noteworthy to mention that a large number of Bambooti celts exhibits a protuberance or knob towards the distal end. In the given context, the presence of a knob is quite significant in the sense that it must have associated with some operational device. Further, this comparatively short knob cannot be generalized with the shouldered celt category of implements.

Three pottery samples from Bambooti (BBT) had been sent to the Luminescence Dating Laboratory, Wadia Institute of Himalayan Geology, Dehradun. The dates of the samples are under:

Ka=kilo, year=1000years
 $2.70 \pm 0.05 = 2700 \pm 0.05$;
 $3.29 \pm 0.07 = 3290 \pm 0.07$; and
 $3.69 \pm 0.10 = 3690 \pm 0.10$



5



6

Chongkham : 5, pebble tools; Alubari : 6, section of Kamlang river, See p.2



7



8

Wakro : 7, borer and incised potsherd; Paya : 8, stone tools from the terraces of Haju river, See p. 5

BIHAR

4. EXCAVATIONS AT MANER, DISTRICT PATNA

Excavation Branch-III of the Survey under the direction of Arvin Manjul assisted by Jalaj Kumar Tiwari, Ashish Kumar, Neetesh Saxena, S.P. Gupta, Raman Kumar, R.N. Yadav, Dhananjay Kumar and O.P. Pandey carried out excavation at Maner (fig.2).

The site of Maner (Lat. 25°38'30"N; Long. 84°52'25"E) is located at a distance of 32km west of the Patna district headquarters Patna on the Patna-Arrah road in the Danapur subdivision of the Patna district. The site is marked by a high mound overlooking the dry bed of river Son, which carries an area of approx 1.5km from north to south and 1.25km from east to west. A large part of the mound is now occupied by the villagers.

Three trenches named ZA1 Qdt. II (fig.3), ZA2 Qdt. II and IV and ZB5 Qdt. IV (fig.4) have been selected for excavation at extreme south western portion of Maner mound (pl.9). The trench ZA1 Qdt. II has been excavated upto 3.75m from ground level and four layers has been encountered. Layer 1 and 2 belongs to Northern Black Polished Ware (NBPW) and Layer 3 and 4 having the material culture of Chalcolithic period. Layer 4 rests on the yellowish compact natural soil.

On the basis of ceramic industries, antiquities and material culture recovered from the excavation following cultural sequence was established. The Gupta and post-Gupta levels are also visible in the adjacent agricultural land.

Period I	:	Chalcolithic
Period II	:	NBPW
Period III	:	Sunga-Kushana

Trench ZA1 Qdt. II dug upto 3.75m and four layers has been encountered (pl.10). Layer 1 and 2 having the cultural assemblage of NBPW including iron spear head, thirty disc shaped metal objects probably alloy of lead and copper found in a earthen ware, potsherds of NBPW and associated ware and a few bone points.

In Layer 3 and 4 Chalcolithic pottery including potsherds of dish-on-stand has been found. Frequency of bone points is more than Layer 1 and 2, fish bones also found from Layer 3.

A circular soakage pit of Chalcolithic period made by potsherds of storage jar has been noticed in trench ZA1 Qdt. II. The diameter of soakage pit is 73cm and depth is 22cm. A drain having the rectangular section in east-west alignment having 73cm width and 14cm depth connected with the soakage pits also traced upto 70cm in length.

Ceramic industry of Period I (pls.11-12) i.e. Chalcolithic period is represented by red ware, black and red ware, black ware and black slipped ware. Representative shapes in red ware are storage jar, vase, bowl, basin, dish-on-stand, legged and perforated basin, etc. These pots are of plain and slipped variety. A few un-diagnostic potsherds with applique decoration bearing finger tip and twisted rope impression are also found. A single potsherd of red ware with several curvilinear standing lines on the exterior in black colour is also found. Black slipped ware is found in variety of bowl, dish, dish-on-stand and lid. Black and red ware are represented with the variety of bowl, basin, vase, dish and dish-on-stand. Lipped basins having broad or narrow lip are also found from the excavation. Most of the pots in this ware are found with short or incipient splayed out rim and convex sides.

Period II (NBPW) is represented by red ware, grey ware, black slipped ware, black and red ware and NBPW (**pl.13**). The representative shapes are big and small vase and bowl, basin both lipped and plain variety, pan with loop handle, legged and perforated basin, dish and lid. In addition to the simple and popular variety of lids, inkpot shape lids are also found. Some of the bowls are found with a thick coating of clay on the exterior. A few tiny sherds of NBPW are also retrieved from the excavation.

Period III (Sunga-Kushana) is represented by predominantly red ware alongwith a few black slipped ware. The representative shapes are storage jar, vase, dish, bowl, basin with lug handle, lipped basin, beaker, miniature vase, etc.

In all one hundred twentytwo antiquities have been recovered during the course of excavation including terracotta objects (**pl.14**), bone objects (**pl.15**), iron objects, ivory objects and stone objects (**pl.16**).

5. ARCHAEOLOGICAL EXPLORATIONS IN AND AROUND NALANDA

The archaeological site (Lat. 25°8' N; Long. 85°27' E) is located about 15km south of Bihar Sharif, the modern district headquarters of Nalanda and about 95km south-east of Patna, the capital of Bihar. The site in and around Nalanda was explored by G. K. Lama assisted by Pankaj Kumar with the objectives to throw lights on the artistic features of the art objects recovered during recent excavations and by self explorations and village to village survey and to reveal the antiquity of the settlement history of the area on the basis of recent archaeological findings (**fig.5**).

The village Sakraurha (Lat. 25°10'97"N; Long. 85°25'62"E) is located about 8km north from the Nalanda ruins and about 15km south-

west from Bihar Sharif. There is a mound in the south of the village extended into 60 x 40m with an extant height of 4m yielding red ware, few fragments of black stone, etc. One of them is a broken image of Buddha in *dharmachakra pravartanmudra*. Village Tazu Bigha (Lat. 25°08'91"N; Long. 85°25'29"E) is situated 6km north-west from the ruins of Nalanda. A small mound containing potsherds of NBPW, red ware and black ware, an image of Buddha measuring 63 x 25cm in *abhaya mudra*, kept outside the Siva temple having an inscription of one line on the pedestal was found. Makhdumpur is located near Ben (Lat. 25°8'94"N; Long. 85°20'82"E) is about 12km west to the ruins of Nalanda and about 22km south-west from Bihar Sharif. There is a mound in the middle of the village yielding red and red slipped ware and fragment of sculptures, in black basalt, kept at Mahadevasthan. The site Kondi (Lat. 25°14'37"N; Long. 85°26'71"E) is about 10km north to the ruins of Nalanda. Fragment of sculptures are found in the southern and western parts of the village. The Bara village (Lat. 25°6'89"N; Long. 85°22'18"E) is 8km south-west from the ruins of Nalanda. The mound extended into 200 x 200m with an extant height of 12m is located to the south of the village yielding red ware and black ware. Sculptures are kept at Thakurbari and Brahmasthan located on the east and south of the village. Bara Khurd village (Lat. 25°14'54"N; Long. 85°25'23"E) is 13km north-west from the ruins of Nalanda. To the south of village there is a small mound measuring 25 x 20m in area with an extant height of 6m yielding red ware and black ware and a carved pillar measuring 95 x 23cm. Aldhanna village (Lat. 25°15'N; Long. 85°27'E) is 18km north from the ruins of Nalanda. There is a mound in the middle of the village covering an area of 100 x 60m with an extant height of 6m. Potsherds of red ware, black ware and black slipped

Fig. 2

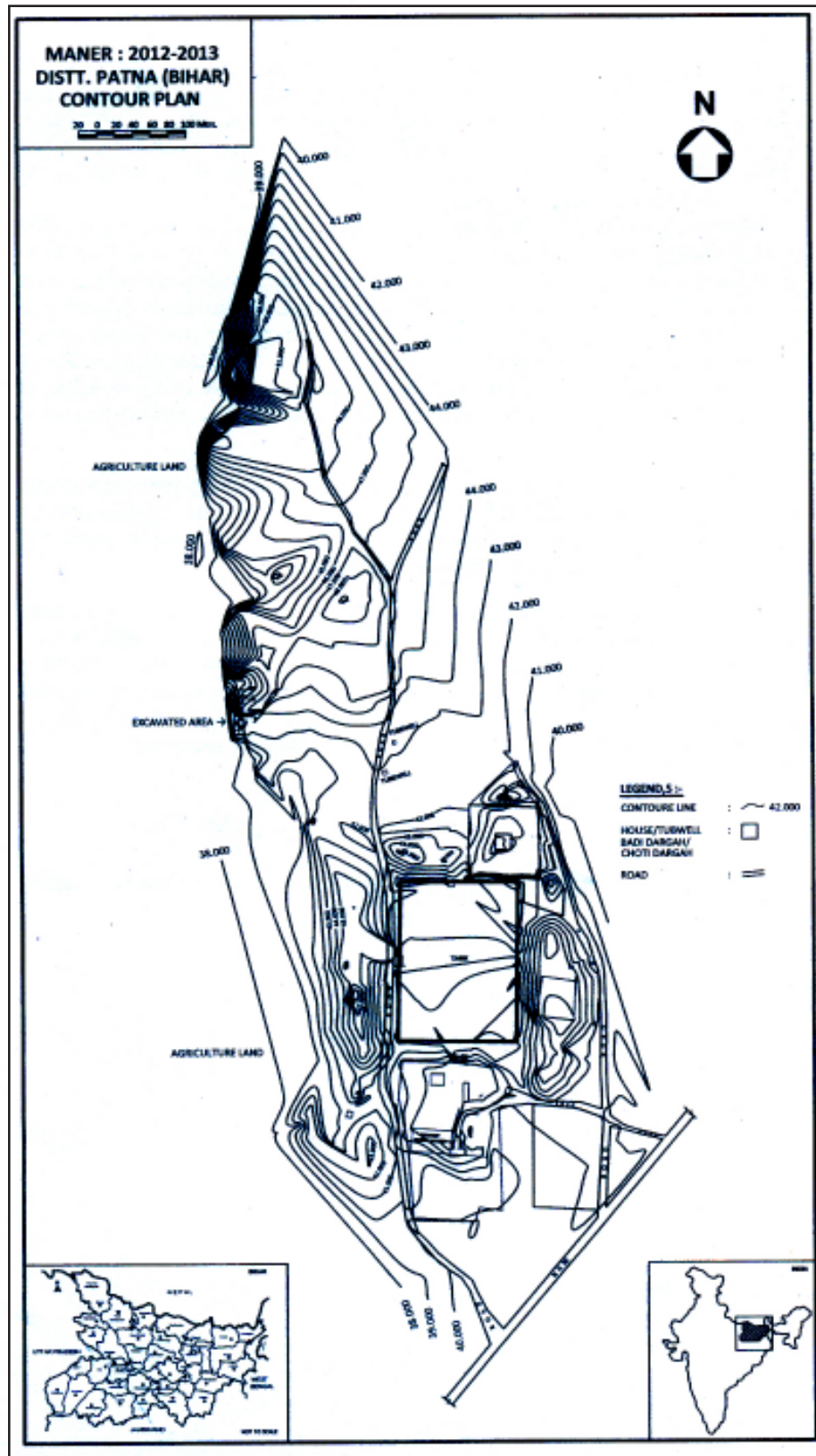


Fig. 3

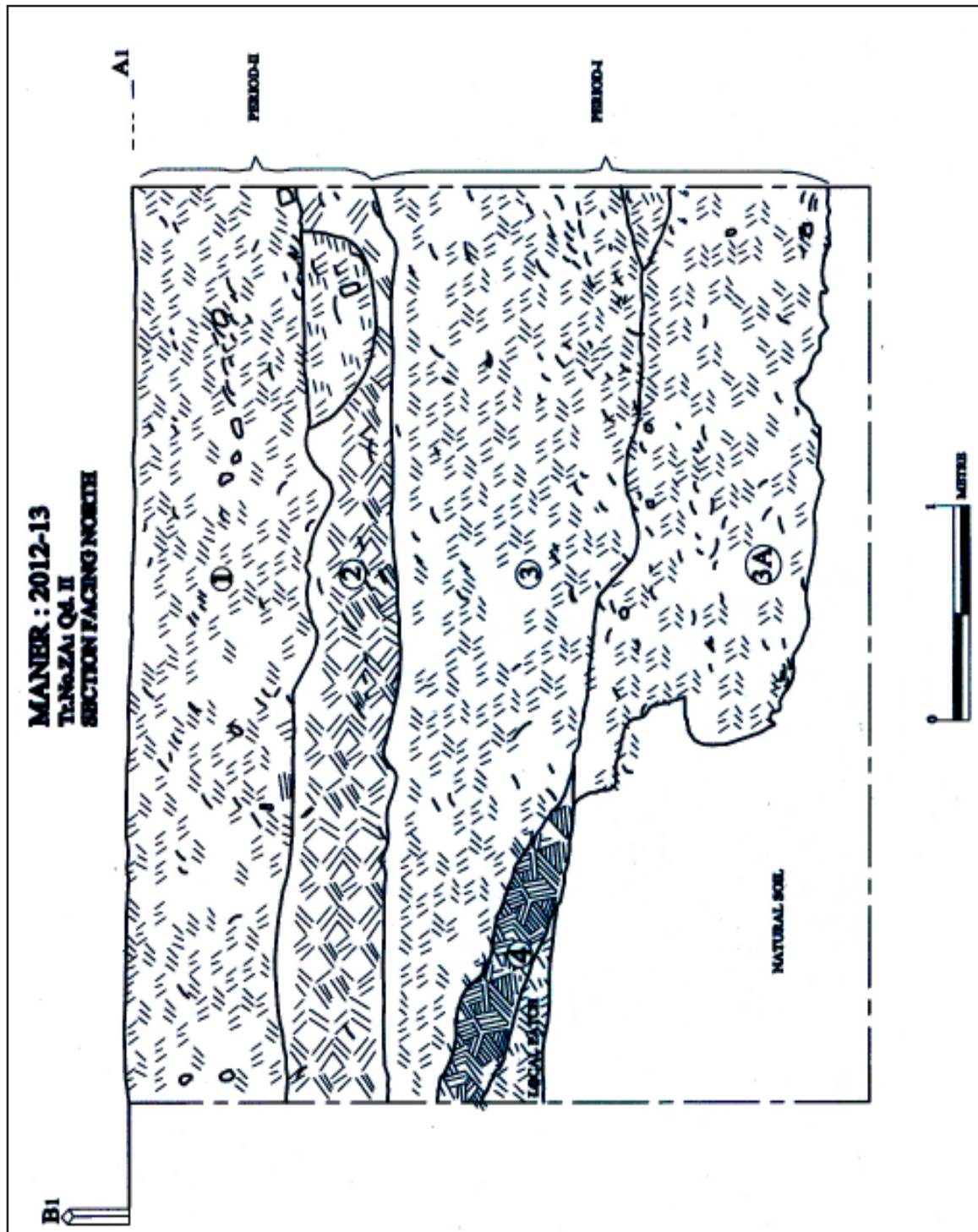
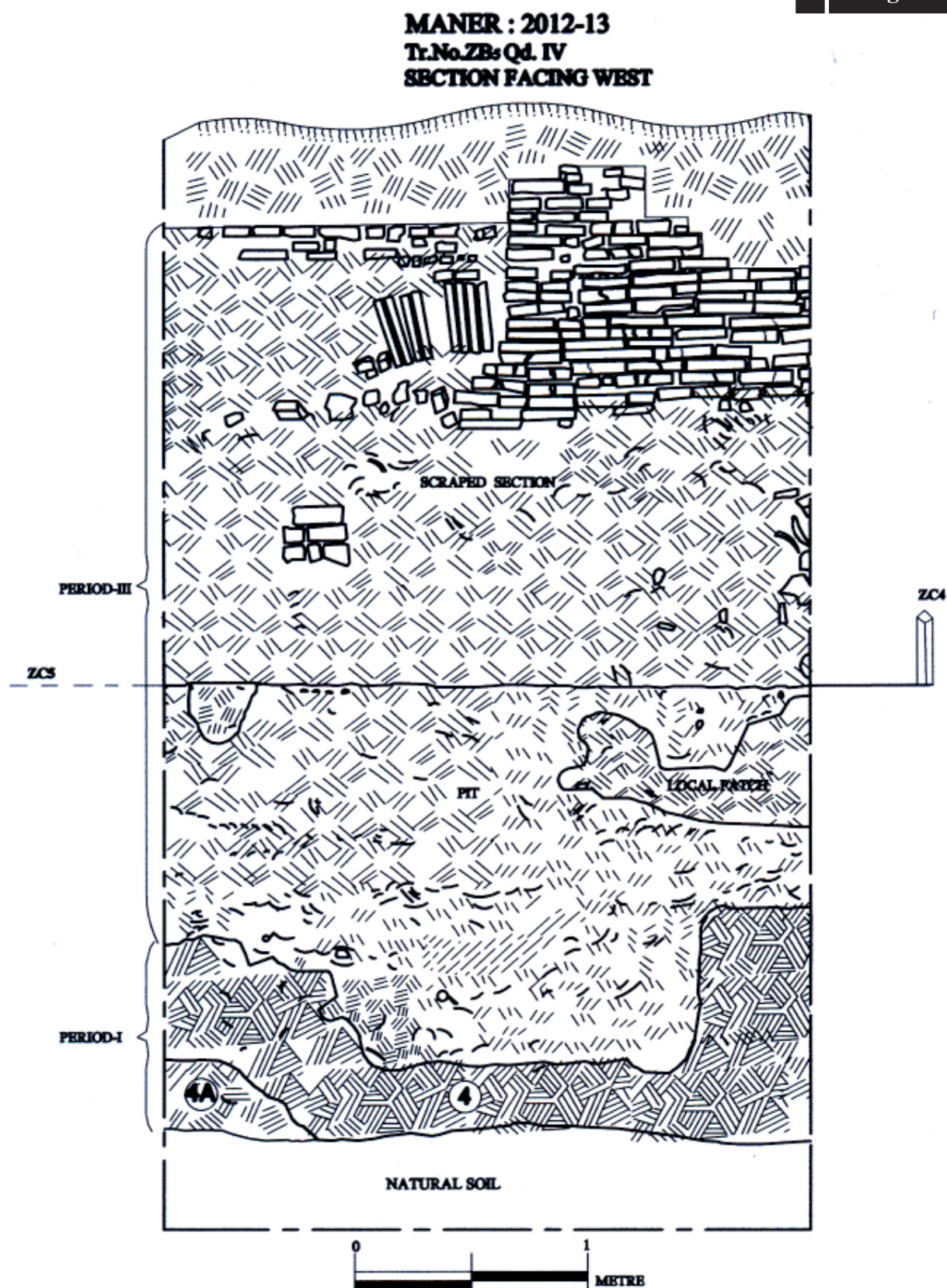


Fig. 4





9



10

Maner : 9, view of excavated trenches; 10, eastern section of Trench ZA1 Qdt.II, See p. 8



11



12

Maner :11-12, pottery Chalcolithic Period I, See p. 8



13



14

Maner : 13, Pottery types, Period II; 14, terracotta human figurines, See p. 9



15



16

Maner : 15-16, bone points and other objects, See p. 9

EXPLORATIONS AND EXCAVATIONS

ware were recovered during exploration. The site Koshnara (Lat. 25°09'67"N; Long. 85°22'54"E) is about 10km west to the ruins of Nalanda. There is a mound to the south of the village covering an area of 35 x 25m with an extant height of 7m. Potsherds of red ware, black ware and black slipped ware were recovered during exploration. Tungi village (Lat. 25°10'13"N; Long. 85°32'24"E) is 16km east from the ruins of Nalanda. There are two mounds to the south of the village covering an area of 100 x 70m with an extant height of 3m containing potsherds of red ware, black ware and black slipped ware. Ajaypur village (Lat. 25°10'13"N; Long. 85°32'24"E) is 14km north-west from the ruins of Nalanda. There is a mound to the south of the village covering an area of 100 x 90m with an extant height of 6m. Potsherds of red ware, black ware and NBPW were recovered during exploration. Ajnaura site (Lat. 25°13'N; Long. 85°24'E) is about 13km north-west to the ruins of Nalanda. A large number of Brahminical and Buddhist sculptures are scattered in the middle and the southern portion of the village. Eksara village (Lat. 25°10'05"N; Long. 85°23'46"E) is 7km north-west from the ruins of Nalanda. The south-west portion of the mound is inhabited by the present villagers. Potsherds of red ware, black ware, black slipped ware and NBPW (silver and golden) were recovered during exploration. A few sculptures including a broken statue of marichi made of black basalt are kept in the Goraiyasthan and Thakurbari. Baraki Aat (Lat. 25°11'62"N; Long. 85°24'43"E) is 10km west from the ruins of Nalanda. The mound in village is totally occupied by the present inhabitants yielding red ware only. Sculptures made of black basalt are kept in the center of village. Chandaura (Lat. 25°5'21"N; Long. 85°25'71"E) is 8km south-east from the ruins of Nalanda. The Paimar river flows 300m east to the village. To the south of the village

there is a mound extended into 50 x 30m with an extant height of 7m yielding red and red slipped ware. Chorsanda (Lat. 25°12'54"N; Long. 85°19'43"E) is located on the north-west of the ruins of Nalanda. The mound extended into 50 x 50m with extant height of 4m is located to the south of the village yielding red ware, grey ware and red slipped ware. Gaura village (Lat. 25°16'02"N; Long. 85°19'52"E) is about 21km north-west from the ruins of Nalanda. The mound extended into 60 x 50m with an extant height of 8m is located to the south-west of the village yielding red ware, red slipped ware, black ware and black slipped ware along with a few antiquities. Karjara (Lat. 25°06'89"N; Long. 85°22'98"E) is about 10km west from the ruins of Nalanda. The mound extended into 30 x 25m with an extant height of 5m is located to the west of the village yielding

Fig. 5

Archaeological sites explored in the vicinity of Nalanda



red ware, red slipped ware, black ware and black slipped ware. The village Sonchari (Lat. 25°11'24"N; Long. 85°19'91"E) is 19km north-west from the ruins of Nalanda. The mound located to the south of the village yielded red and red slipped ware. The village Arawan (Lat. 25°12'N; Long. 85°22'E) is 16km south-west from the ruins of Nalanda. The mound located to the south-west of the village yielded red ware, black ware and black slipped ware. The village Khaira (Lat. 25°10'97"N; Long. 85°21'33"E) is 16km north-west from the ruins of Nalanda. Besides potsherds of red ware, some Buddhist and Brahminical sculptures, among which one is inscribed, made of black basalt are kept to the north of the village at Brahmasthan. Vedagram was the ancient name of village Badauni (Lat. 25°12'N; Long. 85°20'E) which is located 19km north-west from the ruins of Nalanda. To the east of the village is a mound extended into 12 acres with an extant height of 3m yielding red and red slipped ware. Located on the border of Nalanda and Patna districts, the village Barah (Lat. 25°23'N; Long. 85°29'E) is about 38km north from the ruins of Nalanda. The mound situated to the east of the village is extended into 70 x 50m with an extant height of 5m yielding red, red slipped, black and black slipped ware. Kushana and Gupta brick-bats are noticed in the section. Remains of 21 steps are still intact to climb on the mound. The village Barhauna (Lat. 25°18'N; Long. 85°25'E) is 21km north-west from the ruins of Nalanda. The mound situated to the north of the village is extended into 70 x 50m with an extant height of 5m. A few sculptures including an image of Uma-Maheswara in black stone are kept to the south of the village. Birnawan village (Lat. 25°19'N; Long. 85°29'E) is about 26km north-east from the ruins of Nalanda. The mound extended into 110 x 90m with an extant height of 5m is located to the south of the village yielding red, red slipped

and black slipped ware. The village Chandasi (Lat. 25°16'N; Long. 85°28'E) is 15km north to the ruins of Nalanda. The mound situated to the north-east of the village is extended into 70 x 50m with an extant height of 5m potsherds of red and red slipped ware were collected from the surface of the mound. The village Charuipar (Lat. 25°17'N; Long. 85°28'E) is 19km north to the ruins of Nalanda. The mound situated to the east of the village is extended into 60 x 50m with an extant height of 3m including potsherds of red and black ware along with a few terracotta beads etc. Bahadurpur village (Lat. 25°20'N; Long. 85°25'E) is situated on the eastern bed of Mohane river and 36km north to the ruins of Nalanda. The mound extended into 100 x 70m with an extant height of 4m is located to the south of the village yielding red and red slipped ware. The village Dayalpur (Lat. 25°20'N; Long. 85°24'E) is 28km north-east to the ruins of Nalanda. The mound situated to the east of the village is extended into 90 x 80m with an extant height of 5m containing potsherds of red and red slipped ware. The village Dosut (Lat. 25°19'N; Long. 85°31'E) is 29km north to the ruins of Nalanda. The mound situated to the south of the village is extended into 100 x 100m with an extant height of 10m containing potsherds of red and red slipped ware. The village Kundwapar (Lat. 25°13'N; Long. 85°15'E) is 29km north-west to the ruins of Nalanda. The mound situated to the east of the village is extended into 150 x 100m with an extant height of 3m containing potsherds of red, red slipped, black and black slipped ware. The village Kolawan (Lat. 25°23'N; Long. 85°27'E) is 36km north to the ruins of Nalanda. Remains of mud-wall are noticed in the southern section of the mound. Madhopurgarh village (Lat. 25°20'N; Long. 85°23'E) is 29km north to the ruins of Nalanda. There are two mounds extended into 100 x 80m with an extant height of 4m located to the south of the village yielding



17



18

17, potsherds, from Madhopurgarh; 18, potsherds from Rukhaigarh, See p. 20

red, red slipped, black and black slipped ware (pl.17). The village Rukhaigarh (Lat. 25°19'N; Long. 85°22'E) is 29km north to the ruins of Nalanda. There are two mounds situated to the south of the village extended into 100 x 100m with an extant height of 15m yielded potsherds of red, red slipped, black, black slipped and NBPW (pl.18). Kushana bricks are also noticed in the section. A few stone sculptures are scattered at various places in the village. The village Telmar (Lat. 25°26'N; Long. 85°26'E) is 40km north to the ruins of Nalanda. The mound situated to the east of the village is extended into 70 x 50m with an extant height of 3m containing potsherds of red ware. The mound of Rukministhan (Lat. 25°06'N; Long. 85°25'E) is located about 2km south-west of the ruins of Nalanda. The mound covering an area of 90 x 50m with an extant height of 6m has a modern temple to enshrine a life-size image of Buddha (2.92 x 1.98 x 0.85m) in *bhumisparsha mudra* made of black stone of Pala period. There is a

depiction of the life-history of Buddha by intricate engraving on the outer surface of the image. One another image of Buddha is also found in the same posture but the head is broken. Potsherds of red ware were collected from the surface during exploration.

CHHATTISGARH

6. VILLAGE TO VILLAGE SURVEY IN DISTRICT SARGUJA

Raipur Circle of the Survey carried out village to village exploration in the district Sarguja by Shambhoo Nath Yadav, Ankit Kumar and Shiv Shankar Verma under the direction of Arun Raj T. During the course of exploration numerous antiquarian remains comprising of pre-history to early medieval period were discovered and recorded systematically. A list of the village and sites along with the brief description of their important archaeological remains are given below: (see Chart-I)

Chart-I

Village/Sites	Latitude & Longitude	Nature of remains
Bafoli	Lat. 23° 13' 09" N; Long. 83° 16' 43" E	Upper Palaeolithic and Mesolithic tools and core
Bajnathpur	Lat. 23° 26' 21" N; Long. 82° 47' 23" E	Mesolithic tools and core
Deepadih	Lat. 23° 18' 11" N; Long. 83° 43' 17" E	Middle Palaeolithic core(?). Upper Palaeolithic point, blade, flakes, and Mesolithic tools and cores. Ruined stone built temple belongs to Panduvamsis and Kalachuri dynasties
Devgarh	Lat. 23° 01' 06" N; Long. 82° 56' 57" E	Upper Palaeolithic blade, flakes and Mesolithic tools, core. Ruined stone built temples of Kalachuri period
Devipur (Kotpatna)	Lat. 23° 09' 27" N; Long. 82° 47' 55" E	Ruined brick built temple and sculptures of early medieval period
Dhodhagaon	Lat. 22° 41' 02" N; Long. 83° 34' 28" E	Mesolithic tools core and early historical rock paintings

EXPLORATIONS AND EXCAVATIONS

Village/Sites	Latitude & Longitude	Nature of remains
Funagi	Lat. 22° 52' 36" N; Long. 82° 59' 00" E	Mesolithic tools and core
Gamhardih	Lat. 23° 18' 19" N; Long. 83° 41' 57" E	Upper Palaeolithic blade, flakes, Mesolithic tools and core. Iron slag, few potsherds and broken pestle are also found
Jamjharia	Lat. 22° 42' 04" N; Long. 83° 33' 07" E	Upper Palaeolithic and Mesolithic tools and core
Jogimada	Lat. 23° 27' 53" N; Long. 82° 44' 01" E	Rock cut chamber and post holes of Mauryan period
Kalcha Bhadwahi	Lat. 23° 01' 08" N; Long. 82° 55' 27" E	Upper Palaeolithic core(?). Ruined stone built temples of Kalachuri period
Kedama	Lat. 22° 46' 09" N; Long. 83° 02' 08" E	Upper Palaeolithic blade, flakes core and microliths
Kudargarh	Lat. 23° 29' 18" N; Long. 82° 42' 16" E	Microliths stone sculptures c. 12 th -13 th centuries C.E.
Libara (Ghungutta)	Lat. 23° 01' 40" N; Long. 83° 12' 46" E	Upper Palaeolithic blade, flakes and Mesolithic tools, core and grey ware dishes, bowls, black polished ware, dishes, bowls, black and red ware, dishes, bowls, red ware and stone disc, terracotta hopscotch, etc.
Luchakighat	Lat. 23° 05' 40" N; Long. 83° 14' 01" E	Upper Palaeolithic blades, core mesolithic tools and core (pls.19-20)
Maharanipur	Lat. 22° 43' 59" N; Long. 83° 27' 15" E	Ruined stone built temple of Kalachuri period
Maheshpur	Lat. 22° 54' 06" N; Long. 82° 59' 53" E	Upper Palaeolithic and Mesolithic tools and core. Ruined stone built temple of late Panduvamsis and Kalachuri dynasties
Mainpat (Tiger point)	Lat. 22° 52' 37" N; Long. 83° 17' 37" E	Upper Palaeolithic blades, flakes, core and Mesolithic tools and core (pls. 21-22)
Mangarailgarh	Lat. 22° 48' 06" N; Long. 83° 31' 12" E	Upper Palaeolithic blade flakes and Mesolithic tools, core, red ware, black ware. Late medieval temple
Matringa	Lat. 22° 40' 34" N; Long. 83° 03' 11" E	Middle Palaeolithic core(?), Upper Palaeolithic blade, flakes and Mesolithic tools and core
Navanagar	Lat. 22° 57' 37" N; Long. 83° 13' 49" E	Upper Palaeolithic and Mesolithic tools and core, industries site

Village/Sites	Latitude & Longitude	Nature of remains
Parsa	Lat. 23° 10' 29" N; Long. 83° 15' 41" E	Mesolithic tools and core
Ramgarh, Udaypur	Lat. 22° 53' 46" N; Long. 82° 55' 53" E	Upper Palaeolithic blade, flakes and Mesolithic tools, core, ring wells, iron slag, grey ware and red ware, wattle and daub, etc.
Saraidih	Lat. 23° 11' 07" N; Long. 83° 26' 26" E	Upper palaeolithic and mesolithic blade, flakes and core
Satimudha	Lat. 22° 49' 06" N; Long. 82° 59' 40" E	Upper Palaeolithic and Mesolithic blade, flakes, microliths and core
Sitalekhani	Lat. 23° 40' 22" N; Long. 82° 45' 22" E	Mesolithic and historical rock paintings

7. EXCAVATION AT SITA BAREE, RAJIM, DISTRICT GARIABAND

Under the joint aegis of the Raipur Circle of the Survey and the Department of Culture and Archaeology, Government of Chhattisgarh a small scale excavation was carried out at mound of Sita Baree, Rajim (Lat. 20°57'49"N; Long.81°52'36"E) district Gariaband under the direction of Arun Raj T. and co-directed by A.K. Sharma assisted by Bhagirathi Gartia, Shambhoo Nath Yadav, Shiv Shankar Verma, Ankit Kumar, Ashish Vashisth, Prabhat Singh, Praveen Tirkey, L.S. Netam and Pradeep Sahu. The main objective of the excavation was to ascertain the cultural sequence of the mound and to expose the structural remains if any, beneath the ground.

Rajim lies at a distance of about 45km south-east of Raipur, the state capital and that of same distance at the north-west direction of Gariaband, the district town. The mound locally known as Sita Baree (**pl.23**) is situated on the right bank of the river Pairi and interestingly this site witnessed the confluence of three rivers viz., Mahanadi, Pairi and Sondur.

The mound bears scanty vegetation includ-

ing wild vegetation including wild bushes, creepers and trees. The preliminary survey was carried out for laying out trench for trial excavation and it was decided to undertake the excavation work at the highest point of the mound. Accordingly one trench measuring 10 x 10m and subsequently divided by four quadrants with a measurement of 4.25m each was laid out.

During the course of the digging structural remains represented by plinth of stone masonry of chambers (**pl.24**) measuring (4.30 x 4.20m) upto a maximum extant height of 2.40m and verandah (5.90 x 4.20m) brought into light. It has been observed that this structure was constructed by following the pattern of cell foundation. The site was profusely robbed by the villagers which is identified by the robbers trench in the exposed section. The antiquarian remains of the site include terracotta objects comprising of globular, cylindrical, areca nut shaped and *ghata* shaped beads; animal and female figurines (**pl.25**); sling balls; toy cart wheels; bangle fragments; hopscotch; bi-facial moulds, etc. retrieved from the excavation deserve special mention. In addition to these, finding of red ware and black ware potsherds of



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Luchakighat : 19, view of the site; 20, stone tools, See p. 21



21



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Mainpat : 21-22, stone tools, See p. 21



23



24

Sita Baree, Rajim : 23, view of the mound; 24, exposed stone structure, See p. 22



25



26

Sita Baree, Rajim :25, standing female figurine; 26, red ware and black ware pottery, See pp.22 and 27

bowl, *handi*, dish, pitcher, storage jar, spouted pot, lid, knobbed lid, etc. (pl.26) have been found. A fair quantity of glass and shell bangle fragments and a standing lady figure carved out in black stone was also retrieved from the excavation. On the basis of these findings and nature of the construction of the structural remains the site may be ascribed to c. 6th-7th centuries C.E. to 10th-11th centuries C.E.

GOA

8. EXPLORATIONS IN GOA COAST

S. Tripathi of National Institute of Oceanography, Goa has carried out exploration in Goa coast. During explorations of Sail rock shipwreck, the propeller, propeller shaft, rudder, iron anchor, mast, winches, ladder and other remains of the shipwreck were noticed. Among other finds the important discovery was the cast iron cannon ball from the site. GPS position of the shipwreck and survey areas were obtained. As the survey was carried out in limited area but shipwreck remains have been scattered over a large area, therefore it is proposed to undertake again the exploration of the shipwreck. Local divers have informed there are some more shipwrecks in the adjoining area of Sail rock, attempt will be made to locate and explore them and exploration of shipwrecks in Goa waters is possible subject sea conditions, weather and good visibility. Because of unfavourable sea conditions and poor visibility, explorations were not possible in the previous years.

GUJARAT

9. EXCAVATIONS AT KOTADA BHADLI, DISTRICT KACHCHH

The site of Kotada Bhadli is located in Nakhatrana taluka of district Kachchh, Gujarat. The geo-coordinates of the site are (Lat. 23°

20'N; Long. 69°25'E) It was first discovered by J.P. Joshi in 1964-65. It is approximately 3.11 acres in size and is completely intact, a rare feature for Harappan sites. The excavations at Kotada Bhadli were continued in collaboration with Deccan College Post-Graduate and Research Institute, Pune and Gujarat State Department of Archaeology, Gandhinagar, Gujarat. In the continuation of previous year, the excavation were resumed in residential area and southern fortification wall.

Bharat Dighe, Devadatta Phule, Krishna Malap, Kishore Gaikwad, S. Udaya Kumar, Kalyan Chakraborty, Sutapa Lahiri and Tejal Ruikar participated in the excavations. The last year residential trenches were reopened XC2, XC3, XC4, XD2, XD3, XD4 and XE2. Apart from that during this year new trenches were opened on the north, east and south portions of the residential structure XA2, XA3, XA4, XB2, XB3, XB4, XB5, XC5, XD5, XE4 and XE5. The trenches were opened to understand the extent of the complex.

The residential complex is rectangular in shape with well defined northern and western walls. Till the eastern and southern walls of the complex have not been exposed. In all total nine rooms have been exposed in the excavations. In the previous year excavation, room nos.1 and 8 were identified but this year after the removal of baulk and the fallen debris it was the same room which was cleared and these are not two rooms but it is the single room in 'L' shape and within this room no.3 is located which a storage room as two big storage jars have been found embedded in the ground. Within the rooms storage jars and working activity has been found. In none of the rooms kitchen or cooking area has been found. But in large quantity bones both of charred and un-charred have been found along with pottery. This shows that the rooms were used for various purposes and not a single activity was car-

ried out but it was multipurpose complex.

The southern fortification wall was exposed particularly with the outer face of the wall, middle and south-western bastion and probable gate on the south-eastern corner. The outer fortification wall is further traced on the south-eastern side in the trenches XL7 and XL9. This was done in order to understand the alignment of the wall. The total length exposed in these trenches is 10m. On the southern fortification wall two bastions have been exposed a middle bastion and south-western corner bastions. At 7.50m from the western section of the trench XM2 a bastion originates from the top most wall or wall no.1. The joining of the bastion with the wall no.1 is at 90° or right angle. The total height of the bastion on the eastern face is 2.67m. It has 14 courses of stones used in the construction. The breadth or the southern face of the bastion is 9.69m and the height is 2.54m having 14 courses of stones. At 9.69m from the south-eastern corner the bastions turns toward the north and joins with the outer fortification wall. The total height of the bastion exposed in this western face of the bastion is 3.45m having 18 courses of stones and length is 5m. From the south-eastern corner the bastion turns towards the west, the breadth or the southern face of the bastion is 6.16m, the height is 1.58m having 11 stones courses. At 6.16m from the south-western corner bastion turns towards the north that is the western face of the wall. The width of the bastion is 6.50m, the height of the western face is 1.30m having 7 courses of stones. In the south-eastern corner of the site probably the entrance or the gate of the site is located. In order to open the gate the inner fortification wall was exposed in trenches XJ11, XJ12, XJ13, XI11 and XI12. The total length of the inner fortification wall exposed in this area is 10.74m, the height of the wall exposed is 1.74m having 8 courses of stones. On the inner side of the fortification wall at-

tached to the inner fortification wall a rectangular structure has been found.

The ceramic assemblage is dominated by pottery of black-on-red variety, red slipped unpainted variety, red untreated variety, gritty variety, pink ware, kaoline ware and black/ grey ware. The dominated shapes in the all categories are of storage jars, convex-sided bowls and dishes. The paintings on the pottery are geometrical patterns.

Antiquities found in the excavation are beads of terracotta, steatite, agate and shell; perforated and un-perforated pottery discs and shell net-sinkers. The main findings of this year excavation are floor tile, copper bangles and pin and cubical weight.

10. EXCAVATIONS AT KHIRSARA, DISTRICT KACHCHH

In continuation of the previous year Jitendra Nath assisted by R.N. Kumaran, Bipin Chandra, N.B. Soni, J.B. Makwana, M.B. Shah, D.P. Modi, H.R. Tadvī, K.P. Parmar, N.M. Raval, G.B. Varia, Ramraj Meena, Kalyani Vaghela, Sejal Jam and Shailja Pandey of Excavation Branch-V, Vadodara of the Survey resumed the excavations at Khirsara for the fourth season in order to identify the gateway of the citadel on the north and to find the extension of the factory area situated just opposite of the citadel. The excavation in the trenches Y35 (1 and 2), Y36 (1) and Y37 (1 and 2) along the northern side of the citadel wall has revealed the evidence of a narrowed or restricted entrance. It measures 1.40m with an extant height of 5.50m. The floor just below the entrance was laid with multi-colour mud brick bats. Raised with fair faced sandstone of random rubble masonry with mud mortar, the entrance was also closed at a later phase. The excavation in the trenches S31, S32, S33, S34, S35, S36, T31, T32, T33, T34, T35, T36, U31, U32, W31, W32,

X31 and X32 in the 'factory area' identified during the 2010-11 has revealed the early phase structures in the form of small rooms with an entrance of 0.80m, *chullahs* and *kankar* rammed floorings (pl.27). As most of the walls extend to the unexcavated area, the clear plan of this phase is yet to be ascertained. The alignment of this wall is slightly angular from the later phase, a noticeable feature confirmed from the previous excavations. The ceramics of this phase is mainly fine quality of reserve slipped ware of various combinations and the artifact assemblage is composed of large amount of terracotta bangle pieces and tubular beads, few copper objects and steatite micro-beads. The extension of this complex was noticed in the trench S35/3 at the eastern end, nearly 60m away with rooms and a *chullah*. The evidence of this phase in the form of walls is also noticed at some of the index trenches T35/3, W31/1 in the factory area.

In the next phase, the foundation for the factory was laid and raised over the early phase structures. During this phase, a separate fortification was raised for the factory area with a double entrance from the north. Well-dressed sandstones of same sizes were used at the entrances while huge fair faced sandstones are used for the outer wall. This entrance was maintained throughout the occupation of the site. With a guard room towards the east, the width of the street was nearly 4.70m running towards south. The angular stones were used to raise the corners of the outer walls that enable the wall to bear the load (pl.28). In the next phase, the intense human activity was noticed in the form of huge burning activity, ash dump in every area and partitions through creation of the rooms according to the necessity. On the western fortification wall, two cylindrical pots measuring 0.50m in depth were noticed. These were used to insert the wooden poles and in turn they supported the roof. The floors were laid with

kankars and were plastered with mud brick materials. One of the complexes has even showed the evidence of a flight of steps leading to a platform. Spacious rooms with drains, bathrooms were paved and secured with polished sandstones and outlets, huge storage jars secured with stones at the base show a well planned system of building activity. The sudden spurt of activity was noticed in the form of extension of the factory area beyond the fortification on the western side and has again confirmed the evidence unearthed on the eastern side during the second season.

Apart from the complexes with lanes and by-lanes, an interesting structure of this phase is a four-chambered room with inlets and outlets. It measures 7 x 3.5m and probably used as 'dying vat' (pl.29). In the last phase, the whole area was re-laid or plastered with mud brick materials and they reused the stones of the early phases. Even the fortification wall was covered with mud brick materials and its actual use was ceased.

The excavation along the trenches K46 and L46 on the eastern side of the outer fortification wall, a series of kilns was identified and two were exposed. The first one is circular on plan and has two chambers one above the other. Its longer axis along the mouth which was meant for supply of fuel had two hollow compartments. The fire reaches the upper chamber through 15 flues, all of which are interconnected. The walls on both the sides are mud plastered. Due to firing to a high temperature, the walls are vitrified. This kiln measures 3.80m in diameter and 5.42m in longer axis. The diameter of the flues ranges from 0.10m to 0.15m. The second kiln is also a rock-cut one and circular in shape. With a fuel chamber in the front all are open. The interior of this kiln also shows the evidence of firing at a high temperature. The diameter of the chamber is

2.20m and the overall length is 3.60m.

The surface clearing has also shown that there was a series of kilns of various sizes. It is interesting to mention that these series of kilns along with the above are secured by the second fortification wall. This wall measures 2.60m in width. The reason for constructing the kilns outside the main fortification wall indicates the safety measures adopted by the Harappans in preventing the fire hazard and secondly, the easy availability of raw materials from the nearby area. As the river is situated just near the site and the ground area is composed of flat natural rock, the area is ideal to keep ceramics when it is in leather hard condition.

The excavation in the factory area has revealed the usual classical Harappan ceramics. Apart from the copper ingots and slags, shell and its debitage, raw material of various semi-precious stones, the artifacts recovered are the terracotta beads of various shapes and sizes, bangles pieces, dice, toy carts, wheels both plain and hubbed (some are with paintings) animal figurines, hoards of beads of various semi-precious stones, gold and steatite, shell bangles, beads, ladles and inlays, copper arrow head, knives, chisels, bangles, nails, beads, stone objects like mortar, quern (both legged and plain), pestles, mortar, drill bits, chert blades and microlithic tools, whet stones/ sharpener, sling balls, hammer stone, weights of various shapes, sizes and material and above all, a steatite button seal with geometric symbol.

11. EXCAVATIONS AT SHIKARPUR, DISTRICT KACHHH

The Department of Archaeology and Ancient History, M. S. University of Baroda, Vadodara continued excavation at Shikarpur in Bhachau taluka of district Kachchh for the sixth field season under the direction of P. Ajithprasad assisted by K. Krishnan, K.K. Bhan

and S. Pratapachandran. Apart from imparting training in archaeological excavation to the M. A. students of the Department, the main objective of the excavation in the current season was to check the presence of an outer fortification in the southern side of the site. A series of five trenches measuring 5 x 5m were laid out in a row approximately 40m away from the southern inner fortification wall for tracing the outer wall. These trenches were selected after considering the results of a Ground Penetration Radar survey conducted in the last season and also looking at the crop-mark pattern visible in aerial photographs of the site. Excavations in these trenches, especially in the trenches Ic2 and Ic3 revealed remains of stone and mud-brick structures, probably dwelling places (**pl.30**). While both the structures were built in the phase I, the stone structures were continued to be in use in the phase II too. The stone structure/house excavated in the trench Ic2 had two chambers separated by a 60cm thick wall. A tall, perforated jar was found in one of the rooms of this structure. The structure also had a small stone built platform attached from outside to its north-eastern corner.

Remains of another stone structure belonging to the phase II are found in the next trench, Ic3 which had its foundation on the stone walls of an earlier structure built in the phase I. The wall is found extending further south in the trench Ic4. This later structure at the top is associated with a few Sorath Harappan ceramics suggesting that this was occupied during the 2nd phase.

The excavation revealed the outer fortification wall mainly in the trench Id1 (**pl.31**), which is adjacent to the trench Ic4, on its south. The height difference between the two at their respective top is about 4m. While the inner fortification was 10m thick at its extant top, the outer wall is much compact measuring 1.95m at its top. The tapering wall has a broader, 2.5m

thick base. The foundation trench of the wall had cut through about 30 to 40cm thick cultural deposit suggesting that the outer wall was constructed a bit later than the initial spread of habitation in the southern part of the site. However, there was no distinction in the cultural material found below the wall and those abutting the wall; both belonging to the classical Harappan along with a few Anarta potteries.

The wall showed evidence of a major repair work carried out on the eastern part, upwards from the tenth course. The bricks used in the repair works are smaller in size and more yellowish brown in colour. The wall appears to have become dysfunctional and shifted a bit further towards south as the inner face of the wall is found damaged by a large silo that partially cut the extant top. The mid-brick structure found in the trench Ic3 is found extending southward into the trench Ic4 and eventually joins the outer fortification. Remains of two stone structures,

one with a long north-south running wall are found built over the debris of this early structure in the trench Ic4. This stone structure also belonged to the last part of the urban phase habitation but was in use during the phase II. The most important artefact unearthed in the current excavation was an inscribed Harappan steatite seal (**pl.32**). Made on a square steatite tablet measuring 3 x 3cm, it has at the top five Harappan signs neatly scooped out at above a rhino figure showing characteristic features of the famed Harappan intaglio and has a pierced boss with a median groove at the back. This is for the first time an inscribed steatite seal is found from the site. In addition to the steatite seal the excavation revealed several classical Harappan artefacts such as beads of agate, carnelian, *lapis lazuli* and other semi-precious stones and steatite; bangles of shell and terracotta; a small piece of stoneware bangle; terracotta toys such as tops, cart-frames and ani-

Plate 27



Khirsara: early phase structures, See p.29



28



29

Khirsara : 28-29, exposed structures, See p. 29

mal/ bull figurines, a number of Rohri chert blades and a few small household objects of copper. The pottery collected in the excavation included most of the classical Harappan vessel forms such as perforated jars, beaker, dish-on-stand with incised decoration at the centre, Harappan cooking vessels, large basins and pots with cord impression, black slipped jars and several types of reserved slip ware sherds. The Anarta pottery from the same deposit is represented by a few incurved bowls and basins with a blunt carination. The Sorath Harappan bowls and pots are found confined to the upper levels in the trenches Id2 and Ic3.

12. MARITIME ARCHAEOLOGICAL EXPLORATIONS IN LOWER NARMADA REGION

A. S. Gaur of National Institute of Oceanography, Goa has carried out maritime archaeological explorations in lower Narmada region. In course of exploration, he discovered following archaeological sites (**fig.6**). The village Mehgam is situated on the north bank of the river Narmada about 30km west of Bharuch. In archaeology and literature, this has been designated as Late Harappan site and the habitation was largely affected by regular flood in river Narmada. The remains reported earlier were comparable with Rangpur IIB. However, we tried to locate but failed to do so. None of the local person could provide information on old settlement and there is *math* which said to be 400 years old. There is a British period bungalow in the outskirts of the village. In the village Kukarwada on the bank of Narmada, there is a *ashram* traditionally appears to be 400 years old. Small boats are used in this place also. There is a jetty going down to the river. An older *ghat* or jetty has been destroyed and presently not in use. Bhagatrav site is about 60km southwest of Bharuch on the north bank of the Kim estuary. Ancient mound is known as Bhagatrav is situated on the northern bank of the river Kim a small creek connects the site on the western

margin. Village Jetpur is 2km on the north of the site. Earlier explorer mentioned that the mound is about 8' high and about 7' cultural deposit was encountered in two periods. Period I belong to the Mature Harappan and Late Harappan comparable with Rangpur IIA and B whereas Period II is assignable to the Medieval period. Rao (1962) also hypothesized that this may be the south most Harappan port and served as stone raw material supply point to the Harappan settlements of the Saurashtra and Kachchh region.

The site covers an area of 100 x 60m and is under cultivation. On the north west side of the mound a pond has been dug and perhaps some part of the mound has been damaged. The surface collection suggests that there is proto-historic as well as medieval period settlement, thus partially confirming the earlier observation. The site might have played a significant role in maritime activities and also a cowry and a shell was found from the site during the exploration.

13. EXPLORATIONS BETWEEN CHORWAD AND DIU ALONG THE SOMNATH COAST, DISTRICT JUNAGAD

Explorations were jointly carried out between Chorwad and Diu along the Somnath coast, district Junagad, Gujarat by Arati Deshpande-Mukherjee and Soumi Sengupta from Deccan College Post Graduate Research Institute, Pune and Oishi Roy from M. S. University of Baroda, Vadodara. This season explorations were confined to the town of Somnath and its neighbouring coastal areas such as Sutrapada, Kodinar and Charra. The main objectives were to look for archaeological remains in and around Somnath especially coastal evidence in the form of animal bones, shells, etc. Explorations were mainly focussed on three areas in the vicinity of the main Somnath temple. The vacant land lying behind the Somnath Trust office, Rudraheshwar *mandir* and the parking

lot was explored. The entire area is traversed by wall like structures made up of milliolites enclosing mounds which rise to a height of around 10-15ft. These represent some kind of fortification from the medieval times. The entire area is covered with thorny *acacia* trees and uninhabited. A few step wells are present. Explorations on the top of the mounds, fortification walls and areas below revealed the presence of ceramic sherds mostly of the red polished ware. Of significance are two broken sprinklers. A piece of lustrous red ware was found on the surface. Besides these a few pieces of Chinese porcelain were also collected.

In addition to ceramics an appreciable number of shell bangle fragments and sawn shell fragments of *turbinella pyrum* were obtained from the surface of the elevated mounds. They display saw cuts and represent shell debitage resulting from the manufacture of shell bangles.

These definitely indicate the evidence for shell working activity in the area in the past. Bangle fragments vary from plain to slightly decorated ones. From the same area a small circular stone bead made up of chalcedony was also recovered. Interestingly isolated marine gastropod shells belonging to *cypraea sp.*, *conus sp.*, *thais sp.*, *umbonium*, *oliva sp.* were found on the surface of these mounds.

This is probably the first time that evidence for shell working has been obtained from Somnath. Prior to this shell bangles were reported by Nanavati *et. al.* 1971 from Somnath excavations. Section scraping was carried out at two locations. One was a huge pit dug near the base of the fortification close to the parking lot. This revealed fragmented pottery. Here scraping was carried out on a section having a height of 4.80m (Lat. 20°53'20"N; Long. 70°

Plate 30



Shikarpur : excavated mud-brick structures, See p. 30



31



32

Shikarpur : 31, southern outer wall with a broad ledge at the base and structural remains; 32, Harappan steatite seal, See pp. 30 and 31

24°18"E) and revealed pottery and shell; marine shell; animal bones and charcoal. A fragment from the spire portion of *turbinella pyrum* was also found in the sections. A good number of pottery sherds were recovered. Significantly, presence of a base of a vessel is identified as BI ware (glazed ceramics) from the Persian gulf. From section scraping bones and shells were obtained from the following depths. 0-50cm proximal shaft of Tibia of *Capra hircus*, Petrous temporal of cattle, Maxilla of *Capra hircus*, distal part of femur of *Capra hircus* and 8 medium unidentified fragments.

Charcoal and shell samples have been sent to Birbal Sahni Institute of Palaeobotany, Lucknow (BSIP) for radiocarbon dating while pottery, bone, shell and soil samples are being studied at Deccan College, Pune. Phosphate analysis carried out in the chemistry laboratory at Deccan College.

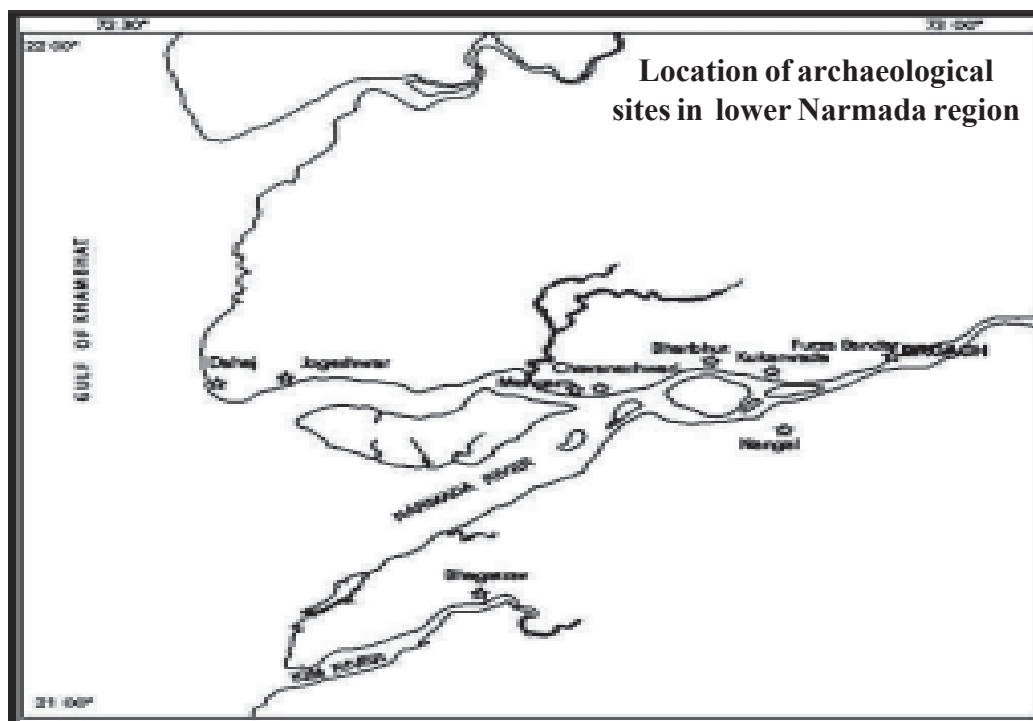
HARYANA

14. EXPLORATIONS OF CHAUTANG VALLEY, DISTRICT KARNAL

Exploration conducted by Manoj Kumar, Technical Assistant under the supervision Ranvir Shastri, Deputy Director of Department Archaeology and Museums, Haryana on the old bed of Drishadvati river. During the exploration of Chautang (old Drishadvati river) valley in Assandh and Nissing blocks, six new archaeological sites of early Harappan culture, Harappan culture, late Harappan (**fig.7**), ochre colour pottery (OCP), painted grey ware (PGW) and historical period (**figs.8-9**) were located.

The village Rattak (Lat.29°37'22"N; Long.76°37'04"E) is located at a distance of about 10km north-west of Assandh, on Assandh-Sirasal road. The site lies 700m west to the village. This site is locally known as Ratta

Fig. 6



Khera mound situated on the right bank of Chautang (old Drishadvati river). It measures approximately 15acre in area and is about 7m in height. This site has been already explored by Suraj Bhan (1967) in form of PGW and historical culture. The site shows deposit from late Harappan to the PGW culture, early historical, historical and early medieval period. A few sherds of black slipped ware are also found. Late Harappan period is identified with pottery (pl.33) like fragment of dish-on-stand and terracotta bulls, etc. These types of antiquity and pottery are similar to those of late Harappan level of Balu (Kaithal) and Mitathal IIB phase i.e. PGW shreds of bowls with black motifs. Few terracotta beads and a shell figurine of goddess are also found belonging to PGW culture. Besides red color stamped pottery, spouted pot (pl.34), red polished pot (pl.35) and a part of dish belong to early historical and historical period and early medieval pottery were reported. A few sun baked brick structures or fire brick structures of Kushan period were also reported. This site of Ragushan (Lat. 29°39'16"N; Long. 76°40'02"E) lies very close of village in the south. It is situated 2km in the north west of Chautang and is at a distance of 8km north-east of Assandh. The mound in the village measures approximately 5-10acre in area yielded remains belong to late Harappan and historic period. Late Harappan pottery like upper portion of narrow mouth vase with outer turned drop edge rim has black horizontal lines and some other late Harappan potsherds etc., a historical period jar are also recovered from the site. The village Pangala (Lat. 29°36'58"N; Long. 76°37'03"E) is located at a distance of about 12km from Ragushan. The site is now under cultivation and locally called as Tiba. Historical period human habitation evidences are from the site like pottery and broken bricks etc. The village Chochara (Lat. 29°36'38"N; Long. 76°38'23"E) is situated on Assandh to Sirsal road on the bed of Chautang. The site has yielded the remains of

historical periods. The village Deeg (Lat. 29°39'17"N; Long. 75°37'51"E) is located at a distance of about 20km south-east of Pundri, on Pundri to Chochara road. The site covers an area of 15-20acre and it rises to a height about 3m. The site is locally known as Khera unearthed material remains of early Harappan, Harappan, late Harappan, OCP, PGW, historical and early medieval periods. Early Harappan period is identified by incised wave line potsherd of grey and dull red fabric (pl.37) the similar to these pottery reported from Sothi and Mitathal. Harappan pottery like dish-on-stand, fragments of vases with black horizontal lines and other motifs and antiquity of a carnelian bead and terracotta hub-wheel etc. were reported. Authentic evidences of late Harappan period are also recovered like with a typical late Harappan complete pot and out-turned rim narrow mouth with vertical neck vase fragment (pl.36). Few sherds of OCP were also found. Many fragments of PGW pottery (pl.38) were also recovered from site. A large no. of historical and early medieval pottery were also available on site. Other artifacts like beads (pl.39) terracotta cakes and iron slags are also recovered.

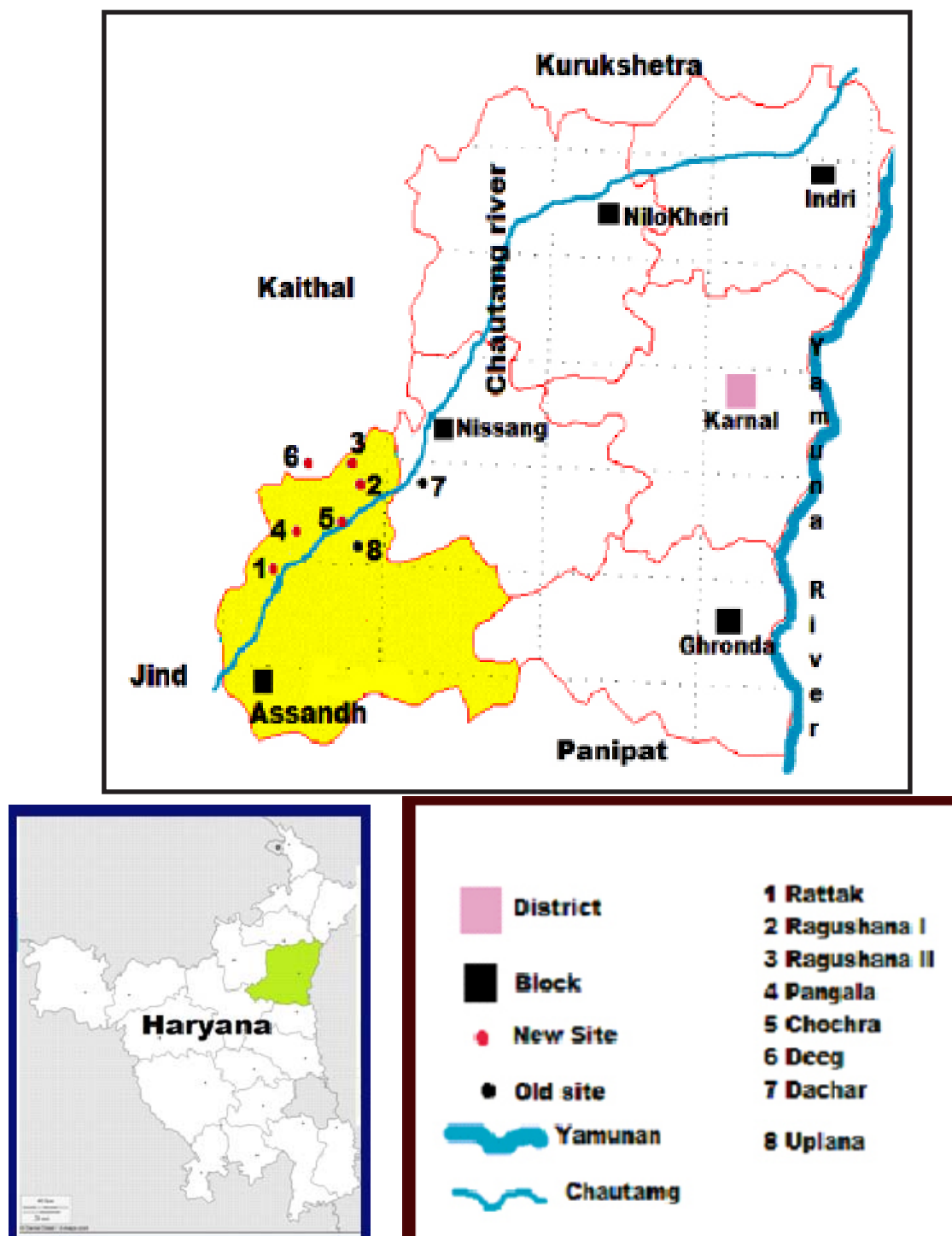
HIMACHAL PRADESH

15. EXPLORATIONS IN MID-HOLOCENE SITES IN SIWALIKS IN DISTRICTS BILASPUR, KANGRA AND UNA

The exploration in the districts of Bilaspur, Una and Kangra, Himachal Pradesh carried out by Anujot Singh Soni, University College Dhilwan (Barnala - Punjab) that yielded many pre-historic sites.

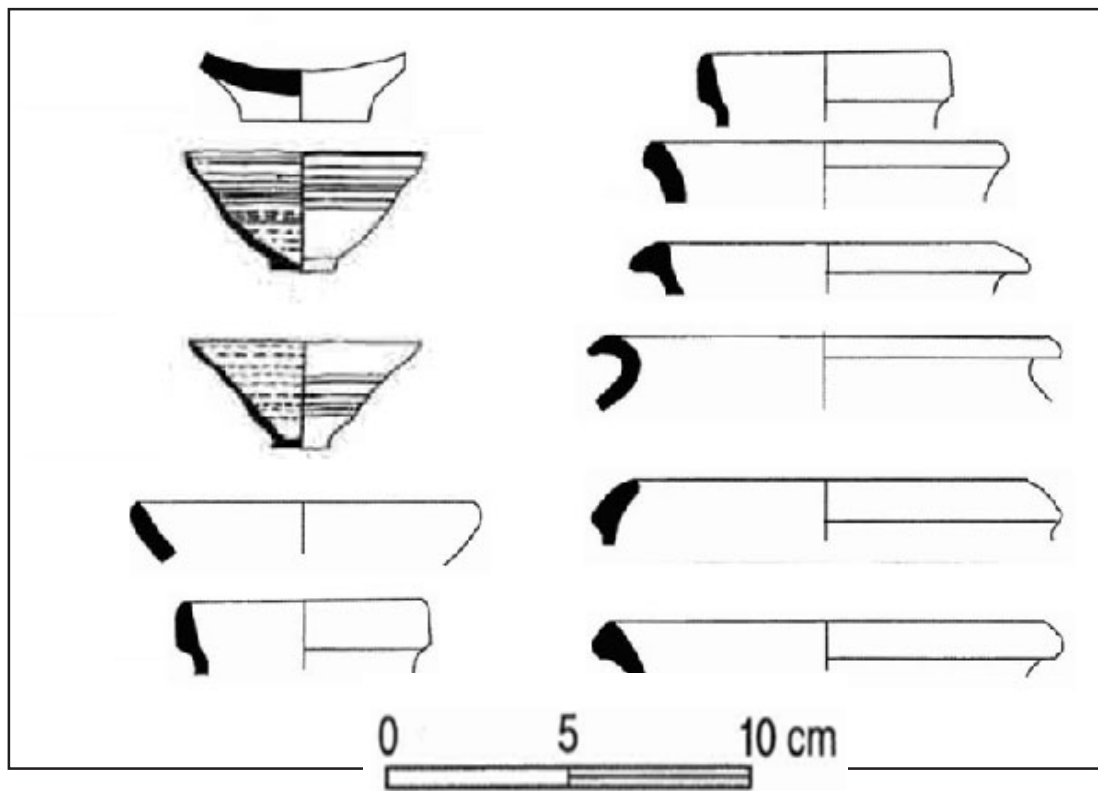
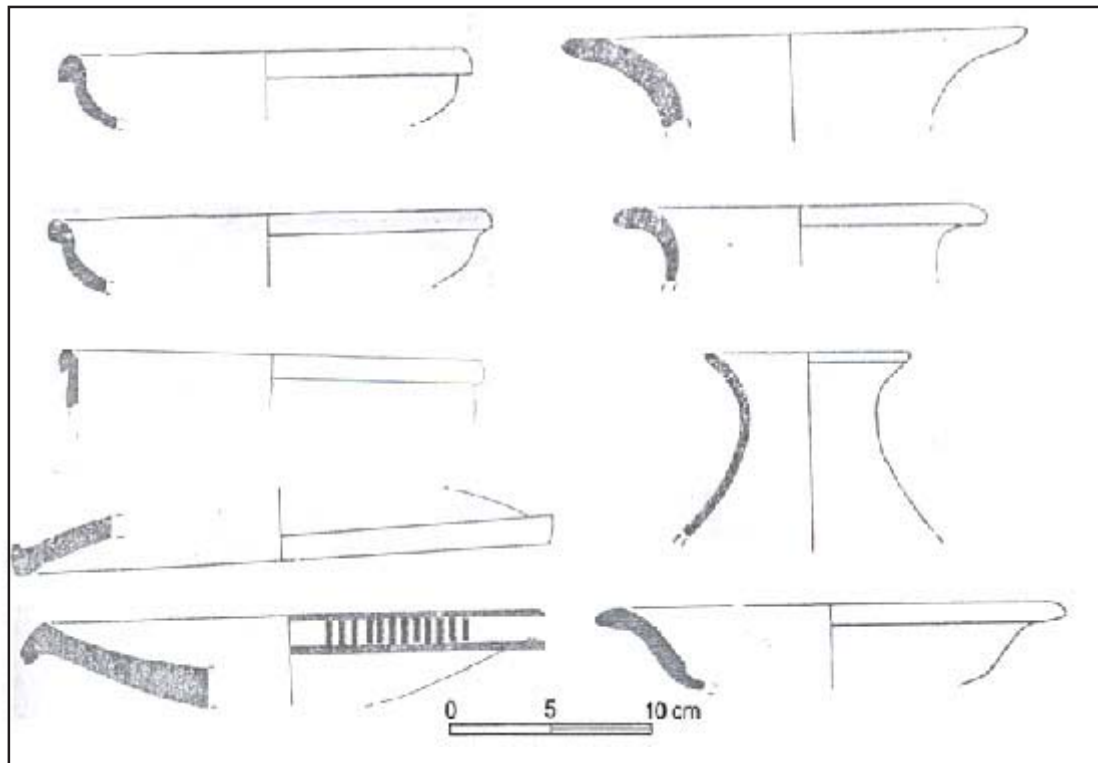
The site of Jandori-1 (Lat. 31.34°N; Long. 76.45°E) is on an interfluvial Siwalik surface between the streams Jandori-Khad and Sakrun-Di-Khad on Punjab/ Himachal borders near Darauli (Punjab) (pl.40). A large number of stone artefacts were found spread on its

Fig. 7



Explorations on the Chautang river valley, Haryana

Figs. 8-9



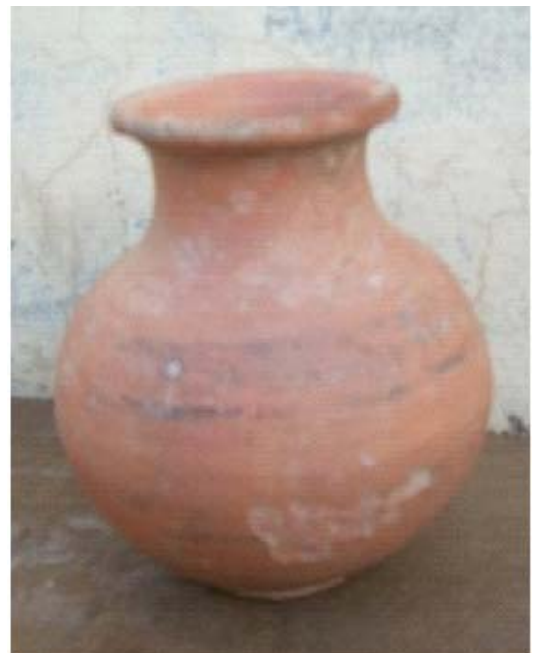
Late Harappan ceramic types



33



34



35

Rattak : 33, Late Harappan pottery; 34, spouted pot; 35, red polished pot, See p. 37



36



37

Deeg : 36, Early Harappan ceramic types; 37, potsherds, Late Harappan, See p. 37



38



39

Deeg : 38, PGW pottery; 39, terracotta beads, See p. 37

right side with weathered potsherds embedded here and there. The lithic specimens are of Soanian type flaked and detached pieces, ring stones, some Hoabinhian types and edge-ground flakes (**pl.41**). The assemblage from this site contains 35.5% flaked and 64.5% detached pieces. There were some 29% uni-marginal/ uni-facial choppers and 7.5% bi-marginal choppers. The flake tool category possesses 10.3% Levalloisian element. Besides, scrapers, borers, chisels, flaring types, blade-flakes, backed knives, borers, cutting-tools fabricated on flakes as well as edge-ground flakes are also found. This assemblage can also be assignable to mid-Holocene period of ring-stones which are available from neolithic to Harappan times. Dola site (Lat. 31.29°N; Long. 76.50°E) is also on an interfluvial surface of mid-Siwalik badland rocks between the streams Dhru-Di-Khad and Barara-Khad on Ganguwal-Guru Ka Lahore road. The stone tools, potsherds and pebbles were collected from the rain-gully of the site. The total 465 stone tools along with number of late-Harappan potsherds as identified from the rims of black and ware potsherds (**pl.42**). The lithic assemblage contains 9.1% cores and tools made on them, 2.4% chopper/ chopping tools 45.8% flakes/ flake tools along with sufficient shatter/ debitage (42.7%) with a size range of 2cm to 7cm. This appears to be an abandoned site complex of late Harappans. Dhrot-Nainowal site (Lat. 31.26° N; Long. 76.54° E) is situated on the left bank of Dhrot-Nainowal stream near Nainowal village on Anandpur Sahib-Dhrot road. Out of 681 lithic artefacts (**pl.43**) collected from the lowest and 2 upper terraces of this stream, 41.7% were flaked pieces, 42.44% flakes and flake tools and 15.86% the debitage pieces. Pitted cobbles (**pl.44**) are a new tool type collected from the terraces of river Satluj near Nangal (dated to mid-holocene by using OSL method).

16. EXPLORATIONS IN KINNAUR, DISTRICT KINNAUR

Kinnaur district (Lat. 31.58°N; Long. 78.41°E) is the north east part of Himachal Pradesh situated between an altitude of 2,320 to 6,816m ASL. It borders Uttarakhand towards south-east district of Kullu on the west, Lahul and Spiti districts towards north west and Tibet in the east respectively. It is surrounded by three mountain ranges of Zaskar, Dhauldhara and Himalaya enclosing the valleys of Satluj, Spiti and Baspa and their tributaries.

The field investigation was carried out under the direction of Vinod Nautiyal of the Department of Ancient Indian History, Culture and Archaeology, HNB Garhwal University, Srinagar, Garhwal, Uttarakhand jointly with the Himachal State Museum, Shimla assisted by senior faculty and technical staff of the Department namely R.C. Bhatt, Pradeep M. Saklani, Jagdish Singh Rawat and Mukesh Bahuguna, Sudhir Nautiyal and Hari Chauhan, Punya Chand Negi and Rajesh Sehgal from Himachal State Museum, Shimla, to explore the archaeological sites in the region and also to assess their potentiality for excavation in future. The details of archaeological sites explored are as follows.

The archaeological site at Kanam (Lat. 31°40'42"N; Long.78°27'3"E) is located at an altitude of 2800m on a steep slope of the hill towards west of the village on the right flank of the Satluj river. The exploration around the site yielded a few fragments of red ware and grey ware pottery, some fragment of bones and pottery along with charcoal, etc. recovered from the exposed gravel deposit. On further clearing the fallen debris on the slope was found, a partially damaged cist burial (**pl.45**) at the depth of 70cm measuring 1.27m long and 44cm wide on northern end and 65cm on



40

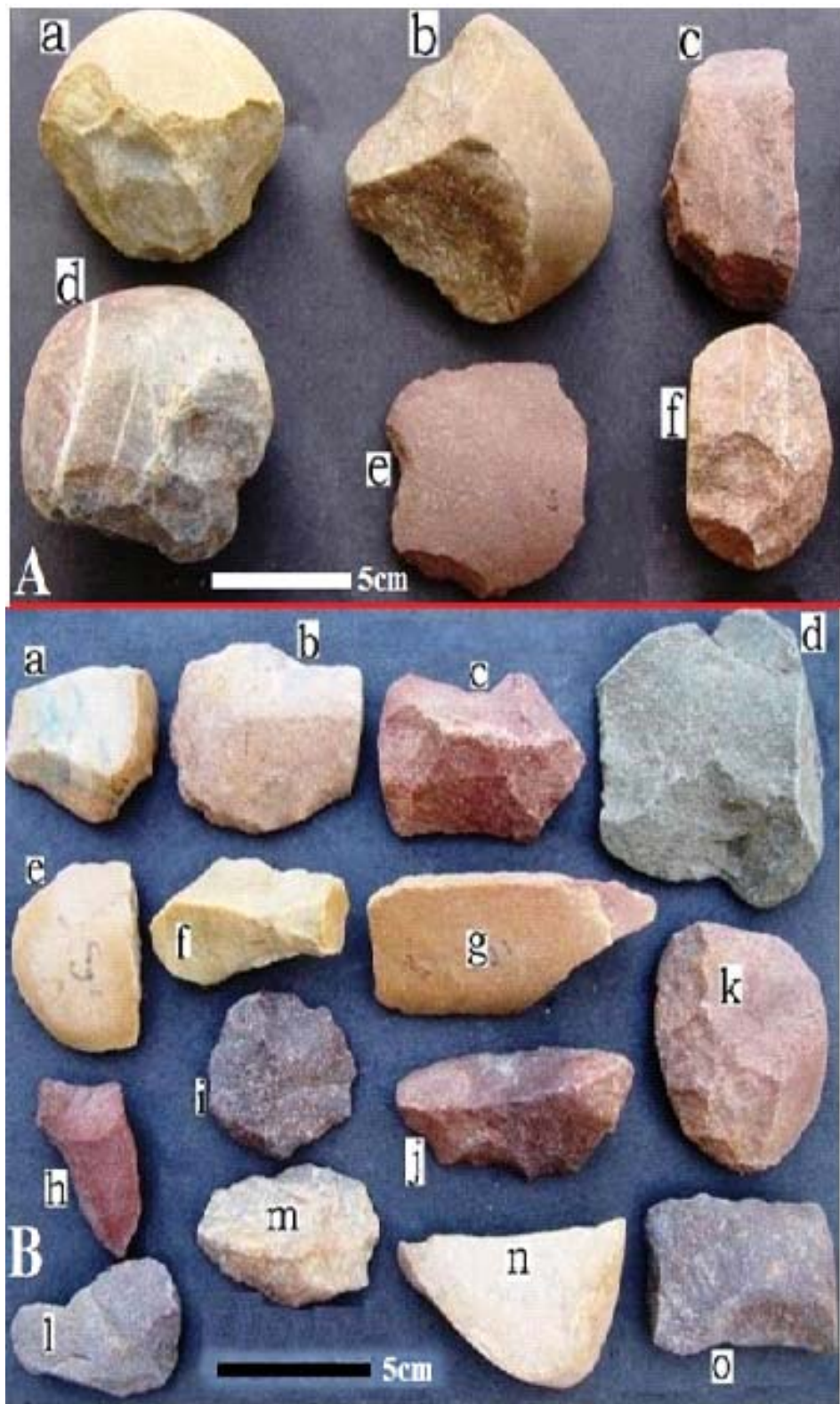


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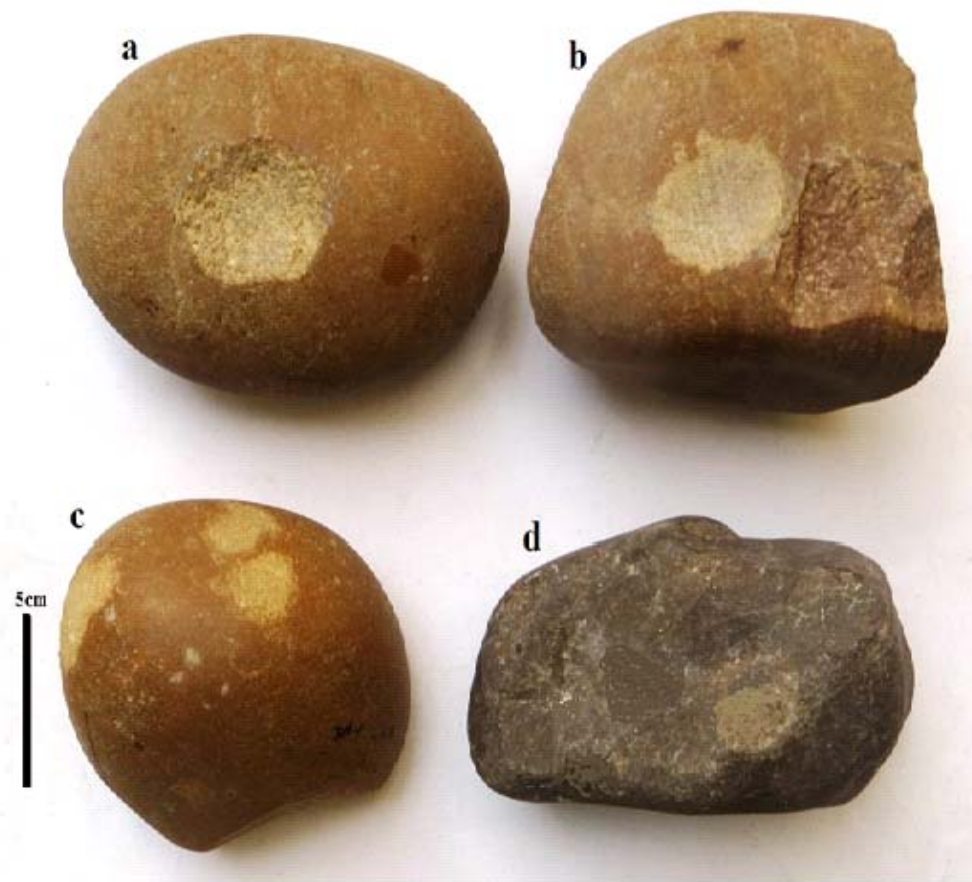
Jandori-1: 40, interfluvial site; 41, lithic tools, See pp.37 and 43



Dola : (A) core and flake tools; (B) red ware and black and red wares, See p. 43



Dhrot-Nainowal : stone artefacts, See p. 43



Nangal: Pitted cobbles, See p. 43

southern end with three orthostats and capstones to partially cover the cist. The human skeleton is laid with its head towards south with both the forearms placed across each other wearing two copper bangles with fasteners on the left arm and one bangle on the right arm. The long limb bones (Femur, Tibia and Fibula) are quite long and sturdy. The human skeletal remains examined by Veena Mushrif, Deccan College, Pune and has been identified as of a male of c. 50+ years. The grave goods includes a long necked red ware globular vase pot (pl.46) on the right side of the skeleton horn of either of a sheep or goat, glazed micro beads made on semi-precious stone and steatite (pl.48). A large

number of iron tools (pl.47) including knife, sickle and nails heavily encrusted with sand and silt were also found. Based on the Radiocarbon and OSL dates, obtained from BSIP, Lucknow and Physical Research Laboratory, Ahmedabad respectively, the burial site of Kanam may be placed between c. 500BCE-300BCE. The find of human burial for the first time in Kanam is significant, therefore, confirming that the ancient burial culture was prevalent in the inner Kinnaur region of Himachal Pradesh between 500BC till 300 BC as it was found in Malari in Garhwal, Uttarakhand, Mustang in Nepal and western Tibet.

The archaeological sites of Lippa (Lat.31°39'56"N; Long.78°72'98"E) is situated on the confluence of Kerang Khadd and Taiti streams at an altitude of 2745m in Pooh Mandal in Morang division about 42km from district headquarters of Rekong Peo. No archaeological work has been done so far, except the Buddhist monastery at Lippa has been well documented by Survey in 1998-99. The site of Lippa finds the first reference in the travelogue of Rahul Sankrityayan, entitled "*Kinner Pradesh Mein*" wherein he reports some human remains and pottery. The present exploration assumes significance because of the findings of two burial sites for the first time. Towards the west of village on a steep slope some pottery fragments of red and grey ware have been found. Towards the north of the village called Lippa Chakra were found a few orthostats of cist with pottery and bones along with some pieces of charcoal have been recovered from the slope of the hill which was being prepared for raising the apple orchard. Among the other finds from the site are the two small highly vitrified clay crucibles. The first crucible is of thin walled, rimless and almost convex in shape. The another one is a shallow crucible with a large opening on another side. It suggests that these must have been heated under high temperature. A number of glazed steatite micro beads along with the other beads made on semiprecious stone and shell were recovered. The steatite beads measure in the range from 4.32mm to 14.8mm in length with diameter between 3.40mm to 9.9mm. This is for the first time such steatite and shell beads have been found from western Himalaya.

The site of Rarang (Lat. 31°36'37"N; Long.78°21'31"E) is located at an altitude of 2666m ASL. 10km from Akpa on the right flank of rivers Satlej and 15km south of Lippa. A cist was found at the depth of 1.40m by villagers during the construction of a house right in

the heart of the village. A small in size (1.30 x 0.45m) which has been made for burying a child. Though the bones have been thrown away by villagers but a pot which was also found in the cist was kept safe. It is a medium sized vase of red ware with handles on both the sides with decorated ridge on the junction of neck and body. A few more capstones of the cist have also been found hanging on the exposed hill slopes suggesting Rarang to be an important archaeological site like Lippa and Kanam for future exploration and excavation.

Thangi (Lat.31° 33'10.47"N; Long. 78° 28'49.57" E) is a large village on the right flank of river Thidong, a tributary of Satleuj and 13km from Moorang on the way to Khimokhul pass on Tibetan border. Recently some villagers while preparing terraces for apple orchard in a steep slope of the hills found a cist burial with a human skeletal remains and pottery. But unfortunately it was found that the cist was completely destroyed and the stones of the cist were used for making the wall of the terraces, however a small skull and a miniature vase (pl.49) was retrieved from the site.

Ropa (Lat. 31°47'52.83"N; Long. 78° 25'15.20"E) is situated on the bank of the rivulet Rupagad at an altitude of 3090m ASL in the Pooh sub division. The burial sites are spread around an area of 5sq km as some of the orthostats or capstones were found exposed on the steep slopes of the hill. Total eighteen vessels of different shape and size were retrieved while raising the terraces for apple orchard by villagers. The repertoire of pottery include wheel made large sized grey and red ware pots with long neck, small vases, cups and a wide mouthed deep vessels with flat round base and handles on both the sides on the body. The pots discovered from Ropa are very unique in shape, size and therefore reflects a unique pottery tradition in Kinnaur region of Himachal Pradesh. A large

number of marine shell beads have also been found inside a pot.

JHARKHAND

17. EXPLORATIONS IN DISTRICT KHUNTI

The Ranchi Circle of the Survey carried out explorations in district Khunti under the direction of N.G. Nikoshey assisted by Abdul Arif, Jaishankar Naik and K.K. Jha located two new sites of archaeological potentiality. Village Sinni (Lat. 22°49'40"N; Long. 85°11'21"E) of Dumangdari in Torpa block is located 45km from its district headquarters Khunti. The scattered remains of a temple, locally known as Mahadevasthal is situated on a triangle flat valley in between the confluence of two seasonal streams Karo and Banei river. The temple made

of granite stones are scattered in three clusters within an area of 20 x 30m amidst the thick vegetation. Besides, a Siva-linga and a circular *yonipitha* along with images of Nandi, Ganesa and damsels are also found. Village Fatka (Lat. 22°49'30"N; Long. 85°10'11"E) of Dumangdari in Torpa block is located 42km from its district headquarters Khunti. The village is significant for the megalithic remains (pl.52) of numerous menhirs and cap stones (flat stone slab) distributed in three clusters. The megalithic burials of the site are mainly two types- menhir with a cap stone and menhir without capstone. The height of the menhir is ranging from 60cm to 170cm. The length of the cap stone slab either rectangular or roughly oval, ranging from 50cm to 150cm.

Plate 45



Kanam : human skeleton with grave goods from cist burial, See p. 43



46



47

Kanam : 46-47, high necked globular vase, iron implements from burial, See p. 47



48



49

Kanam : 48, semiprecious stone beads; Thangi : 49, A. skull, B. miniature vase, See pp.47 and 48

18. EXCAVATION AT ITKHORI, DISTRICT CHATRA

In continuation of the previous year's excavations, the work continued under the direction of N.G. Nikoshey assisted by Abdul Arif, Jaishankar Naik, K.K. Jha, M.K. Brahmchari and Mukesh Ekka. The excavation was carried out in three different localities of the mounds (Lat. 24°17'32"N; Long. 85°08'27"E). The main objectives of excavation of this mound was to know the ancient ruins of Bhadrakali temple area. The second mound at Kanunia Mai temple selected for excavation to know the cultural sequence of the site and third mound at Bhadrakali temple locally known as Chulahartand area had been taken for the excavation work (pls. 50-51). During the course of excavation three different places at Itkhori, a good number of antiquities have been recovered datable to *circa* 9th-10th century C.E. Antiquities of stone sculptures, Ganesa, Visnu, Saraswati, Mahisasurmardini, *yonipitha*, *amalaka* (broken), architectural members, terracotta beads, hop-scotch, ear ornament, semiprecious stone beads, iron rings, copper bangles, bronze bangles, arrow head, chisel, knife, sickle, nails are noteworthy.

The ceramic industry comprises the red ware and red slipped ware. Red ware fragment, were of medium and coarse varieties. The dull red colour of the pottery that has been rarely shined. The fabric of all types was mostly gritty and porous due to impurity of clay and mixing of organic material grass, husk and mixed sand also for tempering. Well levigated fine clay was rarely used for making pottery. Except for a few cases, the pottery was not well-fired. In some cases, patches of red and black colour were visible that suggest that uneven firing has been done in the kiln. The pottery of the site is mostly wheel-made. Very few wares were made by hand includes jar, basin, vases, globular pots and *handis*. Bowls and dishes both shallow and deep, lids, decorated lamps (*dipakas*), decorated incised and stamped designs, miniature

ritualistic pots, knife-edge bowls, spouted pots are the main shapes of potteries which were recovered in the excavation.

KARNATAKA

19. EXPLORATIONS IN AND AROUND BADAMI REGION

Problem oriented explorations have been conducted in and around the main settlement of the present Badami area by Excavation Branch-VI, Mysore of the Survey to know about the palace complex of the Chalukyas of Badami. An initial survey conducted in the northern and southern hillock area at Badami has given clear picture of the inner as well as the outer fortification constructed right from the Chalukyas to late medieval period. During the course of exploration, few brick structures of medieval period were noticed within inner fortification of the northern and southern hillock area. The brick sizes measure 23 x 14 x 5cm and 17 x 14 x 5cm Besides a rock shelter with red ochre paintings has also been discovered at Banappana Saro (Lat. 14°28'46"N; Long. 75°48'06"E) on the western side of the northern hillock in Badami (pl.53). It depicts a hunting scene. The representations include a decorated deer, a tiger. The pointed face of spotted deer is clearly drawn without any facial features and the horns are very clear and broad (pl.54). It has a long body having long and round neck and both the front and hind legs are long with beautiful knee curves. The center part of the body of the animal figure is decorated with spots. The tail is pointed and turned upward. It measures approximately 90cm long and 35cm width. The tiger is represented on the northern side of the rock shelter, shown lying on the floor like thing is partly visible and facing the deer. It is one of the most outstanding rock paintings recently discovered in the northern hill-ock area at Badami.



50



51

Itkhori : 50, view of the site; 51, exposed structures, See pp. 52



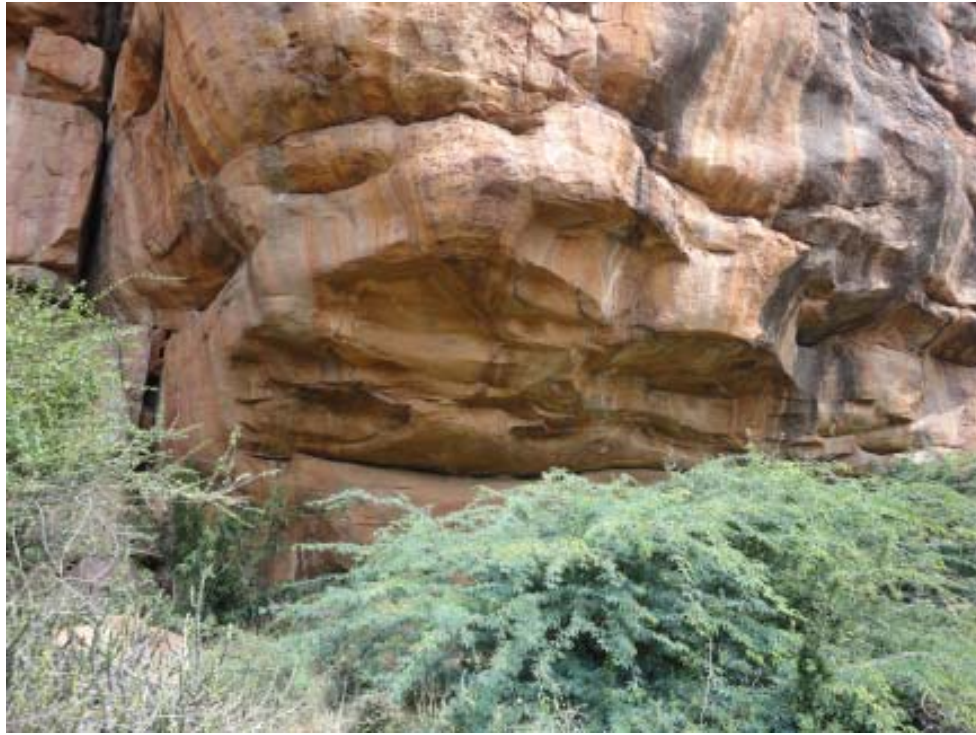
Fatka : megaliths, See p.49

20. EXCAVATION AT NOBLEMAN'S QUARTERS 22C, HAMPI, DISTRICT BELLARY

The Department of Archaeology, Museums and Heritage, Government of Karnataka carried out excavations at Hampi (Lat.15°10'9"N; Long.76°28'10"E) in Hospet Taluk under the direction of R. Gopal assisted by T. S. Gangadhara of the Department of Archaeology, Museums and Heritage, C. S. Vasudevan of Department of Ancient History and Archaeology, Kannada University, Hampi and Manja Nayka, Department of Archaeology, Museums and Heritage and laid bare the plan of the medieval structures as well as retrieved many antiquities. In order to know the full plan of the structure NMQ-22A, the area in front of this structure namely NMQ-22A having a spacious central hall surrounded by an en-

closure wall, trenches was laid on the eastern side abutting the exposed structure and designated as NMQ-22C (pl.55).

An area of about 30 x 30m selected and 9 trenches were laid and up to a depth of 2m were excavated (pl.56). The excavation revealed rubble stone masonry wall of 26m length with a width of 1.50m running from west to south-east with four courses of stones was exposed. The wall is constructed without the use of any binding material. The stone blocks are placed one above the other. The exposed wall is quite disturbed with a couple upper courses being missing in one of the trenches situated very close to the main structure. The exposed wall is perpendicular to the wall of the structure at NMQ-22A. The latter wall having wash basin runs north-south. The wall culminates at the eastern side and



53



54

Badami : 53, painted rock-shelter; 54, painted spotted deer; See p.52

joins a street running in north-south direction from Hazara Ramachandra temple and palace complex. The eastern end of the wall is to be fully exposed. The colour of the soil is generally black which is interspersed with ash. In some trenches ashy layers were encountered, while some have brown soil.

The dump of potsherds were encountered in trenches suggesting that this area was deliberately used as a dumping ground. About one meter from such a dump, lime plastered flooring was met with. As such this west to south-east wall appears to be an enclosure wall for a passage leading to the structure at NMQ-22A from the street as this passage directly leads to the protected doorway.

During the course of excavations potsherds of black, red, grey and buff colour having various shapes, sizes were recovered. Some of the potsherds have stamped and incised designs on the neck portion. A miniature black coloured pot was recovered.

The other antiquities that were recovered from the excavation include miniature sculptures of deities like terracotta Ganesa of stylistic in nature. This type of Ganesa sculptures are made out from a lump of clay for worship. However in this case it is burnt and a coat of black slip is given. Five miniature Siva-lingas made out of soap stones were recovered. All the three portions viz., Brahma, Visnu and *rudra bhagas* are found in these Siva-lingas. Two broken Naga stones were found.

Nineteen pieces of bangles made of glass were recovered from excavation. Due to the fragile condition of the material, the bangles are broken and found in pieces only. The bangles were generally plano-convex and a few flat bangles were also recovered. The black coloured bangles outnumber the other coloured bangles. The different colours of bangle include black, yellow, white, grey, whitish-grey, blue, etc. The embossed dots, line designs, floral designs, pinched design and

criss-cross designs were found on the bangle (pls. 57-58).

Altogether eight beads having cylindrical, bi-cone, round and bulbous shapes recovered are made of stone and terracotta (pl. 59). The colours of the beads are black as well as red. The beads have perforations for inserting thread into it. Two damaged weather worn copper coins were found (pl. 60). The legends and other details were effaced. Thirtythree shells of cowries recovered are usually smooth and shiny and more or less egg-shaped, with a flat under surface which shows a long, narrow, slit like opening (aperture), which is often toothed at the edges. The weight of the cowries varies from 0.5gm to 2gm. The cowries recovered from excavations have varied colours like white, yellowish-white, cream and reddish-white. The metal objects found in the excavation include the materials like copper and iron. The copper object includes a jingle-bell, finger-ring and broken bangle, while the ten rusted nails and head of the nails and rusted sickle include the iron objects. Most of the iron objects are poorly preserved. The nails are round, elongated and flat in shape. Altogether twentyfive pencils of different varieties both in shape and colour were recovered. These pencils would have been used for writing purpose. These pencils are elongated, short, squat, flat rectangular, cylindrical and conical and round in shape. From the excavations, a few pieces of porcelain were found (pl.61). The porcelains are generally white in colour with blue and red coloured line and floral designs that are found both on the interior and exterior surfaces. On a porcelain piece, Portuguese letters are noticed. One piece of burnt areca-nut or *supari* was recovered. A few bones and teeth of animals were found in the excavation.

The structures that were exposed and recovered antiquities during the course of excavation belong to medieval period, from early Vijayanagara to the Vijayanagara period, i.e. c. 14th-16th century C.E.



55



56

Hampi :55, view of the site before excavation; 56, excavated trenches, See p.54



57



58

Hampi : 57, shell ring pieces; 58, bangle pieces, See p.56



59



60

Hampi : 59, beads; 60, copper coins, See p.56



Hampi : porcelain pieces, See p.56

MADHYA PRADESH

21. SCIENTIFIC CLEARANCE AT KHAJURAHO, DISTRICT CHHATARPUR

A Memorandum of Understanding (MoU) has been signed between the Survey and Indian Oil Foundation (IOF) for redevelopment of world heritage site i.e. Khajuraho group of monuments. In the said project, an area has been identified around the western groups, the eastern group and the southern group of temples where proposed project of providing tourist amenities is to commence. The detailed survey GPR was conducted by the To Jo-Vikas International Pvt. Ltd., New Delhi through IOF under NCF-IOF-ASI project. The main objectives of scientific clearance of said area is to con-

firm whether the area possess any archaeological remains. The Eastern group of monuments, comprising Vamana temple (Area A8), Javari temple and Brahma temple are located on north-east corner of the Khajur Sagar lake and back of Vamana temple. There are two archaeological mounds towards north of proposed area of excavation and the same would be untouched from the development activities. These mounds perhaps having some temple remains as some components of the temple lying on the surface. The area proposed for excavation was marked as A8 in GPR survey. Three trenches have been laid out from west to east and each trench numbered as A8-1, A8-2 and A8-3 respectively. A modern structure of drain has been exposed in A8-1/1 at the depth of 30cm from surface. The said structure was

built using old dressed and undressed stone blocks for irrigation purpose. Except few boulders no cultural remains were noticed. In continuation of the same project an area has been selected for excavation in the precinct of Dulhadev temple (Area A14). The said anomalies are spreading in garden area of the temple, below the metalled road, close to the outer of boundary wall. Therefore an area of 2 x 2m between existing boundary wall and the metalled road has been selected for excavation to confirm the remains which indicated in GPR survey. Up to the depth of 100cm nothing was noticed. The deposit up to this level is filling material was excavated for the foundation of boundary wall. After this level two rock boulders (probably rock out crop) no other culture remains were notice in this area. A trench of 10 x 10m in Area A13 was laid out for excavation. Two quadrants of same trench are coming inside the boundary wall while two are located outside. The quadrants 1 and 4 of the said trench excavated at the depth of 65cm and bed rock was completely exposed. The deposit is of natural and nothing was found during the course of excavation. Newly acquired area (Area A20) near bus stand of Khajuraho proposed for Yatri Niwas was also included in for scientific clearance work to confirm the anomalies indicated in GPR survey. After surface clearance of the said area three trenches of 10 x 10m were taken for layout. But no cultural remains were noticed. Parking and ticket counters are proposed for the western group of monuments in the newly acquired land (Area A4) close to the Chausath Yogini temple (100m beyond toward east of the temple). But no cultural remains were noticed.

22. EXCAVATIONS AT DHANSI, DISTRICT HOSHANGABAD

The Department of Archaeology and Ancient History, the Maharaja Sayajirao University of

Baroda, carried out excavations at Dhansi under the direction of K. Krishnan and the team included Parth Chauhan from Stone Age Institute, Indiana with students from the Maharaja Sayajirao University of Baroda. Some of the students from Deccan College, Pune also participated in the excavation for a short period of time. The village of Dhansi located at Latitude: 22°47'N; Longitude: 77°37'E, in Hoshangabad district, (**fig.10**) is on the southern bank of Narmada and the archaeological evidence is on north and northeast of the village. The presence of artefacts at this site was first observed at the bottom of a 15m section, by a team which surveyed this region in 2007 (Patnaik *et. al.* 2007). The Surajkund formation that rests over the Dhansi formation is nearly 2m thick. From this section the GSI obtained evidence of a polarity reversal using palaeomagnetic dating (Rao *et. al.* 1997). Based on these data, the GSI concluded that the sediments below the Surajkund formation are datable to at least 0.78m and were labeled as the Dhansi formation by them. The entire 15m section at the Dhansi site comprises alternating layers of sand and clay (**fig. 11**). In certain other localities besides the sand-clay intercalations thin lenses of pebbles are observable. All artefacts at this site are coming from a pebble horizon which we are referring to as the pebble and artefact horizon (PAH) at the bottom of this section or about 13m down from the surface and about two meters above the water level. The thickness of the PAH varies from five to twenty centimeters and is unconsolidated on top and cemented on the bottom by calcium carbonate. One large step-trench was laid from the top of the 15m section up to the contact zone between the red clay and the yellow sand or about 10m from the top ground level. Another five meters is yet to be dug here up to the water level. This step-trench is two metres wide and was excavated for multiple purposes: (i) to clarify the

detailed stratigraphy of the entire type section of Dhansi formation, (ii) to verify if there are any artefacts or fossils above the PAH, (iii) to expose the strata for proper sampling without any contamination for relative and absolute dating, high-resolution sedimentology and palaeoenvironmental reconstructions. Sediment samples from the entire section for ancient pollen analysis were collected by M. R. Rao and P. Verma of BSIP, Lucknow and luminescence dating by P. Morthekai of National Geophysical Research Institute, Hyderabad. During the excavation of the step-trench, no artefacts or fossils were encountered from the strata above the PAH. Therefore, the sediments of the step-trench above the PAH would be primarily of geological in nature.

In addition to the step-trenching, two archaeological trenches, 2 x 2m each were laid out, located towards the north of the step-trench within a 10m distance. The archaeological trenches are labelled as ET-1 and ET-2 (fig. 12), respectively. The purpose of these two test-trenches was to record *in situ* artefacts from the PAH and understand their spatial patterning, if any. We also aimed to recover any possible fossil material since a weathered herbivore tooth was found earlier from the same context (Patnaik *et. al.* 2009).

Results in ET-1: We removed all fine sediments above the PAH. Our main goal during this season in this trench was to expose an area of 4m² of the surface of the PAH to document the density of the pebbles, artefacts and other material, if any, such as fossils, using both graphical and photographic methods. All artefacts and associated lithic materials which could help us in reconstructing the lithic technology of the cultural level on the PAH, were also photographed, mapped and collected through gridding and 'pinning'. Within the collected materials, there are a few potential artefacts and a certain amount

of debitage, whose nature and other characteristic features are currently under study. Once all main specimens were collected from the surface of the PAH, we covered the PAH so that it does not undergo any destruction.

Results in ET-2: In this trench all artefacts were found on the surface of the PAH (pl.62) and also within the PAH and never within the cemented calcium carbonate or clay below the PAH. It may be noted that most of the artefact specimens were fresh indicating minimal fluvial transport. The frequency of artefacts in each square was not highly varied (information below). The other associated materials included pebbles and/ or angular clasts.

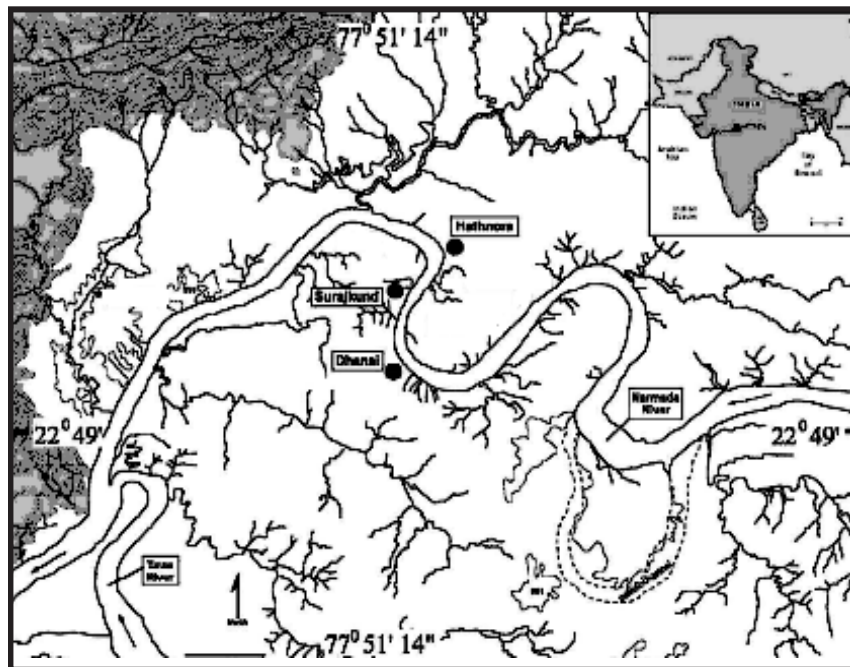
Step-trench: The step-trench was laid perpendicular to the river at the type-section to study the geological and archaeological nature of the sediments. This is achieved by recording its *in situ* orientation, degree of sorting of detritals and pebbles and other characteristic features.

High resolution sampling will be done to

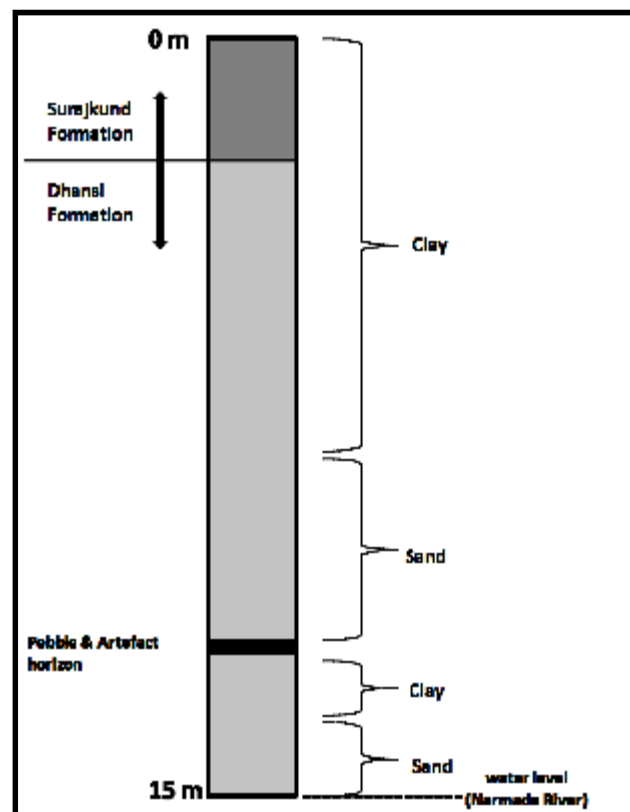
SQUARE	TOTAL SPECIMENS (Pebbles & artefacts)
A4	500
B4	551
C4	467

collect sediments from these strata at 2cm intervals after the current rainy season. These samples are to be subjected to various analyses, such as, granulometric study, magnetic susceptibility, etc. The sand horizons are semi-consolidated and mottled, and do not contain carbonate nodules. This indicates different levels of pedogenesis on the clay 9 of 14 strata than the sand horizons. The strata are disturbed at various places by different levels of depositional weathering and erosional processes and

Figs 10-11



10



11

Dhansi : 10, location map; 11, stratigraphy of section

Fig. 12



Location of the 3 trenches at the Dhansi site. scale: ET-1 and ET-2 are 4m² each.

Plate 62



Dhansi : close up of an in situ flake within Trench ET-2, See p.62

also preserve evidence of bio-turbation such as insect burrowing, root activity etc.

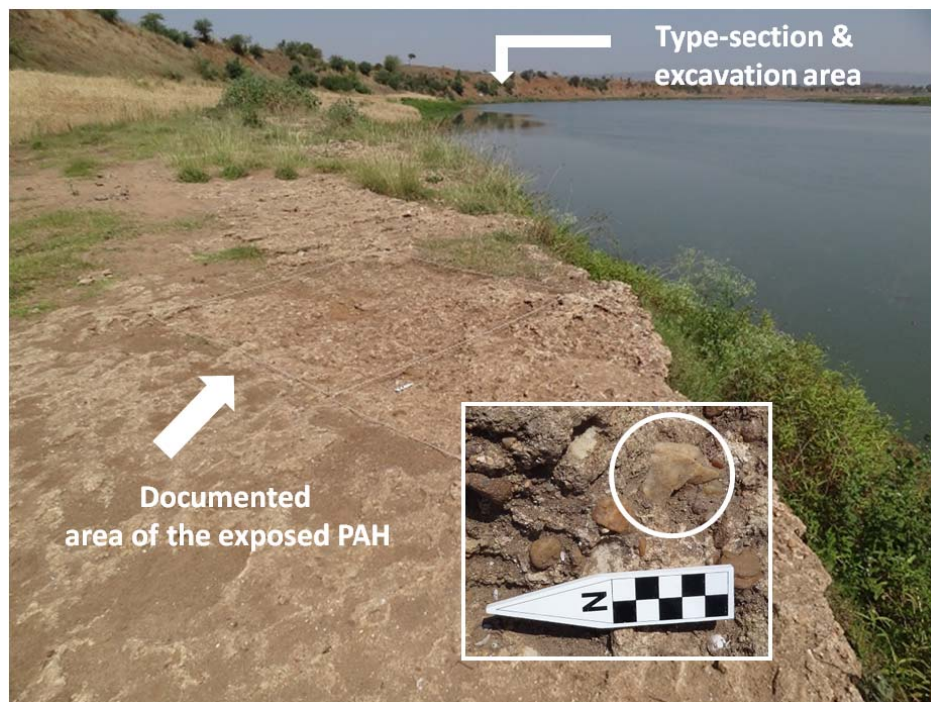
Both of the archaeological trenches ET-1 and ET-2 were oriented along north-south transect and the stratigraphy in both trenches is generally similar. The primary sediment in both archaeological trenches is characterized by yellow/ orange/ grey mottled sand. At the type section, this mottled sand unit contains only one main pebble horizon, the PAH. The top part of the PAH is unconsolidated while the bottom most pebbles and artefacts in the PAH are part of a cemented calcium carbonate matrix. This cemented deposit is very thin and is then followed by a paleosol that varies in thickness from 5 to 25cm at places under the PAH. Through the three gridded squares, we excavated a total of 7500cm which yielded an average of about 506 specimens (pebbles and artefacts combined) per square.

In addition to the artefacts recovered from the excavated trenches, 85 specimens were collected from the exposed PAH out of which at least 50 are clear artefacts including flakes, flake fragments and one fragment of a possible discoidal core or tool butt. All of these specimens were located very close to the excavated trenches along the same line *in situ*. In addition to the artefacts, some fragments of a vertebrate fossil were also observed *in situ* in the PAH and collected. Although its quantity and state of preservation are small and poor, they suggest the possibility of encountering more fossil material in the future within the locality. Along with the herbivore tooth found earlier (Patnaik *et. al.* 2009), these fragments appear to be the only known early pleistocene vertebrate fossils from south of the Siwalik hills. The current direction of the river is much thicker than the thin cemented deposit under the PAH at the type section. At this location, we plotted potential artefacts in a 1 x 1m grid

to compare the artefact frequency with the PAH in the excavated area (pls.63-64). Each square was photographed individually with *in situ* artefacts. However, a detailed techno-morphological comparison between the flakes from Dhansi and known biface thinning flakes is required to identify the cultural affinities of the former artefacts. Almost all artefacts at Dhansi are restricted to ten centimetres in length and are often larger than the associated pebbles they are found with. The flake types include primary, secondary and tertiary specimens reflecting sequential knapping from cores. The dominant raw material is quartzite which occurs in variable qualities and colours and specimens made on chert and quartz were also noted. This makes us suppose that early pleistocene hominins in this region were exploiting a variety of stone raw materials. Assemblage composition of specimens that were individually documented and separated in trench ET- 2 within 50 x 50cm (within excavated squares only). This excludes the majority of the pebbles. Due to our slow and meticulous exposure of the PAH deposit, it was not always clear if a particular specimen was a broken pebble or an artefact. Hence all such doubtful specimens were documented and kept separate for subsequent verification in the laboratory. Below is the outcome of this verification, separation and classification. From the above described distribution context of artefacts, its stratigraphy and stratigraphic correlation with the previously dated vertical section of Dhansi, it can be stated that the artefacts belong to the early pleistocene epoch. No clear Acheulian characters was encountered so far in this deposit.

23. EXPLORATIONS OF DECORATED ROCK SHELTERS IN THE GAWILGARH HILLS, DISTRICT BETUL

In continuation with previous year's work, the Prehistory Branch together with the Exca-



63



64

Dhansi : 63, close-up of an in situ artefact; 64, flakes, See p.65

EXPLORATIONS AND EXCAVATIONS

	A4	B4	C4	TOTALS
Flake	4	4	2	10
Clast or pebble	1	5	1	7
Flake fragment	1	1	0	2
Flake(?)	3	5	4	12
Angular fragment	2	2	0	4
Un-diagnostic	1	0	5	6
Angular pebble	1	0	0	1
Angular flake	1	0	0	1
Split pebble	0	1	0	1
Pebble fragment	0	1	0	1
Pebble	0	0	2	2

vation Branch-I of the Survey, Nagpur under the direction of Nandini Bhattacharya Sahu assisted by Gajanan Laxmanrao Katade, Vijay Gedam and Ekta Dharkar, K.M.Girhe, Indira Tiwari, N. K. Nimje, P. S. Pashine, R.D. Deshpande, T.B.Thapa, M.S. Kadhao and Kapil Chutele of the Prehistory Branch and Prabash Sahu, Rajesh Mehar, H.J. Barapatre, Bhaskar Bhoyar, Pabitra Mohan Barik, M.R. Kambe, Mehtab Alam and Kartik Mudaliar of the Excavation Branch-I, Nagpur continued with the exploration and documentation of decorated rock shelters in the Gawilgarh hills of the Satpura mountain ranges, in the Multai and Atner tehsils of Betul district of Madhya Pradesh.

The team discovered 155 decorated rock shelters in the Gawilgarh hills inside the Satkund and Dabka reserve forest areas bordering the Amaravati district of Maharashtra. The work was undertaken as a part of the village to village archaeological investigations in the Tapti Purna valley yielded these decorated rock shelters which were hitherto unknown in the cen-

tral region of the country.

The decorated rock shelters have been divided into twenty groups and their nomenclature derived from either the village nearby or any shrine or locally known landscape of the area. The groups so named are Ambadevi (ABD) group named after the present shrine - fourteen shelters, Agya Doh (AGD)- one shelter, Borkap (BKP)- three shelters, Ghodamma (GMA)- one shelter, Gaimukh (GMK)- eighteen shelters, Ghorpend (GPD)-five shelters, Jhunkari (JNK)- two shelters, Kosumb Gufa (KMG)- five shelters, Kund (KND)- seven shelters, Kukadsadev (KSD)- eleven shelters, Mendhagarh (MDG)- ten shelters, Mungsadev (MSD)- one shelter, Pat (PAT)- twentyfour shelters, Pachmuh (PCM)-three shelters, Pachumri (PMR)- five shelters, Ramgarh (RMG)- three shelters, Salbuldi (SBD)- twelve shelters, Telkan (TKN)- eleven shelters, Takira (TKR)- thirteen shelters and Ugum (UGM)- six shelters.

The decorations in the rock shelters of

Gawilgarh hills fall under two broad divisions; viz., pictographs executed in different colours like green, white, black, bluish black, yellow and different shades of red and petroglyphs comprising bruising, pecking, engraving and

cupules. The themes of decorations revolve around diverse forms of nature; flora and fauna; hunting scenes; war scenes and abstract geometric patterns (see Chart-II).

CHART-II

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
ABD 1 (pl. 66)	Lat. 21°24' 34.6" N; Long. 77°56' 58.2" E	South-west	Deep and shallow cupules, jungle scene	Stick human figures, humped bull, <i>barasingha</i> (pl.65), elephant, palm impression, hut and festoons
ABD 2	Lat. 21° 24'26.5" N; Long. 77° 57'01.5" E	West	Shallow cupules, Engraved panel of honeycomb, deer, humped bull, human figurines, tree and vulva (pl. 67)	Row of hollow diamonds, antelopes and geometric motifs
ABD 3	Lat. 21° 24'22.1" N; Long. 77° 57' 02" E	South-east	Deep cupules	Human figures
ABD 4	Lat. 21° 24'20.9" N; Long. 77° 57'04" E	South	- - -	Hunting of mongoose by harpoon, (pl.69) group of stick human figures, antelopes and geometric motifs
ABD 5	Lat. 21° 24'31.4"N; Long. 77° 57'04"E	West	Engraved female showing vulva, pecking of antelopes, human and circles	Honeycombs, palm impressions, antelope, goat and <i>langur</i>
ABD 6	Lat. 21° 24'23"N; Long. 77° 57'07.6"E	South	Engraved human figure with raised hands, vulva	Diamonds

EXPLORATIONS AND EXCAVATIONS

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
ABD 7	Lat. 21° 24'23.5"N; Long. 77° 57'09.8"E	West	Rows of shallow cupules	Honeycomb
ABD 8	Lat. 21° 24'18.18"N; Long. 77° 57'01.2"E	South-west	Human figures, elephant, bull and vulva	Feline attacking an animal, stick human figures, peacock, honeycombs, tree and jackfruit
ABD 9	Lat. 21° 24'23.2"N; Long. 77° 56'56.4"E	East	Deep cupules, engraved square-bodied animal and vulva	Bull, diamonds and honeycombs
ABD 10	Lat. 21°24'27.7"N; Long. 77°56'53" E	South-west	Bruising of animals	Bull, palm impression
ABD 11	Lat. 21°24'25.6"N; Long. 77°56'55.1"E	North	Bruising of an animal, engraving of vulva	Human figurines, humped bull and <i>sankhalipi</i> in white
ABD 12	Lat. 21°24'33.3"N; Long. 77°56'48.6"E	South	Deep cupules, engraving of human figurines and tree	Jackfruit
ABD 13	Lat. 21°24'28.3"N; Long. 77°56'47.3"E	East	Rows of shallow cupules	- - -
ABD 14	Lat. 21°24'13.1"N; Long. 77°56'57.5"E	South-west	- - -	Antelopes and human figurine
AGD	Lat. 21° 24'00"N; Long. 77° 54'11"E	North	- - -	War scenes, horse and elephant riders, swordsmen and drummers
BKP 1	Lat. 21° 25'45.2"N; Long. 77° 57'32.1"E	North-east	Deep cupules, engraved row of doe, stags one of which rubbing horns onto a tree, gaur and vulva	Hide of a spotted deer, doe in light green

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
BKP 2	Lat. 21° 25'45.3"N; Long. 77° 57'31"E	North-east	Deep cupules and vulva	- - -
BKP 3	Lat. 21° 25'35.9"N; Long. 77° 57'33.6" E	North	Engraved tree and vulva	Antelope
GMA	Lat. 21° 26'13.3"N; Long. 78° 02'54.2"E	North-west	- - -	Human figures
GMK 1	Lat. 21° 24'11.6"N; Long. 77° 54'28.4"E	North-west	- - -	Antelope
GMK 2	Lat. 21° 24'11.7"N; Long. 77° 54'28.8"E	North	- - -	Antelopes with long necks and honeycomb
GMK 3	Lat. 21° 24'8.2"N; Long. 77° 54'28.3"E	South	Deep and shallow cupules, human figure, vulva and geometric design	Human figures, antelope
GMK 4	Lat. 21° 24'06.4"N; Long. 77° 54'32.1"E	South-west	- - -	Animal figure
GMK 5	Lat. 21° 24'07.7"N; Long. 77° 54'36.1"E	North-west	Deep cupules in a row	Animal figures
GMK 6	Lat. 21° 24'06.5"N Long. 77° 54'30.5"E	West	- - -	A rectangular bodied animal
GMK 7	Lat. 21° 24'03.8"N; Long. 77° 54'36.8"E	South	- - -	Palm stencil by blower method, animal in orange colour in outline
GMK 8	Lat. 21° 24'02.1"N; Long. 77° 54'38.1"E	South-west	- - -	Animal with chequered body
GMK 9	Lat. 21° 24'02.6"N; Long. 77° 54'37.2"E	West	Deep cupules	Bull with filled in body
GMK 10	Lat. 21° 24'02"N; Long. 77° 54'38.5"E	West	Shallow cupules in half circle	Indistinct animals in white

EXPLORATIONS AND EXCAVATIONS

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
GMK 11	Lat. 21° 24'14.7"N; Long. 77° 54'32.9"E	West	Deep and shallow cupules, vulva and animal figures	Palm and animal figures
GMK 12	Lat. 21° 24'15.0"N; Long. 77° 54'31.8"E	West	Deep cupules and vulva	Geometric motif
GMK 13	Lat. 21° 24'10.2"N; Long. 77° 54'47.5"E	North-west	- - -	Sankhalipi in kaolinite
GMK 14	Lat. 21° 24'21.8"N; Long. 77° 54'38.2"E	South-east	- - -	Herd of animal and bull rider in red and horse with rider in black
GMK 15	Lat. 21° 24'22"N; Long. 77° 54'39"E	South-east	Deep and shallow cupules and vulva	- - -
GMK 16	Lat. 21° 24'23"N; Long. 77° 54'21"E	West	Rows of shallow cupules	- - -
GMK 17	Lat. 21° 24'25"N; Long. 77° 54'17"E	East	Rows of shallow cupules, bruising of animals, human figure and vulva	Indistinct animal figurine
GMK 18	Lat. 21° 24'33"N; Long. 77° 54'27"E	North	Rows of shallow cupules and pecked roundels	- - -
GPD 1	Lat. 21° 25'28"N; Long. 78° 00'14"E	East	Row of shallow cupules	- - -
GPD 2	Lat. 21° 25'22"N; Long. 78° 00'00"E	West	Deep cupule	Doe and palm impression
GPD 3	Lat. 21° 25'21"N; Long. 78° 00' 00" E	West	Humped bull	- - -
GPD 4	Lat. 21° 25'34"N; Long. 77° 58'59"E	East-North-east	Deep cupules	- - -
GPD 5	Lat. 21° 25'23"N; Long. 77° 59'51"E	West-North-west	Shallow cupules, humped bull	Stick human figure and animals (pl.72)
JNK 1	Lat. 21° 26'21"N; Long. 78° 03'10"E	East-North-east	Engraved herd of animals.	- - -

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
JNK 2	Lat.21° 26'26"N; Long.78° 03'23"E	West	Rows of shallow cupules.	- - -
KMG 1	Lat.21° 24'07"N; Long.77° 55'37"E	East-South-east	Deep cupules, tree, animal and tool sharpening marks.	Elephant, boar, antelopes, <i>nilgai</i> , antelope killed by a harpoon, tiger or other carnivorous felines with horn goat, tortoise, geometric patterns, honeycomb, animal hide, spoked wheel and a human figure painted in white with red outline
KMG 2	Lat.21° 24'07"N; Long.77° 55'30"E	South-South-west	Tool sharpening marks.	Stag struck by a barbed arrow, <i>langur</i> , antelopes, deer, <i>nilgai</i> , tortoise, honeycomb, fishing net, zigzag lines painted in different shades of red, man and animal painted in white
KMG 3	Lat.21° 24'09"N; Long.77° 55'25"E	South-west	- - -	Rhinoceros, deer, boar, stick human figure and geometric motifs
KMG 4	Lat.21° 24'10"N; Long.77° 52'27"E	South	Tree and vulva.	Animal with chequered body
KMG 5	Lat.21° 24'09"N; Long.77° 55'25"E	North-east	- - -	Stick human figure, animal with chequered body
KND 1	Lat.21° 25'49"N; Long.78° 01'16"E	North-east	- - -	Angular bands, animal
KND 2	Lat.21° 25'49"N; Long.78° 01'18"E	North-east	- - -	Geometric motifs, honeycomb, snake and animal

EXPLORATIONS AND EXCAVATIONS

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
KND 3	Lat.21° 25'50"N; Long.78° 01'19"E	South-west	Deep and shallow cupules	Man taming two animals, <i>nilgai</i> and tree
KND 4	Lat.21° 25'53"N; Long.78° 01'16"E	North	Deep and shallow cupules, herd of animals and vulva	Bull, bullock cart with spoked wheels, antelopes, long necked animals and doe
KND 5	Lat.21° 25'54"N; Long.78° 01'18"E	North	- - -	Human figures, antelope
KND 6	Lat.21° 25'54"N; Long.78° 01'20"E	North	- - -	Rows of Human figures and other animals
KND 7	Lat.21° 25'53"N; Long.78° 01'23"E	North	- - -	Animal figures.
KSD 1	Lat. 21° 24'14"N; Long. 77° 56'38"E	South	- - -	Illegible
KSD 2	Lat. 21° 24'27"N; Long.77° 56' 65"E	South	- - -	Stick human figures
KSD 3	Lat. 21° 24'24"N; Long.77° 56'64"E	South-east	Shallow engraving of board	Elephants, antelopes, fish, geometric motifs and palm
KSD 3A	Lat. 21° 24'24"N; Long. 77° 56'64"E	South-west	- - -	<i>Nilgai</i> , deer, antelope, tortoise, fish, palm, honeycomb and geometric motifs(pls.70-71)
KSD 4	Lat. 21° 24'23"N; Long. 77° 56'62"E	South	- - -	Herd of animals and palms
KSD 4A	Lat. 21° 24'24.3"N; Long. 77°56'60.2"E	West	- - -	<i>Nilgai</i> , snakes, chequered diamonds, landscape, antelope with elongated body
KSD 5	Lat. 21° 24'24.3"N; Long. 77°56'60.2"E	West	Engraved panel of honeycomb and vulva	<i>Nilgai</i> , snakes, chequered diamonds, landscape, antelope with elongated body

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
KSD 6	Lat. 21°24'12.2"N; Long. 77°56'36.2"E	North	Engraved Herd of gaurs and vulva and pecked deer (pl.68)	Stick humans, antelope, <i>langur</i> , donkey, palm and camel. Horse rider in white
KSD 7	Lat. 21°24'11.5"N; Long. 77°56'23.2"E	East	Pecking of a herd of deer	<i>Nilgai</i> , deer, antelope and rows of chequered diamonds
KSD 8	Lat. 21°24'25.4"N; Long. 77°56'68.0"E	East	- - -	Deer and goats
KSD 9	Lat. 21°24'24.4"N; Long. 77°56'68.0"E	South	- - -	Antelope, chequered diamond
MDG 1	Lat. 21°24'36.4"N; Long. 77°57'50.4"E	West	Shallow cupules	Horizontal lines
MDG 2	Lat. 21° 24'44.0"N; Long. 77° 57'45.4"E	South-west	Engraved bulls	Animals
MDG 3	Lat. 21° 24'54.5"N; Long. 77° 57'32.5" E	South-west	Deep and shallow cupules	- - -
MDG 4	Lat. 21°24'57.4"N; Long. 77°57'36.5"E	South-east	- - -	Human figure and antelope
MDG 5	Lat. 21°24'57.2"N; Long. 77°57'41.6"E	South-west	Deep cupule	Human figure
MDG 6	Lat. 21°24'59.6"N; Long. 77°57'41.3"E	South-west	Deep and shallow cupules and bull	Human figure
MDG 7	Lat. 21° 25'00"N; Long. 77° 57'35"E	North	- - -	Indistinct animals
MDG 8	Lat. 21° 25'08"N; Long. 77° 57'44"E	South-west	Deep cupule	Camel and <i>nilgai</i>
MDG 9	Lat. 21° 24'56"N; Long. 77° 57'46"E	West	Vulva	- - -

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
MDG 10	Lat. 21° 25'03"N; Long. 77° 57'48"E	North-west	Pecked roundel and shallow cupules arranged in a circle	Indistinct animal
MSD	Lat. 21° 24'10"N; Long. 77° 55'51"E	East	Deep, shallow and rectangular cupules, vulva, deer, bruising of animal	Stick human figures in white, deer, antelope, donkey, lizard, peahen, connected diamonds, beehives
PAT 1	Lat. 21° 24'23"N; Long. 77° 57'29"E	East	Rows of shallow cupules (pl.73)	- - -
PAT 2	Lat. 21° 24'29"N; Long. 77° 57'31"E	West	Shallow cupules	Diamond motifs
PAT 2A	Lat. 21° 24'29"N; Long. 77° 57'31"E	West	- - -	Donkey
PAT 3	Lat. 21° 24'28"N; Long. 77° 57'34"E	West	- - -	Donkey
PAT 4	Lat. 21° 24'24"N; Long. 77° 57'17"E	North	- - -	Geometric motifs
PAT 5	Lat. 21° 24'24"N; Long. 77° 57'01"E	North	- - -	Stick human figure, animals and geometric motifs
PAT 6	Lat. 21° 24'41"N; Long. 77° 57'31"E	East	- - -	Doe and other animals
PAT 7	Lat. 21° 24'42"N; Long. 77° 57'28"E	South	Shallow cupules	Feline attacking a deer from back, boar, two men carrying an animal suspended from a stick
PAT 8	Lat. 21° 24'43"N; Long. 77° 57'29"E	South	- - -	Four- petalled flower, honeycomb
PAT 9	Lat. 21° 24'49"N; Long. 77° 57'34"E	North	Tool sharpening marks	Fawn following mother doe

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
PAT 10	Lat. 21° 24'49"N; Long. 77° 57'34"E	North	Vulva	Indistinct
PAT 11	Lat. 21° 24'47"N; Long. 77° 57'33"E	South	Deep cupules and engraved animals	- - -
PAT 12	Lat. 21° 24'41"N; Long. 77° 57'44"E	East	Deep and shallow cupules	- - -
PAT 13	Lat. 21° 24'56"N; Long. 77° 57'32"E	South	- - -	Horse rider and indistinct animals
PAT 14	Lat. 21° 25'59"N; Long. 77° 57'30"E	West-north-west	- - -	Humped bull, dog, tree and beehives
PAT 15	Lat. 21° 24'52"N; Long. 77° 57'21"E	West-north-west	- - -	Indistinct animal figures
PAT 16	Lat. 21° 24'35"N; Long. 77° 57'42"E	South	- - -	Animal with horizontal stripes
PAT 17	Lat. 21° 24'56"N; Long. 77° 57'32"E	South	- - -	Tree, masked swordsmen, horse rider, elephant and other animals
PAT 18	Lat. 21° 24'56"N; Long. 77° 57'32" E	East	- - -	Indistinct animals
PAT 19	Lat. 21° 25'00"N; Long. 77° 57' 30"E	North-west	Engraved flower	Floral motifs, diamonds (pl.74)
PAT 20	Lat. 21° 24'52"N; Long. 77° 57'20"E	North-west	Deep and shallow cupules, gaur, elephant in front of a tree, vulva, pecking of different animals	Floral motif, tree, war scene, horse rider in white, <i>barasingha</i> , antelopes, crab and geometric motifs
PAT 21	Lat. 21° 24'52"N; Long. 77° 57'18"E	North-east	Engraved flower	Men in arms painted in white, dotted circles
PAT 22	Lat. 21° 24'42"N; Long. 77° 57'40"E	North	Deep and shallow cupules, vulva	Stick human figures, diamonds and suspended loops, fish, swordsmen riding horse

EXPLORATIONS AND EXCAVATIONS

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
PAT 23	Lat. 21° 24'56"N; Long. 77° 57'25"E	North-north-west	Tools sharpening marks	Deer
PCM 1	Lat. 21° 26'12"N; Long. 77° 58'48"E	West	Engraving of animals	Indistinct
PCM 2	Lat. 21° 26'12"N; Long. 77° 58'47"E	South-west	Deep and shallow cupules	- - -
PCM 3	Lat. 21° 26'08"N; Long. 77° 58'52"E	West	Herd of bulls and other animals	- - -
PMR 1	Lat. 21° 25'16"N; Long. 77° 59'12"E	North-east	Deep and shallow cupules, vulva, human figure	Human, animals and palm in red; geometrical design in white
PMR 2	Lat. 21° 25'12"N; Long. 77° 59'20"E	North-north-east	Shallow cupule	Palm
PMR 3	Lat. 21° 25'08"N; Long. 77° 59'10"E	South-south-east	Animals, vulva	Chequered diamonds, animals
PMR 4	Lat. 21° 25'20"N; Long. 77° 59'33"E	North	- - -	Animals
PMR 5	Lat. 21° 25'18"N; Long. 77° 59'37"E	West	Shallow cupules	Indistinct animals
RMG 1	Lat. 21° 25'55"N; Long. 78° 01'59"E	East-north-east	Cupule	Indistinct
RMG 2	Lat. 21° 26'14"N; Long. 78° 02'14"E	South-east	Cupules	Indistinct
RMG 3	Lat. 21° 25'55"N; Long. 78° 01'59"E	North-east	Cupules and animals	- - -
SBD 1	Lat. 21° 25'28"N; Long. 78° 00'58"E	North-west	Shallow cupules	Stag
SBD 2	Lat. 21° 25'43"N; Long. 78° 00'54"E	North-east	Shallow cupules, stick figure, vulva, feet and fox	Stag, geometric motifs
SBD 3	Lat. 21° 25'35"N; Long. 78° 00'50"E	North-east	- - -	Horse riders hunting a stag

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
SBD 4	Lat. 21° 25'26"N; Long. 78° 00'24"E	South-west	Stick figure and vulva	- - -
SBD 5	Lat. 21° 25'24"N; Long. 78° 00'22"E	South-west	Stick figure, vulva and bull/ stag	- - -
SBD 6	Lat. 21° 25'25"N; Long. 78° 00'21"E	West	Rows of shallow cupules	- - -
SBD 7	Lat. 21° 25'30"N; Long. 78° 00'40"E	West	- - -	Indistinct animal
SBD 8	Lat. 21° 25'34"N; Long. 78° 00'49"E	West-north-west	- - -	Indistinct animal
SBD 9	Lat. 21° 25'34"N; Long. 78° 00'48"E	West-north-west	- - -	Geometric motif
SBD 10	Lat. 21° 25'39"N; Long. 78° 00'54"E	South	- - -	Geometric motif
SBD 11	Lat. 21° 25'38"N; Long. 78° 00'52"E	South	- - -	Geometric motif
SBD 12	Lat. 21° 25'41"N; Long. 78° 00'18"E	North-east	- - -	Geometric motif
TKN 1	Lat. 21° 24'17"N; Long. 77° 55'56"E	South-east	South-east	Stags, monitor lizard, geometric motifs
TKN 2	Lat. 21° 24'17"N; Long. 77° 55'56"E	South-west	Shallow cupule and wavy lines	Dog, beehive, donkey, prey bird, squirrel, stick figure and geometric motif
TKN 3	Lat. 21° 24'57"N; Long. 77° 56'30"E	West	Cupule, geometric motifs	Intricate motifs
TKN 4	Lat. 21° 24'33"N; Long. 77° 55'56"E	South	- - -	Stag, wild buffalo

EXPLORATIONS AND EXCAVATIONS

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
TKN 5	Lat. 21° 24'55"N; Long. 77° 55'73"E	North-west	Tree	Stag, stick human figures, rows of bats (pl.75), mongoose, toad, horse and geometric motifs
TKN 6	Lat. 21° 24'50"N; Long. 77° 55'97"E	South	- - -	Indistinct
TKN 7	Lat. 21° 24'60"N; Long. 77° 55'87" E	North-east	- - -	Geometric motifs
TKN 8	Lat. 21° 24'54"N; Long. 77° 55'90"E	South-east	- - -	Chequered diamonds
TKN 9	Lat. 21° 24'41"N; Long. 77° 55'51"E	South-west	Cupules, jungle scene and river	- - -
TKN 10	Lat. 21° 24'26"N; Long. 77° 56'01"E	West	- - -	Stag
TKN 11	Lat. 21° 24'19"N; Long. 77° 55'56"E	North-west	Vulva	Indistinct
TKR 1	Lat. 21° 24'57"N; Long. 77° 54'24"E	North-north-west	Vulva	Fish
TKR 2	Lat. 21° 24'58"N; Long. 77° 54'19"E	South-west	Cupules, human figure, vulva, jungle scene	Mongoose in green colour, geometric motif
TKR 3	Lat. 21° 24'59"N; Long. 77° 54'23"E	South	Jungle scene, snake and vulva	- - -
TKR 4	Lat. 21° 24'59"N; Long. 77° 54'26"E	South-south-west	Stick human figures and vulva	- - -
TKR 5	Lat. 21° 25'00"N; Long. 77° 54'36"E	North	Beehive, tree and stick human figure	- - -
TKR 6	Lat. 21° 25'15"N; Long. 77° 54'48"E	East-north-east	- - -	Boar and geometric motif

Name of shelter	Geo-coordinates	Orientation	Significant Decorations	
			Petroglyphs	Pictographs
TKR 7	Lat. 21° 25'17"N; Long. 77° 54'55"E	South	Stick human figures, vulva, cupule and jungle scene	- - -
TKR 8	Lat. 21° 25'17"N; Long. 77° 54'38"E	West	Vulva	- - -
TKR 9	Lat. 21° 25'17"N; Long. 77° 54'38"E;	West	Deep cupules	- - -
TKR10	Lat. 21° 25'18"N; Long. 77° 54'38"E		Stick figure and vulva	- - -
TKR 11	Lat. 21° 25'19"N; Long. 77° 54'38"E	West	- - -	Animals
TKR 12	Lat. 21° 25'20"N; Long. 77° 54'38"E	South	Shallow cupules, stick figures, vulva, beehive	Fish, beehive in red and animal painted in green
TKR 13	Lat. 21° 25'17"N; Long. 77° 54'35"E	South	Stag and vulva	Animal and geometric motif
UGM 1	Lat. 21° 24'55"N; Long. 77° 57'07"E	North	Cupules, panel of engravings and vulva	Stick figure, floral motifs and geometric motif
UGM 2	Lat. 21° 24'55"N; Long. 77° 57'07"E	North	Bruising of human figure and vulva	Human figure, boar, elephant, bullock cart drawn by animal and deer
UGM 3	Lat. 21° 25'00"N; Long. 77° 57'13"E	North	- - -	Indistinct
UGM 4	Lat. 21° 25'00"N; Long. 77° 57'41"E	North	Vulva	Antelope in a net, tortoise, stick figures
UGM 5	Lat. 21° 25'04"N; Long. 77° 57'13"E	North-east	Vulva	- - -
UGM 6	Lat. 21° 25'15"N; Long. 77° 57'06"E	North-east	- - -	Geometric pattern in white



65



66

ABD 1, Betul : 65, barasingha; 66, entrance to a rock shelter, See p. 68

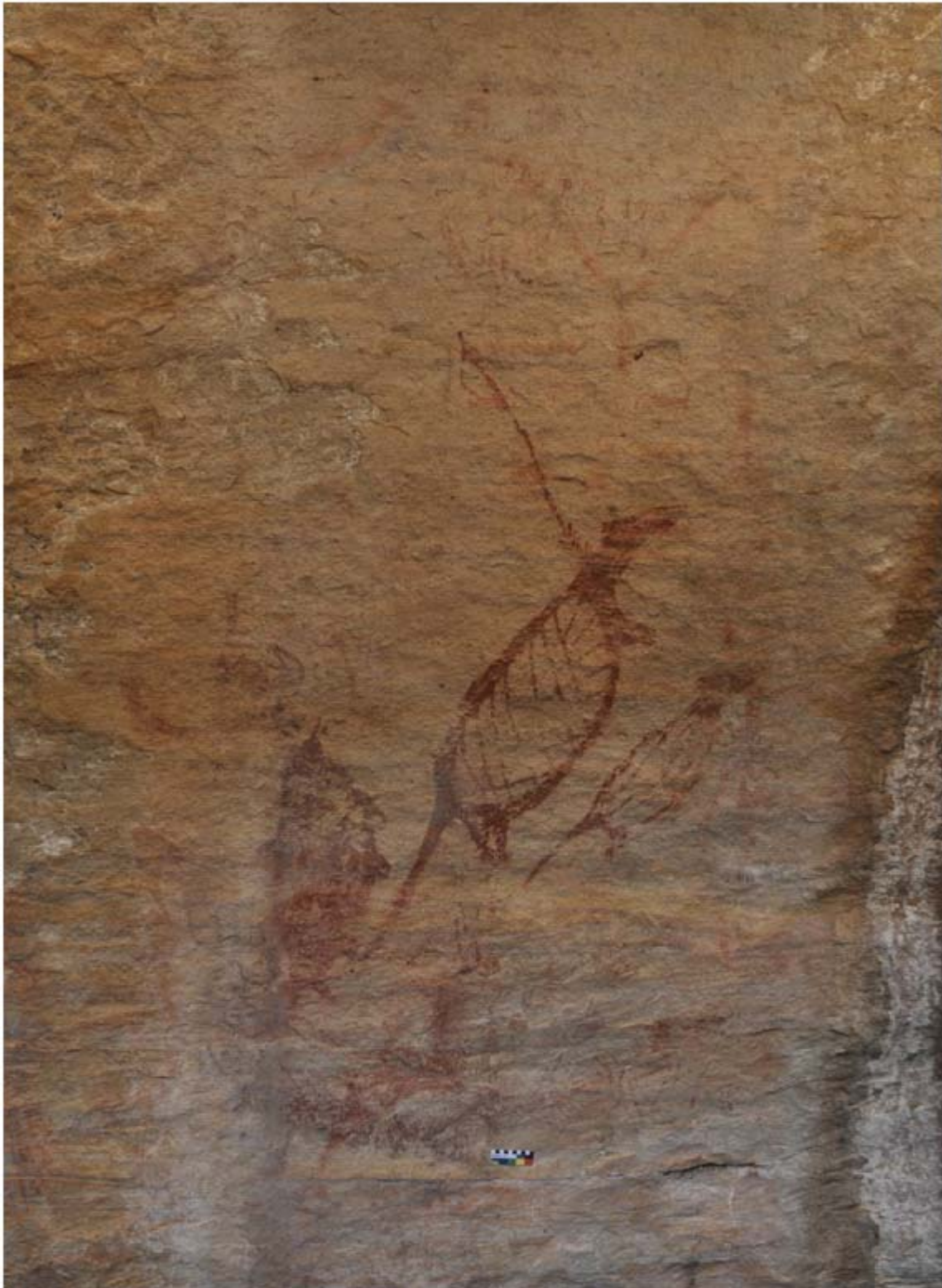


67



68

ABD 2, Betul : 67, engraved panel; KSD 6 : 68, engraved herd of gaurs (bosgaurus), See pp. 68 and 74



ABD 4, Betul : bandicoots shot by barbed arrow, See p. 68



70



71

KSD 3A, Betul : 70, geometric motifs; 71, view of the Kukadsadev group, See p. 73



72



73

GPD 5, Betul : 72, human figure; PAT 1, Betul : 73, arrangement of cupules, See pp. 71 and 75



74



75

PAT 19 : 74, geometrical motif, TKN 5 : 75, row of bats, See pp. 76 and 79

On the basis of styles of execution, superimpositions, colour scheme of the decorative elements coupled with the discovery of stone tools from and within the vicinity of the shelters and in the absence of chronometric dates, it has been inferred that the decorated rock shelters were occupied right from the upper palaeolithic to the historical period passing through the mesolithic, neolithic and chalcolithic periods. Few shelters seem to have been occupied through all the ages starting from the beginning and some others seem to have been occupied in some of the periods. The tools found from the shelters and their surroundings comprised upper palaeolithic, mesolithic and chalcolithic artefacts.

The upper palaeolithic repertoire comprised parallel sided blades, blunted back blades, borers, points, burins, scrapers. The mesolithic repertoire comprised lunates, triangles, blades, points and components of hafted composite tools. The chalcolithic repertoire comprised parallel sided blades, bladelets.

MAHARASHTRA

24. EXPLORATIONS IN MIDDLE REACHES OF BHIMA RIVER BASIN, DISTRICTS OF SOLAPUR AND PUNE

The present environmental archaeological exploration in middle reaches of Bhima river basin work was carried out under the University Grants Commission major research project by Sabale P. D., Principal Investigator and Professor, Environmental Archaeology, Department of Archaeology, Deccan College, Pune.

Bhima river is a major left side tributary of Krishna. The study area falls between Latitude: 14°05'N to 15°20'N and Longitude: 74°07'E to 75°45'E, on the toposheet map of Survey of India (Scale 1:250,000). It covers the parts of Solapur and Pune districts of Maharashtra. The river flows through the drought prone area, such as Karmala, Madha, Pandharpur, Mohol, Mangalwedha and south

Solapur of Solapur districts. Therefore, most of the time, the channel of the river was found dry and river has become seasonal.

Since the area under study was quite vast, therefore, a detailed geo-archaeological exploration has been carried out along the river and back water of Ujani reservoir, to reconstruct the paleo-environmental conditions, geomorphology, geology and the landscape of the Bhima river basin. So, to study the geo-archaeology, at places the lithological sections were checked. For this interpretation the cutting section of river, set and geomorphic characters of the terraces at both sides, meanders, ox-bow lakes, natural levee deposit, sand bar deposit, hanging valleys, waterfalls, thickness of alluvium etc. were studied in the field. Further, in the river cutting section the stratigraphy of the particular area with thickness of each bed, nature, type and texture of material was studied. In each layer, fossils of plants and animals were recorded properly. In case of fine sized fossil, such fossil along with that particular layer soil samples are collected for the laboratory study. During same time, the special care was taken for the mesolithic tools the types of microliths, size, material from which it belongs, probable source area etc. were also studied in the field.

During the exploration number of mesolithic sites, mesolithic tool locality, Satavahana, early historic, early medieval, late medieval (*garhi*), early medieval temple site (*hemadpanthi*), late medieval temple site, medieval and late medieval tomb, sites were documented. The details of each site have been recorded properly.

25. ARCHAEOLOGICAL EXCAVATIONS AND EXPLORATION IN NANDED AND YAVATMAL DISTRICTS

Archaeological excavation at Shiur was undertaken jointly by the Department of Archaeology of the Deccan College Post Graduate and Research Institute, Pune and the Department of Archaeology, Solapur University, under the di-

Location	Lat./long.	Name of tem./monu.	Remark/description
Bigwan (old) (Indapur tehsil, Pune Distt.)	Lat. 18°18'07"N; Long. 74°46'08"E Ht. 501m	Habitational site	Early historic
Konda-hicholi (Karmala tehsil, Solapur Distt.)	Lat. 18°18'07"N; Long. 74°46'08"E Ht. 501m	Ancient archaeological site	Late historical site to late medieval
Takli (Karmala tehsil, Solapur Distt.)	Lat. 18°15'3"N; Long. 74° 52'6"E Ht. 1486ft	Ancient archaeological site	Late medieval period
Katraj (Karmala tehsil, Solapur Distt.)	Lat. 18°17'15"N; Long. 74° 22'24"E Ht. 1486ft	Ancient archaeological site	Satvahana to late medieval period
Komalwadi (Karmala tehsil, Solapur Distt.)	Lat. 18°16'04"N; Long. 74°56'09"E Ht. 504m	Habitational site	Late medieval site
Komalwadi (Karmala tehsil, Solapur Distt.)	Lat. 18°16'05"N; Long. 74°56'15"E Ht. 503m	Bridge on railway line	Late medieval site
Ketur (Karmala tehsil, Solapur Distt.)	Lat. 18°15'99"N; Long. 74°57'31"E Ht. 506m	Mahadeo temple	Medieval period. The remains of a base of the temple. Some pillars of hexagonal shaped of <i>hemadpanthi</i> temple style are found.
Ketur (Karmala tehsil, Solapur Distt.)	Lat. 18°16'04"N; Long. 74°57'27"E Ht. 506m	Habitational site	Early historic
Saugao (Karmala tehsil, Solapur Distt.)	Lat. 18°16'70"N; Long. 75°02'62"E Ht. 494m	Mahadeo temple	The remains of much destroyed Mahadeo temple
Saugao (Karmala tehsil, Solapur Distt.)	Lat. 18°16'69"N; Long. 75°02'51"E Ht. 498m	Habitational site	Early historic
Undergao (Karmala tehsil, Solapur Distt.)	Lat. 18°18'06"N; Long. 75°02'55"E Ht. 508m	Mahadeo temple	Medieval period
Undergao (Karmala tehsil, Solapur Distt.)	Lat. 18°18'04"N; Long. 75°02'48"E Ht. 526m	Habitational site	Early medieval period
Chikhalthan (Karmala tehsil, Solapur Distt.)	Lat. 18°14'19"N; Long. 75°04'49"E Ht. 468m	Habitational site	Early historic

EXPLORATIONS AND EXCAVATIONS

Location	Lat./long.	Name of tem./monu.	Remark/description
Kotling (Karmala tehsil, Solapur Distt.)	Lat.18°12'90"N; Long.75°03'30"E Ht. 510m	Kotling temple	Medieval period
Kugao (Karmala tehsil, Solapur Distt.)	Lat.18°12'87"N; Long.75°06'14"E Ht. 496m	Habitational site	Early historic site
Dahigao (Karmala tehsil, Solapur Distt.)	Lat.18°13'44"N; Long.75°06'89"E Ht. 507m	Habitational site	Medieval site
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'16"N; Long.75°08'06"E Ht. 499m	Mahadeo temple	Early historic. The remains of an early historic temple of <i>hemadpanthi</i> temple style. It is buried up to 7ft. under thick pile of deposits only.
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'17"N; Long.75°08'08"E Ht. 500m	Mahalaxmi temple	Early historic. This temple has compound wall of about 60 x 60sqft and temple has dimensions 30 x 30sqft. The remains of a temple with <i>sabhamandapa</i> and <i>garbhagriha</i> are found.
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'18"N; Long.75°08'09"E Ht. 499m	Pushkarni	Early historic. <i>Pushkarani</i> (tank) is connected to the left side of Mahalaxmi temple.
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'19"N; Long.75°08'10"E Ht. 498m	Mahadeo temple	Medieval period. Temple is made up of very well dressed compact basalt stone.
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'34"N; Long.75°08'30"E Ht. 498m	Ancient Buddhist temple	A remnant of ancient Buddhist temple having the idol of Buddha.
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'34"N; Long.75°08'30"E Ht. 498m	Bhavani temple	The remains of Bhavani temple is just near to the Buddha temple.
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'34"N; Long.75°08'30"E Ht. 498m	Habitational site	Early historic (Satvahana)
Wangi (Karmala tehsil, Solapur Distt.)	Lat.18°11'17"N; Long.75°08'08"E Ht. 495m	Mahadeo temple	Medieval period. This is a <i>hemadpanthi</i> temple type.
Kandar (Karmala tehsil, Solapur Distt.)	Lat.18°06'66"N; Long.75°11'62"E Ht. 522m	Mahadeo temple	Medieval period. It is typically <i>hemadpanthi</i> temple is made up of well dressed compact basalt stone.

Location	Lat./long.	Name of tem./monu.	Remark/description
Surali (Madha tehsil, Solapur Distt.)	Lat. 18°04'91"N; Long. 75°10'03"E Ht. 531m	Habitational site	Late medieval site
Akule - Khurd (Madha tehsil, Solapur Distt.)	Lat. 17°04'70"N; Long. 75°11'29"E Ht. 527m	Mahadeo temple	Hemadpanthi temple
Khead- Bhalvani (Karmala tehsil, Solapur Distt.)	Lat. 17°45'42"N; Long. 75°15'43"E Ht. 431m	Habitational site	Early historical
Tanu (Indapur, PN)	Lat. 17°57'22"N; Long. 75°01'41"E Ht. 1263ft	Mahadeo temple	Medieval period
Nira-narsingpur (Indapur, PN)	Lat. 17°58'25"N; Long. 75°07'95"E Ht. 1256ft	Narsing temple	Early historical Present at the confluence of Nira and Bhima rivers
Bemle (Madha tehsil, Solapur Distt.)	Lat. 17°56'87"N; Long. 75°12'09 "E Ht. 1259ft	Siddheshwar temple	Medieval period
Bemle (Madha tehsil, Solapur Distt.)	Lat. 17°56'87"N; Long. 75°12'09 "E Ht. 1259ft	Kaleshwar temple	Medieval period
Bemle (Madha tehsil, Solapur Distt.)	Lat. 17° 56'82"N; Long. 75°12'10"E Ht. 1292ft	Memorial	Medieval period
Kavthali	Lat. 17°44'77"N; Long. 75°17'21"E Ht.1161ft	Mahadeo temple	Late medieval period. Double storied temple
Pandharpur (Solapur Distt.)	Lat. 17° 40'77"N; Long. 75° 20'29"E Ht. 1217ft	Sadguru Bhausaheb Maharaj Dehulkar	Late medieval period. Memorial is buried up to 2.5ft very well carved monument.
Pandharpur (Solapur Distt.)	Lat. 17° 40'77"N; Long. 75° 20'26"E Ht. 1225ft	Small fort	Late medieval period. The northern side gate is buried up to 4ft
Pandharpur (Solapur Distt.)	Lat. 17° 40'70"N; Long. 75° 20'30"E Ht. 1213ft	Steps (Kumbharghat)	Late medieval period
Pandharpur (Solapur Distt.)	Lat. 17° 40'70"N; Long. 75° 20'30"E Ht. 1211ft	Gate (Kumbharghat)	Late medieval period

EXPLORATIONS AND EXCAVATIONS

Location	Lat./long.	Name of tem./monu.	Remark/description
Pandharpur (Solapur Distt.)	Lat. 17° 40'72"N; Long. 75° 20'35"E Ht. 1200ft	Laxman Maharaj Vathrikar Memorial	Late medieval period
Pandharpur (Solapur Distt.)	Lat. 17° 40'72"N; Long. 75° 20'35"E Ht. 1200ft	Sculpture of Hanuman	Late medieval period. Circle foundation 20ft radius circle monument shows, initially the buried up to 2.5ft, but exposed upto 2.8ft, i.e. sand is washed out up to 2.8ft.
Pandharpur (Solapur Distt.)	Lat. 17° 40'71"N; Long. 75° 20'35"E Ht. 1201ft	Monument	Late medieval period
Pandharpur (Solapur Distt.)	Lat. 17° 40'70"N; Long. 75° 20'36"E Ht. 1207ft	Monument	Late medieval period. Hexagonal shaped monument, circular foundation (5 steps) made up of compact basalt.
Pandharpur (Solapur Distt.)	Lat. 17° 40'70"N; Long. 75° 20'36"E Ht. 1206ft	Monument	Late medieval period. Hexagonal shaped monument, circular foundation (5 steps) made up of compact basalt.
Pandharpur (Solapur Distt.)	Lat. 17° 40'69"N; Long. 75° 20'36"E Ht. 1205ft	Monument	Late medieval period. Hexagonal shaped monument, circular foundation (5 steps) made up of compact basalt.
Pandharpur (Solapur Distt.)	Lat. 17° 40'69"N; Long. 75° 20'36"E Ht. 1205ft	Monument	Late medieval period. Hexagonal shaped monument, circular foundation(5 steps) made up of compact basalt.
Pandharpur (Solapur Distt.)	Lat. 17° 40'69"N; Long. 75° 20'36"E Ht. 1204ft	Monument	Late medieval period. Hexagonal shaped monument, circular foundation(5 steps) made up of compact basalt.
Pandharpur (Solapur Distt.)	Lat. 17° 40'68"N; Long. 75° 20'36"E Ht. 1203ft	Monument	Late medieval period. Foundation is available while upper portion of memorial.
Pandharpur (Solapur Distt.)	Lat. 17° 40'68"N; Long. 75° 20'36"E Ht. 1210ft	Monument	Late medieval period. Foundation is available while upper portion of memorial is washed out by flood activity.
Pandharpur (Solapur Distt.)	Lat. 17° 40'69"N; Long. 75° 20'38"E Ht. 1203ft	Monument	Late medieval period. The part of temple foundation is collapsed due to the lack of strong foundation.

Location	Lat./long.	Name of tem./monu.	Remark/description
Pandharpur (Solapur Distt.)	Lat. 17° 40'67"N; Long. 75° 20'39"E Ht. 1200ft	Monument	Late medieval period. The height from the basement foundation is 76cm(bottom most found level) at south while same level is found buried under the sandy alluvium.
Pandharpur (Solapur Distt.)	Lat. 17° 40'64"N; Long. 75° 20'35"E Ht. 1200ft	Monument	Late medieval period
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'37"E Ht. 1200ft	Monument	Late medieval period. Foundation is available while upper portion of memorial.
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'37"E Ht. 1210ft	Monument	Late medieval period. Foundation is available while upper portion of memorial.
Pandharpur (Solapur Distt.)	Lat. 17° 40'66"N; Long. 75° 20'37"E Ht. 1200ft	Monument	Late medieval period. Pile of building stone demolished due to flood activity.
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'36"E Ht. 1202ft	Monument	Late medieval period. Pile of building stone demolished due to flood activity.
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'36"E Ht. 1202ft	Monument	Late medieval period. Pile of building stone demolished due to flood activity.
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'34"E Ht. 1220ft	Monument	Late medieval period. Squarish memorial having diameter 8 x 8ft present near temple.
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'36"E Ht. 1220ft	Monument	Late medieval period. Squarish memorial having diameter 8 x 8ft present near temple.
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'36"E Ht. 1220ft	Monument	Late medieval period. Squarish memorial having diameter 8 x 8ft present near temple.
Pandharpur (Solapur Distt.)	Lat. 17° 40'65"N; Long. 75° 20'36"E Ht. 1220ft	Monument	Late medieval period. Squarish memorial having diameter 8 x 8ft present near temple.
Pandharpur (Solapur Distt.)	Lat. 17° 40'60"N; Long. 75° 20'35"E Ht. 1210ft	Monument	Late medieval period. Memorial of Shantaram Buva Guruji (Varkari- Alandi).
Pandharpur (Solapur Distt.)	Lat. 17° 40'60"N; Long. 75° 20'36"E Ht. 1210ft	Monument	Late medieval period. Memorial of Shankar Buashete.

EXPLORATIONS AND EXCAVATIONS

Location	Lat./long.	Name of tem./monu.	Remark/description
Pandharpur (Solapur Distt.)	Lat. 17° 40'60"N; Long. 75° 20'35"E Ht. 1210ft	Monument	Late medieval period. Memorial of Pandurang Deshpande and Sitaram Deshpande.
Pandharpur (Solapur Distt.)	Lat. 17° 40'63"N; Long. 75° 20'35"E Ht. 1202ft	Temple	Late medieval period. Belapurkar temple.
Pandharpur (Solapur Distt.)	Lat. 17° 40'64"N; Long. 75° 20'36"E Ht. 1192ft	Temple	Late medieval period. Govind-Maharaj-Chopalkar temple.
Pandharpur (Solapur Distt.)	Lat. 17° 40'67"N; Long. 75° 20'36"E Ht. 1204ft	Temple (Govind Maharaj Amalterkar temple)	Late medieval period. The platform of temple having height 10ft, 50sqft temple dimension, whole temple ht. is 100ft.
Pandharpur (Solapur Distt.)	Lat. 17° 40'67"N; Long. 75° 20'36"E Ht. 1204ft	Temple (Pundalik)	Late medieval period
Pandharpur (Solapur Distt.)	Lat. 17° 40'67"N; Long. 75° 20'37"E Ht. 1203ft	Monument (Lohdand)	Late medieval period. Circular monument having diameter 10-15ft with 4 arches, each arch is 10ft height with 5ft width.
Pandharpur (Solapur Distt.)	Lat. 17° 40'60"N; Long. 75° 20'35"E Ht. 1205ft	Temple (Mother and father of Pundalik)	Late medieval period. It is also called as <i>Akra-Rudra-Maruti Mandir</i> . Double curved arches are present at four sides.
Pandharpur (Solapur Distt.)	Lat. 17° 40'68"N; Long. 75° 20'35"E Ht. 1208ft	Monument	Late medieval period. Squarish platform of compact basalt having 12 x 12sqft
Pandharpur (Solapur Distt.)	Lat. 17° 40'68"N; Long. 75° 20'35"E Ht. 1210ft	Monument (Vishvakarma)	Late medieval period. Remains of temple.
Pandharpur (Solapur Distt.)	Lat. 17° 40'68"N; Long. 75° 20'34"E Ht. 1211ft	Memorial (Dhunda-Maharaj)	Late medieval period. Dhunda Maharaja Deglurkar Memorial.
Pandharpur (Solapur Distt.)	Lat. 17° 40'69"N; Long. 75° 20'34"E Ht. 1211ft	Temple (Mahadeva)	Late medieval period. Platform of temple is circular with 10ft radius.
Pandharpur (Solapur Distt.)	Lat. 17° 40'68"N; Long. 75° 20'35"E Ht. 1207ft	Memorial	Late medieval period. Squarish compact basalt platform having 25cm dimension with 4-5ft height and 2ft width.
Pandharpur (Solapur Distt.)	Lat. 17° 40'70"N; Long. 75° 20'35"E Ht. 1204ft	Memorial	Late medieval period

Location	Lat./long.	Name of tem./monu.	Remark/description
Pandharpur (Solapur Distt.)	Lat. 17° 44'74"N; Long. 75° 17'24"E Ht. 1207ft	Ancient route (Ghat) steps	Buried under the thick quaternary deposits of 7-8ft thick along right bank of Bhima river.
Pandharpur (Solapur Distt.)	Lat. 17° 44'77"N; Long. 75° 17'21"E Ht. 1161ft	Mahadev temple	Late medieval period
Pandharpur (Solapur Distt.)	Lat. 17° 44'71"N; Long. 75° 17'21"E Ht. 1322ft	I. Monument (Santosh Ankush Godse)	Late medieval period. This is well fortified structure.
Pandharpur (Solapur Distt.)	Lat. 17° 44'71"N; Long. 75° 17'21"E Ht. 1319ft	Monument (Laxman Godse)	Late medieval period
Machnur (Mangalwedha tehsil, Solapur Distt.)	Lat. 17° 33'87"N; Long. 75° 33'58"E Ht. 1220ft	Mallikarjun temple	Late medieval period
Machnur (Mangalwedha tehsil, Solapur Distt.)	Lat. 17° 33'87"N; Long. 75° 33'59"E Ht. 1230ft	Memorial (Baba Maharaj Arvikar)	Late medieval period
Machnur (Mangalwedha tehsil, Solapur Distt.)	Lat. 17° 33'87"N; Long. 75° 33'58"E Ht. 1220ft	Early historic site	Early historical period. Site is spread on approximately 20 acre area, at the right bank of Bhima river channel.
Begampur (Mohol tehsil, Solapur Distt.)	Lat. 17° 33'83"N; Long. 75° 34'19"E Ht. 1158ft	Mahadeva temple	Late medieval period. The temple is present at right bank of first terrace. Foundation is hanged because of flood water or erosion.
Begampur (Mohol tehsil, Solapur Distt.)	Lat. 17° 32'84"N; Long. 75° 35'10"E Ht. 1205ft	Hanuman temple	Late medieval period. 15ft height, 10 x 10sq ft temple
Begampur (Mohol tehsil, Solapur Distt.)	Lat. 17° 35'83"N; Long. 75° 36'05"E Ht. 1205ft	Narsimha temple	Recent to late medieval period
Ghodeshwar (Mohol tehsil, Solapur Distt.)	Lat. 17° 33'67"N; Long. 75° 34'30"E Ht. 1204ft	Mahadeo temple	Late medieval period. Fortified temple having an area of 100 x 100sq ft and main temple has dimensions 40 x 40sq ft
Ghodeshwar (Mohol tehsil, Solapur Distt.)	Lat. 17° 39'74"N; Long. 75° 33'05"E Ht. 1213ft	Sai temple	Late medieval period

EXPLORATIONS AND EXCAVATIONS

Location	Lat./long.	Name of tem./monu.	Remark/description
Ghodeswar (Mohol tehsil, Solapur Distt.)	Lat. 17° 39'75"N; Long. 75° 33'07"E Ht. 1215ft	Habitational Site	Medieval period
Siddhapur (Mangalwedha tehsil, Solapur Distt.)	Lat. 17° 31'87"N; Long. 75° 37'95"E Ht. 1200ft	Ambabai temple	Medieval period
Siddhapur (Mangalwedha tehsil, Solapur Distt.)	Lat. 17° 39'74"N; Long. 75° 33'05"E Ht. 1213ft	Yelammadevi temple	Medieval period
Siddhapur (Mangalwedha tehsil, Solapur Distt.)	Lat. 17° 31'84"N; Long. 75° 37'80"E Ht. 1200ft	Vitthal temple	Medieval period. The temple present 150ft away from river.
Siddhapur (Mangalwedha tehsil, Solapur Distt.)	Lat. 17° 31'84"N; Long. 75° 37'82"E Ht. 1202ft	Mahadev temple	Medieval period
Vadapur (South Solapur)	Lat. 17° 32'74"N; Long. 75° 39'05"E Ht. 1212ft	Sai temple	Late medieval period
Kusur (South Solapur, Solapur Distt.)	Lat. 17° 30'76"N; Long. 75° 38'73"E Ht. 1100ft	Nagnath temple	Medieval period. Platform with idol of Nagnath is present.
Kusur (South Solapur, Solapur Distt.)	Lat. 17° 30'72"N; Long. 75° 38'72"E Ht. 1125ft	Katvyanchi (memorial)	Late medieval period
Telgaon (South Solapur, Solapur Distt.)	Lat. 17° 28'54"N; Long. 75° 38'75"E Ht. 1158ft	Hanuman temple	Late medieval period
Telgaon (South Solapur, Solapur Distt.)	Lat. 17° 30'54"N; Long. 75° 38'75"E Ht. 1158ft	Laxmi temple	Late medieval period
Telgaon (South Solapur)	Lat. 17° 28'52"N; Long. 75° 38'75"E Ht. 1058ft	Mari Aai temple (kolivasti)	Late medieval period
Telgaon (South Solapur)	Lat. 17° 28'99"N; Long. 75° 38'71"E Ht. 1058ft	Mari Aai temple (Harijanvasti)	Late medieval period

Location	Lat./long.	Name of tem./monu.	Remark/description
Telgaon (South Solapur)	Lat. 17° 28'48"N; Long. 75° 38'71"E Ht. 1167ft	Habitational site	Late medieval period. Mound is present at back side of previous Mari Aai temple.
Telgaon (South Solapur)	Lat. 17° 29'05"N; Long. 75° 37'15"E Ht. 1168ft	Naneshwari	Late medieval period
Bhandar Kavte (South Solapur)	Lat. 17° 27'18"N; Long. 75°40'93"E Ht. 1148ft	Memorial	Medieval period
Bhandar Kavte (South Solapur)	Lat. 17° 27'13"N; Long. 75°40'73"E Ht. 1082ft	Ganesh temple	Medieval period

rection of P. Dandwate of the Deccan College. The site (Lat. 19°40'46"N; Long. 77°27'39"E) is located on the right bank of river Painganga in Hadgaon Taluka, 75km north east from Nanded in Nanded district of Maharashtra. The location is marked by meeting point of other two districts, Yavatmal and Hingoli in Nanded district.

On the basis of evidences it reveals that there was a settlement in late Satavahana period (2nd century C.E.) and continued till 7th-8th century C.E. Number of early historical objects; aricanut shaped terracotta beads, terracotta bangles and figurines, bangles and beads of shell, beads of semi-precious stones, beads and bangles of glass have been found.

In the same year under reviews, exploration was also undertaken by P. Dandwate and G. Shete from Deccan College, Pune in Nanded and Yavatmal districts near village Shiur to locate archaeological sites. Following two early historic and one late medieval habitation sites were found during exploration.

The site of Borkhi, an early historic and medieval settlement, is around 3km south of Talni in Hatgaon tehsil, district Nanded. The spread of habitation deposit is in 1 hectare area that

yielded the pottery of red ware, red slipped ware, black and red ware and black slipped ware. Gojegaon is also located in the Umarkhed tehsil in Yavatmal district, on Umarkhed-Nanded road. The spread of the deposit covers an area of 0.5 hectare that yielded red ware, red slipped ware and black and red ware. The finding of black and red ware and other pottery confirm early historic identity of both the sites. The site of old Marlegaon in tehsil Umarkhed, district Yavatmal. The site contained red ware, red slipped ware and black slipped ware pottery. The fabric is sandy. A terracotta human figurine with head, hands and legs mutilated was also found. At Gojegaon, temple remains of medieval period found which includes parts of pillar, mutilated sculptural pieces like Salunkha, Nandi, etc. Remains of a temple of Maratha period is found in Unchegaon of Nanded district which consists of a *mandapa* and *garbhagriha*. In the *garbhagriha*, it is nothing but a part of *gomukha* is enshrined as presiding deity. Outside the temple under a tree an image of *panchamukhi* Siva-linga and Nandi is placed. The *panchmukhi* Siva-linga is a unique with five faces of Siva are placed on five sides of the *linga*. At Talani in Nanded districts a temple of devi Jagadamba of Maratha period and a

temple dedicated to Siva of medieval period are found. The Siva-linga and the *Salunkha* is very big in size, the Siva-linga is about 2ft in height. Outside the temple one standing image of Visnu and few herostones are also noticed.

26. EXPLORATION IN LONI-BHAPKAR, DISTRICT PUNE

P. Dandwate, B. Gajul and T. Joshi of Deccan College, Pune carried out exploration in the village Loni-Bhapkar located on the right bank of the river Karha, a tributary of river Nira. It is about 12km east of Morgaon and 13km north-west of Baramati in Pune district. Loni-Bhapkar is famous for its temple complex comprising two temples and one step-well locally known as *puskarani* belonging to 13th or early 14th century C.E. The temple at present is dedicated to Siva, known as Mallikarjuna temple, while another one is dedicated to Dattatreya, a form of Visnu. The temple comes under the *bhumija* style of temple architecture and the *sikhara* is *chatusbhuma* and *pancharatha* type.

The habitational mound (60 x 40m) located towards the west of Mallikarjuna temple yielded pottery of historical period, thick and thin both in fabric. The pottery includes red ware and black ware; shapes are small jars, vessels, dishes, small bowls without any paintings, designs and motifs. Pieces of bricks and vitrified bricks have also been collected from the mound.

27. EXCAVATIONS AT MALLI, DISTRICT NAGPUR

In continuation of previous year's excavation, State department of Archaeology and Museums, Maharashtra, Nagpur division under A.V. Bhoyar and Virag G. Sontakke, assisted by B.P. Waghade, J.K. Thawakar carried out archaeological excavation at Malli (Lat. 21°19'221"N; Long. 79°54'249"E) which is located nearly 135km east of district Nagpur.

The megalithic burial site is located on the northern outskirts of Malli village. The habitation mounds were situated on the left bank of

Chorkhambara river which is sub tributary of Wainganga. Concentrations of megalithic burials are in south-eastern side of the present village that include stone circle, stones circles having double and triple enclosing circle, dolmen with/ without stone circle, independent cist, cists with single enclosing circle, cists with double enclosing circle and cists with triple enclosing circles etc. are noticed at the site. Peripheral burials of most of burial are laterite which is abundantly found in the region. For inner architecture different type of stone were used. Schist with different variant was generally used as cap stone of cists, conglomerate and other stone were also used for different purposes. In all total four megaliths from different localities were taken for excavation.

Megalithic Burials are located in locality 2 and this small burial is constructed on a slanting landscape having double stone circle type and made out of laterite and basalt stones. Very small amount of deposit of 60cm was observed at the burial. Two depositional layers were identified here. The burial was erected upon a hard compact lateritic natural soil mixed with whitish cherts. Small pebbles of the laterite are found near the central portion of the circle. Two small cist slabs placed vertically are found in south east quadrant. These slabs resemble cist kind of architecture found at Malli. Southern vertical slab of this cist measures 35 x 5 x 20cm whereas northern side stone measures 28 x 5 x 2cm. Coarse red ware is prominent type of ceramic found in the excavations. Surface of the pottery is coarse to gritty surface. Common shapes are dish and shallow bowl in this burial.

Burial no. 6 is the biggest stone circle type of burial with single peripheral circle. This stone circle was made out of large laterite blocks having deposit of 140cm. Total diameter of the circle with filling is 27.30m with 79 peripheral boulders are used. Biggest stone

measures 210 x 80 x 60cm while the smallest stone being 20 x 13 x 9cm. Uppermost surface contains small chips of schist, sandstone, gneiss and pebbles of laterite mixed with soil of black color. Accumulations of stones are found in a central area of the burial. Fine whitish ash is found in north east quadrant of the burial and a flat stone was used over it may be for security. Ceramic assemblage found were coarse variety of micaceous red ware occasionally gritty surface shapes come along big pots and basins. Coarse red ware with gritty/ without gritty surface few sherds of black and red ware were also found inside the burial.

Burial no. 7 was a stone circle made out of different stones. Peripheral stones were placed vertically in a circle. All 24 slabs were used for peripheral boundary and were erected vertically as like menhir.

The cist was found inside the burial located near the south peripheral boulders. This rectangular cist was measured 105 x 80 x 41cm and an opening towards east and closed in all the directions. Inner measurement of the cist was 63 x 55 x 38cm. Cist slabs were made out of conglomerate stone. Fragment of skeleton remains with coarse red ware were found inside the cist.

Burial no. 8 is located in locality 2 and the burial made out of slabs of different stones. It seems schist was most preferable stone for construction of this type of burial. Small piece of iron was found inside the burial. Very less coarse red ware ceramic found. No mortal remains was found. To find out the whole cultural phenomena of the early iron age society two trenches measuring 10 x 10m each was taken for scientific investigation. Trench A was laid on the Mound no.2 and Trench B was on Mound no.1.

Trench A was taken up on Mound no. 2. Stratigraphically, no occupational break was ob-

served indicating a continuity of habitation at this location. Excavations throughout revealed early iron age period. Total depth achieved in this trench was 2.90m from surface level.

The stratigraphic deposit of lower levels was characterized by white ashy soil mixed with charcoal and compact clay material. Semi compact to loose deposit of ash mixed with small pieces of charcoal with red soil patches probably indicating some kind of burning activity. Thin black and red ware is characteristic feature of this phase. It had a fine and thin section with bright red slip of black and red ware. Its notable feature of this ware is painted designs in black colour. Sporadic evidences of white painted designs are also discovered. Black and red burnished wares with high burnishing are found from lower strata. Variety of painted designs on black on red ware consisted of comb pattern, vertical strokes, horizontal bands, diamond shapes and square full of lines.

In higher levels of the Trench A, series of habitation layers are noticed. The ceramic industry was represented by black and red ware with slight thick sides, red burnished ware, black burnished ware, red ware, coarse red ware and micaceous red ware of medium to fine fabric. Two different activities of the trench revealed habitation floors remains of industrial activity. Variety of iron objects and stone objects were recovered.

In Trench B total ten habitational layers were identified. Layer nos. 1 to 6 relate to habitation deposit of early iron age culture while the lower most deposit yielded a ceramic free microlithic assemblage. The microlith bearing deposit composed of compact soil of light brown to yellow colour mixed with small gravels of laterite and composite silt, microlithic assemblage was non-geometric in character consisting generally of blades, flakes, thumb scrapers, cores etc. made out on chert. One of the floor levels was char-

acterized by small river pebbles used as a base over which compact brown clay with lime plastering rested. Evidence of floor levels, burning patches and ashy deposit found in same level. Abundant pottery was recovered from the top layers which includes coarse red ware in large quantity followed by micaceous red ware, black burnished ware and black and red ware (**figs. 13-14**). In megalithic community of Vidarbha, most of the iron objects are found in the burial complex. But at Malli, iron objects like knife, axe, adze etc. are found *in situ* at occupational areas. Scanty remains of copper objects were also observed. Piece of copper bangle and ring were obtained in habitation deposit. Other antiquity include terracotta beads with coarse fabric, stone muller and pounder etc. Therefore, a ceramic layer of microlith was assignable to *circa* 3000 BCE to *circa* 2000 BCE while early iron age period to the *circa* 800 BCE to *circa* 500 BCE

28. EXCAVATION AT KARKAL, DISTRICT SOLAPUR

The archaeological site of Karkal located on bank of the river Bhima in south Solapur taluka, district Solapur (Lat.17°25'7"N; Long. 75°42'47.5"E) was excavated by Department of Ancient Indian History, Culture and Archaeology, Solapur University under the guidance of Maya Patil Shahpurkar and team. The site is around three hectare, however, two hectare is under cultivation and the other half hectare area of site was destroyed by farmers.

Explorations carried out around site brought to light numerous stone sculptures of different period. The notable sculptures are herostones, Gajalakshmi, Visnu, Siva-linga, *saptamatrika*, Naga, etc. and several other images of medieval period found scattered.

The aims and objectives of the excavations was to know the cultural sequence of the site; to look for continuity of the early historic pe-

riod and to the early medieval period and to know whether there any cultural influence or any indication of long distance trade.

In all seventeen trenches were laid down at the site along with few trial trenches. In Trench A1, four stones of pottery kiln exposed were placed at four corners of this patch, at the level of 2.12m to 2.18m stone patches and stone alignment were also exposed. In Trenches B1 and B2, at the depth of 2.30m to 2.34m four big postholes were also exposed containing wooden fragments and wood powder. In Trench B6 at 2.15m below surface black soil was exposed. In Trenches C2 and C3 stone alignments and iron slag found in large quantity while in Trench C6 one terracotta disc inscribed with *swastika* was found. In Trench D6, were found pots kept on one above other and some broken pots along with floor level, 2.34m to 2.36m below surface (**pl.78**). Bowls and decorated rims of big storage jar were also recovered. In the Trench G10, one small stone structure was found. Series of postholes were exposed in Trench G11 is circular shape over an area of 2 x 1.70m at the depth 1.91m to 1.95m (**pl.77**).

In the Trench G13, multiple bust of the female figurine made, foot portion of human in terracotta were recovered at the depth between 1.92m to 2m.

Excavation of the Trench YX1 brought to light evidences of the potsherds, bones of animals and human (**pl.76**), one small shell and one miniature pot with areca nut shaped bead and large number of pottery with bigger in size of Roman impact, i.e. with red slip and glazed from both sides. One conical potsherds (part of amphorae ?) was found. The Trench B6 exposed glass bangles of black, red, yellow color and bi-chrome, polychrome and other antiquities including microliths (**pl.79**).

On the basis of the surface treatment, fabric, decoration and shapes, the ceramic assem-

blage is classified into following six different categories. Coarse red ware is the most predominant ceramic category and one of the utilitarian varieties, meant for storage purposes. The fabric is gritty, coarse to medium coarse in nature. The wheel made pots in this variety are plain, devoid of any surface treatment. Common shapes include big storage jars (*ranjana*), medium size globular pots, 'V' shaped bowls with exerted tapering rims, lid-cum-bowl with ledge and shallow bowls. Red slipped ware is mostly coarse to medium coarse. The slip shows a variety of shades of red colour ranging from brick red to bright orange red. All the pots are wheel made. The most common shapes in this category include small and medium size globular pots with beaded, under cut, out turned, tapering rims. These pots have high, medium or constricted necks. The red polished ware are wheel made deluxe pottery uniformly bright red slipped and polished. This pottery is dated to the beginning of the Christian era and associated with the Roman contact. Black and red ware (pl.84) is one of the important ceramic assemblages of the early historic period. Mostly wide-mouthed pot, it bears slip on both, the inner as well as external surfaces, which is usually fired into red and black colours. The limited typical shapes include the convex sided bowls include vertical-sided dishes with tapering rims and spouted vessels. Coarse grey ware is the most common ware at Karkal. The fabric is coarse gritty and ill-fired. Common shapes include carinated handis, lid-cum-bowl and medium to small size globular pots with constricted neck and outer projecting thick flat rims. It is treated with shiny jet-black slip with incised decorative patterns namely triangles, squares, zigzag lines and leaf pattern. Most common shapes are small to medium size globular pots without turned, flat rims basins, and carinated *handis* etc. Black on red ware was found in the Trench C2. One conical pot was found in G13 (pl.85).

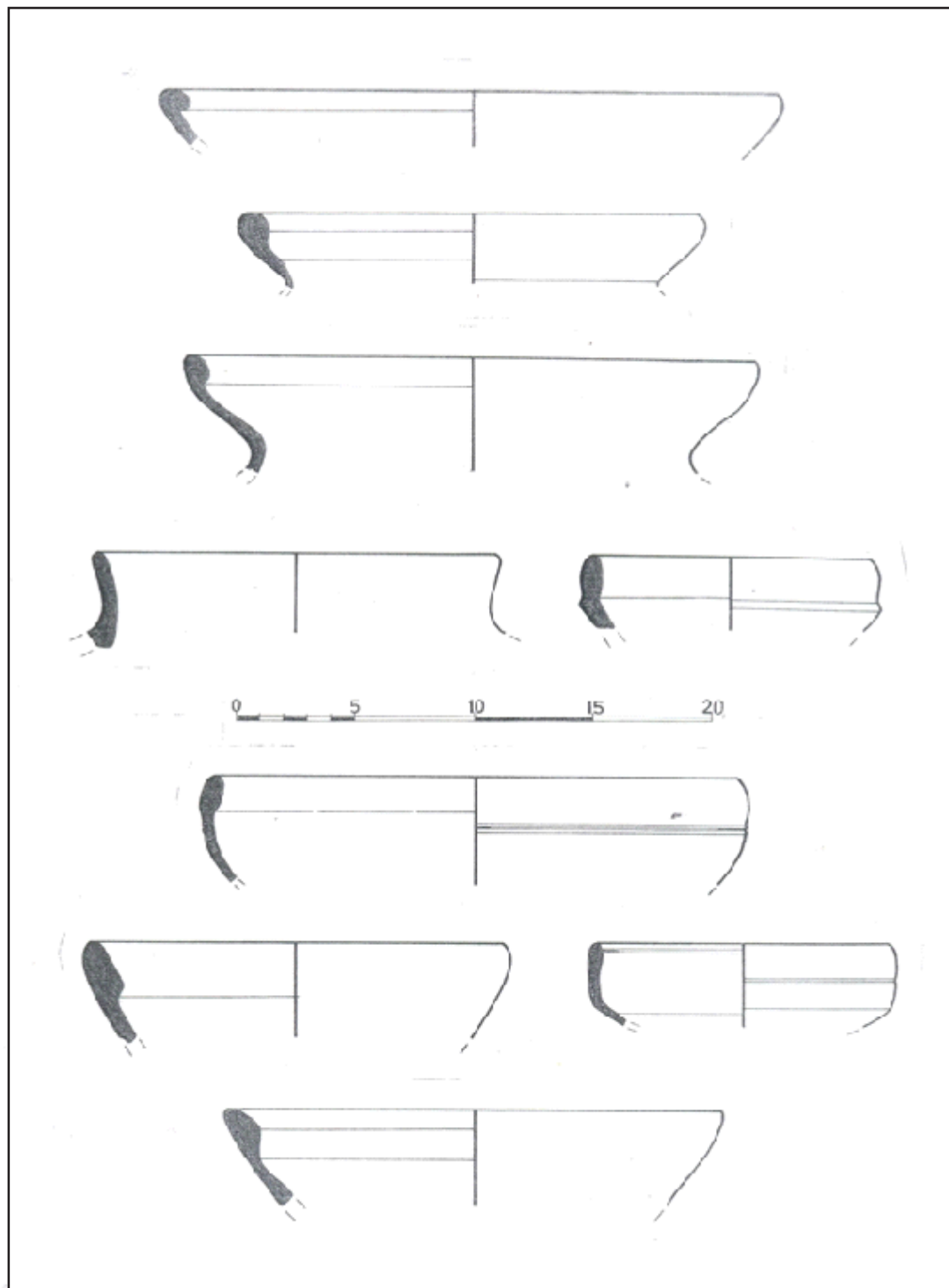
The most common ceramic findings from the site include vessels of various types that are used for daily activities such as cooking, storage and other day to day activities. These vessels are useful indicators of the technological development, food habits, artistic and aesthetic qualities, trade patterns and general economic conditions in the past.

A large number of animal bone fragments from excavation indicate that these belong to cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*), goat (*Capra hircus*) and dog (*Canis familiaris*) also there is perhaps blackbuck (*Antelope cervicapra*) & four-horned antelope (*Tetracerus quadricornis*). Variety of faunal remains recovered at the site throw light on the range of domesticated animals and dietary system of the society.

The antiquities at the site contain ornaments, toiletry objects and several other varieties of objects made in shell and their waste (pls.80-81), terracotta, glass, stone, copper and iron, etc., 26 bangle fragments of which one is decorative found on the surface (pl.83). Three earring fragments, 10 shell beads of different shapes were found (pl.82). One of the significant findings of excavation was ivory bangle from Trench A1 at the depth of 2.06m to 2.15m. Besides, the terracotta objects were also found in excavations. These include earrings, numerous areca nut shaped beads, hopscotch, pendant, human (male and female) and animal figurines (ram and horse), etc.

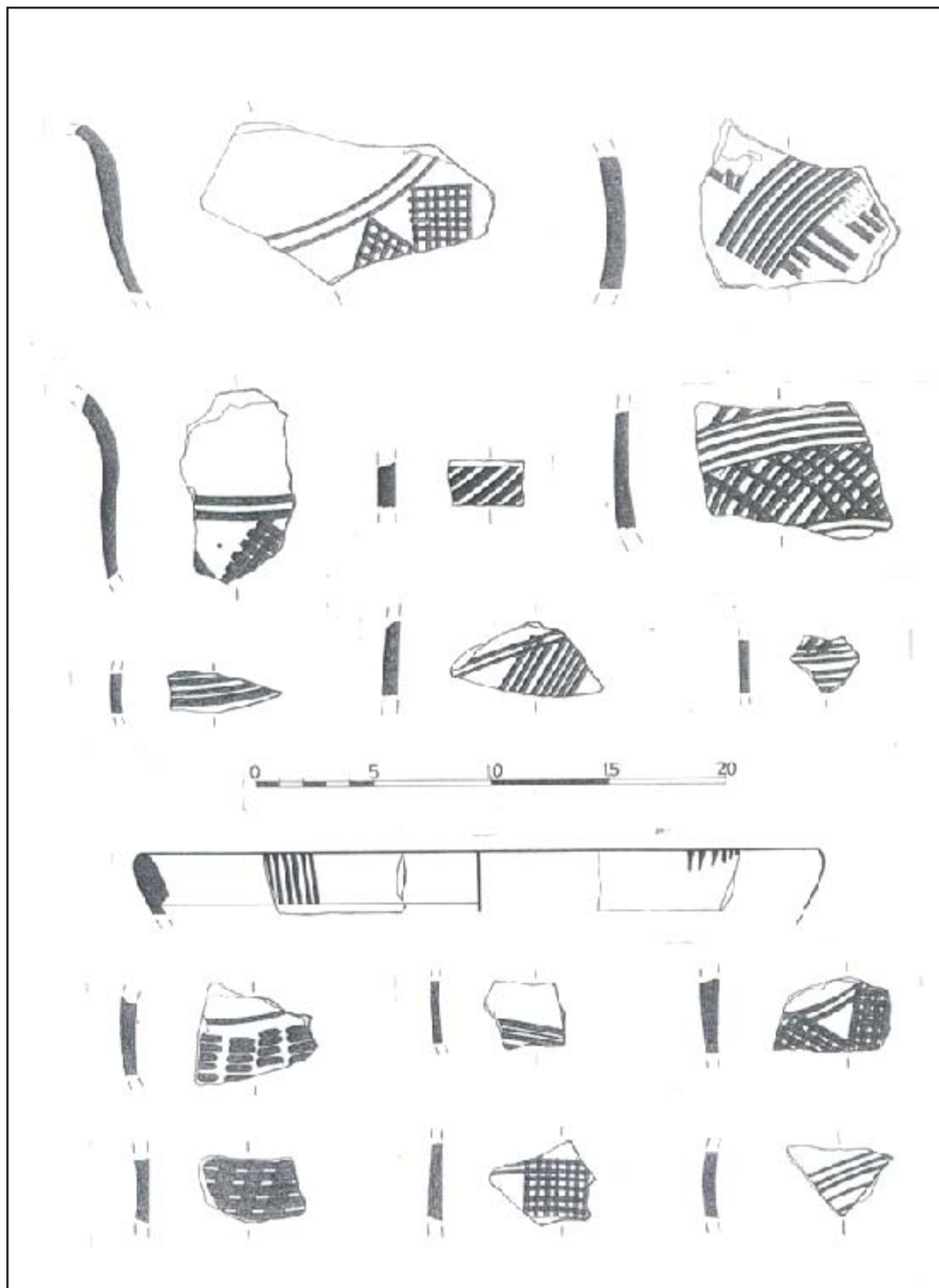
Metal objects found in the excavations are mostly of iron and copper. The iron objects consists arrow heads, nails, weapon and large number of iron slags. A few copper objects of rings were also discovered. Glass beads and bangles were also recovered from different levels. Objects include skin rubber, muller and quern, bird shots, beads, etc. were also found

Fig. 13



Malli : pottery types

Fig. 14



Malli : painted ceramics.

from excavation.

Charred grains of wheat, *moong* and gram along with variety of faunal remains suggested their diet system. People of Karkal lived in wattle and daub houses of stone foundations, walls made of split bamboos plastered with mud.

On the basis of antiquities, potteries and structural remains recovered from the excavation is assignable to following three periods.

Period I: Pre-Satavahanas (300 - 200 BCE)

Period II: Satavahanas (200 BCE. - 2nd century C.E.)

Period III: Medieval (10th century C.E. - 14th century C.E.)

Plate 76



Karkal : floor surface and animal bones in Trench YX1, See p. 99



77



78

*Karkal : 77, series of post-holes in the Trench G11; 78, cluster of 'V' shaped bowls in Trench D6,
See p. 99*



79



80



81

Karkal : 79, microliths; 80-81, shell objects, See p. 99 and 100



82

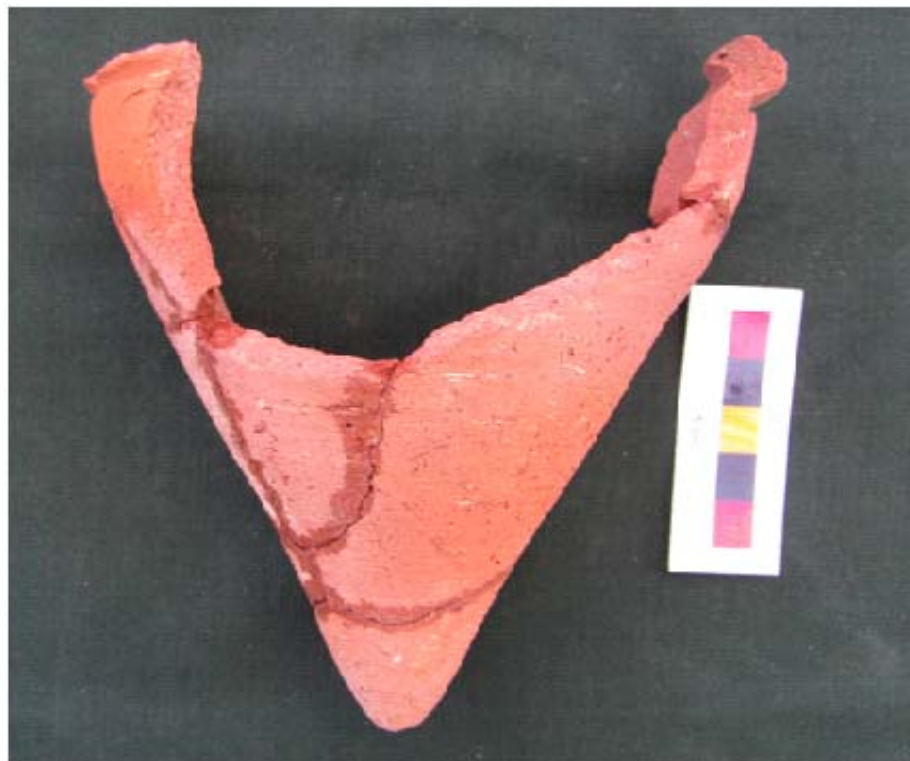


83

Karkal : 82, shell beads; 83, shell bangles, See p. 100



84



85

Karkal : 84, black and red ware, Trench YX-1; 85, conical pot, Trench G13, See p. 100

29. EXPLORATIONS IN DISTRICTS MUMBAI, RATNAGIRI, RAIGAD AND THANE

The explorations has been carried out by Mayur Thakare, Consultant, Competent Authority of the Survey, Mumbai Circle to understand defense and settlement pattern of Indo-European (Portuguese and British) periods (1498-1818 C.E.) in north Konkan (Palghar, Thane, Mumbai sub-urban, Mumbai

and northern part of Raigad district).

The region of Konkan especially north and central has one of the earliest remains of Indo-European sites and monuments datable to first quarter of the 16th century. These represent the earliest phase of European arrival and spread in western coast and in India. The findings of exploration are as under:

Taluka Vasai, District Thane	
Location	Nature of Remains
Sasughar	Remains of large residential complex/ outpost and chapel, Portuguese period
Maljipada	Outpost, Portuguese period
Juchandra	Remains of outpost, Portuguese period
Ramedy Church, Vasai	Wooden door in the church, Portuguese period (pl.88)
St. Thomas Church, Sandor, Vasai	Wooden door in the church, Portuguese period
Gas village (Near Nalasopara)	Visnu sculptures, Medieval (Shilahara/ Yadava ?) period (pl.87)
Arnala island	Circular bastion Portuguese period (pl.86)
Shrigaon	Remains of outpost, Portuguese period
Mandavi	Temple Remains, sculptures, Portuguese fort and Medieval (Shilahara/ Yadava ?) period
Dongripada NE 12 Km from Vasai	Outpost, Portuguese period
Nagale	Remains of the outpost on the top of small hillock and remains of the foundation of extinct Portuguese outpost/mansion in the village, Portuguese period
Shilottar	Remains of outpost, Portuguese period
Vajradongari (Hiradongari), Vasai	Remains of fortification, Maratha period

Taluka Dapoli, District Ratnagiri

Location	Nature of Remains
Utembar Temple, Utembar (near village Kelshi)	Sculptures, hero stones and <i>sati</i> stones, Medieval period (Shilahara/ Yadava ?)
Aasud Temple, Aasud (near village Murud)	Sculptures, herostones and <i>sati</i> stones, Medieval period (Shilahara/ Yadava ?)

Taluka Palghar, District Thane

Location	Nature of Remains
Dahisar	Outpost, Portuguese period
Khamloli	Remains of fortified mansion/outpost, Portuguese period
Nawaze	Outpost, Portuguese period
Girale	Outpost, Portuguese period
Duktan	Outpost, Portuguese period
Virathan	Fortified mansion/church complex, Portuguese period
Jalsar	Outpost, Portuguese period
Dativare	Remains of fort, Portuguese period
Edwan	Outpost and well, Portuguese period
Khatali	Remains of house complex with intact wooden logs and medallion carvings, Portuguese period
Usarni	Maratha/ stepwell, Portuguese period
Danda	Bastions, outpost, mansion/ villa, coat of arms, Portuguese period
Kelve	Remains of church and pentagonal bastion, near customs office, Portuguese period
Mahim	Remains of pentagonal bastion and adjoining structure with a wall. Square bastion, protection wall at Mahim PHC, Maratha/ Portuguese period step well and British period

Taluka Palghar, District Thane

Location	Nature of Remains
Panchali	A big outpost/ mansion, Portuguese period
Boisar	A big outpost, Portuguese period
Kumbhavali	A big outpost/ mansion, Portuguese period
Koliwade/ Kolawade (Near Boisar)	A big outpost/ mansion, Portuguese period
Kurgaon	A big outpost/ mansion with two wells, Portuguese period
Vengani	A big outpost/ mansion with two tunnel filled with debris like structure inside, Portuguese period
Dahisar Tarf Tarapur - (at village Samaj Mandir)	Remains of outpost, Portuguese period
Kudan - At Marathi school	Foundation remains of outpost, Portuguese period outpost, Portuguese period

Taluka Thane, District Thane

Location	Nature of Remains
Nagale Bandar	Remains of large mansion/ villa, Portuguese period
Gaimukh	Remains of mansion, Portuguese period
Vartak Nagar, Thane	Church, Portuguese period

District Mumbai sub-urban

Location	Nature of Remains
Madh island	Sculptures, Medieval period (Shilahara/ Yadava ?) Portuguese outpost (pl.91), St. Bonaventure church, Portuguese period
Island nearby Madh island	Circular bastion, Portuguese period
Trombay, BARC campus	Church complex, Portuguese period
Chouk, Utan	Remains of fortification, Maratha period

Taluka Dahanu, District Thane

Location	Nature of Remains
Chinchani	Stepwell, Maratha/ Portuguese period
Buruzpada (7km. south of Dahanu)	Circular bastion, Portuguese period
Kolawali (16km. south of Dahanu)	Outpost/ mansion, Portuguese period and temple, Maratha period
Aasangaon	A big square watch tower with adjacent structure having gun slits, Portuguese period (pl.90)

Taluka Alibag, District Raigad

Location	Nature of Remains
Aawas	Sculptures, Medieval (Shilahara/ Yadava) period
Akshi	Sculptures, Medieval (Shilahara/ Yadava) period
Chaul (Mukhari Ganpati Temple)	Sculptures, herostones, Medieval (Shilahara/ Yadava) period
Jineshwar Temple, Shrivardhan	Sculptures, herostones, <i>sati</i> stones, Medieval (Shilahara/ Yadava) period

Taluka Bhiwandi, District Thane

Location	Nature of Remains
Gane	Foundations of outpost, Portuguese period
Firangpada	Outpost, Portuguese period
Kharabao	Remains of fort, Portuguese period
Paigaon	Foundations of outpost, Portuguese period
Kambe	Remains of fort, Portuguese period
Pimpalasaon	Chapel complex and outpost, Portuguese period
Junadurkhi	Remains of outpost, Portuguese period
Kawad	Temples, step wells, Maratha period (pl.89)
Medhe (near Vajreshwari)	Temple remains, sculptures, inscribed stone, Medieval period (Shilahara/ Yadava?)
Kalambhom (near Vajreshwari)	Temple remains, sculptures, half portion of inscribed stone, Medieval period (Shilahara/ Yadava?)



86



87

Arnala : 86, circular bastion Portuguese period; Gas : 87, Visnu image, medieval period, See p.108



88



89

*Remedy church, Vasai : 88, church door Portuguese period; Kawad : 89, step well Maratha period,
See pp.108 and 111*



90



91

Aasangaon : 90, watchtower, Portuguese period; Madh island : 91, outpost/mansion, Portuguese period, See pp.111 and 110

ODISHA

30. SCIENTIFIC CLEARANCE WORK AT SUN TEMPLE, KONARK, DISTRICT PURI

The Bhubaneswar Circle has undertaken the scientific clearance work outside the prakara wall of the Sun temple, Konark in front of the southern entrance gateway at a distance of 4m away from it. A total area of 10 x 10m has been cleared scientifically up to a maximum depth of 5.50m. A trial trench of 4 x 2m has revealed that the original working level of the temple complex is lying below 2.50m from the existing surface level. The topmost layer contains the khandolite and laterite architectural fragments of the temple dumped during the debris clearance and conservation work of the monument done in the past. Below this dumping debris layer, there is a barren aeolian deposit of nearly 4m which is light yellowish in color. The brown sand layer below the barren sand layer contain a few potsherds of coarse red and grey ware indicating it as the original working level(pls.92-93).

31. EXCAVATIONS AT KANKIA (RADHANAGAR), DISTRICT JAJPUR

In continuation of previous year's excavation, further work was carried out at the fortified settlement of Kankia under the direction of S. Patnaik of OIMSEAS, assisted by students of Banaras Hindu University (UP) and Utkal University (Odisha) with a view to determine the cultural sequence; to expose horizontally the structural remains of different periods; to correlate and compare the remains with other excavated early historical and Buddhist sites.

Keeping in view the extensive nature of the fortified settlement and its massive disturbances due to human occupation and agricultural field the site was divided in to 4 locations such as location KNK I, and IA, location KNK II, III and IV. During the year, excavation was taken

up in location KNK III and IV. Location KNK III is situated in the middle of the southern fortification where location IV is in the extreme end of the site in south-west corner.

The right side arm extending east-west of the entrance at KNK III which was partially unearthed was now completely exposed and extending towards north. The left side arm of entrance highly disturbed and was merged with the mud fortification (pl.94). The bricks used measure 34 x 24 x 8cm and 29 x 24 x 8cm respectively. In the eastern end of the wall big size boulders are used instead of laterite stone. Few Buddhist antiquities and silver coins indicate that this structure may goes back to the early part of the Christian era. The excavation in the KNK IV in the extreme end of the south-west corner a brick structure encountered. The bricks used in structure measure 29 x 24 x 8cm. Only 2 to 3 courses of bricks are noticed. The concentration of terracotta ornaments and also one inscribed stone pendant indicate that this area might be occupied by some skilled craftsman community.

In the KNK III area (Trench XK16) well fired brick and undressed laterite stone small structures are encountered during the excavation. The bricks used measure 29 x 24 x 8cm, 34 x 24 x 8cm and 39 x 24 x 8cm respectively. Perforated finger tip marked terracotta tile pieces along with keys are also unearthed in this level. A number of terracotta beads, tile keys, hopscotch, few terracotta figurines and copper coins along with varieties of early historical potteries are found.

Cultural chronology of site

Period I: On the basis of antiquities and structural activities the chronology of the site assigned to circa 4th century BCE to 1st century BCE. In the early phase of this period morrum rammed floor level has been found in the adjoining to the massive brick structure area. The

phase is characterised by presence of Northern Black Polished Ware, black and red ware, black slipped ware along with red ware, grey ware, red slipped ware, etc. Terracotta objects includes beads, skin rubber, figurines, ornaments, hopscotch, etc. are significant finding of this period. Besides, bone point, semiprecious stone beads, highly eroded silver punch marked coins, etc. are also unearthed. Few terracotta inscribed sealings/tablets and inscribed potsherds which palaeographically goes back to 1st century BCE are also unearthed in this phase.

Period II: The period may started from 1st century BCE till the ends of 3rd century C.E. was the most prosperous period of this site as evidenced by the clay mould and terracotta figurines. The prominent potteries of this phase are applique-incised-basket impression red wares, black slipped, red slipped, red ware, grey ware, etc. Maximum numbers of fine terracotta ornaments and beads with flat bases also been unearthed during this phase.

Period III: Kankia (Radhanagar) yielded 593 numbers of antiquities during excavation. Among them good numbers of both silver and copper coins include highly eroded silver coins, un-inscribed copper cast coin and Puri-Kushan copper coins are found (pl.95). A large numbers of terracotta figurines both human and animal, among them are lion, bull, lady figurine, snake figurines, etc. (pl.97). The lone terracotta moulded elephant figurine is found in the Sunga-Kushana level. Beads of both stone and terracotta in circular, oval, cone shaped have been unearthed during the excavation. Some semiprecious stone beads are also found. In addition to these an inscribed stone pendant was also found (pl.96). Besides, the site yielded a large numbers of terracotta objects like the gamesman, ear ornaments, hopscotch, crucibles of different sizes. Period III dated from the end of 3rd century C.E. to 5th century C.E. is de-

void of any antiquities.

32. ONSHORE EXPLORATIONS OF ODISHA COAST

Onshore explorations were conducted by S. Tripathi of National Institute of Oceanography, Goa at Khalkatapatna along the left bank of Khushabhadra river, nearer to Konark and brought to light terracotta ring-wells, beads, brick-bats and celadon pottery, Chinese pottery and local pottery. These finds are scattered over a wide area. These remains submerge during high tide and expose during low tide. Similar kind of Chinese pottery, local pottery and terracotta ring wells have been recorded at Khalkatapatna and adjoining regions during land excavations in addition to Chinese coins.

The explorations on the northern part of Konark coast of Odisha brought to light remains of a shipwreck in 8 to 10m water depth. The seabed is sandy, shipwreck remains are covered with fishing nets and fishing rope. Three boilers, cabin and frames are noticed. Major portion of the boilers are buried in the sea bed because of shallow water depth and high energy zone. The frames are highly eroded whereas all boilers are *in situ*. These boilers resemble those at Amee Shoals, Goa boilers in terms of their size. The ship might have drifted to the shore either due to engine failure or by storm, then wrecked. The archival records mention that H. M. ship Carron was wrecked 65km north of Konark in July 1820, probably this is the same shipwreck.

RAJASTHAN

33. EXCAVATION AT MAHARAJ-KI-KHERI, DISTRICT UDAIPUR

This ancient mound of Maharaj-ki-Kheri (Lat.24°38.617'N; Long.73°55.102'E), was first noticed by V. N. Mishra of Deccan College, Pune in the year 1962-63 identified as



92



93

Sun temple, Konark : 92-93, trial excavation in front of the southern entrance gateway, See p.115



94



95

Kankia : 94, brick structures; Puri : 95, copper coins, Kushana, See pp.115 and 116



96



97

Kankia : 96, inscribed stone pendant; 97, terracotta lion, See p.116

Kheri (1962-63, p-19). Excavation was carried out by Delhi Circle of the Survey under the guidance of Vasant Swarnkar, assisted by Manoj Dwivedi, Shiv Kumar Bhagat, Praveen Singh, Rajesh Meena, Suresh Meena, R.P Mathur, K.L.Saini and Ravindra Jhangid with the objectives to know the extension and the cultural sequence of the site and to ensure the chalcolithic habitation deposit on the mound and its relation with other chalcolithic sites of this region, as Ahar and Balathal in Udaipur and Gilund in Rajasthan.

Geographically, the site is located in between two natural water reservoirs. This mound has a gentle slope towards western side. The medieval settlement is almost departed because of the agricultural activities resulting the chalcolithic settlement occurs on surface itself.

Excavations have been taken up in two different locations. Trench AA5 was excavated at north east corner of the mound yielded a single course stone structure measures 8.60m in length and 1.60m in width respectively. Second operational area was towards southern side. At this place seven trenches have been laid and excavated in eastern-western direction (XB2, XC2, XD2, XE2, XF2, XG2, XH2). Other two trenches XC3, XC4 were also excavated at this location (**fig. 15**). This second location revealed one curvilinear structure in Trench XB2 varies in 2 to 4 courses measuring total length of 4.50m approximately and 30cm wide and at either end it is 70cm. One more stone structure (wall) brought to light in trench XC2. The width of the wall suggests that it might have been part of a huge structure. The total length of the wall was about 8.50m and maximum width of 0.90m. The evidence of a small drain in southern side, is also noteworthy. In Trench XC3, two medium size wide mouth storage vases also found here with few more pots on floor. The excavation revealed two cultural pe-

riods:

Period I: Typical Chalcolithic

Period II: Medieval (totally removed, but found few evidences of medieval period)

34. ARCHAEOLOGICAL EXPLORATIONS IN THE CATCHMENT OF THE SOM, DISTRICT UDAIPUR

Village to village survey was carried out under the direction of J.S. Kharakwal assisted by Kul Shekhar Vyas, Sameer Vyas, K.P. Singh, Hitesh Bunkar, Bhagwan Das, Devendra Singh, Roshan Lal Regar, Raghuvir Singh Devra and Nupur Tewari of the Department of Archaeology, Sahitya Sansthan, JRN Rajasthan Vidyapeeth, Udaipur in the Sarara, Salumer and parts of Khairwada *tehsils* along the Gargal, Gomati and Kalyanpur Nala tributaries of the Som in Udaipur district. Following archaeological sites belonging to bronze age, historical phase and medieval times were discovered.

Some Ahar culture sites such as Jhadol (Kumharia Magri), Sagtara, Udpuria Khalsa, Depur Amla are more than three hectare in size. Close to these large settlements was discovered a small settlement e.g., Juni Jhadol (Ramla Pada) near Jhadol, Depur near Depur, Amla, Paalu near Sagtara and so on. These small sites appear to be the satellite settlements. Cultural deposit, particularly at the large sites, has survived more than 7m. Scatter of copper slags, terracotta and stone balls, chert nodules were observed on the surface, besides a few structures. At Jhadol modern settlement and agricultural fields have been raised over the mound and the peripheral area is being levelled for agriculture (**pl.98**). Our close examination revealed that several residential structures of Ahar culture were found exposed at the site. Following the decline of the Ahar Culture, the sites was again occupied during the early historic period. The sites has about a meter thick deposit on top belonging to the Historical phase. Ramla

EXPLORATIONS AND EXCAVATIONS

Pada, a small Ahar settlement, located about 2km to the north of Jhadol (Kumharia Magri), has also yielded copper slag. At Sagtara, on the bank of Gargal, the entire modern village is raised right on top of the ancient mound. Palu, a small temporary settlement of the Ahar culture was discovered about 2.5km away on the right bank of Gargal.

An interesting discovery was made at Navda, a village located on the right bank of Gomati. The Ahar Culture site was located on a hillock located close to the village. The discovery of Navda has added a new dimension to the understanding of Ahar.

At all the Ahar Culture sites was discovered pottery of typical Ahar ware as white painted black and red ware, bright red slipped, coarse grey, thin red slipped and tan ware. These pottery types represent the early and mature or

prosperous phase of Ahar Culture. Among the collected samples are a variety of bowls, medium and large sized jars, pots, basin and dish-on-stands. The black and red pottery is decorated with a variety of geometric designs formed by dots, wavy or band of lines. On the other hand, the coarse pottery is decorated with prominent appliqué and incised geometric designs. Both hand made and wheel thrown types are available in the collection. Besides, grinding and hammer stones, nodules and cores of agate, chert, quartz, and slag were also discovered at some sites. Besides bronze age settlements, scores of historic and medieval settlements at Jhadol, Sagtara, Chokra Limri, Badgaon Bandoli, Behuti, Kejad, Sallara, Semari, Kalyanpur, Dheladanda, Veerpur, Semari, Rampur, Depur, Bhalun Gurah, Baravali, (Tanda), Bagthala, Navda, Badgaon, Thikariya, Depur Amla, Deosomnath were discovered (fig.16).

Name of site	Geo-coordinates	Tehsil	Cultural material	Period
Rampur	Lat. 23° 56'N; Long. 73° 47' 12.9E	Sarara	Pottery	Medieval
Sagtara	Lat. 24° 9'30.9N; Long. 73° 51' 09.4E	Sarara	Structures, pottery, tiles	Chalcolithic historic and medieval
Badawali (Tanda)	Lat. 24° 03' 04N; Long. 73° 55' 11.6E	Sarara	Temples, structures, pottery, inscription	Early medieval
Bagthala	Lat. 24° 05' 03N; Long. 73° 53' 38.5E	Sarara	Pottery, tiles fragments, terracotta bead	Medieval
Palu(Mandvi angri)	Lat. 24° 85' 1.1N; Long. 73° 51' 37.2E	Sarara	Ahar pottery, slag	Chalcolithic
Badgaon (Thikaria)	Lat. 24° 9' 23.1N; Long. 73° 54' 30.8E	Sarara	Pottery	Historic
Bhalun Gurah	Lat. 23° 59.017'N; Long. 73° 44.436'E	Khairwada	Medieval	Pottery and iron slag
Itali Kheda	Lat. 23° 59.982'N; Long. 73° 57.000'E	Salumber	Pottery	
Kalyanpur	Lat. 24° 00.109'N; Long. 73° 45.395'E	Rishabhdev	Fort wall, structures, pottery	Medieval

Name of site	Geo-coordinates	Tehsil	Cultural material	Period
Tikam Baavji	Lat. 24° 06.666'N; Long. 73° 51.020'E	Sarara	Temple, inscriptions, Brahminical icons	Medieval
Navda 1 (Fali Magri)	Lat. 24° 06.897'N; Long. 73° 53.241'E	Sarara	Structures, Ahar pottery, chert nodules	Chalcolithic
Navda 2	Lat. 24° 07.106'N; Long. 73° 53.540'E	Sarara	Pottery	Historic
Navda 3	Lat. 24° 07.213'N; Long. 73° 53.568'E	Sarara	Pottery, slag, tuyeres	Medieval
Badgaon	Lat. 24° 09.420'N; Long. 73° 54.993'E	Sarara	Structures, pottery	Medieval
Chawand	Lat. 24° 10.574'N; Long. 73° 48.645'E	Sarara	Fort, structures, slag, pottery	Medieval
Kejar	Lat. 24° 10.712'N; Long. 73° 50.568'E	Sarara	Pottery	Medieval
Kadi Magri	Lat. 24° 11.134'N; Long. 73° 56.935'E	Sarara	Ancient well	Late medieval
Hadsan Talab	Lat. 24° 11.269'N; Long. 73° 53.342'E	Sarara	Pottery, ancient reservoir	Medieval
Sallara	Lat. 24° 11.308'N; Long. 73° 54.967'E	Sarara	Pottery, step well	Historic and medieval
Bandoli	Lat. 24° 11.411'N; Long. 73° 49.847'E	Sarara	Structures, pottery, iron slag	Medieval
Udpuria Khalsa (Vejpur)	Lat. 24° 12.234'N; Long. 73° 53.510'E	Sarara	Pottery, chert nodules, slag, structures	Chalcolithic and historic
Dingri	Lat. 24° 13.046'N; Long. 73° 51.510'E	Sarara	Pottery	Medieval
Juni Jhadol (Ramla Para)	Lat. 24° 13.433'N; Long. 73° 54.674'E	Sarara	Ahar pottery, slag,	Chalcolithic
Jhadol(Kumharia Magri)	Lat. 24° 13.449'N; Long. 73° 52.666'E	Sarara	Pottery, saddle querns, agate nodules, terracotta disk fragments.	Chalcolithic and historic deposit (pl.99)
Virpura	Lat. 24° 14.081'N; Long. 73° 56.952'E	Sarara	Pottery, brick fragments	Medieval
Harila	Lat. 24° 14.572'N; Long. 73° 52.347'E	Sarara	Ancient reservoir	Medieval

35. EXCAVATIONS AT GANESHWAR, DISTRICT SIKAR

Excavation at Ganeshwar (Lat. 27° 40. 327' N; Long. 76° 48.966'E) located 10km south-east to Neem-ka-Thana in district Sikar was carried out under the direction of R.N. Singh, the Centre of Advanced Study, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University assisted by Arun Kumar Pandey, Dheerendra Pratap Singh, Vibha Pandey, Gargi Chatterjee (Benaras Hindu University), Appu Sharan, Vikash Pawar (Maharshi Dayanand University, Rohtak) and Narender Parmar (Deccan College) in collaboration with the Rajasthan State Archaeology Department.

Ganeshwar region is dotted with the hillocks of Aravalli ranges and sand dunes which forms the part of Thar desert. These hillocks provide drainage to rivulets originating in this region to north through Kantil river. The site is under protection of the Department of Archaeology and Museums, Government of Rajasthan. The site was in imminent danger, continuously being destroyed for agriculture and developmental activities.

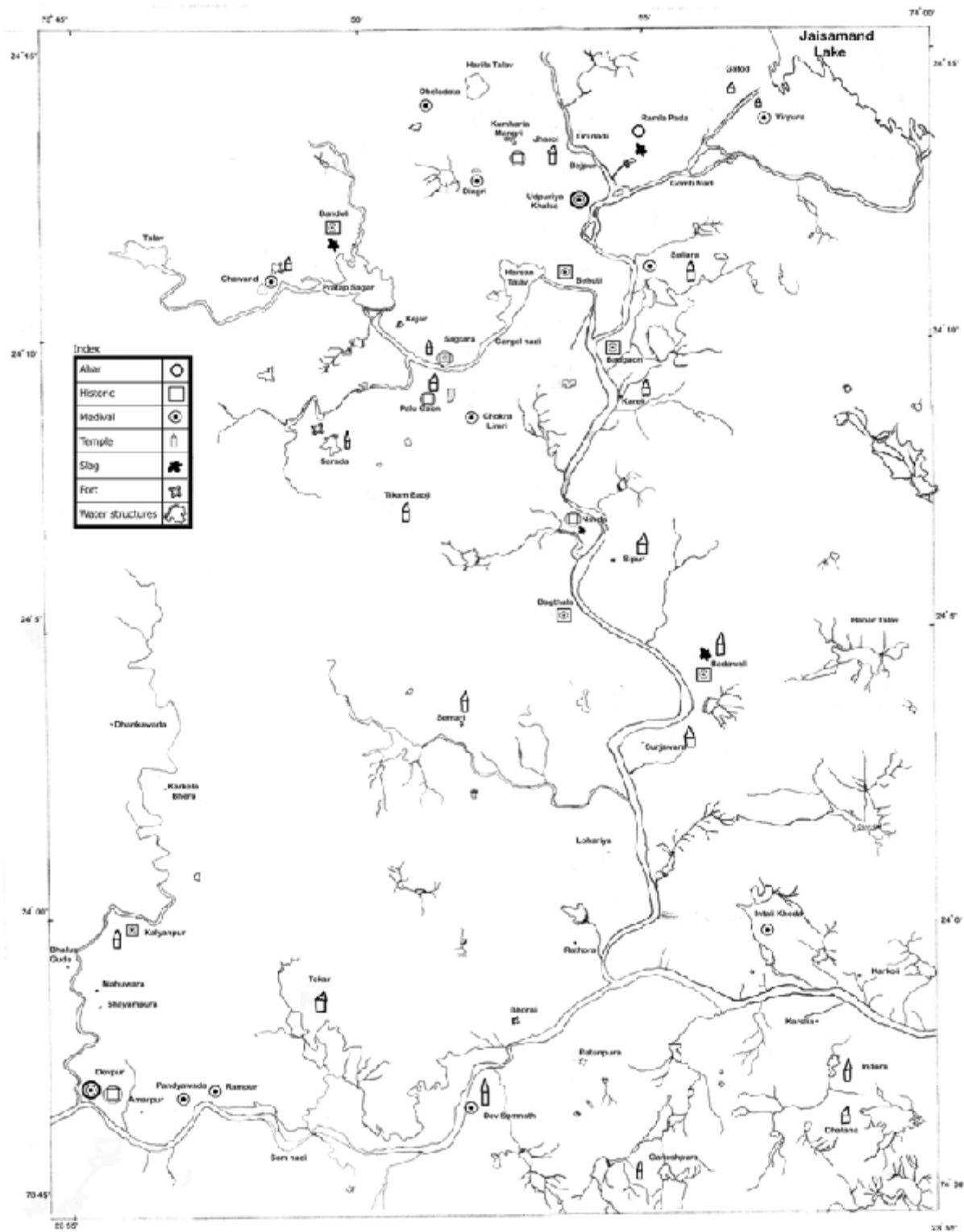
Ancient mounds located at the source of the river Kantil (which used to join the river Drishadvati near Sothi-Bhadra on the north, (1981-82, p.61).

The prime objectives of the present excavation were to understand the cultural materials of Period I (microlithic industry and charred bone) and Period II (with microliths and copper implements-IAR, 1987-88) and to re-assess the cultural sequence, to document various ceramics and antiquities in detail, to obtain datable material for Radiometric dating (AMS), to collect archaeobotanical and archaeozoological materials and to collect soil samples for phytolith study and OSL dating and so on.

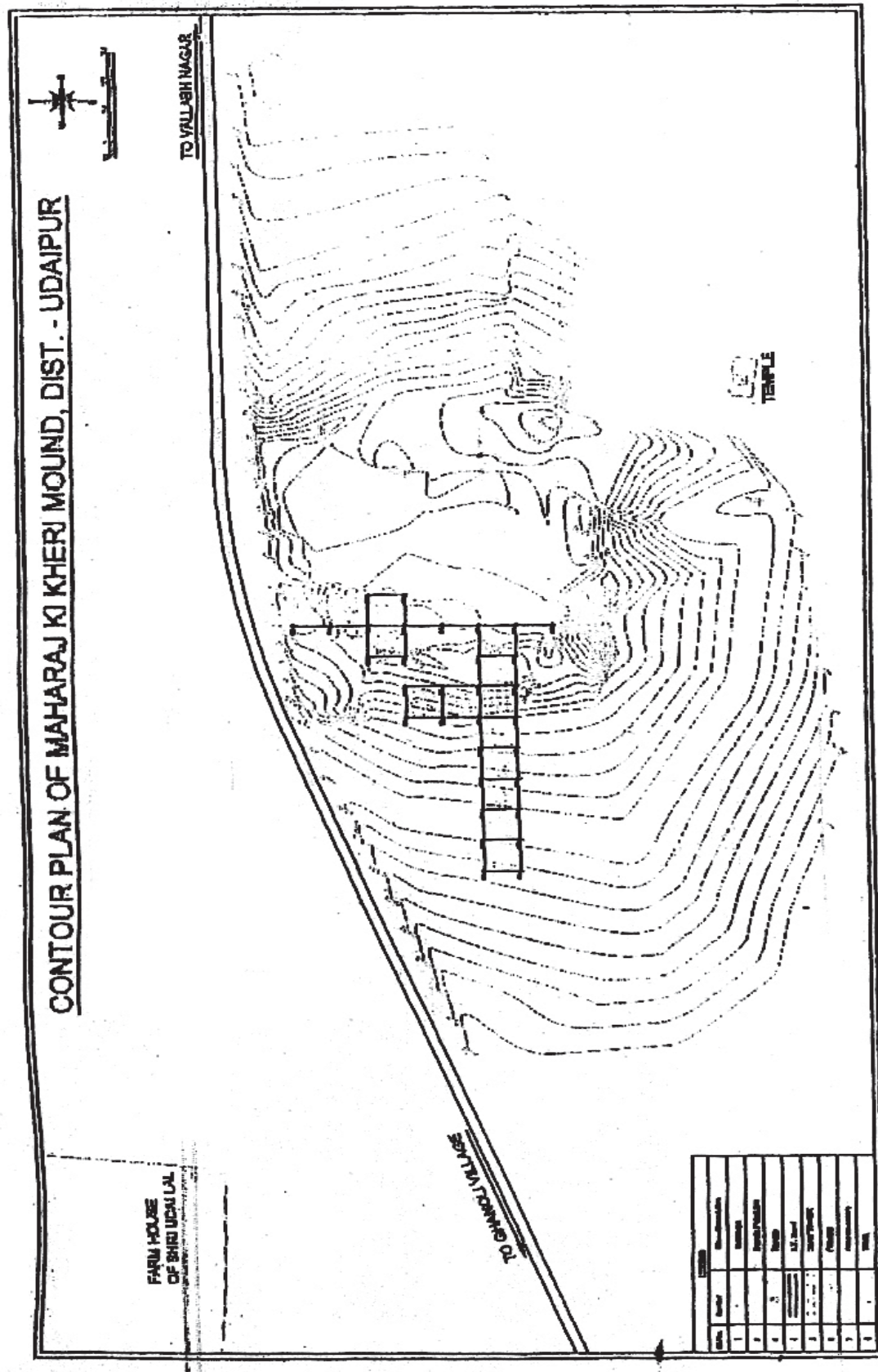
Total five trenches were laid down viz.: A-I, A-4, XA-1, XA-4 & YA-1; two trenches at Mound 2 on the Bhudoli road, two trenches on Mound 1 and fifth trench on the northern slope of hillocks (**figs.17-18 and pl. 100**). Excavation brought to light cultural sequence from mesolithic to chalcolithic with a flimsy deposit of iron age just below the top soil represented by a few iron objects. Maximum cultural deposit was 3.20m. In addition to microliths, the most common material recovered was fragments of fired ceramic vessels of various types. Amongst the antiquities, steatite beads figured highest in number (150), but there were also a range of other small finds including copper arrowheads (**pl.101**), finished and unfinished carnelian beads. 164 microliths recovered from 5 trenches among them 114 are finished microlithic tools, 48 are the other varieties and could not be categorized under finished tool. There are 8 types of finished microlithic tools: blade, knife, lunate, trapeze, point, burin, scraper, notched flake. Amongst them, blade is the dominant variety (42 among 114 finished tools, 36.84%). There are four kinds of scrapers; side scraper, double side scraper, convergent scraper and end scraper. In addition, flake, core, chip, crystal etc. are also present. Raw materials include quartz, chert, chalcedony, etc. (**fig.19**). The potteries were largely wheel-made, with a few hand-made as well. Isolated and small bits of coarse red ware recovered from upper layer of mesolithic level, but could not be ascertained their shape. Chalcolithic potteries include red ware- coarse and fine, dull red ware, red slipped ware, incised and deep incised (20%), chocolate red slipped, reserved slip, post-firing scratching and also a few with graffiti marks.

Their shapes include vases, bowls, jars, dish on stand, legged bowls, goblets, handled, miniature pots, etc. (**pls.102-103**). In addition to paintings are incised designs including groups of parallel bands, chevrons, herring-bone pattern, criss-cross, short strokes, nail and thick wavy lines,

Fig. 15



Sites of Ahir culture, historic and medieval discovered in the explorations





98



99

Sagtara : 98, bright red slip pottery of Ahar; Jhadol : 99, exposed fort wall at Kalyanpur, Ahar site, See pp.120 and 122

etc. Paintings are in black, incisions with the alignment of paintings either in black or red. The applique design was made on the shoulder without adding the additional strip of clay while at other sites a strip of clay was affixed. There was no slip below the applique designs. Due to limited nature of excavation, much details of structure except in Trench A4 could not be ascertained. Evidence of a hut was noticed in the form of post-holes just above the mesolithic level. More than 1100 animal skeletal elements were recovered and examined by Joglekar, Deccan College, Pune. Considerable number of fragments were modified that include bone tools. The domestic mammalian species identified include cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), goat (*Capra hircus*), sheep (*Ovis aries*). The wild mammalian species identified include nilgai or blue bull (*Boselaphus tragocamelus*), Indian gazelle (*Gazella bennetti*), black buck (*Antelope cervicapra*), porcupine (*Hystrix indica*), wild pig (*Sus scrofa*), spotted deer (*Axis axis*). In addition to these a few non-mammalian species were found domestic fowl (*Gallus domestics*) and freshwater fish were found. The excavations at Ganeshwar focused on recovering well stratified cultural material, carbonized organic remains for new radiocarbon assay, samples for phytolith and soil micromorphological analysis, and samples for flotation to collect macro-botanical remains.

Although the materials recovered from the recent excavations are under study but on the basis of preliminary observations, this now confirmed that the site yielded a 60cm deposits of mesolithic (may be late) with a few evidence of domestication of certain animals has already been reported from the Bagor. Archaeobotanical samples are under study and a few carbon samples have been submitted for AMS dating but on the basis of stratigraphical and typological considerations, the chronological sequence of the site may be fixed as early as 4000 BCE.

36. EXCAVATIONS AT KARANPURA, DISTRICT HANUMANGARH

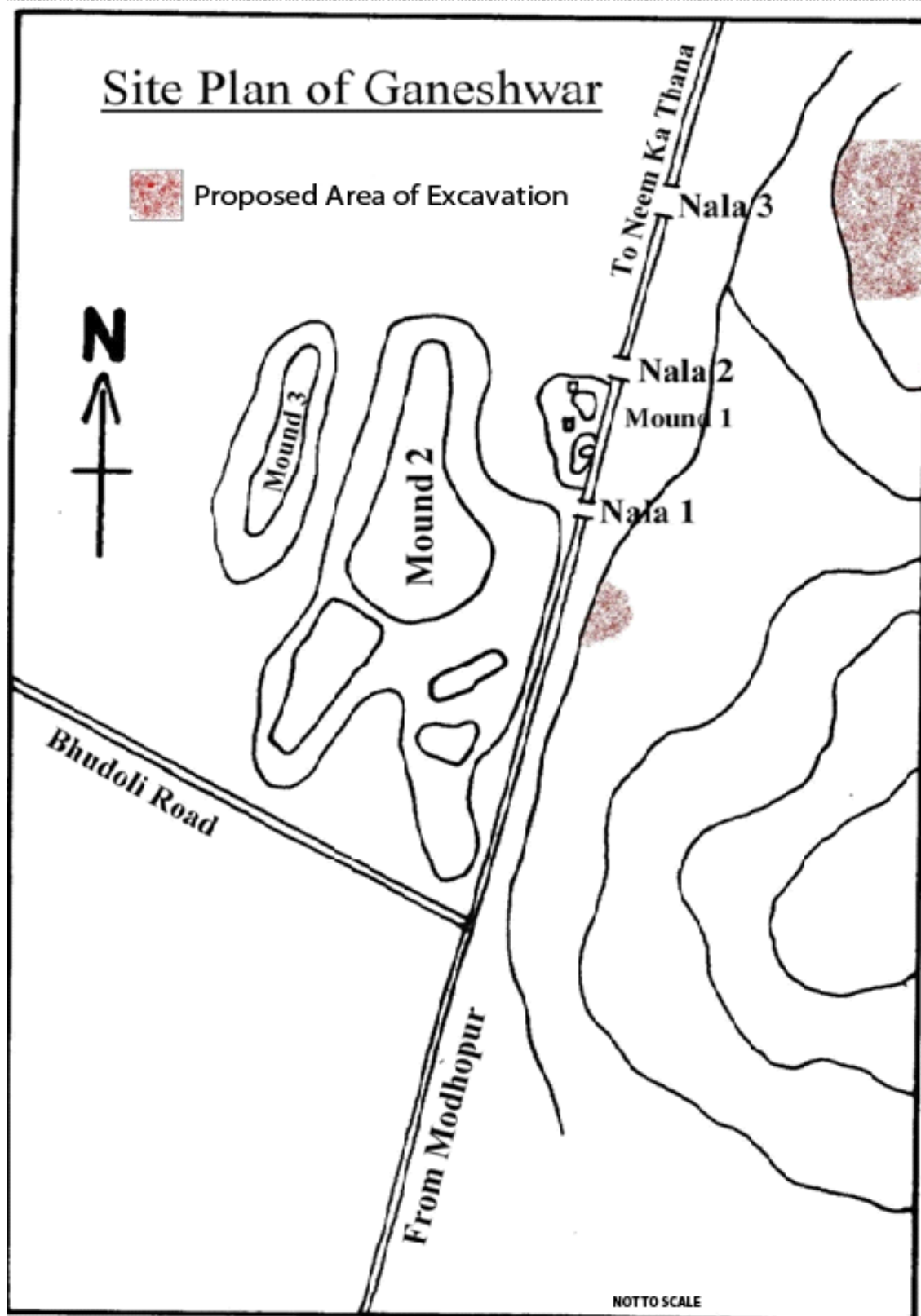
The Excavation Branch-II of the Survey carried out excavation at Karanpura under the direction of V. N. Prabhakar and S. K. Mitra, assisted by Hari Om Sharan, B. S. Fonia, Nidhi Gupta, Tajindar Kaur, P. P. Pradhan, V. P. Verma, Priti Shandilya, L. S. Mamani, Ravindra Kumar and Subhash Kumar.

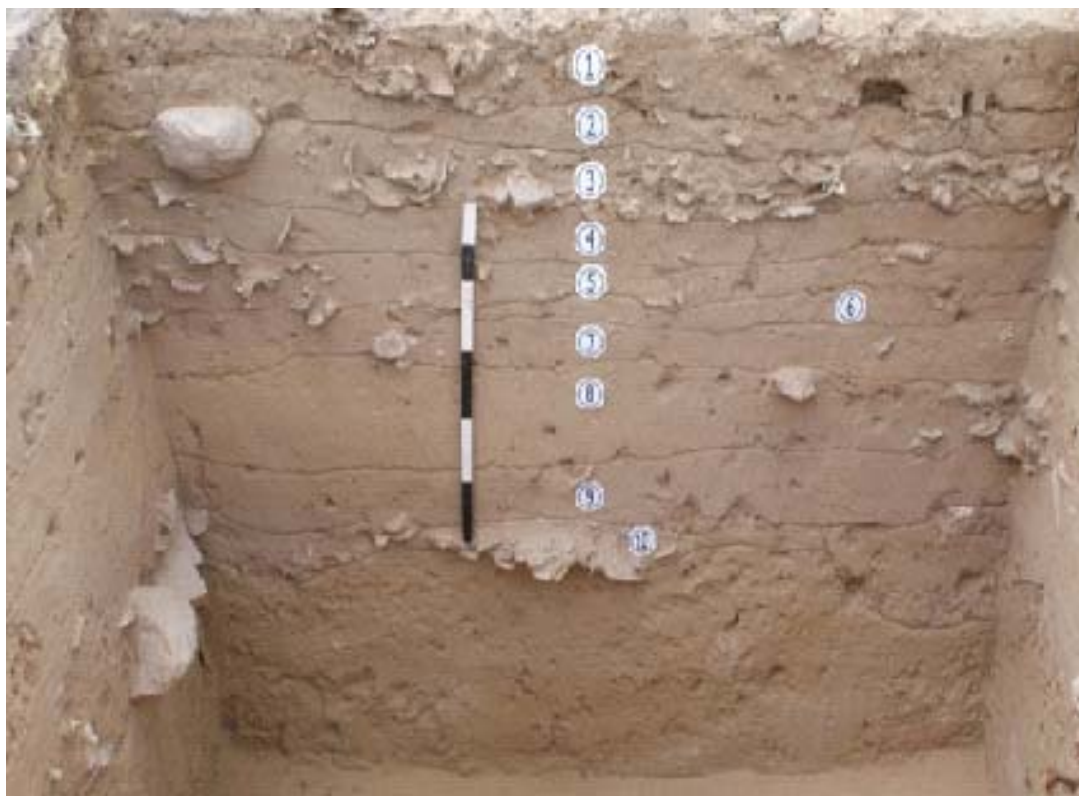
The site of Karanpura, on the left bank of now dried up River Drishadvati located at a distance of 27km southeast of Sothi and 41km southwest of Siswal both of which have yielded early Harappan remains in this region. The extensive excavation was carried out to understand the nature of the settlement and to salvage the archaeological remains; to bring to light the cultural sequence, settlement pattern, house plans in order to understand the ancient settlement at Karanpura in the right perspective; to understand the early Harappan tradition of Karanpura systematically in order to establish any transformation from early Harappan to mature Harappan tradition; to collect floral, faunal, charcoal and soil samples to carry out various scientific investigations; and to collect various other stone and metal samples to carry out scientific investigations.

Accordingly, 107 quadrants of 4.25 x 4.25m have been opened. The entire site was gridded with 10 x 10m and the area was split into areas A to E. The excavation brought to light two broad cultural levels identifiable with early and mature Harappan periods. The early and mature Harappan levels were identified in Area A, Areas B and D brought to light only early Harappan levels while, Areas C and E yielded only mature Harappan levels. The findings in brief from each of the excavated areas are given as under.

The designated 'Area A' forms the central

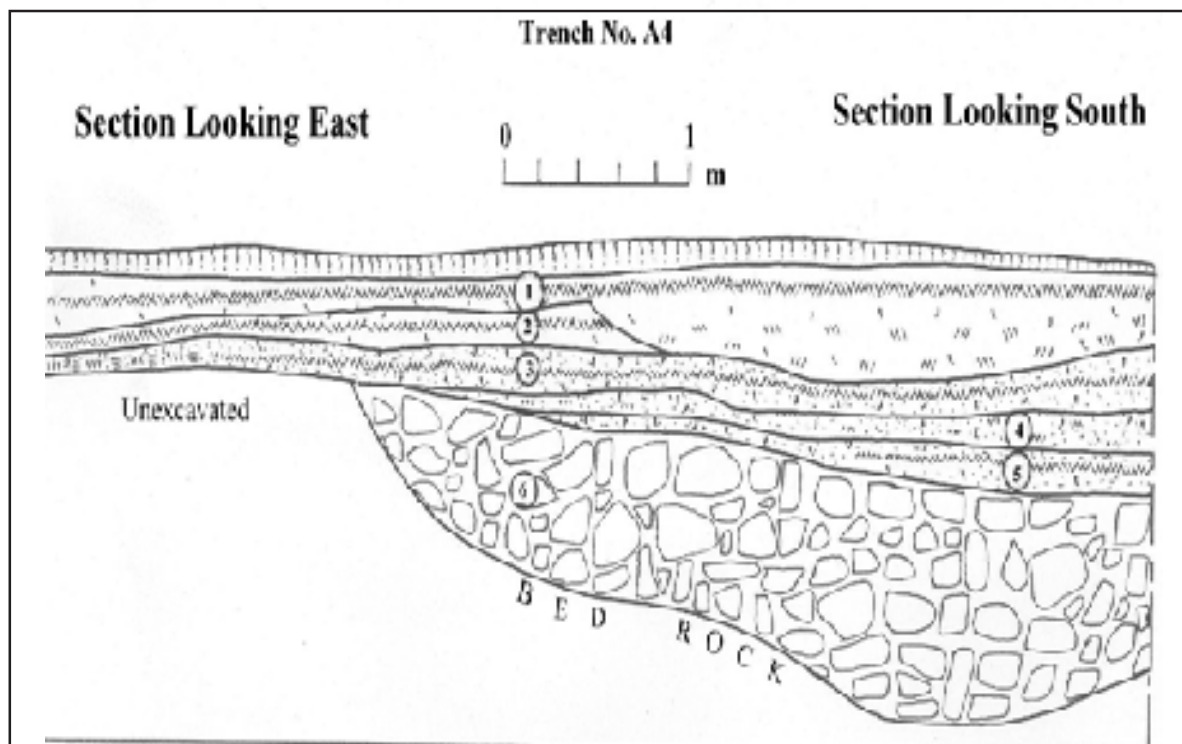
Fig. 17





100

Fig. 18



Ganeshwar : 100, section looking east Trench A-1, See p.123



Ganeshwar : 101, copper objects and fragment of crucible, See p.123

part of the current investigations and is the elevated portion of the entire archaeological remains at Karanpura and subjected to excavation. Total 18 trenches of 10 x 10m horizontally were excavated and half portion of three trenches of 10 x 10m was excavated. The natural soil was reached in five trenches. The level of natural soil varies from 2.94 to 3.53m below surface.

The excavation in 'Area A' brought to light structural remains of mud bricks and at least seven house complexes, a northeast-southwest running massive wall of nearly 22.03m in length and 6.54m in thickness with two courses of large sized mud-bricks not confirming to any ratio. This massive wall separates the 'Area A' into two parts, viz., north and south. The habitation remains are also rich in the southern portion only. Though a major portion of the southern area is already obliterated and removed by the local villagers for agricultural purposes. At least five house complexes in surface area while the northern portion beyond the massive wall revealed two house complexes.

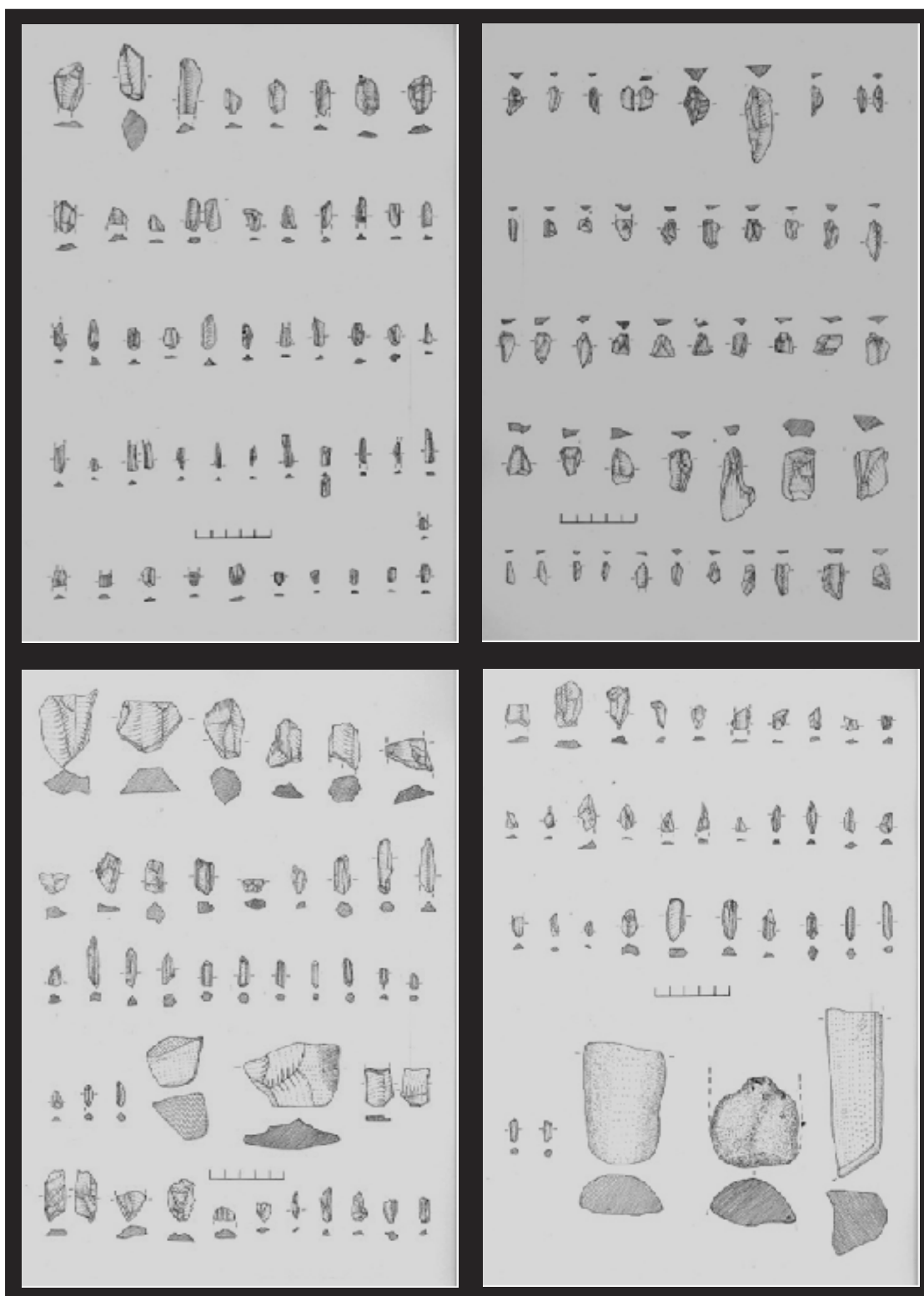
Remains of two cultural phases of the habitation, consisting of mature and early Harappan

phases, namely period II and I respectively was recovered. The mature Harappan phase is characterised by the architecture of house complexes using mud-bricks in 1:2:4 ratio with the brick size of 8 x 16 x 32cm, while the mud-brick walls of early Harappan phase consisted of 1:2:3 ratio with brick size of 14 x 28 x 42 cm. Further, the presence of typical mature Harappan pottery with painted motifs could be noticed during Period II.

The 'Area B' yielded deposit of the remains of early Harappan habitation just below a deposit of top soil of 10cm which corresponds to the Sothi-Siswal cultural complex. The habitation remains are characterised by the presence of at least four structural phases of mud brick structures, both rectangular and circular on plan. The topsoil pertaining to nearly 10cm. consists of a mixture of different deposits due to extensive ploughing. Immediately below this deposit were unearthed the structural remains. The mud-bricks used in the construction are larger in size and having dimensions of 14 x 28 x 42cm in 1:2:3 ratio.

The floor levels of a large house complex excavated brought to light the remains of a 'U'

Fig. 19



Ganeshwar : microliths



102



103

Ganeshwar : 102-103, pottery types, See p.123

shaped hearth facing north with burnt remains of probably reeds that could have formed part of roof. A large-scale conflagration had taken place towards the end of the early Harappan occupation as indicated by burnt layers. The charred remains of a wooden pole was also unearthed, fallen over the mud brick wall. Five terracotta spindle whorls, with the same graffiti marks, a large number of micro steatite beads and a plenty of copper artefacts in the form of a broken spearhead, rings, bangles, etc. were unearthed.

The 'Area C' is also located at a slightly lower elevation. Four trenches of 4.25 x 4.25m excavated brought to light the remains of both mature and early Harappan habitation.

In 'Area D' the structural remains of early harappan period were encountered right from the surface were already removed by levelling operation in past. The structural remains consist of portion of two house complexes and an enigmatic structured probably enclosed by a boundary wall. These structures were constructed using mud-bricks of the ratio 1:2:3. It consists of two rooms, one larger and located towards the east and the smaller to its west. The larger only one course of the structure is preserved. Interesting crescent-shaped structure located to the north-northwest of above-mentioned structural remains is found.

The 'Area E' is in the form a small-elevated mound distinct from the other areas, which are largely levelled and destroyed. In total two trenches of 4.25 x 4.25m were excavated and the natural soil was reached at a depth of 1.9m from the surface.

The excavation brought to light the remains of mature Harappan occupation characterised by two structural phases. The mud brick structures with single room are oriented in north-west-southeast direction with an offset of to

the left of the north. This room also brought to light the remains of a copper sheet, thin circular mirror, with a delicate handle having a slight curvature towards the mirror side. The shape and style of the copper mirror indicates its Harappan affinity as reported from other sites like Rakhigarhi, Kalibangan, etc.

Another structural phase was also excavated below the above-mentioned structure, only a portion of a northeast-southwest running wall was exposed due to a limited space available.

TAMILNADU

37. EXPLORATIONS IN THE COASTAL PART OF THE DISTRICT OF THANJAVUR, THIRUVARUR AND NAGAPATTINAM

Following sites were explored under the guidance of Sathyabhama Badhreenath assisted by M. Prasanna of the Chennai Circle of the Survey as part of exploration of Buddhist sites in the coastal part of the districts of Thanjavur, Thiruvavarur and Nagapattinam, Tamilnadu for their Buddhist affinity.

38. EXCAVATIONS AT VADAMANGALAM, DISTRICT KANCHIPURAM

Excavations were conducted at Vadamangalam (Lat. 12°57'50"N; Long. 79°54'17"E) near Sriperambatur in Kanchipuram by the SCSVMV University under the direction of S. Rama Krishna Pisipaty. Early iron age settlements and iron smelting areas were traced at two mounds surrounded by three eri/ lakes and separated by a small lake. On the southern side, an early iron age settlements and iron smelting areas were noticed. A series of iron smelting areas right from the Sriperambatur eri to Vadamangalam, more than a five kilometers long stretch towards the south was traced. Excavations were conducted near Kariamankalanieri region. On the other mound,

opposite side towards north and northeastern side, structures with megalithic have been appeared in different sizes and types. Slag and iron blocks were scattered in the region of Sriperambatur eri shows that the earliest smelting method known as bloomery smelting or the direct method adopted by the early smiths of this region. The method of smelting was used from around the 8th century BCE is reported for the first time in the region. Bloomery smelting took place in a furnace made of clay in round shape. A flat boulders and terracotta pipes were noticed for bellows to blow air into the furnace

through blowing holes in the side. Iron slag and blocks in cubical 15cm and cylindrical (15cm diameter and 25cm long) shapes along with terracotta pipes were retrieved from the site. Terracotta pipes in different sizes with metal deposit upon some portion were also noticed from the smelting areas (pls.104-105).

On northern side of mound, at a distance of 2km, memorial structures with megaliths were reported already. The circular aligned dwellings with big boulder fencing and roofed with per-

Name of the Village	Latitude & Longitude	Taluk	District
Bloc Rajagopalapuram (Kuttalam)	Lat. 11° 04' 02" N; Long. 79° 33' 04" E	Kudavasal	Nagapattinam
Buddhamangalam	Lat. 10° 47' 40" N; Long. 79° 44' 07" E	Kudavasal	Nagapattinam
Darasuram	Lat. 10° 57' 24" N; Long. 79° 22' 24" E	Valangaiman	Thanjavur
Elumagarai	Lat. 10° 59' 15" N; Long. 79° 37' 28" E	Thiruthuraiipoondi	Nagapattinam
Eraiur	Lat. 10° 46' 14" N; Long. 79° 29' 28" E	Kudavasal	Tiruvarur
Gopinathaperumalkoil	Lat. 10° 55' 40" N; Long. 79° 20' 05" E	Thanjavur	Thanjavur
Kandiramanikam	Lat. 10° 54' 31" N; Long. 79° 30' 52" E	Kudavasal	Tiruvarur
Karpaganatharkulam	Lat. 10° 25' 22" N; Long. 79° 36' 42" E	Thiruthuraiipoondi	Tiruvarur
Kaveripoompattinam	Lat. 11° 08' 50" N; Long. 79° 49' 49" E	Kudavasal	Nagapattinam
Killiyur	Lat. 10° 58' 14" N; Long. 79° 36' 38" E	Kudavasal	Tiruvarur
Kiranthi	Lat. 79° 47' 25" N; Long. 79° 47' 25" E	Mannarkudi	Nagapattinam

EXPLORATIONS AND EXCAVATIONS

Name of the Village	Latitude & Longitude	Taluk	District
Kumbakonam	Lat. 10° 57' 32" N; Long. 79° 22' 33" E	Kumbakonam	Thanjavur
Kurumbur	Lat. 79° 44' 11" N; Long. 79° 44' 11" E	Valangaiman	Nagapattinam
Manambadi	Lat. 11° 03' 52" N; Long. 79° 25' 17" E	Kumbakonam	Thanjavur
Manganallur	Lat. 79° 37' 59" N; Long. 79° 37' 59" E	Thiruthuraipoondi	Nagapattinam
Mannarkudi(Sundarakottai)	Lat. 10° 37' 32" N; Long. 79° 26' 21" E	Mannarkudi	Tiruvarur
Mathagaram	Lat. 10° 53' 33" N; Long. 79° 16' 42" E	Valangaiman	Tiruvarur
Mattur	Lat. 10° 52' 57" N; Long. 79° 09' 33" E	Thiruvidai	Thanjavur
Mulaiyur	Lat. 10° 55' 30" N; Long. 79° 21' 12" E	Marudur	Thanjavur
Nagapattinam	Lat. 10° 06' 10" N; Long. 79° 50' 30" E	Kudavasal	Nagapattinam
Pattiswaram	Lat. 10° 55' 22" N; Long. 79° 20' 31" E	Kumbakonam	Thanjavur
Perandaakottai	Lat. 10° 43' 17" N; Long. 79° 12' 54" E	Thanjavur	Thanjavur
Perunjcheri	Lat. 11° 02' 05" N; Long. 79° 39' 24" E	Thiruthurai	Nagapattinam
Pushpavanam	Lat. 10° 27' 49" N; Long. 79° 50' 31" E	Poondi	Nagapattinam
Puthur	Lat. 10° 39' 08" N; Long. 79° 38' 30" E	Thiruthuraipoondi	Tiruvarur
Seethakamangalam	Lat. 10° 55' 03" N; Long. 79° 32' 26" E	Kudavasal	Tiruvarur
Thanjavur	Lat. 10° 46' 58" N; Long. 79° 07' 57" E	Kumbakonam	Thanjavur

Name of the Village	Latitude & Longitude	Taluk	District
Tirunattiyattankudi	Lat. 10° 41' 51" N; Long. 79° 37' 10" E	Thiruthurai	Tiruvarur
Tirunageswaram	Lat. 10° 57' 51" N; Long. 79° 25' 43" E	Kumbakonam	Thanjavur
Tiruvalanjuli	Lat. 10° 56' 42" N; Long. 79° 19' 39" E	Kumbakonam	Thanjavur
Ullikottai	Lat. 10° 35' 56" N; Long. 79° 24' 47" E	Poondi	Tiruvarur
Valaiyamapuram	Lat. 10° 52' 56" N; Long. 79° 24' 05" E	Mannarkudi	Tiruvarur
Valangaiman	Lat. 10° 53' 19" N; Long. 79° 23' 34" E	Valangaiman	Tiruvarur
Velankanni	Lat. 10° 40' 47" N; Long. 79° 50' 16" E	Mannarkudi	Nagapattinam
Vikkiramam	Lat. 10° 27' 51" N; Long. 79° 24' 30" E	Pattukkottai	Thanjavur

ishable materials were the construction style of the early iron age people in this region. Evidences of early human activities in this area have been appeared right from the early stone age. Pebble tools, flake tools and microlithic tools also have appeared on the other side of the village, near Karimankalanieri. Besides, black and red ware, red ware, etc., pottery were also reported from the habitational areas.

39. TEST-PITS AT THE SITE OF SAWYERPURAM (SAYAPURAM), DISTRICT TUTICORIN

This long-term project on the aegis of Sharma Centre for Heritage and Environment (SCHE) seeks to investigate the nature of microlithic sites along the southeast coast of India, in relation to their association with the Teri sand dunes in Tamilnadu, and related quaternary formations, to investigate microlithic sites both in association with the well-known Teri sediments and in other pleistocene deposits; to obtain chronological controls; to study

the technology represented here; to compare these with similar discoveries in Sri Lanka, and to situate them in the context of adaptation to coastal environments. Teri dunes and associated sites areas were revisited. Sawyerpuram, Kattalangalam and Kuttampuli were surveyed and revisited. Test pits at Sayapuram (Sawyerpuram) was conducted by Kumar Akhilesh and Shanti Pappu, where unequivocal evidence of microlithic artefacts in association with the Teris was available. The Sawyerpuram Teri complex dunes rise 1-2m in height and are being extensively destroyed by quarrying, agriculture and infrastructure development. Although no clear sections were available, but this gravel is associated with indurated dune sands, and capped by loose sands which are archaeologically sterile. The low artefact density may be attributed to years of intensive collections by archaeologists and students.

One test-pit (1 x 1m) was laid out at the top

of the recent dune remnant. It was excavated in 10cm spits till a total depth of 0.80m (pl.106). Artefacts were noted to occur *in situ* within the dune at a depth of around 0.59-0.62m below the surface. All sediments were duly sieved through 1mm sieves and wet-sieving was also conducted for selected sediment samples. A total of two *in situ* artefacts were recovered from the test-pit while debitage pieces less than 2cm were recovered during sieving. This conclusively established the fact that the artefact horizon rests on the surface of an older dune surface, and that the dates currently used for dating the dune sands need to be reconsidered. Samples for OSL dating were collected.

The second test-pit (2 x 2m) (pl.107) was laid on the surface of the stabilized 'older' dune. The deposit was carefully excavated to a depth of 5cm and all sediments were sieved. The depth of the dune was reported to be around 3m below the surface. The aim to examine the stratigraphy of the deposits underlying the dune elsewhere, e.g. at Pudukottai, Puttan Taruvai, etc.

In addition to the test-pits, surface scatters were plotted with laying of two grids of 8 x 5m and 8 x 8m divided into quadrants of 1 x 1m and 2 x 2m each respectively. All total 892 artefacts were collected which includes cores, tools and waste flakes, chunks and chips. Natu-

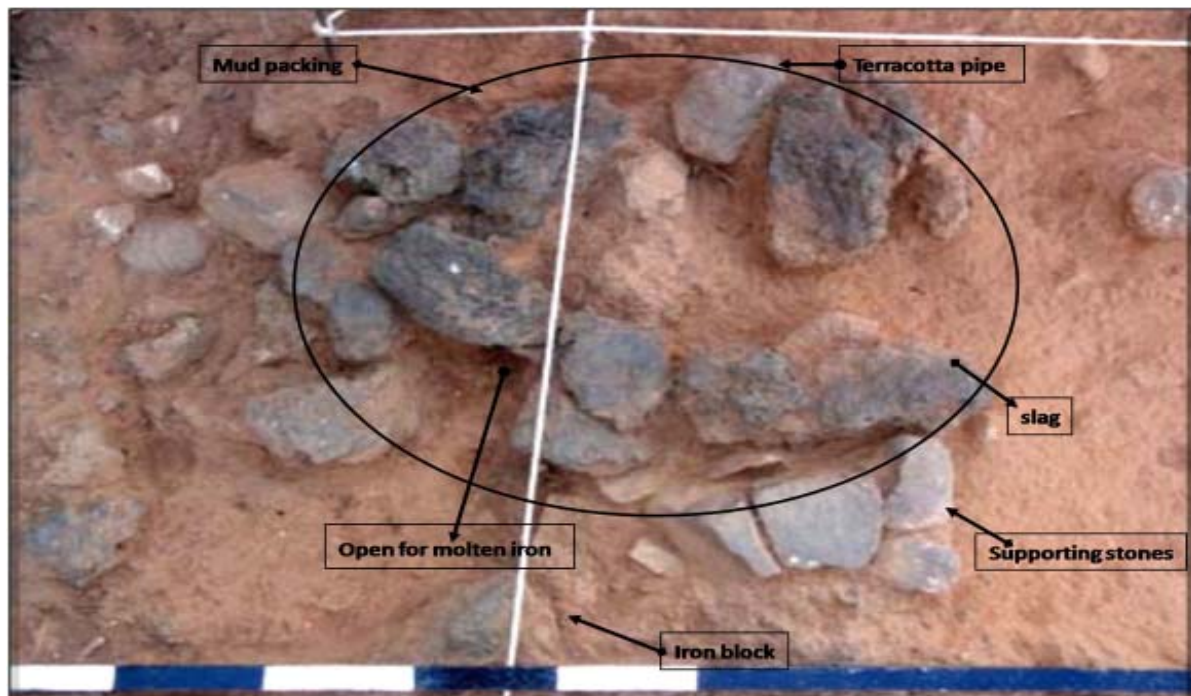
ral clasts were also documented and are being carefully examined owing to the fact that several pieces more than 5cm may represent manuports. Raw materials used were quartz, crystal quartz, chert and silicified wood. In addition to artefacts, a number of quartz nodules, pebbles and chunks are noted at the site. There is no evidence of fluvial activity in these dunes. Sediment samples were collected for geochronological and geomorphological studies.

Although studies by Rajendran (1979) and Joshi *et. al.* (1997), state that the artefacts were post-Teri in age and not contemporary with the Teris and of early holocene in age. But our present study show that they differ from earlier scholars in the following ways.

Microlithic artefacts are noted to occur on the surface of older formations, e.g. lateritic gravels, etc. The dune building occurred during the pleistocene and early holocene. Periodic shifting of dunes, further complicates the stratigraphy of the region. Microlithic assemblages are found on the surface of an old weathered dune surface only. No tools occur on the surface of the most recent/youngest dunes underlying the older dune surface. Thus, occupation of the dunes was a short term episode, where tools occur within a 5cm horizon.

Counts of artefacts collected

SWP-01 (test pit 1x1 m)	2 artefacts (<i>in situ</i>) and debitage less than 2 cm
SWP-02 (test-pit 2x2 m)	146
Locality 1 (surface)	409
Locality 2 (surface)	363
Locality 3 (surface)	529
Total artefacts	892



104



105

Vadamangalam : 104, ground plan of furnace form Trench II; 105, bloomery furnace with slag, pipe and iron blocks, See p.134

40. EXCAVATIONS AT ARPAKKAM, DISTRICT KANCHIPURAM

Excavations at Arpakkam in Kanchipuram were continued under the direction of P.D.Balaji, Department of Ancient History and Archaeology, University of Madras with 2nd year M.A. students who were imparted field training in archaeology. During this season three trenches namely ARP-5, ARP-6 and ARP-7 measuring each 5 x 4m were laid.

ARP-5 revealed stratified deposit to a thickness of 1.96m was registered. Total three layers were highly disturbed mixed with brick bats and debris of structures. Antiquities mixed with pottery, glass bangles were found in abundant from the deposit. Presence of a British copper coin endorsed the fact that these upper layers were of modern period. The lower level yielded sherds belonging to red slipped ware mixed with terracotta objects like hopscotches, smoking pipes, spouts, etc. The excavation at ARP-6 yielded a deposit to a thickness of 2.76m. It was divided into four layers (pls.108-109). A lime floor with brick bats presence of a brick structure with four compartments were also found. The size of the bricks measures 21 x 11 x 4cm. As many as nine courses of bricks in double line were noticed. The binding material seems to be lime. Besides black and red ware and all black ware, antiquities like bead and bangles made out of semiprecious stone, shell and glass were also collected. The cultural deposit in ARP-7 is divided into four layers. On the upper level, a floor paved out of square bricks was observed. The bricks were laid evenly having a measurement of 23 x 23 x 4cm. They are well burnt and of high quality. Presence of all black ware, black and red ware and red slipped ware mixed with micro beads, hopscotches, votive lamp pieces and weighing measure stone were also recovered. A copper coin identifiable to Chola period was also recorded in this trench (pls.110-111).

On the basis of the antiquities, pottery and other associated findings the deposit found in trenches could be dated as follows.

Period I: 4th – 3rd century BCE to 4th-5th C.E.

Period II: 4th-5th century C.E. to 12th-13th century C.E.

Period III: 12th-13th century C.E. to Modern

All the three periods were noticed in all the trenches except the ARP-5, wherein Period I was not found, only Period II and Period III were observed.

41. EXPLORATIONS AT MODIKUPPAM, DISTRICT VELLORE

Problem oriented research explorations have been conducted by Excavation Branch-VI, Mysore at Modikuppam to know the neolithic cultural extension. The investigation conducted at Modikuppam brought to light a habitation mound to the south east of present village of about 1m thick deposit to the occupation right from the neolithic period to early historic period (pl.112).

The pottery types (pl.113) found from the mound include typical burnished grey ware, black and red ware and red ware with red ochre paintings. The shapes met both in the burnished grey ware and black and red ware include different types of bowls, dishes, plates, etc. Besides a broken saddle quern was also found near the habitation mound. Another important finding from the nearby area was the presence of a number of hollow grinding stones of different dimensions at three different localities.

42. EXCAVATIONS AT KODUMANAL, DISTRICT PERUNDURAI

The habitation-cum-burial site Kodumanal located on the left bank of the river Noyyal, tributary of river Kaveri, in Perundurai taluk, by K. Ranjan, Pondicherry University was excavated. It lies on the ancient trade route that connects Chera's second capital Karur (Vanji)



106



107

Sawyerpuram : 106, layout plan for excavation; 107, test-pit II, See p.137



108



109

Arpakkam : 108-109, excavated structures, See p.139

on the east and the Muciri (Pattanam) on the west in Kerala coast. Four trenches were laid in middle part of the 15 hectares of habitation mound and two graves were opened in the 40 hectares of burial complex. The excavations yielded 185cm early historic cultural deposit. The people of the early phase were mostly artisans working on semiprecious stones particularly rock crystal and carnelian and the people of the late phase were generally cultivators. In the lower levels were found the Russet Coated Ware (pl.119), black and red ware and all the pottery looks bright and polished.

The trenches opened in the mid part of the habitation mound yielded a maximum number of eight floors of square/rectangular gravel paved plastered with lime oriented north-south. In the present excavation, a shell industry is exposed (pl.118). The technique of manufacture for shell bangles is essentially the same as in Gujarat. Beads of sapphire, beryl, agate, carnelian, amethyst, *lapis-lazuli*, jasper, garnet, soapstone and quartz were unearthed (pl.117). The habitation part of the site yielded a number of graffiti bearing potsherds recovered from the earlier and middle levels. There are about fifty almost complete post-firing signs engraved on the shoulder portion of the bowls and pots but mostly confined to the table wares of the black and red ware. The more common graffiti marks are sun, *swastika*, star, ladder, *nandi-pada*, fish, bow and arrow, wheel, cart, etc. Few graffiti marks were found engraved at the end portion of the Tamil-Brahmi inscription incised on a potsherd. Though the exact connotation of these symbols, individually or in compound form, cannot be ascertained convey a certain message either pictographically or ideographically to the contemporary society. More than 60 inscribed potsherds bearing Brahmi letters were recovered (pl.121). Interestingly, a huge pot placed on the floor of one of the industrial houses had inscription engraved on the shoulder portion of the pot read-

ing *ca-m-pa-n su-ma-na-n* (pl.120). Other inscribed potsherds reading *ca-paa-ma-ka-tai-pa-m-maa-taa*, *ca-m-pa-n*, *si-li-ka-n*, *su-ma-na-n*, *ti-s-sa-n*, *u-raa-na-n* and *sa-n-tu-va-n* were also unearthed.

About 150 graves still found intact covering an area of 40 hectares. Most of the circles are cairn circles entombing a simple cist, transepted cist, transepted cist with two subsidiary cists and double cists. Some of the cairn circles are associated menhir installed as part of the circle. Two graves were opened in the present season of excavation.

Grave no. 1(MEG XV) is a cairn circle located in the elevated field called Toranakulikadu, built of fine lime stone blocks placed in two rows around the main cist and two subsidiary cists. The main cist is a transepted variety and the other two subsidiary cists erected on either side of the main cist were of simple variety. Each cist was covered by a separate capstone. All the three cists face a common passage in front of them. There were four port-holes in all. The two port-holes scooped out at the centre of the eastern slab of the main cist were trapezium in shape (pl.116).

Grave no. 2(MEG XVI) is a cairn circle consists of two circles entombing double cists (pl.115). The outer slab circle has a diameter of 8.40m. It is built of stone slabs planted vertically around the inner stone circle leaving a gap of 20-40cm between the two. The slabs were planted adjacent to each other. In a few places the slab circle is missing due to agricultural activities. Some of the slabs were tilted outward and a few were totally flattened on the ground. In total 20 slabs were planted around the inner circle. Some of the unusual size of the slabs suggests that these slabs would have been the basal part of the earlier existed menhir. The inner circle measuring maximum diameter of 7.60m is built of wall like structure.

Two cists were placed at the centre of circle



A



B



C



D



E



F

Arpakkam : (A) copper objects, (B) terracotta objects, (C) ear ornaments, (D) hopscotches, (E) terracotta lamps, (F) terracotta spouts, See p.139



A



B



C



D



E



F

Arpakkam : (A) terracotta smoking pipes, (B) black ware, (C) glass beads, (D) conical jar(bottom portion), (E) glass bangles, (F) porcelain sherds, See p.139



112



113

Modikuppam : 112, view of the habitation mound; 113, painted pottery in situ from the mound, See p.139

with a common rectangular passage on the east. At the time of excavation, the top edges of some of the orthostats are exposed. The cists were built of four orthostats constructed around the floor slab. Trapezium-shaped porthole was scooped out on the frontal slab. A four fragmentary part of a four-legged jar of a red slipped ware was unearthed on western side of the circle. The grave goods were mainly of iron objects, bones and few potsherds in association with carnelian beads of both etched and plain variety. The habitation cuttings (pl.114) yielded gem stone industry, iron and steel industry, conch-shell industry, textile industry, large number of potsherds bearing graffiti marks and Brahmi letters. The radiometric dates place the early historic cultural deposit between 6th century BCE and 2nd century BCE.

UTTARAKHAND

43. EXPLORATION AT KANWASHRAM, DISTRICT PAURI

The site known as Kanwashram (Lat. 29°47' 27"N; Long. 78°27'08"E) is located about 12km from Kotdwar on Kotdwar-Devi Mandir road on the right bank of river Malini. Kanwashram is said to have associated with Rishi Kanwa and king Bharat. Consequent upon the publishing report in local news papers that regularly architectural fragments of temples and sculptures are recovered from a seasonal *nullah* during rain the site was surveyed by a team from Dehradun Circle of the Survey and found that the sculpture of a *Yakshi* head of a horse or donkey with one male attendant holds a *dhal* and other are temple fragments. Earlier in 1991 some sculptural/architectural fragments were recovered and some of the important sculptures were taken away by the Ancient History and Museum, Department of Garhwal University, Srinagar (Garhwal) and stone blocks/fragments of temple were used by forest department for construction of wall.

UTTAR PRADESH

44. EXCAVATIONS AT AHICHHATRA, DISTRICT BAREILLY

The Excavation Branch-IV, of the Survey took up excavation at Ahichhatra (Lat. 28°22'N; Long. 79°08'12"E) under the direction of Bhuvan Vikrama assisted by Mahendra Pal, Suvendu Kumar Khuntia, Bibhuti Bhusan Badamali, Rabindra Nath Sahoo, Surath Kumar Bhoi, Ajaya Kuamr Sasmal and Daljeet Singh to understand the various cultures in the Ganga valley. The site has yielded a continuous record of settlement from OCP to the 12th century C.E. The major objectives of the excavation was to understand the PGW culture as a whole; the genesis of PGW; retrieval of some datable material so that a series of date could be generated to establish the chronology of the site on firm footing; the early settlements and layout planning; the cultural interplay of in the Ganga valley with reference to Ahichhatra and to impart field training to the students of Institute of Archaeology.

In all nineteen trenches measuring 10 x 10m each and spreading over three mounds was laid along the east-west axis namely eastern mound (EM), central mound (CM) and western mound (WM) (pl.122).

At the mounds EM and CM the top levels yielded burnt brick residential structures complete with drains and floors belonging to the Mitra Panchal period. These levels yielded more than 150 coins, majority of which are of Mitra kings of Panchal. On the basis of the coins the entire period from 250 BCE to 320 C.E. is designated as Mitra Panchal period. Huge pits were encountered in north-south orientation along the fortification wall while in the trenches in east-west axis immediately below the early Mitra Panchal remains were encountered PGW structure with circular huts and post-holes (pl.123).

So far 15 floors have been encountered in a trench. Evidence of massive earthquake was noticed in many trenches. Rest of the trenches yielded adobe walls (**pl.124**), burnt floors along with PGW pottery. NBPW is conspicuous by its sporadic presence along with PGW at the present level, which appears to be the last phase of the PGW period. First time elaborate structures of PGW have been encountered geological phenomenon have been recorded and interpreted.

Beads of stones, terracotta, bone, points of bone, hairpins of ivory, antimony rods, chisels and a variety of tools, utensils of copper, knives, chisels, and other tools of iron, variety of animal and human figurines of terracotta are among the noteworthy finds. But the most unique find from the mid Mitra Panchal period is a small

gold foil with images of a turbaned man casually holding a trident and on his left a turbaned lady with a lunate attached to her turban and holding a child in her left hand while in the right perhaps holds a snake (**pl.125**).

Other find from the early Mitra Panchal period is a terracotta figurine of an elephant (**pl.126**) with long tusks, trunk raised, a lug handle attached to its head and back a small perforation on its back. Through the perforation in the back water can be filled inside the belly which comes out of the trunk when tilted. These decorated figurine reminds of the elephants associated with 'Gaja-Lakshmi'.

The master craftsmen of the Mitra Panchal period created a magnificent and most mystique kind of object a composite figure (**pl.127**).

Plate 114



Kodumanal: habitation cuttings, See p.146



115



116

Kodumanal: 115, double cists; 116, main cist with two subsidiary cists, See p.142



117



118

Kodumanal: 117, carnelian beads; 118, conches found in the shell industry, See p.142



119



120

Kodumanal: 119, russet coated ware pot; 120, pot engraved with Tamil-Brahmi inscription, See p.142



Kodumanal: Tamil-Brahmi inscribed potsherds, See p.142

The initial study of pottery so far shows that the Painted Grey Ware had a variety of shades and fabrics and showing the preferences of paintings on different pots. In the red ware there appears a gradual evolution of cooking pots, water vessels, storage pots, etc.

From the excavation so far a tentative sequence of cultural periods can be proposed as follows:

From top to bottom:

1. Gupta Period
2. Mitra Panchal Period
3. PGW
4. Formative PGW
5. OCP

45. EXCAVATIONS AT PIPRAHWA, GANWARIA AND TOLA SALARGARH, DISTRICT SIDDHARTH NAGAR

The ancient sites of Piprahwa, Ganwaria and Tola Salargarh were subjected to excavation under the direction of B. R. Mani, Praveen Kumar Mishra, assisted by O. D. Shukla, Rajeev Dwivedi, Anil Kumar Tiwari, Rajendra Yadav, Sanjay Kumar Singh, Vimal Kumar Tiwari, S. B. Shukla, S. K. Arora, Kamlesh Kumar Pangtey, Ravi Shankar Saxena and Rajni Shankar Srivastava of the Lucknow Circle of the Survey.

The fresh vertical excavations in all three localities i.e., Piprahwa, Ganwaria and Tola Salargarh was carried out. Altogether, twelve trenches, seven at Ganwaria, three at Piprahwa, and two at Tola Salargarh were selected for excavation. Of these, seven quadrants were laid at Ganwaria at various location and levels of the mound namely ZA6 Qdt.III, XF7 Qdt. III, XF8 Qdt. III, XG4 Qdt. IV, XC2 Qdt.I, XA3 Qdt. III and ZA1 Qdt. IV. The purpose of laying out trench XA3 was to re-open an old trench of

1970's to retrieve the cultural index of the site for ready reference.

Similarly, at Piprahwa, two quadrants, one each on the north-east and north of the stupa has been selected for excavation. Two trenches have been laid out at Tola Salargarh to reconfirm the cultural deposit and collection of charcoal samples for C14 dating.

Excavations at Ganwaria

Period I(Pre-NBPW): Average deposit of this period is about 70cm as reported from trench ZA1 Qdt. IV, XC2 Qdt. I and XA3 Qdt. III. Ceramics of this period include black slipped ware, red slipped ware, red ware, chocolate slipped ware, black and red ware and corded ware. The shapes were bowl, dish, water vessel, basin and perforated pot, etc. The ceramic industry is clearly distinguishable comparable to the successive potteries. It is fine in texture. The same ceramic traditions continued in the successive periods i.e. NBPW with some variations.

Period II(NBPW): Average deposit of this period is about 140cm and remains of this period have been found in almost all the trenches. The ceramic industry of this period is clearly marked with the presence of NBPW potsherds; however, it is meager in numbers. The previous shapes and wares continued though new wares have also been introduced. The main industry is marked by the presence of NBPW, black slipped ware, grey ware, red slipped ware, chocolate slipped ware and red ware and important shapes are bowl, dish, basin water vessel, lipped bowl/basin, handled pot, miniature pots, etc.

Among the antiquities, beads of glass, steatite, agate, terracotta, semiprecious stones (**ppls.130-134**) and bone points, iron objects, pestles, terracotta, wheels and an agate weight are worthy of mention. This period was con-

siderably prosperous as reflected in the material culture.

Period III (Sunga): Average deposit of this period is about 60cm to 70cm. The levels of Sunga period are demarcated from the previous NBPW period on the basis of pottery assemblage. The frequency of red ware is gradually increased in number. The ceramics include black slipped ware, grey ware and red ware and the shapes include storage pot, water vessels, spouted pot, dish, bowl, carinated pot, lid, miniatures pot, etc. Remains of floors made of brick jelly were also noticed from these levels. The antiquities include steatite bead, terracotta beads of *ghata*-shape, areca-nut shaped beads, bone point, fragment of terracotta bangles, terracotta bull figurine, hopscotch and unidentified iron objects.

Period IV (Kushana): Average deposit of this period is about 130cm. Ceramics of this period include red ware, grey ware and black slipped ware and the shapes include large sized pots, carinated pots, bowl, dish, basin, inkpot type lid, miniature pot, etc. Dishes and potsherds of black slipped ware probably belong to the earlier period, found in the levels of period IV. Several brick structures and floors were also noticed in this period (**pl.128**). The structures are made of burnt bricks, sometimes re-used in later structures. A floor level of Kushana period has yielded three pots including earthen vase, metal bowl and earthen bowl with snake hood. Besides, floors of different levels were noticed in the trench ZA1 Qdt.IV (**pl.129**). All three pots are placed close to each other in *in situ* and suggest that some kind of ritual was performed there. The most interesting ritual object is a handmade terracotta bowl with a snake-hood on the rim, may be depicting the story of snake in the hermitage of Mahakasyapa which came inside Buddha's bowl. Beads of terracotta and stone, stone weight, copper coins of Kushana period, terracotta human figurines (**pls.135-136**) including the figures of Naigamesa,

terracotta figurines of animal and bird, terracotta bangles, gamesmen, ritual pots, hopscotch, terracotta bangle, bone arrow-heads and points, stone pestle, etc. are the important antiquities recovered during excavation in Ganwaria. The iron dagger found from this level is an important iron implement. The broken terracotta female figurine seated on high stool holding an unidentified object in hands is noteworthy. Besides, some more human figurines including male and female figurines, seated or standing in posture treated with red slip have also been reported from the excavations.

The site was further subjected to excavation to confirm the deposit and to collect the charcoal samples for C14 dating. Two quadrants, one each located on the north-east (ZN2 Qdt. IV) and north (ZL3 Qdt. III) of the stupa was selected for excavation. As no habitation deposit was found so far from the excavation at Piprahwa except some brick bats filling in the pits sealed by layer 1.

Excavation at Tola Salargarh

The site is located 1km north-east of Piprahwa and has remains of a monastery datable to the Kushana period. A Kushana copper coin has been found near the monastery while surveying the site for excavations. On the basis of surface study, two quadrants were laid out for excavations-XB8 Qdt.III and A2 Qdt. II. No cultural remains except a few brick bats, a copper coin of Kushana period and Sunga-Kushana pottery have been noticed at this site. It may be suggested that this site was occupied for a short period and due to agricultural activities the cultural deposit has been lost.

Excavations between Piprahwa and Ganwaria

Two trenches were laid between Piprahwa and Ganwaria to know the extension and link between two sites. Excavation was carried out



122



123

Ahichhatra : 122, google imagery; 123, circular hut and post-holes, See p.146



124



125

Ahichhatra : 124, adobe structures; 125, gold plaque, See p.147



126



127

Ahichhatra : 126, elephant; 127, mysterious object, See p.147

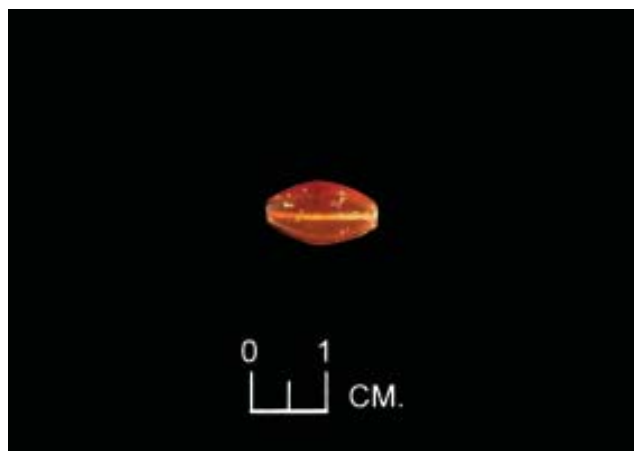


128

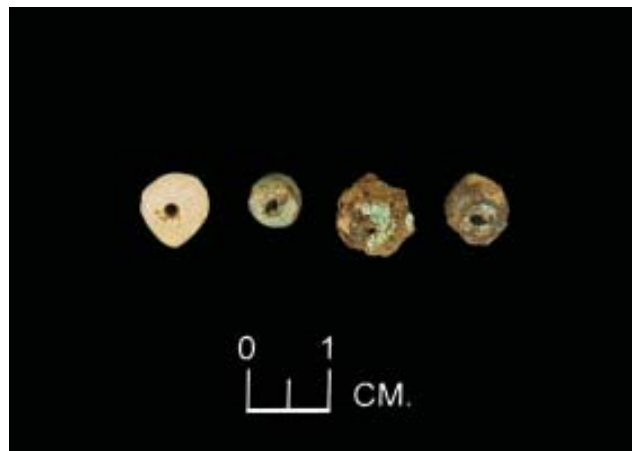


129

Ganwaria : 128, walls of a structure; 129, floors of different levels(ZA1 Qdt. IV), See p.153



130



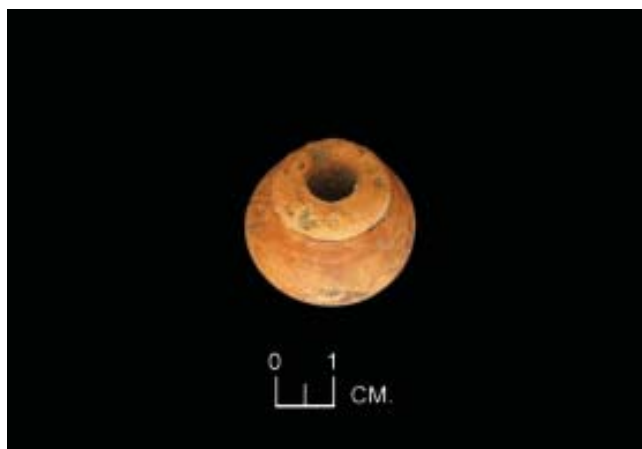
131



132



133



134

Ganwaria : 130-134, beads, See p.152



135



136

Ganwaria : 135-136, terracotta human figurines, See p.153

up to depth of about 2m but only natural deposit was found. During the excavation, about 85 charcoal samples have been collected from different levels throughout four successive periods and which are under process for scientific analysis, particularly for getting the radiometric dates of pre-NBPW and NBPW deposits.

46. EXPLORATION IN DISTRICT MAHARAJGANJ

The Department of Ancient History, Archae-

ology and Culture, D.D.U. Gorakhpur University, Gorakhpur, under the supervision of Vipula Dubey, assisted by I.S. Vishwakarma, Rajwant Rao, Rekha Chaturvedi, Shitala Prasad Singh, Digvijay Nath, Pragya Chaturvedi, Kamlesh Kumar Gautam, Dhyanendra Narain Dubey and Ram Pyare Mishra carried out exploration and reported following archaeological sites in the Nichlaul tehsil of Maharajganj district.

Site	Nature of remains
Bariyarpur	Cord impressed ware, rusticated ware, black slipped ware, black and red ware, red ware
Basuli	Medieval red ware, bricks and medieval temple remains
Bhaisapur	Black and red ware, red ware, black slipped ware, grey ware
Kanhaiya Baba	Black and red ware, black slipped ware, red ware, bricks and architectural fragments of a ruined brick temple
Padari urf Misganj	Red ware, black and red ware, glazed ware, ruins of <i>lakhauri</i> brick Kushana and medieval periods
Paikauli Kala	Black slipped ware, grey ware, NBPW, red ware, Kushana bricks
Puraina Dhus	Cord impressed ware, rusticated ware, burnished red ware, burnished black ware, black and red ware, red ware, black slipped ware

47. EXPLORATIONS IN THE MARIAHU SUB-DIVISION, DISTRICT JAUNPUR

The village to village exploration has been carried out by the regional Archaeological Unit, Varanasi, Directorate of U.P. State Archaeology Department, Government of Uttar Pradesh, in Mariahu sub-division (development blocks-Ramnager and Mariahu), district

Jaunpur under the direction of Subhash Chandra Yadav, assisted by Sanjay Kumar Vishvkarma and Alok Kumar Yadav. The main objectives of the operation was to explore and properly document the ancient sites and antiquarian remains in the aforesaid area. During the course of exploration following sites, sculptures and architectural member have been reported and documented.

Name of sites	Development Block	Archaeological remains
Ashapur	Ramnager	Red ware, northern black polished ware, grey ware, black slipped ware, iron slag, terracotta beads <i>c.</i> 8 th century BCE to beginning of Christian era
Auraila	Mariahu	Red ware, <i>c.</i> Kushana- Gupta periods
Babaganj (Mokalpur)	Mariahu	Red ware, black slipped ware <i>c.</i> 2 nd century BCE to 5 th century C.E. and a very beautifully carved sand stone made well (19 th century C.E.)
Badaua- Barahila	Mariahu	Red ware, ancient bricks 2 nd to 5 th century C.E.
Banevara	Ramnager	Red ware, Gupta and post-Gupta periods
Bari Gaon	Ramnager	Red ware, medieval period
Basti	Mariahu	Red ware, ancient bricks and broken sculptures, <i>c.</i> 2 nd century BCE to 5 th century C.E.
Bhagirathpur	Mariahu	Red ware, <i>c.</i> 3 rd to 6 th century C.E.
Chakanthua	Mariahu	Red ware, ancient brick bats, iron slag, 2 nd century to 6 th century C.E.
Chorari	Ramnager	Red ware, black slipped ware, black and red ware, grey ware, ancient bricks and terracotta animal figurine, <i>c.</i> 8 th century BCE to 6 th century C.E.
Damodaradeeh	Ramnager	Red ware, Kushana and Gupta periods
Daudi	Ramnager	Red ware and broken sculptures, early medieval period
Devapar	Mariahu	Red ware, terracotta human figurine, ancient bricks, Kushana and Gupta periods
Gauhar	Mariahu	Red ware, black slipped ware, Sunga, Kushana and Gupta periods
Gutvan	Ramnager	Red ware, black and red ware, <i>c.</i> 5 th century BCE to 5 th century C.E.
Gutvan Mahadev	Ramnager	Red ware, black and red ware, terracotta animal figurine, ancient bricks, <i>c.</i> 5 th century BCE to 5 th century C.E.
Horaiya	Ramnager	Red ware and ancient bricks, <i>c.</i> 2 nd to 6 th century C.E.

Name of sites	Development Block	Archaeological remains
Jamua Bazar	Mariahu	Red ware, Kushana and Gupta periods
Jiyaramau	Mariahu	Red ware, ring well, 2 nd century BCE to 6 th century C.E.
Jogapur	Mariahu	Red ware, Gupta and post-Gupta periods
Kalanideeh (Raipur)	Ramnager	Red ware, black and red ware and ancient bricks, c. 5 th century BCE to 5 th century C.E.
Kasiyanvdeeh	Ramnager	Red ware and ancient bricks, Kushana-Gupta period
Katesar	Mariahu	Red ware, ancient brick bats, early medieval period
Koiran	Ramnager	Red ware, black and red ware, c. 5 th century BCE to 5 th century C.E.
Kumbh	Mariahu	Red ware, grey ware, ancient bricks and broken sculptures, c. 3 rd century BCE to early medieval period
Kuthuli	Mariahu	Red ware, early medieval period
Maideeh	Mariahu	Red ware, c. 3 rd to 6 th century C.E.
Mansil	Mariahu	Red ware, Gupta and post-Gupta periods
Mokalpur	Mariahu	Red ware, black slipped ware, c. 2 nd century BCE to 5 th century C.E.
Muhammadpur	Ramnager	Red ware and ancient bricks, Kushana and Gupta periods
Nevadiya Kot	Ramnager	Red ware and ancient bricks, early medieval to medieval periods
Padravpur	Ramnager	Red ware, black and red ware and ancient bricks, c. 6 th century BCE to 5 th century C.E.
Pasiyahi Khurd	Ramnager	Red ware, early medieval period
Raiya	Mariahu	Red ware, black slipped ware, terracotta animal figurine and ancient bricks, c. 3 rd century BCE to 5 th century C.E.
Rajapur	Mariahu	Ruins of a tomb, late medieval period
Sahjara	Mariahu	Red ware, Gupta and post-Gupta periods
Santoshpur (Rajmalpur)	Mariahu	Red ware, post-Gupta periods

Name of sites	Development Block	Archaeological remains
Sarangdeeh	Ramnager	Red ware, terracotta animal figurine, ancient bricks and broken stone sculptures, c. 2 nd century C.E. to early medieval periods
Sarai Kalidas	Mariahu	Red ware, terracotta animal figurine, 3 rd century C.E. to 6 th century C.E.
Selhuapar	Mariahu	Red ware and broken sculpture, early medieval period
Seur	3-IT1. XI G1	Red ware, terracotta figurine ancient bricks and broken sculptures, c. 2 nd century C.E. to early medieval periods
Sevandeeh	Ramnager	Red ware and broken sculptures, Kushana to early medieval periods
Sirauh	Ramnager	Red ware, black and red ware and ancient brick structures. c. 3 rd century C.E. to medieval period.
Soith (Basudev patti)	Mariahu	Red ware, terracotta animal figurine, Gupta and post-Gupta periods
Subaspur	Mariahu	Red ware, broken sculpture and <i>lakhauri</i> bricks, early medieval to medieval periods
Sudanipur	Mariahu	Red ware and ancient bricks, early medieval to medieval period
Tazuddinpur	Mariahu	Red ware, 2 nd to 6 th century C.E.
Tejgarh	Ramnager	Red ware, medieval period
Tekari	Mariahu	Red ware, black slipped ware, ancient bricks and broken sculptures, 2 nd century BCE to early medieval period
Utirai	Mariahu	Red ware, early medieval period

48. EXPLORATIONS IN DEVELOPMENT BLOCK OF KARVI SUB-DIVISION, KARVI, DISTRICT CHITRAKOOT

Archaeological exploration was carried out in development block, Karvi sub-division, Karvi by Ram Naresh Pal, under the direction of Rakesh Tewari, Director of Uttar Pradesh

State Archaeology Department, Lucknow.

The villages/ sites with antiquarian remains are as under:

Village/Site	Cultural Assemblages
Aawanpur raja	Medieval mound with red ware
Ahmadganj	Early medieval mound with redware
Akbarpur	Medieval mound with redware
Baglai	Remains of a temple and broken sculptures of 11 th -12 th century C.E.
Bake Siddh baba	Rock shelter painted in ochre colour, animal scenes
Banadi	Medieval mound with red ware
Bandhon	NBPW, black slipped ware , red ware and iron slags
Bankat	Early medieval mound with red ware
Bankat	Mesolithic tools (flake, blade bladelets and other fragment of stone tools)
Bandhoin Devi	Late medieval mound with red ware
Bare Purwa	Mesolithic tools
Barwara	Medieval mound with red ware
Bhabhai	Medieval mound with red ware
Bhaisaundha	Early medieval mound with red ware
Bhagigwa	Kotia culture with red ware and black ware
Bharatpur	Early medieval mound with red ware
Bharthaul dih	Upper Palaeolithic tools, early medieval mound with red ware and remains of god-goddesses sculpture of 11 th -12 th century C.E.
Bihara	Upper Palaeolithic tools and mesolithic tools
Chakla ki Ghati	Upper Palaeolithic tools
Chandragahna	Kotia culture with red ware and black ware
Chhipni	Upper Palaeolithic and Mesolithic tools
Chhoti Chhir	Early medieval mound with red ware
Chhulha ka dih (Khera)	Early medieval mound with red ware
Dewangna Ghati	Upper Palaeolithic tools

EXPLORATIONS AND EXCAVATIONS

Dhorachho Shahr	Kotia culture with red ware and black ware
Dilauha	Kotia culture with red ware and black ware
Dond ka dih	Early medieval mound with red ware
Ghuretanpur	Kotia culture with red ware and black ware
Gonda	Remains of a stone temple of 11 th -12 th century C.E.
Harsauli dih	Kotia culture with red ware and black ware
Hinautamaphi	Medieval mound with red ware and medieval temple of Siva
Jalhal	NBPW, black slipped ware and red ware
Kaleshwar Ghati	Upper Palaeolithic tools
Kalupur	Remains of a stone temple and sculptures of 11 th -12 th century C.E. and medieval mound with red ware
Kanchangiri ki pahari	Upper Palaeolithic tools and rock shelter, painted in ochre colour, hunting scenes of animal, etc.
Kolhu Beehar	Early medieval mound with red ware
Khoh ki Pahari	Upper Palaeolithic tools and Mesolithic tools
Kuberganj	Medieval mound with red ware
Lodwara	Upper Palaeolithic tools and Kotia culture with red ware and black ware
Marjat pur	Medieval mound with red ware
Navaa biher	Upper Palaeolithic tools and remains of ancient temple (11 th -12 th century C.E.)
Parari	Medieval mound with red ware
Pathraudi	Mesolithic tools
Purani Kotwali	Black slipped ware and redware
Purataaraunha	Kotia culture with red ware
Rewhatia	Upper Palaeolithic tools
Siddhpur	Mesolithic tools
Sitapur	Kotia culture with red ware and black ware
Suraj kund	Kotia culture with red ware and black ware
Taroan	Kotia culture with red ware and black ware
Teliyan Ghati	Upper Palaeolithic tools

49. EXCAVATIONS AT PAKKAKOT, DISTRICT BALLIA

In continuation of the previous year's excavations, the Centre of Advanced Study, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Uttar Pradesh, conducted excavations at Pakkakot, (fig.20), Uttar Pradesh under the direction of Sita Ram Dubey associated by Ashok Kumar Singh, Santosh Kumar Singh, Barun Kumar Sinha, Ram Badan, Siva Kumar and Shiv Shankar.

The main objectives of the current field season's excavation were to trace out the main entrance of the fortified area exposed earlier; to find out structural remains through horizontal excavation to find out other sites of archaeological importance in the vicinity of Pakkakot to find similarities and dissimilarities with other sites of the mid-Ganga plain in the light of the findings at Pakkakot and to confirm the possibility of trade linkage from other contemporary sites of the region and to impart field training to the Undergraduate and Post-graduate (Archaeology) students of the department.

Accordingly, thirtythree trenches measuring 4 x 4m and 3 x 3m on Mound 1 and 2 were laid. On account of the severe flood during NBPW period the inhabitants were forced to settle at a safer place on Mound 2 (main mound) which is higher than the surrounding area, as it is indicated by the flood deposits in the section of the trenches excavated by us on Mound 1 and 3. In the later period the inhabitants constructed fortification wall and watch towers for the security purposes.

The deposit of Period I (neolithic habitation) was found on Mound 1 represented by about 50cm of cultural deposit in Trench YA-

3, AA-1 and ZB-2. This period was characterized by the ceramics of cord-impressed red ware, rusticated ware and slow wheel made red ware and some of the handmade potsherds. Rice husk was used as degraissant on the core of potsherds. The potsherds are generally thick in fabric. Generally, the pots are ill-fired and the clay used in the ceramics is not well levigated. Shapes are also limited in comparison to the overlying chalcolithic culture. They include bowls, pedestalled bowls, medium sized vases, martban, footed vessels and a few spouted vessels. The inhabitants of neolithic period have used several methods to decorate the pottery. The first method comprises post-firing scratching by a sharp instrument which includes geometrical patterns. The second method of decorating the potteries was appliqué method. Types of rope and chain pattern were also executed on the ceramics of this period. The small finds of this period include bone points and pottery discs. Fragment of reed marks and burnt clay lumps suggest that the inhabitants of this period used to live in wattle-and-daub houses. A good quantity of animal bones and archaeo-botanical remains were recovered which are under process of study.

Period II belongs to the Chalcolithic Culture and was traced on Mound 1 only. These deposits were traced in Trench YA-3, AA-1 and ZB-2. It measures 60cm in thickness. Ceramics of black-and-red ware, black slipped ware, red slipped ware and red ware were recovered from this period. The pottery is wheel made and ranges from fine to coarse variety. Important types of these wares are bowls, spouted vessel, vases, large sized basins and footed bowls. Ceramic industry of this period may be well compared with those of other sites like Checher-Kutubpur, Senuwar and Chirand, all located in Bihar; Waina, Bhunadih, Lahuradeva, Narhan, Khairadih, Agiabir, Jhusi, Tokwa, Raja-Nala-Ka-Tila, Malhar, etc. in Uttar Pradesh.

Apart from ceramic assemblage, antiquities recovered from this period include terracotta beads, bone points and arrowheads, gamesman and pottery disc.

Cultural deposit of Period III is divided into three sub-phases, i.e. IIIA, IIIB and IIIC (early, middle and late). Cultural deposits of Period IIIA were recovered from Trench YA-3 (**fig.21**), AA-1 and ZB-2 of Mound 1 and deposits of Period IIIB were recorded from Trench ACC-23 of Mound 2 and deposits of Period IIIC were recovered from Trench XU8 and ACC-23. The ceramic assemblage of this period consists of NBPW, black slipped ware, grey ware and red ware. Among the characteristic types mention may be made of corrugated flanged bowls with sharpened rim, nail-headed rim, dishes with vertical featureless rim, incurved featureless rim, lipped basins, carinated *handi*, pear shaped vases and other variety of vases. A good number of frying pans of grey ware and red ware are the other noteworthy types of this period. This is a new type of pottery recovered from this period. These types of frying pans are not reported so far from any other site of mid-Ganga plain.

Other important findings of this period include beads of semiprecious stones and terracotta, iron and copper objects, a large quantity of bone points and arrow heads, terracotta and pottery discs, skin rubber balls and pestles, and terracotta seals and sealings and several copper coins.

The inhabitants of NBPW period lived in wattle and daub houses. A large number of animal bones were collected from this period.

Period IV is marked by Sunga-Kushana pottery with sprinkler of red ware. Other important types of red ware are bowls, basins, *karahis* and lids. Mention may be made of lugged

handled frying pan in a good quantity. Burnt bricks of structures have been largely robbed by present day inhabitants of Pakkakot. A few burnt bricks were noticed in Trench ACC-23, ACC-25, ABB-25 and AA-24.

The antiquities recovered from the deposit of this period are mainly terracotta human and animal figurines, 85 bone points and arrowheads, 52 beads and pendants of semi-precious stones and terracotta, 12 terracotta sealings, 06 cost copper coins, iron and copper objects, etc.

The uppermost mound was inhabited in the Gupta and post-Gupta times. Though, strata belonging to these two periods were found highly disturbed on Mound 1, some rare structures of Gupta and post-Gupta (Period V) were exposed location of Buddhist monastic area during excavation(**fig.20**).

The most important discoveries are two architectural complexes viz., Monastic complex and Buddhist monastery with *chaitya griha*.

Among these two Monastic complexes, the structure was made almost entirely of broken bricks, on Mound 1 within 200m extent, one has more than half a dozen small cells (**fig. 22**) built in two rows ($2.15 \times 1.94\text{m}$, $1.94 \times 1.84\text{m}$, $1.35 \times 1.20\text{m}$, $1.75 \times 1.50\text{m}$), though only their plinth level is visible. The second architectural complex, contains *garbhagriha* ($2.40 \times 2.40\text{m}$) surrounded by circumambulatory path ($5.60 \times 5.30\text{m}$) and eight rooms of different sizes, four rooms of $3.90 \times 2.40\text{m}$, three rooms of $5.35 \times 2.35\text{m}$, $5.35 \times 2.45\text{m}$ and $2.65 \times 2.30\text{m}$ and one square room ($2.35 \times 2.35\text{m}$). The gate of this architectural complex, probably of a monastery is west-oriented (**pl.137**). On the basis of similarity with the Buddhist monastery and *chaitya* cum monastery of Sarnath, Kusinagar and Piprahwa (U.P.), Nalanda (Bihar), Dhamnar

Fig. 20

PAKKAKOT-MOUND-1, BALLIA

Tr. No.- YA3

SECTION LOOKING WEST

0 1 Mt.

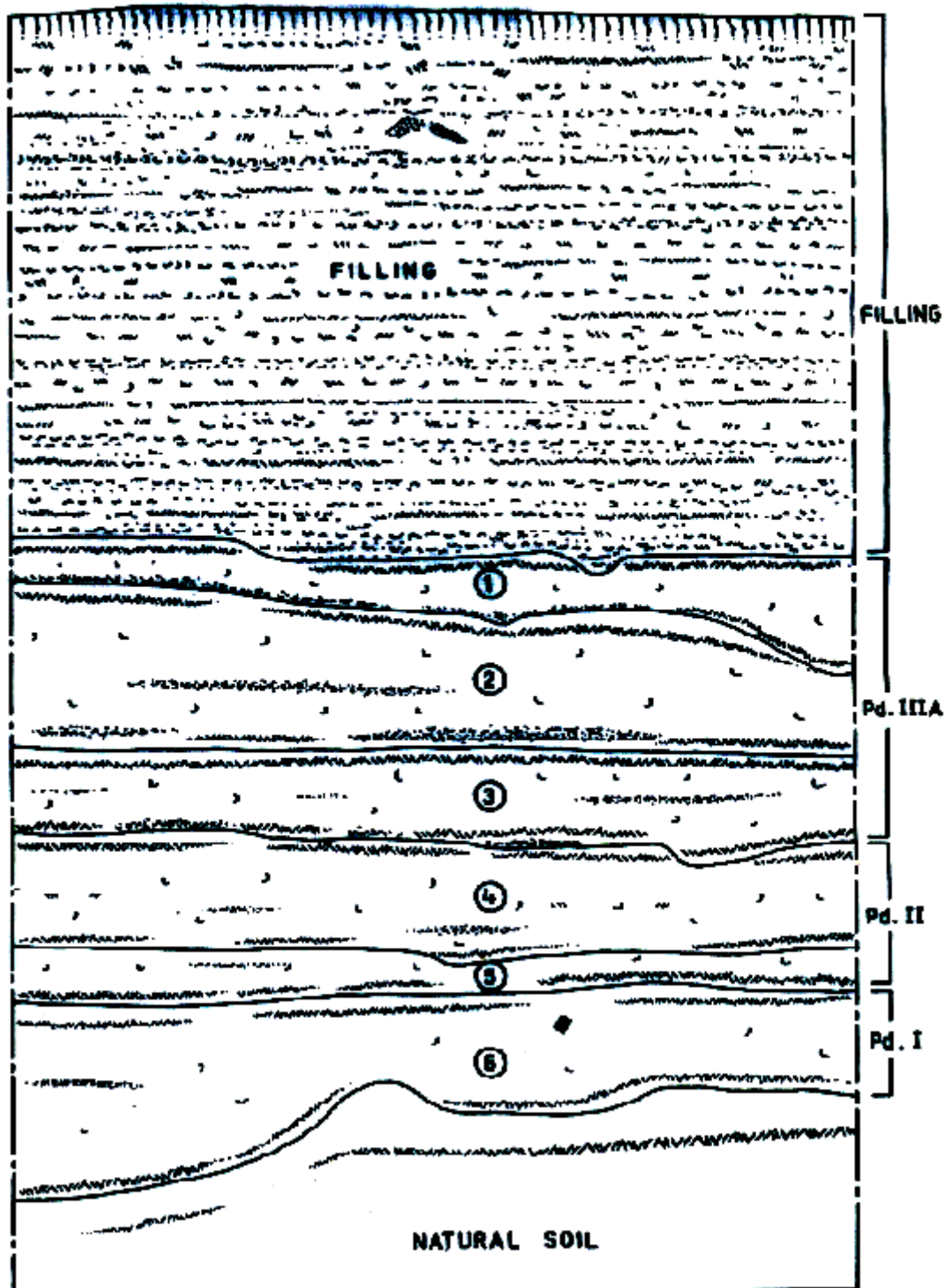


Fig. 21

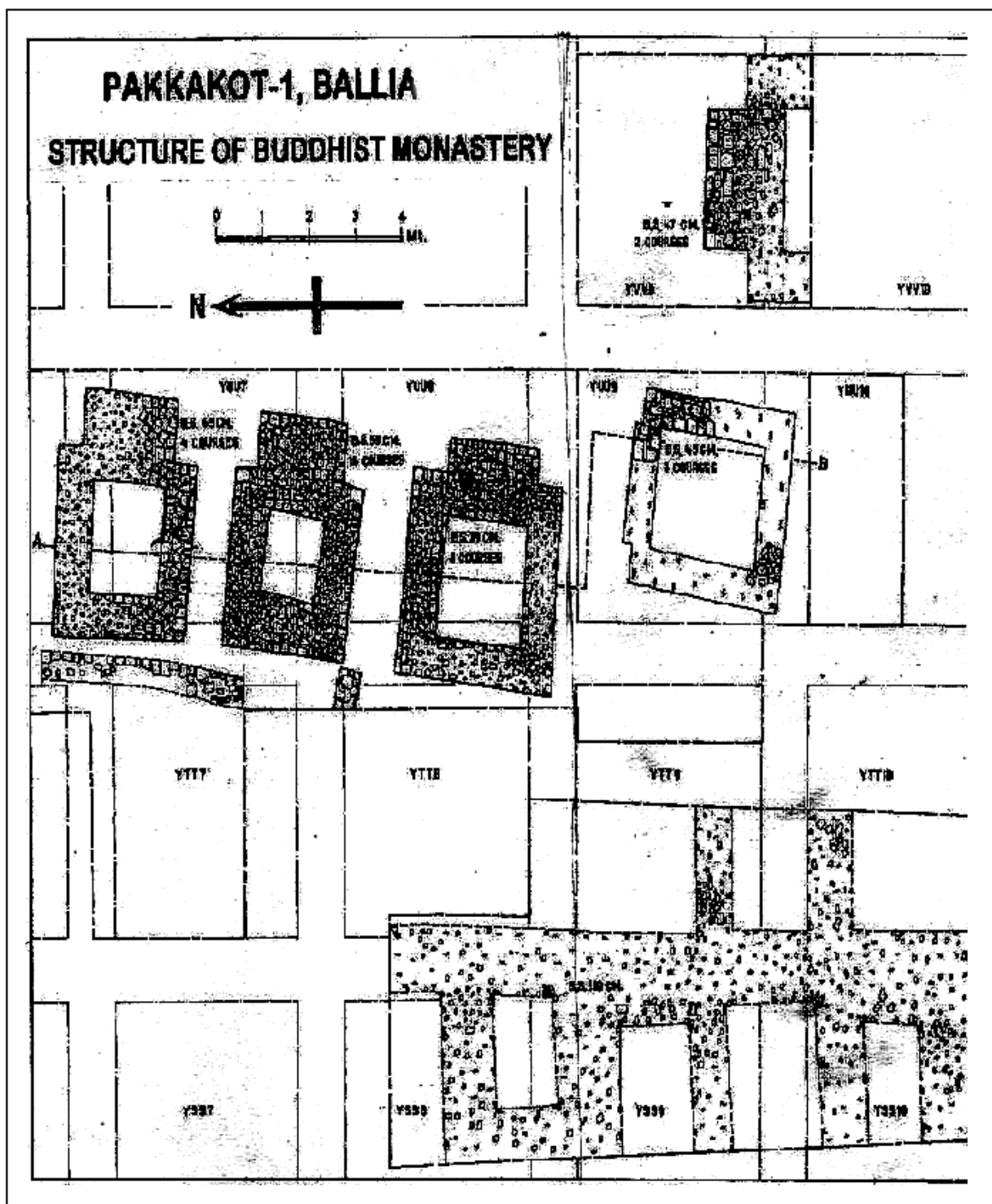
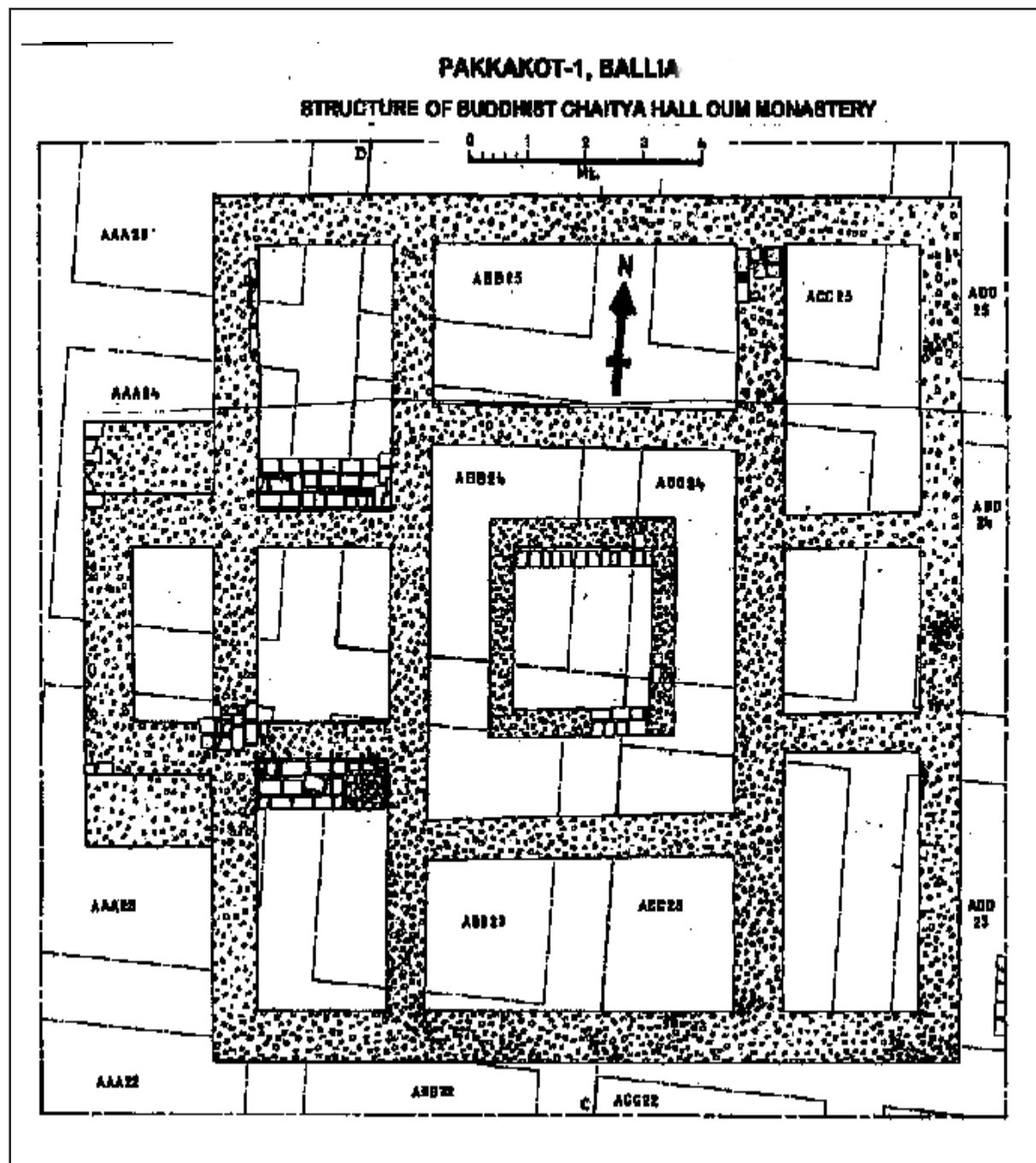


Fig. 22





137



138

Pakkakot : 137-138, excavated Buddhist monasteries, See pp.167 and 173



139



140

Pakkakot : 139, Siva-linga of stone; 140, seal bearing trisula mark, See p.173

and Poladongar (M.P.) these two architectural complexes may be identified as Buddhist monastic cells and worship-room cum monastery respectively (pl.138). A fragment of art object depicting stupa and headless icon of Buddha in *Dharmachakra pravarttana mudra* can be referred good evidence in this context.

A Siva-linga made of stone (pl.139) on upper portion on the plinth of one monastic cell, a seal was also found nearby this area, which bears *trisula* with some letters were also found (pl.140). On the basis of these findings we can conclude that the monastic cells were later on occupied by the followers of 'Saiva sect'. The small findings of this period include human and animal figurines, beads of semi-precious stones and terracotta, seal and sealings, iron and copper objects, terracotta balls, etc.

In the light of glazed ware potteries as recovered from surface it can be concluded that the site was inhabited during medieval period too. The excavation revealed the following cultural sequence:

- Period I: Neolithic
- Period II: Chalcolithic
- Period III: NBPW
- Period IV: Sunga-Kushana
- Period V: Gupta and post-Gupta period
- Period VI: Early medieval - medieval period

50. EXPLORATIONS ALONGWITH SAI RIVER, DISTRICT LUCKNOW AND UNNAO

An archaeological exploration along the Sai river was carried out by Ram Vinay and N. S. Tyagi under the general direction of Rakesh Tewari of the U. P. State Archaeology Department. The main objectives of this exploration was to document the early settlement site and remains along the Sai river in Asoha, Nawabganj and Sarojani Nagar development block.

During the course of exploration a number of sites and mounds are visited and documented the sites of archaeological importance.

Village	Block	Cultural Material
Aantpar Ka Lalakhera	Asoha	NBPW, grey ware, black slipped ware, red ware
Ain	Sarojani Nagar	Red ware
Asoha	Asoha	Red ware
Balhemau	Asoha	Red ware
Ballukhera	Asoha	Red ware
Bhaisoura	Nawabganj	Siva temple 16 th century C.E.
Bhatgaon	Sarojani Nagar	Black and red ware, black slipped ware, red ware, glazed ware

Village	Block	Cultural Material
Bikamau Asoha	Asoha	Red ware
Billouch Garhi	Sarojani Nagar	Red ware
Chaupai	Asoha	Red ware
Chilauli	Asoha	Red ware
Daun Darshwa	Asoha	NBPW, grey ware, black and red ware, black slipped ware, PGW, red ware, corded ware
Dayalpu R	Sarojani Nagar	Grey ware, NBPW, black slipped ware, red ware
Gondawan Sarojani Nagar	Sarojani Nagar	Red ware, glazed ware
Gundouli	Sarojani Nagar	Red ware
Hanaura	Nawabganj	Red ware
Himmatgarh Nawabghnj	Hasanganj	NBPW, black slipped ware, red ware
Ismailpur	Asoha	Red ware
Kakraha Pathraha	Asoha	NBPW, grey ware, black slipped ware, red ware, corded ware
Kandarpur	Asoha	Siva temple
Kantha	Asoha	Red ware
Kirpakhera	Nawabganj	Red ware
Kotwa	Asoha	Red ware, glazed ware, sculpture
Lala Khera	Asoha	Red ware
Latif Nagar	Sarojani Nagar	Red ware, black and red ware, NBPW, grey ware, black slipped ware, red ware
Mehnaura	Mohanlalganj	Red ware
Mirrikala	Asoha	Red ware

Village	Block	Cultural Material
Mirzapur Latauwan	Sarojani Nagar	Red ware
Muktemau	Asoha	Red ware
Nanamau	Sadar Lucknow	Red ware
Nibehari Kalyanpur	Nawabganj	Red ware
Pipar Sand	Sarojani Nagar	Black slipped ware, black and red ware, red ware, glazed ware
Rahim Nagar Pariyana	Sarojani Nagar	Sculpture
Saidpur Purahi	Sarojani Nagar	Black and red ware, grey ware, red ware, black slipped ware, corded ware
Sahrawan	Asoha	Red ware
Semari	Asoha	Red ware, black slipped ware
Shivdin Khera	Sarojani Nagar	Red ware
Sulsamau Lalumar	Mohanlalganj	Red ware
Qyoni	Asoha	Red ware

51. EXCAVATIONS AT BASADILA TILATAR, DISTRICT GORAKHPUR

The ancient site of Basadila Tilatar (Lat. 26°47'10"N; Long. 83°55'30"E) is located in Sardar Nagar block of Chauri-Chaura sub-division about 25km east of the city headquarters of Gorakhpur.

The site came to light for its wooden structure during the renovation and enlargement of a pond to the western fringe of the village

Basadila Tilatar by the villagers in 2010-11. The evidence of wooden structure made of *sal* tree planks was found towards the western side of the pond.

The excavation was conducted under the direction of Shitala Prasad Singh, of the Department of Ancient History, Archaeology and Culture, Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur assisted by Vipula Dubey, J.N. Pal and V.K. Khatri, Harendra Yadav, Raj Kumar, Jitendra Kumar Yadav, Ravi Prakash and Kamalesh Kumar.

The objectives of the excavation was to know the stratigraphic position of living structure, four trenches (5 × 5m), namely A1, A2, B1 and B2; and to understand the stratigraphic position of the wooden structure baulks measuring 50cm across the structure both north-south and east-west (**fig.23**).

Segment 'A' lies in the north-east portion of the trench. The layers 1 to 4 and partly layer 5 were excavated show compact deposits of yellowish and brownish clay that yielded potsherds of Northern Black Polished Ware and associated red ware. Further digging was not possible due to water-logging. This excavated Segment 'B' contains major portion of the wooden structure below 2.20m (**pl.141**). Deep digging was done upto the depth of 5.80m below. In total seventeen *sal* wood planks were found. The segment contains shell, charcoal and potsherds, small vase (*lota*) of fine red ware, burnt clay lumps, potsherds, charred wood and leaf impression on clay, charred wood and animal bone fragments, spouted vessel of red ware, small vase with rope on its neck, fish bone, turtle bone and bird bones, bird bones with cut mark, fragment of sand stone quern and iron knife, stem of plants, bowls of NBPW (**pl.143**), pots of grey ware and red ware and iron arrowhead and nail (**pl.144**), deep basin, globular jar and potsherds, etc. (**figs.24 to 26**).

Segment 'C' and 'D' yielded small potsherds of red ware, a good number of terracotta human and animal figurines, terracotta lamp, perforated discs of terracotta and terracotta beads in the layer 1 of 1m thick (**pl.142**). Layer 2 of light yellowish clay has a thickness of 80cm. Layer 3 has a thickness of 65cm yielded red ware and grey ware potsherds. Layer 4 having a thickness of 40 to 45cm yielding potsherds and fragments of charcoal and bone fragments. Layer 5 was excavated only upto the thickness of 35cm due to water-logging.

Trial digging at BDL 2, about 2km east of the village Basadila Tilatar at a raised ground revealed burnt bricks of Kushana period and was occupied from early NBPW period to Gupta period. The artifacts retrieved suggesting that the site constructed in the early NBPW phase and it was in constant use upto Gupta period through the Sunga-Kushana periods.

WEST BENGAL

52.EXPLORATIONS IN SUNDERBAN, DISTRICT SOUTH 24 PARGANAS

S. Maiti and P. K. Naik inspected different sites and places of archaeological interest in Patharpratima Police Station (specially G. Plot) of South 24 Parganas district, accompanied by P. N. Biswas, Kolkata Circle of the Survey and D. Maitra, Achin Giri and Kallol Kumar Dasgupta and Biswajit Sahu, a resident of Gobardhanpur village. The objective was to explore new sites.

The Taterbazar mound (Lat. 21°41'42.9"N; Long. 88°21'57"E) is located between Jagadal Gang and Curzon creek in *mouza* Uttarsurendraganj. The mound was got converted to a market place with a modern Siva temple at the centre which is gradually sloping sideways. Brickbats, pots sherds are strewn all over the place and adjacent houses are mostly built of the bricks collected from the mound. In the nearby *Padmapukur* (lotus pond) stone sculptures and other antiquities are reported.

A terracotta head belonging to the post Gupta period was found while scrapping the river section at mouza Satyadaspur G Plot (Lat. 21°42'21.9"N; Long. 88°25'33.6"E). A large number of red wares, grey wares, lack wares, mat impressed wares are seen scattered on the mud surface and clinging to the section mound may be dated between post-Gupta to medieval

period.

A large number of brick bats, red wares, etc. have been found scattered on the surface at Brajaballabpur Garbari (Lat. 21°42'31.6"N; Long. 88°21'45.9"E). It has been reported that while digging a pond few ring wells in lines were exposed and the available sizes of the bricks are 32 x 20 x 6cm, 21 x 20 x 7cm respectively. A copper-plate of Dommana Pala was discovered from this site.

The site Gobardhanpur (Lat. 21°36'07.4"N; Long. 88°24'08.7"E) is situated at the confluence of Curzon creek, Jagaddal Gang and Thakurani river near Sashtha Khanda Jungle merging in the Bay of Bengal and on the sea shore a large number of broken bricks and brick bats, a large number of sherds of red ware, grey ware and black wares have been noticed. Fossil remains of aquatic creatures have been found in plenty along with archaeological relics.

The site Chhotoraksaskhali (Lat. 21°45'54.3"N; Long. 88°22'34.9"E) is situated on the banks of the river. Near Chandpatar *ghat*, a large number of sherds of red ware and grey ware have been found inserted in the sections along with the roots of trees. A fragment of terracotta human figurine, fragment of a terracotta pan of red ware, rim of a vase having flaring mouth, mat impressed wares, etc. have been collected.

Achinta Nagar I plot shree pally (Lat. 21°48'02.7"N; Long. 88°25'54.7"E) is under cultivation and has got damaged. Numerous potsherds can be seen on the field and the nearby pond. A fragmentary piece of a stone muller, terracotta toy is seen in the collection of one Nishikanta Majhi.

In the mouza Banashyam Nagar (Lat. 21°47'07.3"N; Long. 88°25'21.2"E) in a newly constructed temple, a four armed Vishnu dating back to Sena period as being worshipped by

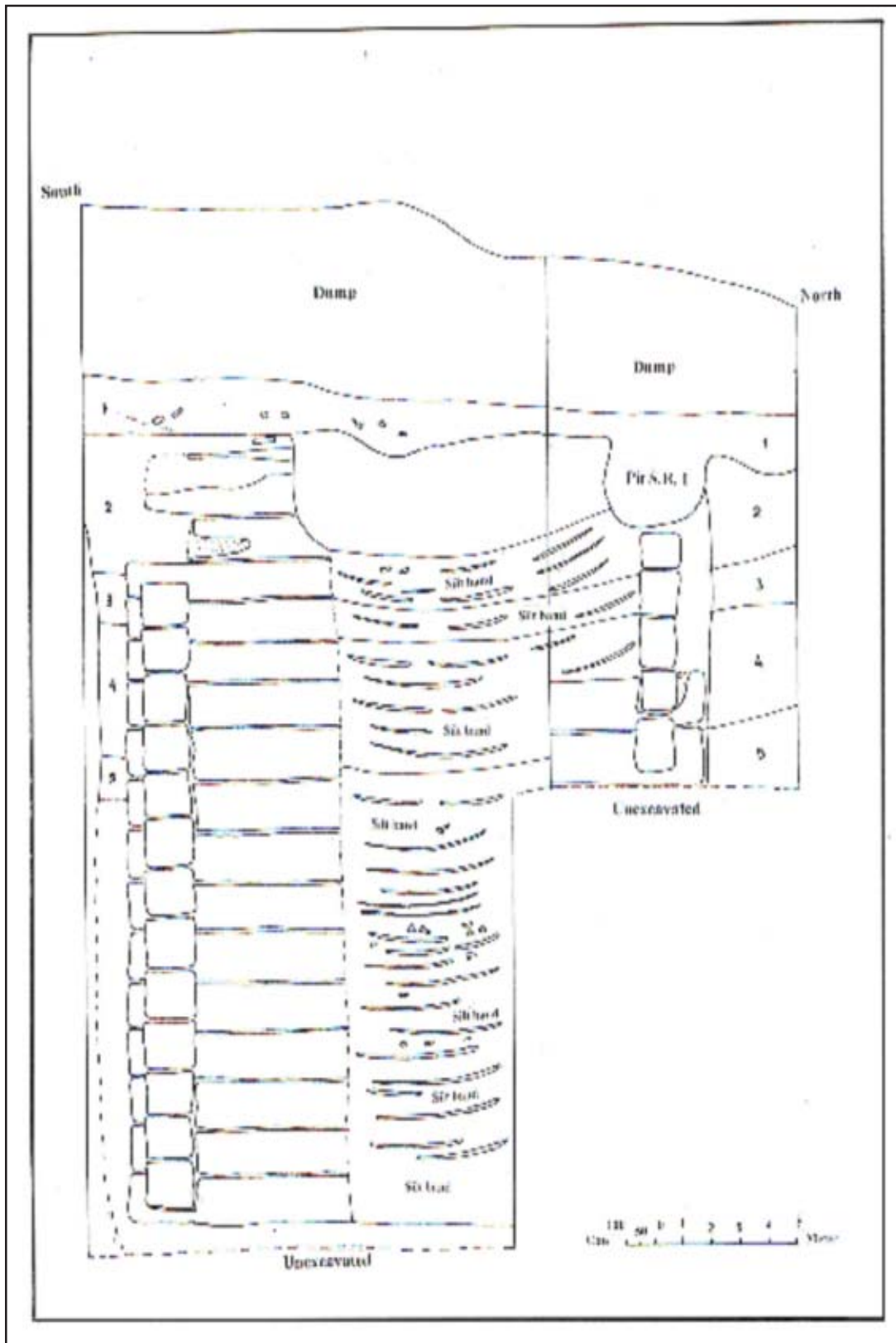
the villagers. The dimension of the statue is 72 x 39x14cm. The deity stands on *samapadasthanaka* pose on a double petalled lotus pedestal flanked by Lakshmi and Saraswati. While his upper and lower right arms hold *gada* and *padma* respectively, his upper and lower left arms hold *chakra* and *sankha*. The god is wearing *banamala*, *upavita*, *kiritamukata* and profusely ornamented. Kneeling devotees and Garuda have been nicely carved. The image was recovered from a nearby mound.

Red wares have been noticed at Buraburir tat/ Kankra Marir chak (Lat. 21°37'10.3"N; Long. 88°24'0.24"E). A big stone image of Narashimha measuring 147 x 62 x 28cm has been kept in the Patharpratima Police Station (Lat. 21°47' 35.6"N; Long. 88°21'40.8"E). The image is four armed and with his front two hands he is tearing open the belly of the demon King Hiranyakasipu. Left and right legs of the deity are broken. The deity wears profuse ornaments. At the top of stele is *kirttimukha* which is flanked by flying *gandharvas*. A kneeling devotee is found below on the left side. On stylistic ground, it may be placed between 11th-12th century C.E.

53. EXCAVATION AT DIHAR, DISTRICT KOLKATA

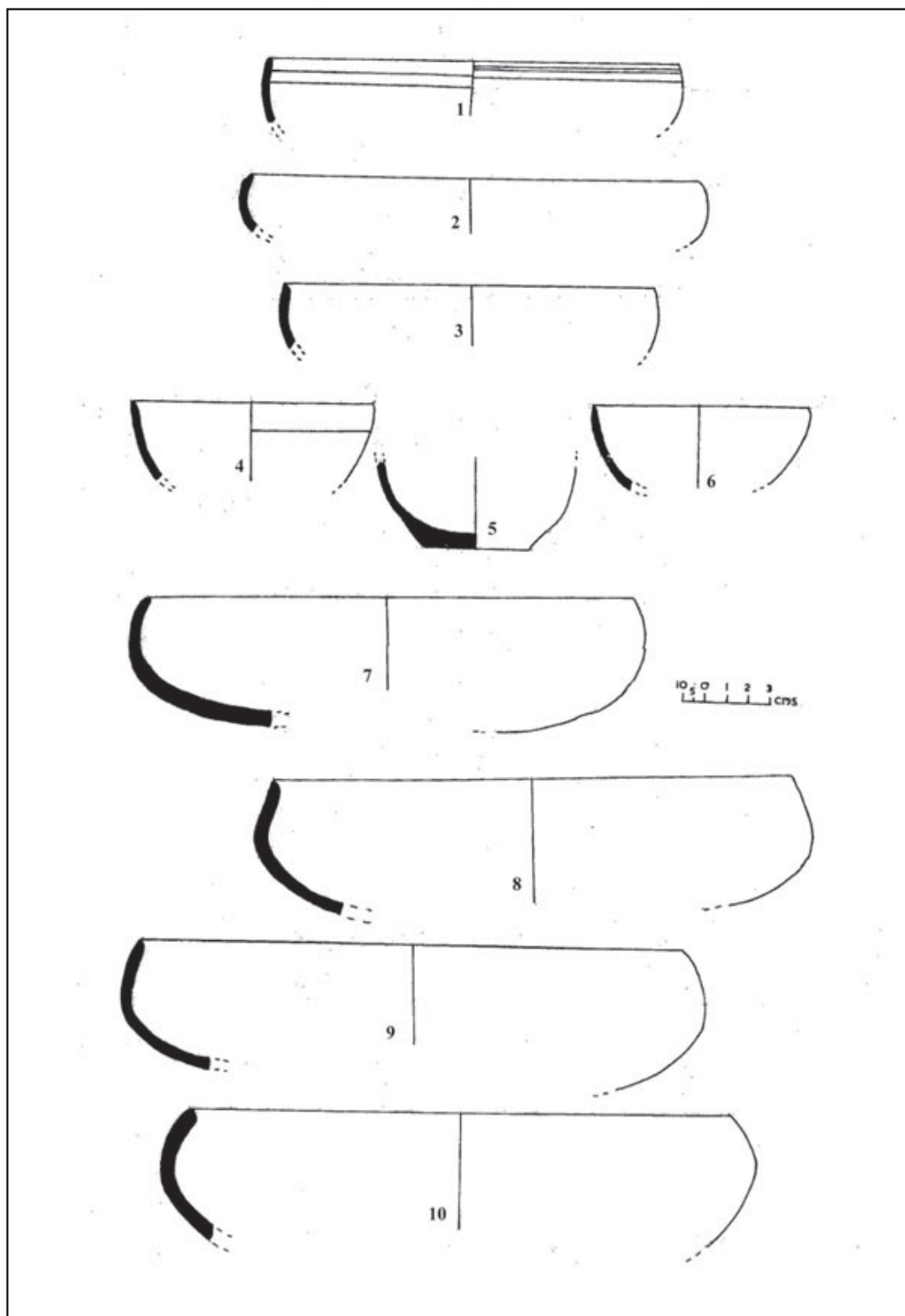
In continuation of the previous field season, excavation work was resumed at the site of Dihar in the Manasatala mound within Kolkata by the Department of Archaeology, University of Calcutta. The objectives of the excavation are to investigate the nature of occupation and the habitational character of the mound DHR 3; to identify the metal bearing occupational layers of the mound and to interpret the changing contexts of different occupational layers/deposits associated with black and red ware from the pre-metallic phases to the historical period (Malla period).

Fig. 23



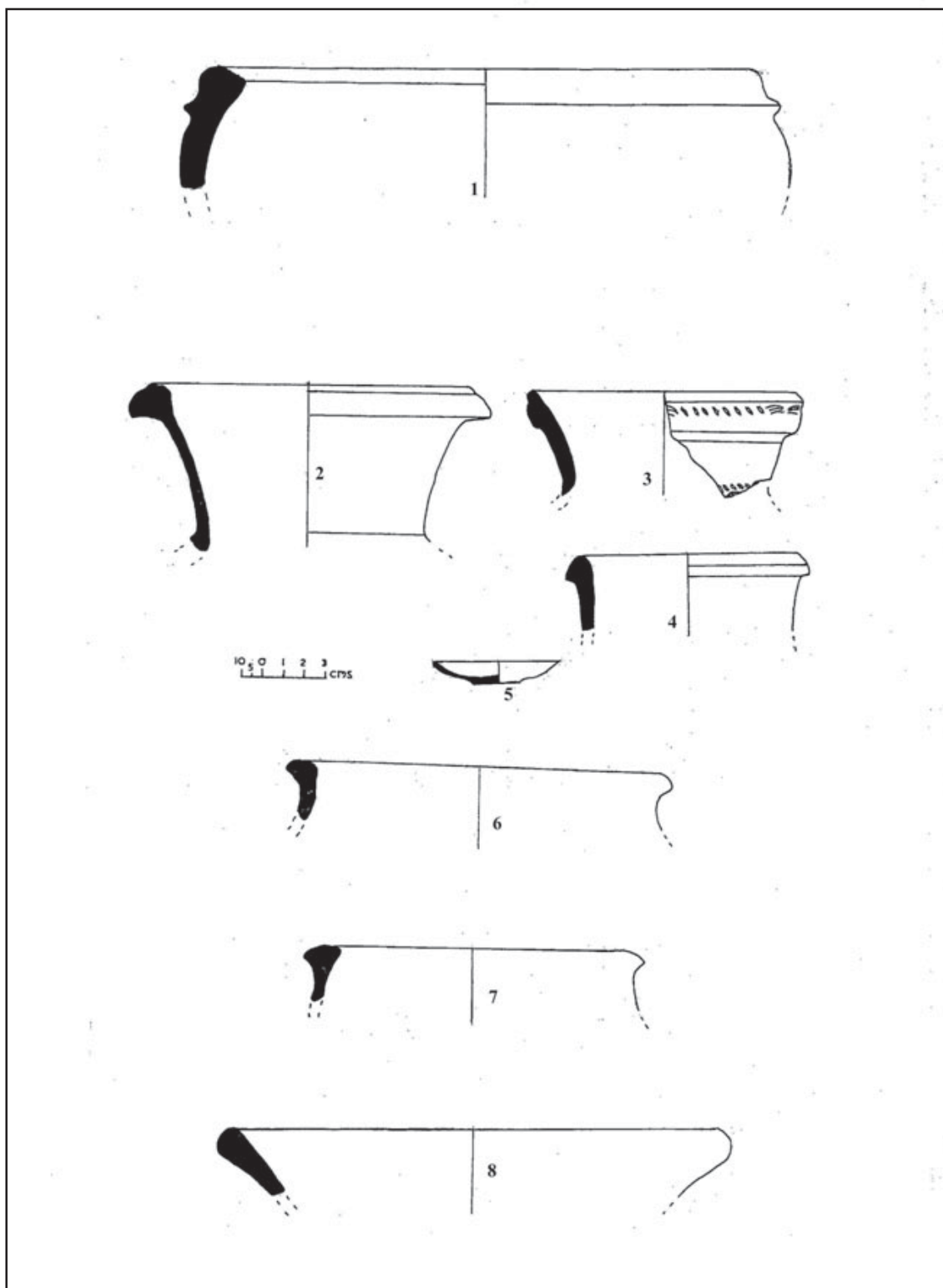
Basadila Tilatar : section (on a-b) of trench A1, facing east

Fig. 24



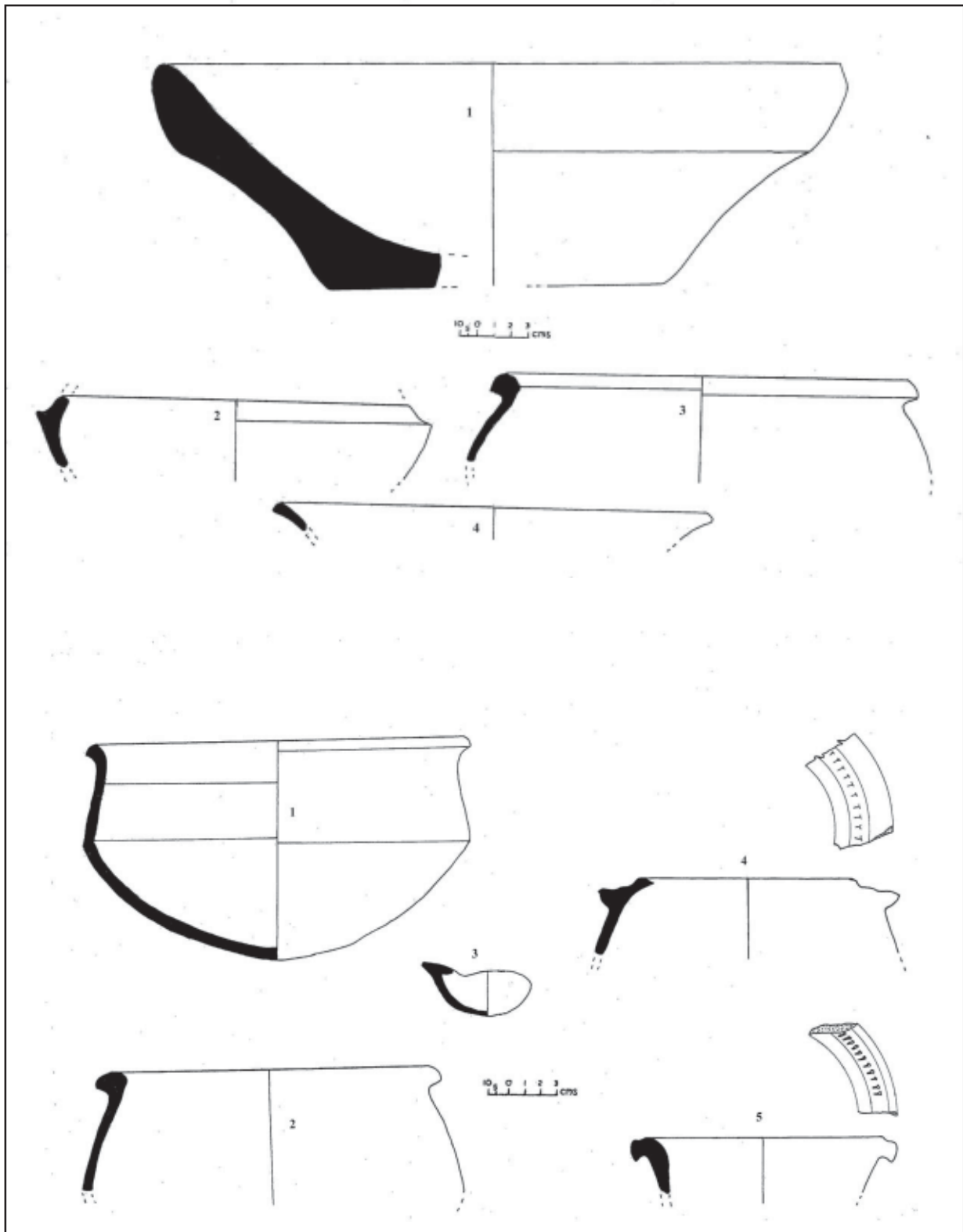
Basadila Tilatar : 1-3 dishes (NBPW), 4-6 bowls (NBPW), 7-10 dishes (black slipped ware)

Fig. 25



Basadila Tilatar : 1 basin (black slipped ware), 2-4 vases (red slipped ware), 5 bowl (red slipped ware), 6-7 vases (red ware), 8 bowl (red ware)

Fig. 26



Basadila Tilatar : 1 basin (black slipped ware), 2-4 vases (red slipped ware), 5 bowl (red slipped ware), 6-7 vases (red ware), 8 bowl (red ware)



141



142

Basadila Tilatar : 141, view of wooden structure, silt bands in the section facing east; 142, terracotta objects, See p.176



143



144

Basdila Tilatar : 143, NBPW sherds; 144, iron arrow-head and nail, See p.176

The layout of the trenches was made in accordance with the elevation of the mound as well as its gradient in relation to a 'presumed palaeo-channel' along the northern part of the mound. The horizontal method was followed and each trench measured 6 x 6m with 50cm baulk on each side. The central part of the mound was marked the cardinal point O, and accordingly the trenches ZB1, the highest point of mound A1, C1 and D2 were laid (pl.145).

The following composite stratigraphy of the Manasatala mound is found from trenches ZB1 and A1 (figs.27- 28 and pl.146). Layer 1, depth from top ranging from 3cm to 4cm humus/top surface, disturbed, late medieval; Layer 2, depth ranging from 12cm to 34cm historical/early medieval; Layer 3, depth ranging from 32cm to 82cm historical/early medieval; Layer 4, depth from top ranging from 61cm to 105cm early historical; Layer 5, depth ranging from 115cm to 144cm metallic stage; Layer 6, depth ranging from 144cm to 182cm pre-metallic stage and Layer 7, depth ranging from 194cm to 202cm disturbed, pre-metallic stage.

Based on occupational deposits, diagnostic types of artefacts/habitational assemblages, six chrono-cultural phases can be tentatively reconstructed at Manasatala mound.

Phase I: Pre-metallic phase associated with black and red ware.

Phase II: Metallic EVF phase associated with black and red ware (occurrence of both copper and iron).

Phase III: Early historical phase (showing the continuity of black and red ware).

Phase IV: Post-Gupta period/early medieval period (showing the continuity of black and red ware along with ceramic types assignable to the Gupta and post-Gupta periods).

Phase V: Medieval (pre-Malla), disturbed se-

quence.

Phase VI: Late medieval (Malla), disturbed sequence.

Structural remains of this excavation includes (a) mud/ rammed floors, (b) reed impressed clay chunks, (c) occasional occurrence of hearths/ ovens and furnaces, (d) larger strips of floor areas possibly indicating lanes/passages/ open spaces, (e) pit-silos, (f) refuse pits, (g) structural/ storage-pits, (h) post-holes, (i) industrial/ manufacturing complexes or workshops (potters' and metal workers') and (j) reed impressed clay reflecting extensive use of wattle-and-daub structures.

The ceramic industry of Dihar is characterized by varied fabrics, shapes and sizes. The pottery are painted with slip and painting design. The designs have similarities with those of other sites of the Ganga valley and even central India.

The present excavation had successfully unearthed exceptional varieties of black and red ware which were not found in the earlier excavations. The latest repertoire of some of the retrieved black and red ware differs from the earlier ones in terms of shape, size, fabric, texture, slips, firing techniques and paintings. The maximum occurrence of black ware is found from the early historical/historical period. These are mainly wheel turned specimens with medium and fine fabric. Both the interior and exterior surfaces of these sherds are highly burnished to achieve a black lustre. The dominant shapes comprise miniature bowls with incurved and featureless rims, miniature pots with narrow mouths and featureless rims, carinated dishes with incurved rims, etc. Red ware occurs throughout the entire chrono-cultural phases of Dihar. Three varieties of red ware were encountered. These include plain or unslipped red ware, slipped red ware and painted red slipped ware, etc.

Sometimes, sherds of red slipped ware depicted with painted motifs. The colour of the slip in red ware bearing paintings varied from tanned red/chocolate to dull red. Further, colour of the red slip applied on black and red ware and red ware (without painting) is relatively more brighter than that found from painted ones (pl.147).

The present excavation has yielded a plethora of cut bones of different domesticated, wild and aquatic species of animals, along with varieties of tools/ objects, made of bones and antlers from different chrono-cultural phases.

The presence of metal working activity is well attested by the evidence, unearthed from present excavations. Iron fragments and slags and obviously profuse number of metal drop-lets along with fragile evidence of furnaces hardly suggest the presence of a rudimentary form of iron working activities. Besides, specimen of copper ring a broken copper antimony rod and other copper objects have been found from Trench A1 (pl.148). Terracotta objects have been found in large numbers comprising sling balls, net sinkers, hop-scotches, spindle whorls, beads, miscellaneous game objects, terracotta discs, a few broken pieces of animal figurines etc. The excavation has also yielded a number of beads made of semi-precious stones. Ground and polished stone tools, milling tools like saddle querns and pestles, besides, polished quartzite stones were found during excavation (pl.149).

The evidence from Manasatala indicates a picture regarding the beginning of farming, domestication of animals and plants and in the subsequent periods. For the first time evidence of iron working (occurrence of iron) from a level probably assignable to a period prior to 1300 BCE was unearthed.

54. EXPLORATION IN THE UPPER REACHES OF

KUMARI VALLEY AND THE KANA PAHAR REGION, DISTRICT PURULIA

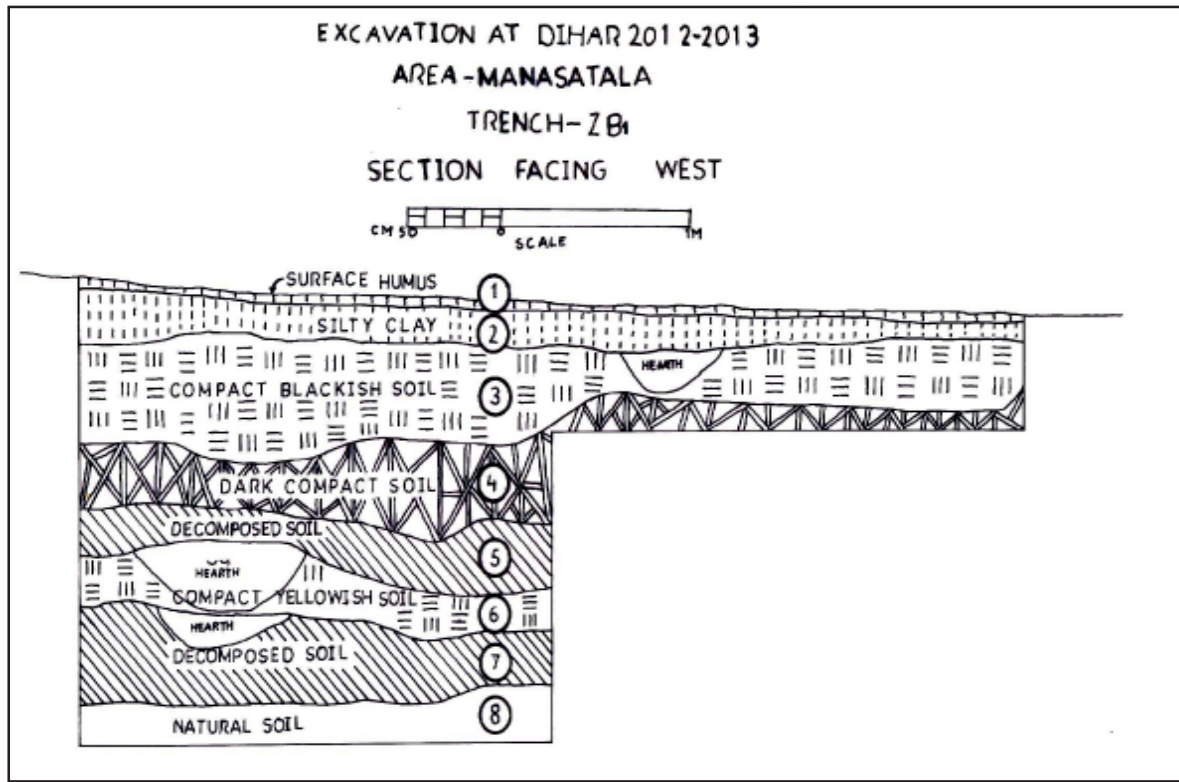
Exploration in the upper reaches of Kumari valley and the Kana pahar region Purulia district was undertaken by Bishnupriya Basak of Calcutta University with the aims to understand the stratigraphy and the process of formation of colluvial deposit in this region, associated with the microlithic context. Therefore, the objective of exploration was to understand processes of site formation in the Ayodhya foothill region.

Two exposed sections were cleared at Mahadebbera (Lat. 23°11'38.77"N; Long. 86°11'53.3"E) and Kana (Lat. 23°07'42.7"N; Long. 86°12'47.5"E), and samples were collected for phytolith analysis (only from Kana) and Optically Stimulated Luminescence (OSL) dating. A third section at Ghatbera was cleared to understand the formation of recent fluvial deposit and its relation with colluvial deposit in the area.

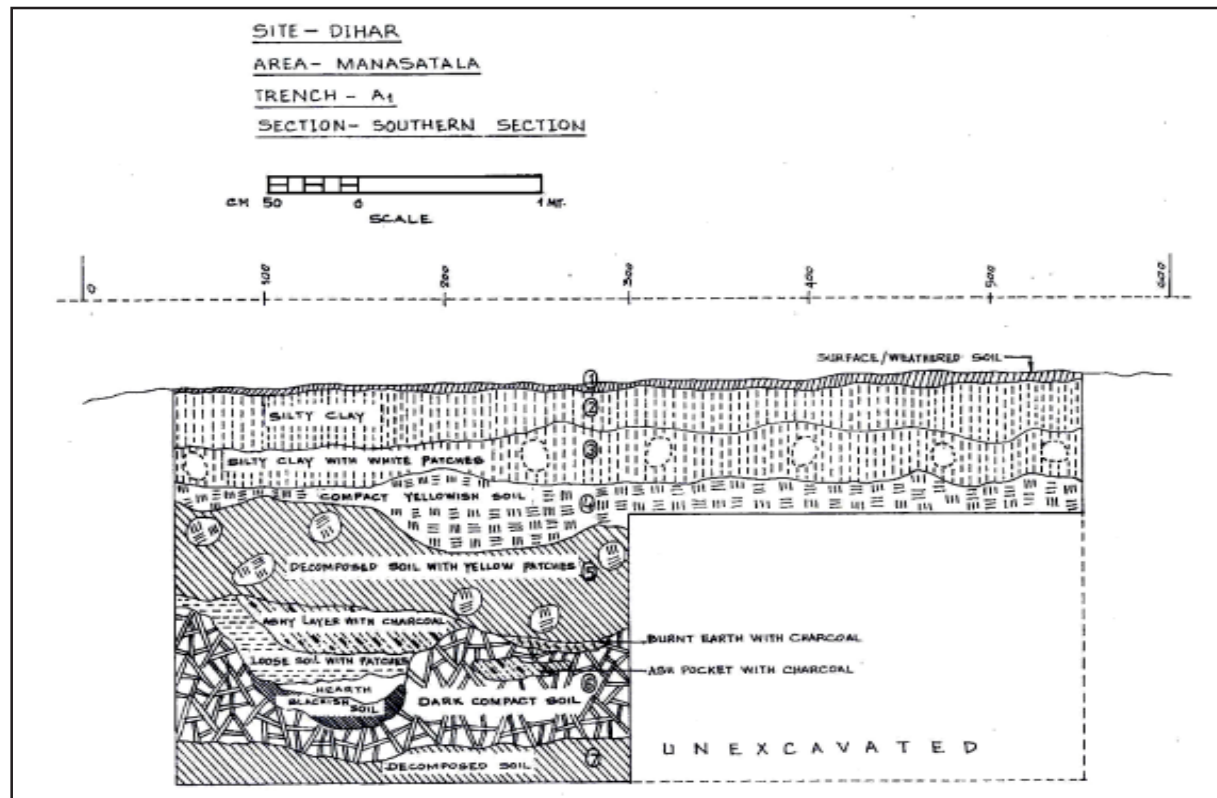
Exploration in an area within a radius of 10-15km from the pediment zone of Mahadebbera was taken up (pl.150).

A few exposed sections were identified approximately within 3km south east of Mahadebbera. These sections, 4-5m in height, located on the bank of Kumari show good exposures of colluvial deposit of reddish silt with lenses of coarse-grained material. A dog leash method of sampling was followed to make a sample collection of artefacts from the site with the help of Brunton compass and tape. The assemblage chiefly constitutes of cores, flakes in different stages of reduction, a few raw material nodules, trimmed nodules and chunks (pl.151). The methodology adopted to analyze the assemblage is the principle of lithic reduction sequence by which the different stages of manufacture and reduction are reconstructed

Figs 27-28



27



28



145



146

Manasatala mound, Dihar : 145, excavated trenches; 146, southern section of Trench A1 and western section of Trench ZB1, See p.184



A



B



C



D



E



F



G



H

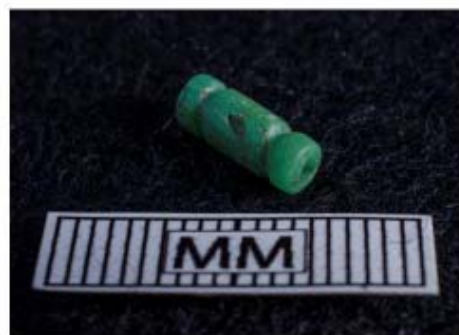
Manasatala mound, Dihar : (A) white painted black and red ware, (B) white painted red ware, (C) marbled vessel / tub, (D) miniature bowl in black and red ware, (E) black and red ware sherds, (F) black and red ware sherds, (G) different varieties tumblers in black and red ware, (H) black ware sherd showing beaded rim, See p.185



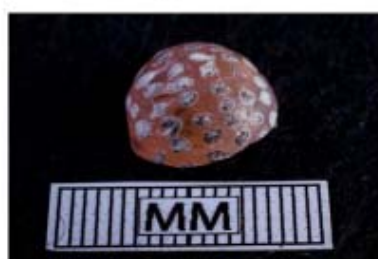
Manasatala mound, Dihar : iron objects, antimony rods and copper ring(Trench A1 and D2), See p.185



A



B



C



D



E



F



G



H

Manasatala mound, Dihar : (A) carnelian bead, (B) barrel shaped bead, (C) etched carnelian bead, (D) stone bead, (E) antlers, (F) bone tools, (G) bone points, (H) four headed bone point, See p.185



150



151

Mahadebbera, Purulia : 150, microlithic in situ; 151, general view of the site, See p.185

from any assemblage. The raw materials used in the manufacture of the tools are rhyolite, black chert, felsic tuff and green quartzite.

(OSL)Optically Stimulated Luminescencedates are now available from Kana (42 ka) and Mahadebbera (34-25 ka) which has pushed back the antiquity of microlithic industries in Bengal and eastern India. No absolute dates exist for any sites belonging to late pleistocene in eastern India. The importance of the study lies in (i) the first-ever dating of microlithic industries of late

pleistocene in eastern India and (ii) the location of the sites in a hill-slope colluvial pediment context which is rare in the Indian sub-continent. The chronology gives supportive evidence to antiquity of microblade/microlithic industries from central and southern India. Moreover, in the Indian sub-continent most upper palaeolithic/microlithic sites are reported from alluvial context, sand dunes or rock shelters. Late pleistocene sites in a dated colluvial context such as these are very few in the Indian sub-continent.

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS¹

ANDHRA PRADESH

1. TELUGU INSCRIPTION, MAREPALLI, DISTRICT MEDAK

This inscription is engraved on a granite pillar erected in front of a Sivalayam, right side of the *dhvajastambha*. Written in Telugu-Kannada characters and dated in *saka* 1238 (1316 C.E.), it contains 62 lines and records the gift of the village Marepalli to *Sri Parvata Mallikarjunasvami* temple for the performance rituals and its maintenance by *Rudradevanimgaru*, the chief of elephants. The gift was made for the merit of his master Kakatiya Prataparudradeva, who was ruling Andhradesa with his capital at Orugallu. In this inscription all the boundaries of the granted village are clearly mentioned (pl.152).

2. BRAHMI INSCRIPTION, KOTTAPALLI, DISTRICT EAST GODAVARI

This inscription is engraved on a votive stupa found in the Buddhist site of the village. It is in *prakrit* language and *brahmi* character of 2nd century C.E. It records the causation of the votive stupa by Pavasa of Amakula (pl.153).

3. TWO RASHTRAKUTA INSCRIPTIONS, VELAMAJALA, DISTRICT NALGONDA

The first one in Kannada language is engraved on a stone slab kept in front of the Pochamma temple in the village. It belongs to the Rashtrakuta king Krishna II and dated *saka* 829 (907 C.E.) is in Telugu script. It records the gift of 100 *mattars* of land to a Jaina *basadi* and a garden by Ravichandrayya, a subordinate of the king.

Another inscription engraved on a loose pillar, found outside the same village, is in Sanskrit language and Telugu characters of about the 10th century C.E. It belongs to Rashtrakuta king Krishna II. It records the gift of land in the village to the Jaina *basadi* by Ravichandra son of Vikramalladeva Varmakaravayya, a resident of Velunajala (pl.154).

4. KAKATIYA INSCRIPTION, PAREVADA, DISTRICT NALGONDA

This inscription engraved on a pillar in Telugu language and characters is found in front of Somayadeva temple in the village. It belongs to the Kakatiya king Prataparudradeva and is dated in *saka* 1214 (1292 C.E.). It records the gift of lands and 200 palm trees to the god Somayadeva in the village Parivada for conducting *angarangabhoga* by Ketaya of Velumgonda (pl.155).

¹. Information from: T.S. Ravishankar, assisted by D.M. Nagaraju, Jai Prakash, S. Swaminathan, S. Nagarjuna, K. Karuppaiah, K. Munirathnam, K. Paneerselvam, R.V. Anil Kumar, Meka V Raghavendra Varma, Nagarajappa, Yesubabu and Krishnamurthy of the Epigraphy Branch, Mysore, Southern Zone, Chennai and Northern Zone, Lucknow.

5. TELUGU INSCRIPTION, KANUPARTI, DISTRICT PRAKASAM

This inscription engraved on a stone slab, kept in state archaeology museum of the village is dated in *saka* 1223 (1301 C.E.). It is in Telugu language and characters. It records the gift of some lands in the village for conducting worship and for making food offerings to the god Malanandala Perumal of Mottupalli by Kamayaboya.

BIHAR

6. NAGARI INSCRIPTION, KALIBIGAHA, DISTRICT ROHTAS

This inscription is engraved on the wall of a well and dated in [*vikrama*] 1941 and Bengal *san* 1291 (1884 C.E.). It is *nagari* characters and local dialect and records the construction of the well by Adita Rama, son of Minaka Saha and grandson of Vasati Saha.

JAMMU AND KASHMIR

7. DOGRI INSCRIPTION, JANDI, DISTRICT KATHUA

This inscription is engraved on a stone slab found in the Mahakali temple, now preserved in the Dogri art museum, Jammu. It is dated in [*vikrama*] 1939 (1882 C.E.) and written in *takari* characters and in Dogra language. It records that the ruler Ranbir Singh of Dogra family after getting constructed the temple, offered golden umbrella and crown to the goddess Mahakali.

8. TAKARI INSCRIPTION, MANAVALA, DISTRICT UDHAMPUR

This inscription, engraved on a stone-

block, is now preserved in the sculpture shed built in the premises of the Devi Bhagavati temple in Manavala in Udhampur district and dated [*vikrama*] 1548 (1491 C.E.). It is in *takari* characters and Dogri language and records the installation of the image of Vasukinagar, probably by Daturaja.

JHARKHAND

9. BRAHMI INSCRIPTION, BELANIGARH, DISTRICT GODDA

This inscription, engraved on a rock, is datable to about the 6th century C.E. It is in box-headed characters and Sanskrit language, mentions Niltopalasena (pl.156).

10. KAITHI INSCRIPTION, VANDANABAR, DISTRICT GODDA

This inscription, engraved on the wall of a well is dated in 1892 C.E. and Bengal *san* 1299. It is in *kaithi* characters and local dialect and probably refers to some act connected with the construction of the well by Malika Maghavarnami and also mentions masons Etavari and Managoni.

KARNATAKA

11. TWO SANSKRIT INSCRIPTIONS, TALGUNDA, DISTRICT SHIMOGA

These two fragmentary inscriptions in Sanskrit language and southern box headed characters of about the 5th century C.E. were exposed in the course of excavation conducted by the Bangalore Circle of the Survey. The first one refers to 'crowned prince'. The second one refers to a place name Stanakundura (modern Talagunda). Besides, it also refers to brahmanas, who were proficient in the *vedas* (pls.157-158).

12. KANNADA INSCRIPTION, KALKERE, DISTRICT CHITRADURGA

This inscription engraved on a stone slab kept at Karadimatti is written in Kannada language and characters of the 13th century C.E. It mentions the name of the eastern Chalukya king Jagadekamalla and his subordinate ruler Ballaladeva, belonging to Hoysala dynasty. The imperial king Jagadekamalla is identified with the king Jagadekamalla II, who ruled from his capital Kalyana. It refers to the gift of wet and dry lands located in various places to the god Kalideva of Kalkere probably for performing the rituals by four persons Hiriya Bikkana, Mahadeva Heggade, Mareya Heggade and Chattaiah Heggade (pl.159).

MADHYA PRADESH

13. JAINA PEDESTAL INSCRIPTION, CHAIT, DISTRICT GWALIOR

This inscription is found engraved on the pedestal of an image of Jaina Tirthankara in a ruined Digambara Jaina shrine. It is written in Sanskrit language and *nagari* characters and is dated in *vikrama* 1201 (1143 C.E.). It records the perpetual obeisance to the god Shantinatha by *sadhu* Palihana.

14. MEMORIAL PILLAR INSCRIPTION, CHAIT, DISTRICT GWALIOR

This inscription is found engraved on a memorial pillar found in a ruined Digambara Jain shrine. It is written in Sanskrit language and *nagari* characters and is dated in *vikrama* 1236 (1778 C.E.). It records the construction of the *nishidika* (pillar in memory of a Jaina monk) by Vrishabhasena, a disciple of Sri Pandita Padmasena belonging to Mulasamgha. It also furnishes the geneology of the pontificate (pl.160).

MAHARASHTRA

15. SEVEN NAGARI INSCRIPTIONS, LIMBA GANESH, DISTRICT BEED

All the seven inscriptions engraved on stone slabs fixed into the wall of Sri Balachandra Ganapati temple at different places are in *nagari* script and Sanskrit language. Of the seven inscriptions, five are dated *vikrama* 1633 (1575 C.E.), *saka* 1620 (1698 C.E.), 1630 (1708 C.E.), 1633 (1711 C.E.) and *saka* 16... respectively. The content of the inscriptions is almost the same which records the construction and also renovation of the ancient dilapidated temple and *sabhamandapa* of Ganesh by a devotee named Bhavanidas Kusari.

TAMILNADU

16. CHOLA INSCRIPTION, TIRUVAIYYARU, DISTRICT THANJAVUR

This Tamil inscription in Tamil characters is found engraved on the north and west *patti* of *ardha-mandapa* and central shrine of Uttara Kailasa shrine, situated in the Panchanadisvara temple of the above village. It is dated in the third regnal year of the king Rajendrachola I (1015 C.E.). It records that during the reign of the Chola king Rajaraja I (1009 C.E.), his queen Danti Saktivitanki alias Olokamadevi had allotted 101 *veli*, 2 *ma* and odd of land in two pieces from the two *devadana* villages, to the stone temple Olokamadevi-isvaram-udaiyar at Tiruvaiyyaru, a *devadana* in Pygai-nadu (a sub-division) of Rajendrasimha-valanadu. It is also recorded that the said queen made these allotments for the maintenance of thirty-two dancing girls (*padiyilar*) and other service personnel of the temple and also for conducting offerings and worship in the temple. But in the third regnal

year of Rajendra Chola I, it was found that the land that was left out was not sufficient enough to cover the usual expenses of providing food offerings and burning perpetual lamps to the god, to meet the requirements, hence the queen ordered the resumption of a portion of lands from each allottees. States that Kalvan Chola of Virkavur, a member of the army unit and other officials were appointed as supervisors to execute this task. Further, the inscription informs us the extent of land that was resumed and other related details.

17. CHOLA INSCRIPTION, SILAIYATTI, DISTRICT TIRUCHIRAPPALLI

This inscription in Tamil language and characters is engraved on the north wall of the central shrine of Vasudevapperumal temple. It is dated in the fifth regnal year of the Chola ruler Vikrama Chola (1123 C.E.) and it records that as per the resolution passed by the Vaishnavas of eighteen districts, the Mulaparudaiyar of Tiruvellarai and other officials, that both the payers and the recipients of the *echchoru* should remit the tax through the members of Vandal-variya. Also records that any violation of this regulation will be deemed as violation of royal command (pl.161).

18. TAMIL INSCRIPTION, PAKKAM KOTTUR, DISTRICT TIRUVARUR

This Tamil inscription engraved on the north wall of the mukhamandapa of a Siva temple is in Tamil language and characters. It belongs to the 12th regnal year of the Chola king Rajaraja III (1228 C.E.). Records the gift of some (*kasu*) for burning twilight lamps (*sandivilakku*) to the god (name not specified) by Velalan Marutanchari Udaiyan Tiruvegamban and Sirandavan Maraikkad Vilumian who had inherited the rights over the cultivation of the *devadana* land belonging

to the above mentioned god situated at Kulottunga Cholanallur.

19. TAMIL INSCRIPTION, VALIVALAM, DISTRICT NAGAPATTINAM

This inscription is engraved on the main entrance of the inner *gopura* of the Siva temple. It is in Tamil characters of the 16th and 17th century C.E. It records the construction of the main *gopura* at the entrance and platform by some persons *viz.* Kunarappan Chadaservai, Tirunayantha chadasevvai and Aruran chadasevvai Venkatamuttu Chandasevvai.

20. TAMIL BRAHMI INSCRIPTION, KILAKKUYILKUDI, DISTRICT MADURAI

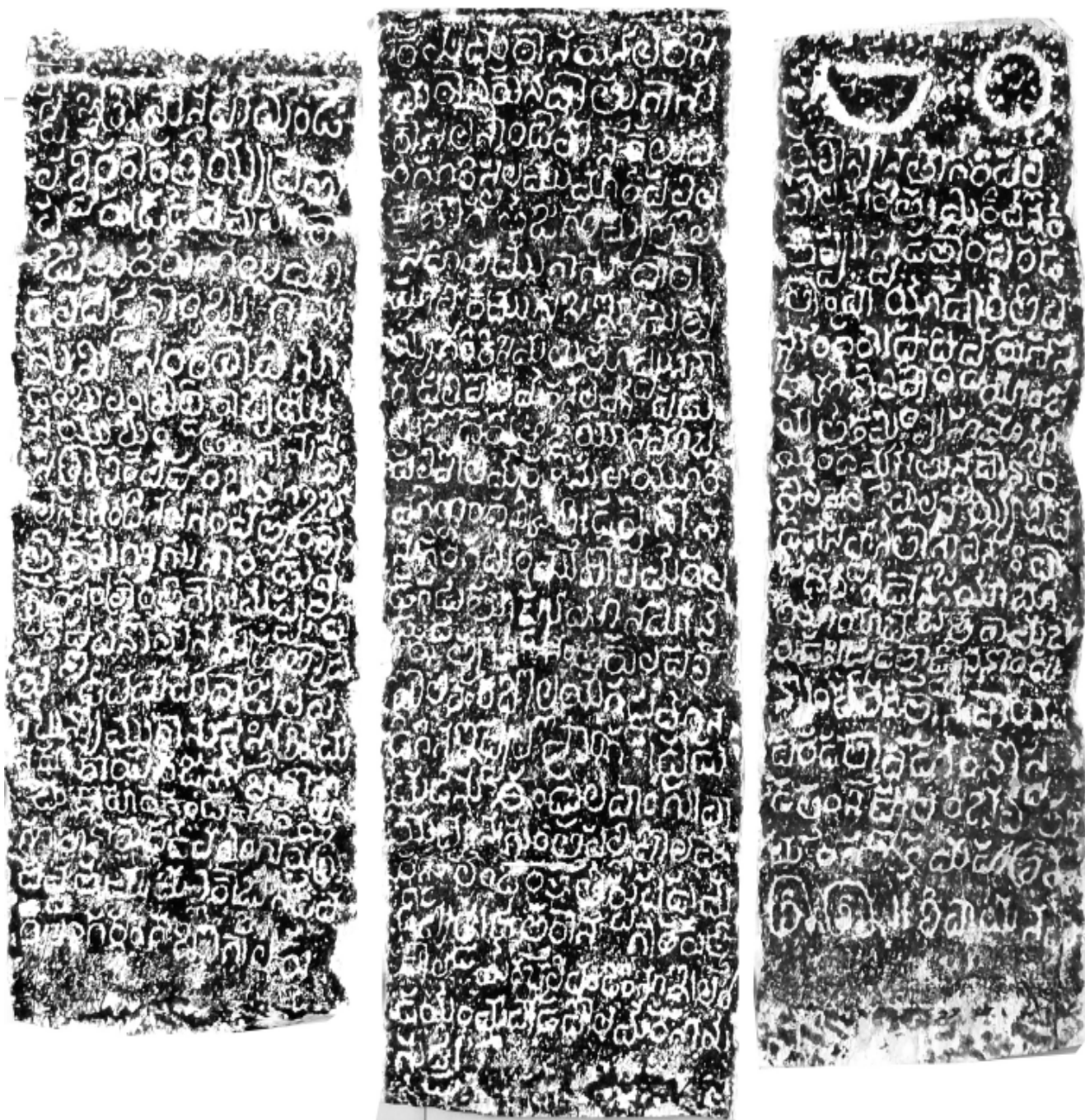
A single line Brahmi characters found engraved on the boulders of a rock cave, located at the top of the Samanar hill near Kilakkuyilkudi and is written in Tamil language. On palaeographical grounds it can be assigned to 2nd century BCE. It seems to record that the bed excavated on the rock-cut cave is a gift by a person named Utinai, a resident of Peruteur who is described as a saintly person.

21. TAMIL BRAHMI INSCRIPTION, THIRUPARANKUNDRAM, DISTRICT MADURAI

This Tamil inscription in *brahmi* characters of 2nd century BCE is found engraved on the foot-step of the Sunai situated to the west of Kailasanathar temple. It refers to two persons *viz.*, Munkaran and Marakti, who might have caused the foot-step.

22. VATELUTTU INSCRIPTION, THIRUPARANKUNDRAM, DISTRICT MADURAI

This inscription is engraved on a rock behind the back side wall of the Palasigandvar temple. It is written in Tamil language and



Marepalli : Telugu inscription of Prataparudradeva, See p. 193



153



154

Kottapalli : 153, Brahmi inscription; Velamajala : 154, inscription of Krishna II, See p. 193



155



156

Parevada : 155, inscription of Prataparudradeva; Belanigarh : 156, Brahmi inscription, See pp. 193-194



157



158

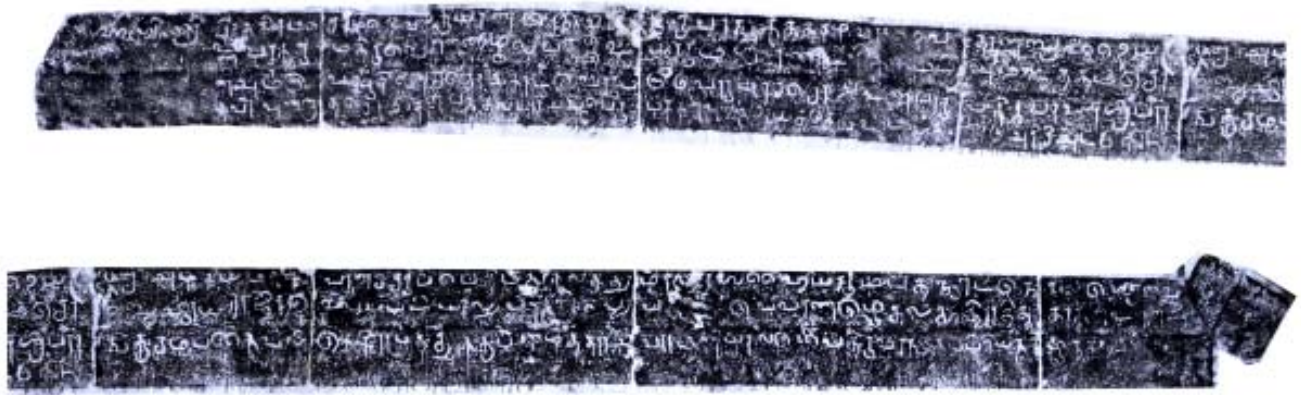
Talgunda : 157-158, Sanskrit inscription, See p. 194



Kalkere : inscription of Jagadekamalla II, See p.195



Chait : Memorial pillar inscription, See p.195



161



162

Silayatti : 161, Vikrama Chola inscriptions; Thiruparankundram : 162, Tamil Brahmi inscription, See pp.196 and 205



Thirupuvanam : Vatteluttu inscription, See p.205

Vatteluttu characters of 10th century C.E. It refers to the execution of this cave probably for a Jaina monk by Udaiyar Pichan Ilandan Maniyaldevan, a Jaina student hailing from Madikarai (pl.162).

23. VATTELUTTU INSCRIPTION, THIRUPUVANAM, DISTRICT SIVAGANGAI

This inscription engraved on a stone slab is

found lying in the temple complex of Tribhuvaneshwara. It is written in Tamil language and *Vatteluttu* characters of 10th century C.E. It refers to the construction of a temple beside gift of a perpetual lamp to the deity for the merit of a person Kun-parai-Ayyan, a resident of Mankkudi by a person Virapandya (vi) nai Marayan (*alias*) Araiyan Viranarayanan (pl.163).

ARABIC AND PERSIAN INSCRIPTION²

ANDHRA PRADESH

1. INSCRIPTION OF ASAF JAH NAWWABS OF HYDERABAD, HIMAYAT SAGAR, DISTRICT RANGA REDDI

The first inscription records the laying of foundation of a tank and its dam by Nawwab Usman Ali Khan, the VII Nizam of Hyderabad in AH 1338 (1920 C.E.) to save people from floods. It was so named as Himayat Sagar after the prince, the heir apparent Mir Himayat Ali Khan Azam Jah Bahadur. It is inscribed by Muhammad Amir Khan and engraved by Muhammad Abdullah. Its language is Urdu written in beautiful *nasta'liq* characters.

2. INSCRIPTION OF ASAF JAH NAWWABS OF HYDERABAD, HYDERABAD, DISTRICT HYDERABAD

The another record of Asaf Jahi Rulers of Hyderabad is an inscription from a gun kept near the conservation Assistant's office at

Golkonda fort. It refers that the gun belongs to the *sarkar* (government of) Nawwab Mir Nizam Ali Khan Asaf Jah II (1764-1803 C.E.). It is executed in *nasta'liq* characters. On the basis of the ruler's name it is datable to the last quarter of 18th century C.E.

3. MISCELLANEOUS EPITAPHS, HYDERABAD, DISTRICT HYDERABAD

One death record from the facade of *dargah* of Shah Nuru-ud Din in Nampalli locality records the demise of Shah Nur-ud Din a pious person in AH 1295 (1878 C.E.). The metrical text in Persian and the chronogram in the last hemistich is composed by poet Siddiq.

Another epitaph in Persian form a grave in Gul Banu mosque in the same locality registers the demise of a lady in AH 1197 (1782 - 83 C.E.) who was wife of Sayyid Shah Ghulam Muhammad Qadiri and daughter of Shams-ud Din Multani of Bidar.

²Information from: Dr. G.S. Khwaja, Director (Epigraphy)i/c, Arabic and Persian Inscriptions assisted by Dr. M.A.Zeya, ASE, and Mr. Mohd. Shahnawaz Alam, A.E., of Epigraphy Branch Archaeological Survey of India, Nagpur. This Branch copied and examined one hundred and three (103) Arabic and Persian inscriptions during the year out of which few important ones are being highlighted here.

GUJARAT

4. MISCELLANEOUS INSCRIPTIONS, SURAT, DISTRICT SURAT

One inscriptional slab lying loose in the Khanqah-i-Refai in Surat records in its Arabic text the arrival of a saint, at Surat in AH 667 (1268-69 C.E.) who is mentioned as the founder of the Refai order of Sufism. This loose tablet seems to be a recent copy of the old epigraph.

One epitaph from Surat city records the death of Sayyid Ahmad Waiz (sermon reader) son of Sayyid Muhammad Waiz in AH 1252 (1836 C.E.). Its Persian text is written in *naskh* style of calligraphy.

5. MISCELLANEOUS EPITAPH, OLPAD, DISTRICT SURAT

One record from a village Olpad in the district registers the demise of Sayyid Miran, a saint in the year 1229 (1813-14 C.E.). The metrical Persian text is written in crude hand.

TAMILNADU

6. QUTB SHAHI INSCRIPTION, KAVERIPAKKAM, DISTRICT VELLORE

This important inscription, through fragmentary, records the construction of a mosque, a fort and a well at Kaveripakkam during the period of Abdullah Qutb Shah by one Minnat son of Haji Husain Astrabadi in AH 1070 (1659-60 C.E.). It also states that the Nawwab Neknam Khan was the *sipah-salar* (i.e. commander of the army). The Persian text is written in crude hand. This epigraph is important for the political history of this region as it casts light on occupation of this area by Qutb Shahi forces after the battle of Talikota (pl.164).

7. INSCRIPTION OF NAWWAB OF ARCOT,

VELLORE, DISTRICT VELLORE

One Persian epigraph from the central arch of the Chowk Masjid in Saidapet registers the erection of a mosque during the time of Saaduatullah Khan, the Nawwab of Arcot, in AH 1148 (1735 C.E.). The metrical text is written in beautiful *nasta'liq* calligraphy.

8. MISCELLANEOUS INSCRIPTIONS, KIRUMBADI, DISTRICT VELLORE

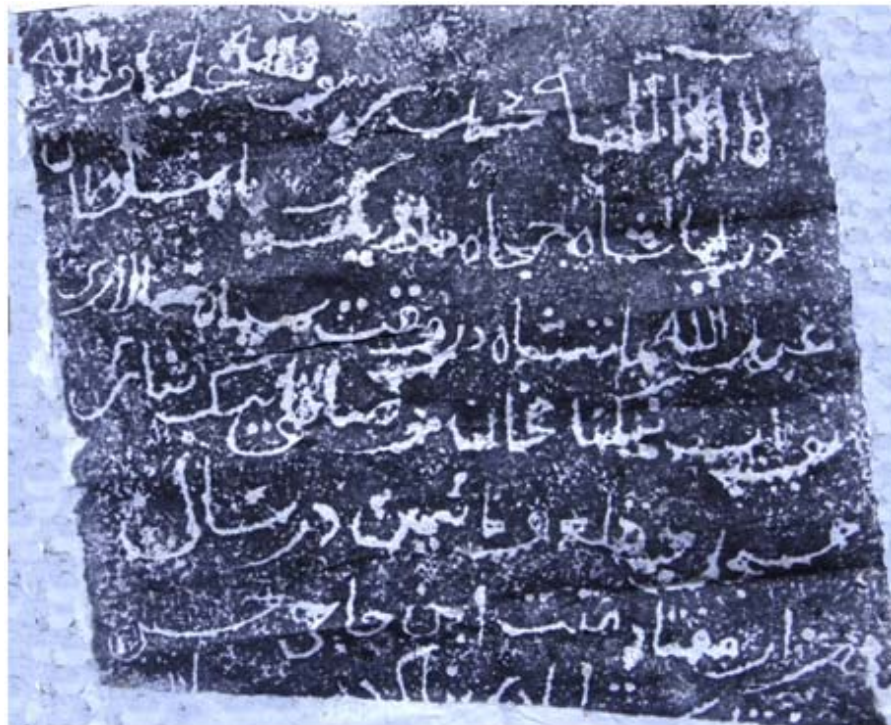
One Persian epigraph from the main entrance of the mosque says that it was built by a lady Maryam in AH 1135 (1722-23 C.E.). The year is also recorded in the last hemistich of the text, making a chronogram for its date. It is calligraphed in *nasta'liq* style (pl.165).

9. MISCELLANEOUS INSCRIPTIONS, KARIGIRI, DISTRICT VELLORE

One construction record in metrical Persian written in beautiful Naskh calligraphy assigns the erection of a mosque to Benam Shah in AH 1166 (1752-53 C.E.). The last hemistich forms the chronogram for the year of its construction. Another record from the same place is an epitaph in metrical Persian which registers the demise of Shah-e Benam in AH 1168 (1754-55 C.E.). The deceased was builder of a mosque mentioned in the previous epigraph.

10. MISCELLANEOUS INSCRIPTIONS, PALLIKONDA, DISTRICT VELLORE

One epigraph in Urdu verse registers the erection of a mosque in AH 1295 (1878-79 C.E.). The chronogram for its date as well as the metrical text is composed masterfully by poet Asi. It is written in *nasta'liq* characters.



164



165

Kaveripakkam : 164, inscription of Abdullah Qutb Shah; Kirumbadi : 165, Persian inscription, See p. 206

III. OTHER IMPORTANT DISCOVERIES

BIHAR

1. ANCIENT REMAINS, MAIN, DISTRICT GAYA

A team from the Patna Circle of the Survey, noticed an ancient Siva temple and a large number of sculptures of Uma-Maheshwar, Ganesa, Durga, Kamdeva, Surya, Vishnu and temple architecture remains around the village. All sculptures are made of black basalt and assignable to Pala period.

KARNATAKA

2. VIRUPAKSHA BAZAAR, HAMPI, DISTRICT BELLARY

During the course of removal of debris and modern accretions in the Virupaksha bazaar a unique sculpture of zoomorphic figure of four armed Narasimha in soapstone datable to early 14th century C.E. (pl.166) has been found.

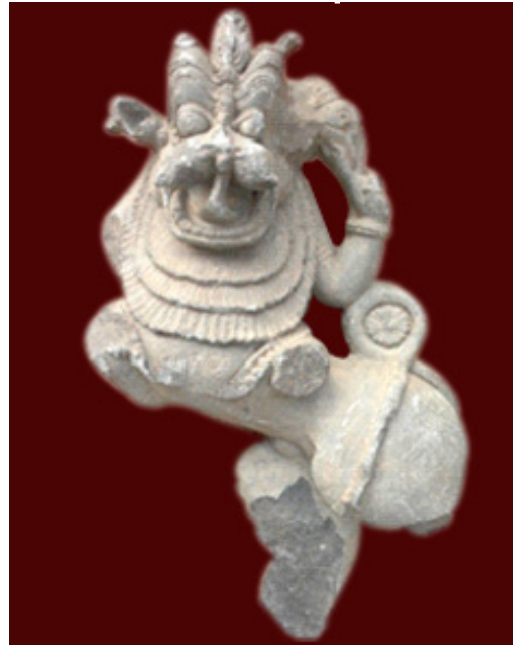
3. COPPER PLATES, TALAGUNDA, DISTRICT SHIMOGA

Two sets of copper plates belonging to Sankama II of Kalachuri dynasty, dated to 24th March 1180 C.E., of Kalinga Chalukya Vijayaditya were discovered during a trial pit diggings carried out to study the foundation details of Pranaveswara temple, Talagunda. The later appears to be spurious. The Kalachuri Sankama II copper plate inscription consists of five plates held by *vrushabha* (bull) circular seal. The inscription in *devanagari* script and in Sanskrit language has 168 lines. It records that Sankama II, who while camping at Banavasi against ensuing battle with the Hoysala ruler, Ballala at the behest of his Minister Kesavaditya made certain gifts to a Brahmin on 24th March 1180 C.E. (pl.167). The copper plate of Kalinga Chalukya (?) has a boar

insignia and is in *devanagari* script and Sanskrit language (pl.168).

Thirteen gold coins were retrieved from the same trench. Of the thirteen gold coins, as many as five belong to Bhuvikrama (630-680 C.E.) of western Ganga's of Talkadu. All the coins weigh approximately 4gm and has an artistically executed caparisoned elephant moving to its left on the obverse and an ornate stylized lotus creeper or what appears like stylized peacock feathers on reverse. The shoulder of the elephant bears the legend in 6th century Kadamba characters. It is for the first time that a hoard of Ganga gold coins have been reported in a far flung place away from their capital Talakadu down south in Mysore district (pl.169). A copper coin of Vijayanagara period of Balakrishna type was also retrieved from the upper levels. (pl.170)

Plate 166



Hampi : Zoomorphic figure of four armed Narasimha, See p.208



167

168

Pranaveswara temple, Talagunda : 167, copper-plates of Sankama II; 168, copper-plate of Kalinga Chalukya (?) with boar insignia, See p.208



169



170

Pranaveswara temple, Talagunda : 169, gold coins of western Gangas; 170, copper coin of Vijayanagara period, See p.208

UTTAR PRADESH

4. SCULPTURE, ARCHITECTURAL MEMBERS, BHARHKOL, TEHSIL KIRAOLI, DISTRICT AGRA

Arakhita Pradhan of Agra Circle of the Survey discovered a colossal Naga image (pl.172) displaced from the top of the platform on the mound, one temple architectural member and few other sculptural fragments in red sand stone were noticed. Besides, a decorated pillar member with *kalasa* motif (pl.171), ascribed to *circa* 10th century C.E.

5. MOUND AND POTTERY, JUGSENA, TEHSIL KIRAOLI, DISTRICT AGRA

Arakhita Pradhan of Agra Circle of the Survey discovered a mound measures 300 x 150m locally known as Jugsena Khera is located on the right bank of the Yamuna in from the Jugsena village (pl.177). Digging for extension of agricultural field has exposed a section of 3.5m yielding large number of pottery of red ware, grey ware, painted grey ware, black slipped ware and bone pieces. The shapes in pottery include bowl and dishes in grey ware; bowls in black slipped ware; bowl, vases, jar and *handi* in red ware (pl.173). One vase of red ware has stamped decoration belongs to Kushana period. The other finds from surface include fragment of a stone pestle, a hopscotch in terracotta, iron ore piece and bone piece.

6. POTTERY, SINGANA, TEHSIL KIRAOLI, DISTRICT AGRA

Arakhita Pradhan of Agra Circle of the Survey discovered Sringi rishi temple associated with Sringi rishi at Singana constructed over an archaeological mound. On the bank of river Yamuna a section of 2.4m to the west of the temple yielded pot sherds of red ware of footed bowl, vase, etc.

7. ARCHITECTURAL MEMBERS AND SCULPTURES, SANTHA, TEHSIL KIRAOLI, DISTRICT AGRA

Arakhita Pradhan of Agra Circle of the Survey discovered temple architectural members and fragment of sculptures, a beautiful figure of *nandi* (pl.174), the architectural members of different types and mainly of *shikhara* part of temple, a narrow pillar like architectural member with depiction of *ghata* design. Besides, medieval pot sherds of red ware, grey ware are also noticed.

8. MOUND, JARAULI, TEHSIL FATEHABAD, DISTRICT AGRA

Arakhita Pradhan of Agra Circle of the Survey discovered the archaeological mound at Jarauli village lies on the left side of the Shamshabad- Fatehabad road. The mound locally known as Jarauli tila and the local tradition associate the site as Jarasandh-ka-Kila. The exposed section of mound has revealed red ware, grey ware and a sherd of stamped red ware. The shapes include footed bowl, dish, vase in red ware and *handi* in grey ware, animal bones, fragment of a terracotta figurine probably trunk part of elephant etc. Besides, architectural members of a temple and fragmentary sculptures (pl.175) were also discovered from the mound.

9. ARCHITECTURAL AND SCULPTURAL FRAGMENTS, CHANDRAPUR, TEHSIL BAH, DISTRICT AGRA

Arakhita Pradhan of Agra Circle of the Survey discovered a large number of architectural and sculptural fragments are kept inside a modern temple locally known as Keimar baba temple. Some old broken images including a Jaina panel are under worship (pl.176). Three seated *tirthankara* are depicted, one at the upper central part and one each on lower end. On

either side of the upper seated image, four standing tirthankara figures are shown. On the lower level 14 standing *tirthankara* figures are depicted in addition to the two seated *padmasana* images.

10. ARCHITECTURAL AND SCULPTURES REMAINS, KAMTARI, TEHSIL BAH, DISTRICT AGRA

Arakhita Pradhan of Agra Circle of the Survey noticed many abandoned havelis of about

200 years old in the village. A large number of broken architectural members and sculpture parts are collected and worshipped in three temples. The images at *sitala mata* temple include Jaina, Saiva, Sakta images and architectural members. The Jaina images include seated Adinatha, *yaksha* Gomukha and *yakshini* Ambika. The Sakta image include image of Ganesa in low relief.

Plate 171



Bharhkol, Kiraoli : decorated pillar with kalasa motif, See p.211



172



173

Bharhkol, Kiraoli : 172, colossal Naga image; Jugsena Khera, and Kiraoli : 173, potsherds of red ware, black slipped and PGW, See p.211



174



175

Santha, Kiraoli : 174, sculpture of nandi; Jarauli, Fatehabad : 175, upper part of a female figure, See p. 211



176



177

Chandrapur : 176, Jain panel; Jugsena Khera : 177, view of the mound, See p.211

IV. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS

The present report incorporates the work done at Birbal Sahni Institute of Palaeobotany, Lucknow, during 2012-13; on the botanical remains recovered from the excavations at ancient Ghorakatora, district Nalanda in Bihar and Khirsara, district Kachchh in Gujarat. The excavations at Ghorakatora were conducted by Patna Circle of the Survey and at Khirsara by Excavation Branch-V, Vadodara of the Survey. Systematic floatation recovery of botanical remains from these sites was put into effect by Chanchala Srivastava and Anil K. Pokharia respectively.

BIHAR

1. GHORAKATORA , DISTRICT NALANDA

Morphological investigation of seed and fruit remains samples from chalcolithic site Ghorakatora (Lat. 25°01'37"N; Long. 85°31'31"E), which lies in village Ghorakatora near Giriyak in district Nalanda was carried out. The samples comprised carbonized seed and fruit remains of field crops belonging mainly to cereals, legumes/pulses of west Asian origins viz. *hordeum vulgare* (Barley) and *lens culinaris* (Lentil); along with indigenous *oryza sativa* (Rice), *vigna radiata* (Green gram), *vigna mungo* (Black gram) and *dolichos biflorus* (Horse gram). In addition to these crop remains, *salmalia malabarica* (Silk-Cotton) and *trachyspermum ammi* (carom seeds/ajwain) are other finds. *Echinochloa crus-galli* (Sawar-Asian millet), *setaria sp.* (Foxtail 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), *cleome sp.* (Hurhur), *commelina benghalensis* (Day flower), *cyperus sp.* (Flat sedge), *fimbristylis sedge* (Fringe-rush),

scirpus sp. (Bulrush), *chenopodium sp.* (White Goose foot/Bathua), *medicago sp.*, *ziziphus sp.* (Jujube), *coix lachryma-jobi* (Job's tears), *polygonum barbatum* (Knot grass), *desmodium gangeticum* (Tick clover), *indigofera hirsuta* (Hairy Indigo), *panicum sp.* (Panicum grass), *sida sp.* (Fan petals), *solanum sp.* (Night shade), *trianthema sp.* (Purslane), *vicia sativa* (Common-vetch), of palaeoethnobotanical significance are also recorded. The samples investigated from this ancient habitational site have added data to advanced agricultural practices in the region of middle Ganga plain in ancient times between Period I: Chalcolithic period (1500- 800 BCE), Period II: NBPW period (800- 200 BCE), Period III: Sunga-Kushana period (200 BCE - 300 C.E.) and Period IV: Gupta and post-Gupta period (300 - 800 C.E.).

GUJARAT

2. KHIRSARA, DISTRICT KACHCHH

Analyzed archaeobotanical samples collected from a Harappan settlement Khirsara (Lat. 23°27'N; Long. 69°03'E) in Kachchh District, Gujarat dateable to 2800-2000 BCE. The finds include the remains of *hordeum vulgare* (Hulled barley), *triticum aestivum* (Bread wheat), *sorghum bicolor* (Jowar-millet), *pennisetum typhoides* (Pearl millet), *macrotyloma uniflorum* (Horse gram), *vigna radiata* (Green gram), and *sesamum indicum* (Sesame). In addition to these, a fibre-crop represented by the presence of seeds of Cotton (*gossypium arboreum/herbaceum*) has been identified in the collection. Associated with these crop remains as an admixture, the remains of the seeds and fruits of weeds and other wild taxa have also been recorded.

V. MUSEUMS

ANDHRA PRADESH

1. SALAR JUNG MUSEUM, HYDERABAD

The Salar Jung museum of Hyderabad is a repository of the artistic achievements of diverse European, Asian and Far Eastern countries of the world. The major portion of this collection was acquired by Nawab Mir Yousuf Ali Khan, popularly known as Salar Jung III who was the Prime Minister of the Nizam VII.

The present museum building was constructed on the southern bank of river Musi, close proximity of the historic Charminar, Mecca masjid etc. (pl.178). The collections of the museum and the library were transferred from Dewan Deodi to the new building in the year 1968.

The museum has a magnificent global collection of art objects. Apart from these, there is a Children's section, a rich reference library which contains reference books, large collection of rare manuscripts etc. As on date, there are thirty-eight galleries in the Museum in three blocks i.e. (I) Indian Block (25 galleries), (II) Western Block (7 galleries) and (III) Eastern Block (6 galleries) in which 13,404 objects are on display (pls.179-180).

The Salar Jung museum library includes a collection of books and manuscripts acquired by the Salar Jung's family and consists of 62772 printed books of which 41208 are in English, 13027 in Urdu, 1108 in Hindi, 1105 in Telugu, 3576 in Persian, 2588 in Arabic and 160 in Turkish languages. The origin of some of the collection dates back to 1656 C.E. Of the 8556 manuscripts in the museum, there are 2623 Arabic, 4815 Persian, 1096 Urdu and 22 in other

languages. There are also 1450 Calligraphic panels in the collection belong to different Iranian and Indian schools.

The museum has taken up the work of wall paneling and false ceiling in central building ground floor and 1st floor. Nearly 12,72,412 Indian visitors and 10,898 visitors of foreign origin have visited the museum from April, 2012 to March, 2013. The museum has organised several annual events like Museum week, Summer Art Camp, 123rd Birthday of Nawab, Children's Week Celebrations, Hindi Sapthah, Republic Day, International Women's Day and Exhibitions on different occasions to impart education, information and to create awareness among all classes of people in the society. Besides, the museum has also organised several workshops and conferences and a series of lectures of national and international level. On the occasion of the 150th year of the Survey an exhibition on "Calligraphy through the Ages" was organized by the Director (Epigraphy), Arabic and Persian Inscriptions, Nagpur. The museum has taken and completed flooring work with composite marbles in the central building first floor.

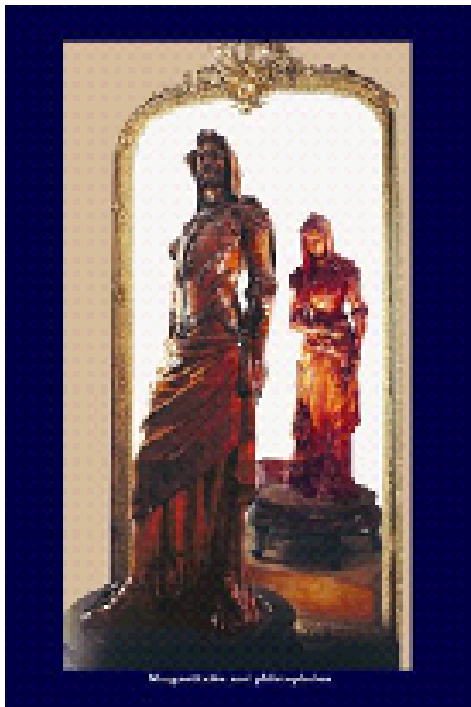
BIHAR

2. ARCHAEOLOGICAL MUSEUM, NALANDA

The wall veneering lamination of showcases in the Gallery 1 and 2 have been taken up and to change the veneering by providing new waterproof ply wood and laminates up to 8' in the Gallery 1 and 2 on wooden frameworks. The vinyl flooring of the museum Gallery 2 and 3 was taken up and provided white vinyl floor to give presentable look to both gallery.



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179



180

Hyderabad : 178, Salar Jung museum; 179-180, art objects, See p.217

3. ARCHAEOLOGICAL MUSEUM, VAISHALI

A new showcase for effective display of ancient coins was constructed; effective narratives are also fixed bilingually on the showcase. A touch screen information kiosk, with bilingual information about the Archaeological site of Vaishali and displayed object of the museum was also installed. The website of the museum was also launched.

4. ARCHAEOLOGICAL MUSEUM, VIKRAMSHILA

Door frame metal detector was installed in museum to strengthen the security system. The CFL were replaced by LED light for improved illumination of displayed antiquities. The background cloths of the showcases were replaced.

KARNATAKA

5. ARCHAEOLOGICAL MUSEUM, AIHOLE

Vitrified tiles was provided on the floor of the museum in office as well as all the galleries. Complete painting work was taken up in the museum, including painting of all the masonry pedestals. Additional masonry pedestals were constructed abutting the front wall of the museum where the sculptures were displayed.

6. ARCHAEOLOGICAL MUSEUM, BADAMI

Vitrified tiles was provided on the floor of the museum in office as well as all the galleries.

7. ARCHAEOLOGICAL MUSEUM, HAMPI

To strengthen the security system the CCTV cameras and DVR system are upgraded and replaced with advance models. The gallery main doors and locking systems are changed and replaced with new ones for ensuring the security of the displayed antiquities. The suitable write-ups and individual labels are provided to the

displayed antiquities in the galleries. All the masonry display pedestals are painted as visitor friendly colour in the open air gallery and guards house of the museum. In continuation of the previous year work the suitable LED spot lights are provided to the displayed antiquities in the Gallery 3 and 4. To ensure the purified drinking water the water filters and coolers are provided to the visitor amenities. The loose sculptures which were kept around the reserve collection are now displayed above masonry pedestals. To upgrade the security system at the entrance the metal detector door frame was replaced and the smoke detectors are also installed. Cultural awareness programmes and photo exhibitions are conducted on the occasions of International Museum Day and World Heritage Week.

MADHYA PRADESH

8. ARCHAEOLOGICAL MUSEUM, CHANDERI

A well furnished VIP lounge was set up in the ground floor for VIPs, tourists and visitors. Cultural notice board on black granite ground with engraved golden letters were prepared both in Hindi and English languages and fixed on stone masonry pedestal at the entrance of the museum. As the location of the museum is in an isolated place and for better security solar lights have been provided on three sides of museum building. Twenty six pedestals of teak wood frame with sunmica finish were prepared for display of different size sculptures in upper corridor. Forty nos. stainless steel bilingual labels were provided to newly prepared masonry pedestals outside of the museum. Five marble stone benches with canopy have been provided for the visitors in open area within the museum campus. Partition of strong room has been furnished with the construction of stone racks and wardrobe. Eight table showcases were prepared for displaying prehistoric

tools, coins and iron objects sixteen large maps of ancient kingdoms have been mounted and fitted in wooden frame with stand and displayed with pictorial representation. A signage of museum in Hindi with stainless steel letters on MS frame and ACP sheet was installed on the museum building. Five highway safety sign boards were erected at the main roads nearby Chanderi for publicity and awareness. Moving messaging display boards were fixed at entrance gate upper corridor, lower corridor and exit of museum for current information and instruction to visitors. Direction boards, signages and plan of museum are fixed at suitable points inside the museum. Wooden doors and the windows in museum including office were polished in wooden colour and grills and ventilators were repainted with enamel paints for aesthetic appearance. An iron grill gate was fixed in generator shed for safety of generator. Anti-termite treatment of the library room, record room and reserve collections was also attended. A cement concrete pathway leading to the strong room was laid. Recess pointing work was done to outer surface wall of stair case. Many functions were celebrated during this period on the occasion of annual days i.e. Museum Day, Museum Foundation Day, World Heritage Week, Independence Day, Republic Day to create awareness for cultural heritage among the students, teachers and local community. On these occasions various competitions among the students were held in for which successful participants were awarded. Photo exhibitions were also organized time to time.

9. ARCHAEOLOGICAL MUSEUM, KHAJURAHO

In the reserve collection new steel rack prepared and installed in new museum workshop for better arrangement of antiquities storage. Replaced the old black and white close circuit television camera and DVR system in the galleries of present museum and introduce new

DVR system and night vision camera at Jardine museum (store) and new museum building for keeping a vigil on the antiquities, visitors and staff on duty as a special security measure. New tin shed provided to the 62.5 KVA generator at new museum for its safety.

Museum day was celebrated on 18th May involving students, teachers and local people in meaningful way. A new brochure entitled "*Purattava Sangrahalaya Khajuraho Ki Jain Purasampada*" in Hindi was also released on this occasion. It is noteworthy to mention here that the museum has also prepared and released a brochure in Braille for blind persons.

10. ARCHAEOLOGICAL MUSEUM, GWALIOR

For aiding the visit of senior citizens steel railing was provided along the stairway. In front of museum main gate; for the visually impaired preparation of text Braille script in metal foils was done and fixed on inclined steel frames. For safety and security in the galleries and open air display close-circuit night vision cameras were installed.

Forty Buddhist sealings were acquired from a resident of Choti Badouni, district Datia as a gift to the museum. Besides routine maintenance of the museum the following works were carried out in the museum namely; shifting of sculptures from sculptures shed to newly constructed museum building was done; for safety and security in the galleries and open air display; close-circuit night vision cameras were installed; computer and printer were purchased to facilitate e-transaction of office works.

11. ARCHAEOLOGICAL MUSEUM, SANCHI

Wooden flooring was provided in the mu-

seum galleries. The said work executed successfully in all the galleries except photo gallery. Chhatra and pillar recovered from Panguraria, district Sehore and installed in the open courtyard of the museum. Shelves were constructed and the reserve antiquities were properly stacked for easy retrieval. Removal of old plaster over the roof of reserve collection and re-laying of fresh plaster had been taken up and completed. One LED TV has also been purchased and installed for cultural awareness programmes. Furnishing of ground floor of Marshall House has also been carried out.

ODISHA

12. ARCHAEOLOGICAL MUSEUM, RATNAGIRI

Air Conditioner (2 ton) under DGS&D rate contract for the remaining two galleries of the museum were installed. Repairing and painting of inside of the museum building was done. Fitting and fixing including cabling of light fitting in Gallery 2 and 4 of the museum have been done. Specified vitrified tiles and stainless steel pipe for railing in the ramp for the physically handicapped person in the museum was provided.

13. ARCHAEOLOGICAL MUSEUM, KONARK

Minor repairing and providing synthetic enamel paint of MS grill over enclosure wall, three numbers of entrance MS grill gates of museum was done. Trilingual metallic labels for displayed antiquities and other labels of museum was provided. Minor repairing and white washing of museum building inside and outside corridor was attended. Air conditioning of publication-cum-library room was provided. Trilingual information brochures on museum was printed. New signage boards were repaired and prepared. New fire extinguishers were procured.

UTTAR PRADESH

14. TAJ MUSEUM, AGRA

A wall showcase was installed in Gallery 3 to display coins. A gold commemorative coin of Taj Mahal gifted by UNESCO was displayed in this showcase (pls. 181-182). The museum galleries viz. main hall, Gallery 1, 2 and 3 were provided with laminated wooden flooring (pls. 183-184). The Taj museum office located at 1st floor of western Naubat Khana was refurbished with laminated board and electrical wiring was also done.

15. ARCHAEOLOGICAL MUSEUM, FATEHPUR SIKRI

A new electricity connection dedicated line and transfer for museum was provided. Pedestals in teak wood with mica finishing were provided for display of life size sculptures. Electric wiring panel box, strong inner lock with brass handle for all the wooden doors of the museum were provided. MS iron door frame and collapsible shutter channel was provided in storage area of the museum.

WEST BENGAL

16. HAZARDUARI PALACE MUSEUM, MURSHIDABAD

The old and torn cloth and glasses from a certain number of showcases have been replaced. Wooden railings have been provided to safeguard the antiquity. Attended patch painting work to the interior walls of the galleries of the 1st floor, huge pillars and partly the outer face of the colossal museum building. The damaged, broken glasses of the window of the galleries have been refurbished with new ones. The old damaged coir-mats and door-mats of the certain galleries have been replaced with the new ones.



181



182

Taj museum, Agra : 181, showcase in Gallery 3; 182, close up of displayed commemorative gold coin (200 Euro). See p.221



183



184

Taj museum, Agra : 183, before; 184, after changes of flooring in main hall, See p.221

Old wooden ceiling with out sized beams, lintels, massive window fitted with coloured/white glasses, doors of this museum were infected by creepy and crawly insects. Anti-termite treatment have regularly been provided in the museum galleries reserve collection, record room, library and other extremely large rooms, balconies, verandah, office rooms etc. A separate wing for the ladies entry has also been shaped. In the library and record rooms quite a few Persia, Arabic, Urdu records of the record room of the Hazarduari palace museum were listed and marked. Few have been documented. The overall museum lighting system with the replacement of new lighting for amenities to the tourists. This office also executed the annual maintenances of existing lift, water purifiers and water coolers, generators and on-line UPS etc.

Ladies and gents toilet blocks for the tourists have been maintained properly besides water pipe lines of the museums as well as the toilets (gents and ladies) near the counter for the visitors and the staffs (inside the museum) were replaced with fresh ones wherever required.

17. ARCHAEOLOGICAL MUSEUM, TAMLUK

Refurbishment of Gallery 1 with *chala* type roof for display of Mauryan terracotta was done. Computerized touch screen kiosk was installed in the gallery for supplying information about museum for the visitors.

VI. ARCHITECTURAL SURVEY OF TEMPLES

NORTHERN REGION

The Temple Survey Project (Northern Region) of the Survey took up the study of the temples in eastern Vidarbha region of Maharashtra under the direction of K. Lourdasamy assisted by M. C. Joshi, Alhad Vyas, L.K. Bhagchandani, S. K. Srivastava and K.R. Malviya with the aim of their detailed documentation highlighting their art and architecture and a comparative study with contemporary styles.

The Vidarbha region (**fig.29**) forms the eastern part of Maharashtra bounded by Madhya Pradesh to the north, Chhattishgarh to the east, Andhra Pradesh to the south and Marathwada and Khandesh regions of Maharashtra to the west. Vidarbha has its own cultural and historical background distinct from rest of the Maharashtra.

In the course of survey the temples at Ramtek in district Nagpur, miniature rock-cut temples and sculptures at Bhatala district Chandrapur and Markanda temple in Gadchiroli district have been documented.

Temples at Ramtek are located on a high hill (Lat. 21.4°N; Long. 79.33°E) about 50km from Nagpur. There are four temples of Vakataka period positioned closed to each other (*circa* 250-550 C.E.). Besides, there is a huge stepped water tank made of sandstone at the foot hill. Varaha Temple (**pl.185**) also known as Varaha *mandapa* presently an open structure is composed of four pillars bearing a small pyramidal roof with an *amalaka* on the top. The present roof of the *mandapa* was probably provided by the Bhonsla rulers. A

huge sculpture of Varaha facing west is shown standing in the *mandapa*. The square pillars are decorated with paired lotus medallions with short octagonal and sixteen sided sections in between. The pillars have heavy plain bracket-capitals carrying beams decorated with thin row of *padmapatra*. The temple may be assignable to 6th-7th century C.E. on the stylistic ground. Another significant edifice known as Trivikrama Temple (**pl.186**) was noticed in which only the *mandapa* part is survived. The image of Trivikrama, facing west, stands in its original place of *garbhagriha*. The wall and roof of the *mandapa* have been completely vanished. However, the available portion of the *mandapa* is retained by new supporting pillars. Narasimha Temple no. 1 (**pl.187**) a closed wall structure stands on a reconstructed *jagati* having a rectangular *sandhara garbhagriha*. It is comprised of four pillars around the gigantic figure of two armed seated Narasimha with in a closed *mandapa* of four central pillars. A pair of pillars separates the *mandapa* from the *garbhagriha*. Both the portions (*anga*) of the temple are connected with a single roof. The pillars around the central deity serve the purpose of *pradakshanapatha*. Two door jambs made of sandstone are provided to the entrance which bear niches showing *ganas*. A stone slab fixed in the interior south wall of the *mandapa* depicts an epigraph in Gupta script of the 5th century which mentions the Vakataka queen, Prabhavatigupta, consort of Rudrasena II and mother of Praversena II. Narasimha Temple no. 2 (**pl.188**) standing on same plan is closed to the previous one. The temple is raised on a platform measuring 9.9m x 15m. The central figure i.e. huge sculp-

ture of Narasimha is surrounded by four pillars. Head-dress of the *gana* on *dwarasakha* can be compared with those of Gupta Temple (Dashavatara) at Deogarh (UP). The temple is *sandhara* type. A huge water tank with a pillared corridor on one side has been observed nearby. The pillar corridor was probably a part of temple which is now disappeared. Besides, there is an ancient *baoli* locally known as *karpur baoli* a few kilometers away from the temples at Ramtek and a dilapidated temple locally called as Kali Mata Temple (pl.189) stands on one end of the *karpur baoli*. It is triple shrined structure. It houses in the *garbhagriha* a fragmentary part of sculptural panel is placed inside. The temple is also provided with pillared corridors. This temple and *baoli* seem to be of later date and may be assigned 9th-10th century C.E. on the stylistic ground.

Bhatala (Lat. 20°20'22"N; Long. 79°4'42"E) is located about 10km from Varora, a small town on northern direction in District Chandrapur. Bhatala is famous for its unique miniature rock-cut temple site and two other temples known as Bhawani and Siva Temples respectively. Both the temples are still under worship. Besides, some loose sculptures have also been found at the site. The site seems to be a great centre of Saiva rituals but Vaisnava sculptures have also been observed.

There are more than twenty miniature rock-cut caves carved out in a series of natural outcrop of moderate sizes in sandstone around a natural semi circular water tank (pond). Besides, some of the rock-cut sculptures in open air have also been noticed. Later on the area was bounded by providing a stone wall. The site is protected by the state Government of Maharashtra. This kind of miniature caves are very rarely noticed in Indian art hence it is very unique for their workmanship and the Vakataka

artist must have been experimented before going for bigger rock-cut caves in this place. Cave 3 and 4 (pl.190) facing south deserve special mention. Both the caves have been carved in a same rock in lunar pattern in east-west orientation. Cave 4 has two cells one in the middle and another on the western most corner. The middle cave contains Ganesa seated over a high *pithika*. The eastern most cell is named as Cave 3 which preserves a Siva-linga with *yonipitha* having *jalhari* towards north. Interestingly, a full blown lotus is carved on the ceiling of the Cave 3 and the cave is facing towards south of the tank. The western cave contains a damaged *pithika* with a pair of human being feet probably a later edition. A rock-cut sculpture of four armed Rudra Narsimha is carved on a rock facing north in *lalitasana*, holding a *chakra* in his upper right hand while a *sankha* in his upper left hand. His lower left hand rests on his thigh while lower right hand holds a mace (*gada*). The *jata* of the hair is shown flowing very ferociously and the neck ornament is well depicted. He is adorned with *yajnopavita*, *kankana* and other ornaments as well.

Bhawani temple, facing north (pl.191) is located on the north eastern side of miniature rock-cave site and about 0.5km away from the same. The temple once stood over here in its original condition has now received many renovation works. Consequently, the placements of the sculptures have been completely changed and they are displayed in the side wall of the temple. Besides, the *sikhara* has become disproportionate. This temple is important in terms of its plan and elevation. The temple is composed of a *garbhagriha*, an *antarala* and a closed *sabhamandapa* which bears a central pathway flanked by pillared platforms. The *pancharatha* temple stands on a high *jagati*. There are no sculptures on the *jangha* however the walls of the *mandapa* display sculptures but not in order. Another temple known

as Siva temple, facing east, has high and raised *vedibandha* having large number of moulding like *khura*, *kumbha* and plain *kalasa* with banding *patta* then *kapotapali*. The temple is *sandhara* and have a passage around the huge Siva-linga. Most of the temple portions have been renovated in the recent past but the interior and period of the temple is around 10th-11th century C.E.

Markenda is located about 75km towards south of Chandrapur town in Mul Tehsil of District Garhchiroli. The village is very famous for the large Siva temple complex along with its minor shrines around. At the centre is the main Siva temple. The whole temple complex is surrounded by a stone wall. The temple complex can be approached from the western side. River Wainganga flows on the eastern side along the temple complex. The flowing of river from south to north is very unique in its nature and appropriately called *uttaraini* like that of at Kasi, the famous holy land of Hindus. Aptly, the temple is called by devotees as Vidarbha Kasi.

The temple (pl.192) locally known as Markand *rishi* temple is of considerable height. Facing east, it contains of a *garbhagriha*, an *antarala* and a *sabhamandapa*. Besides, there is a separate shrine or *mandapa* in front of the temple having *nandi*. The temple is an example of *besara* style of temple architecture in which the *mandapa* bears the pyramidal roof while the sanctum having a long curvilinear *latina sikhara* and circular *griva*, now damaged on the top. On plan, the sanctum is *saptaratha* which contains a Siva-linga with a square and wide *gauripatta* and *pranala* on the north. The roof of the sanctum is supported by four corner square pillars. There is no decoration inside the *garbhagriha*. Some recent alterations have been taken place in the sanctum as well as in the *mandapa*. The square *mandapa*

is open from the northern, eastern and southern sides. The temple is very rich in sculptural representation and the walls of the *garbhagriha*, *antarala* and *mandapa* display the sculptures in three registers of deities, *dikpalas*, *vyalas*, *nayikas* in various postures. *Vedibandha* of sanctum is decorated with elongated *udgama* on all the *rathas* right from *khura* to *kalasa*. Besides, *kumbha* moulding is adorned with a medial *ratna pattika* and the upper *kapota* is provided with a decoration of *simhamukha pattika*. On the other hand the *mandapa* is supported upon a *pitha* composed of *jadyakumbha*, a *kanikapatta* and a *simhamukha pattika* over it. The beautiful *nayikas* have been carved out on some of the *rathas* of *mandapa*. The *sikhara* of the sanctum is damaged. The temple may be datable to 9th-10th century C.E.

SOUTHERN REGION

The Temple Survey Project (Southern Region) of the Survey, under the direction of G. Maheshwari, assisted by A. Anil Kumar, S. Ashok Kumar, K. Ravi Kumar and T. Samuel Joshuva carried out preliminary documentation and architectural survey of structural temples of Kakatiyas, Andhra Pradesh with a view to throw light in the development of temple architecture in South India as whole and Andhra Pradesh in particular. The Kakatiyas have adopted both the North Indian *Nagara/bhumija* and the South Indian *Dravida* style.

The objectives of the work was to distinguish the continuity, if any, of the architectural legacy left by the Rashtrakutas and the Western Chalukyas. To reveal the brick making technique including the scientific analysis of its composition and the firing range, by the application of experimental archaeology in vogue.

Fig. 29





185



186

Ramtek, Nagpur : 185, Varaha Temple; 186, Trivikrama Temple, See p.225



187



188

Ramtek, Nagpur : 187, Narasimha Temple no.1; 188, Narasimha Temple no.2, See p.225



189



190

Ramtek, Nagpur : 189 Kali-Mata Temple; Bhatala : 190, Caves 3 and 4, See p.226



191



192

Bhatala : 191, Bhawani Temple; Markenda : 192, Siva Temple, See pp.226 and 227



193



194

Palampeta : 193, view of the Ramappa Temple; 194, decorated pillar on ceiling, See p.236



195



196

Hanamkonda : 195, view of the thousand pillared temple; 196, rear view. See p.236



197



198

Warangal fort : 197, front view of the mandapa; 198, view of the torana. See p.236

The methodology for the research work is the application of total station survey, photogrammetry, satellite imagery, laser scanners, laser range finders, Auto-CAD, GPS, GIS and literary sources at length. Geo-physical investigation will be applied, to know, the foundation analogy of these edifices. The retrieval of data includes detailed documentation of all the architectural components, sculptural depictions with the digital photography/drawings utilise to analytical interpretation of the research of Kakatiya temples.

The Kakatiya temples, dedicated mostly to Siva, reveal in their construction a happy blending of the styles of north India and south India which influenced the political life of the Deccan. The most important of these temples are those at Palampeta (Ramappa temple) (**p1s.193-194**), Hanamkonda (thousand pillared temple) (**p1s.195-196**) and the incomplete one in the Warangal fort (Swayambhunadha temple) (**p1s.197-198**). As preliminary investigations, the above mentioned sites were taken up and documented them for study.

VII. PRSERVATION OF MONUMENTS

MOUNMENTS OF NATIONAL IMPORTANCE

AGRA CIRCLE

UTTAR PRADESH

1. AGRA FORT, AGRA, DISTRICT AGRA

During this period under review the area adjoining to Amar Singh gate was repaired. Red sandstone flooring was provided after removal of the decayed concrete flooring near the gate to the north of the path. The earthen portion in between the inner and outer rampart wall was repaired which included removal of earth, laying of lime concreting and providing of red sandstone flooring to keep the area in a presentable manner and to avoid vegetation growth.

The repairs to Anguri Bagh was carried out in continuation of previous year's work. The works included re-plastering in lime after removal of decayed plaster and lime punning in ceiling, walls and pillars as per the original pattern (pls.199-202).

The decayed red sandstone members of the stepped entrance to the Diwan-i-Am building were replaced with new ones as per original. The southern *dalan* to the east of the entrance gate of Diwan-i-Am complex was repaired after by removal of decayed lime plaster and re-plastered. The *lakhauri* brick flooring in front of Diwan-i-Am was repaired by pointing with lime mortar.

The work of repairs to Meena Bazar complex was started which included removal of debris, providing and fixing of, thick red sandstone flooring, providing and fixing, thick *pan patti* design *dasa*, providing and fixing fine

dressed red sandstone, thick veneering in place of decayed and missing ones, providing and fixing of fine dressed red sandstone *dab* and *quid*. The collapsed portion of the parapet wall was repaired.

The old drain (*nallah*) in garden near Salimgarh was repaired by removing of the earth, providing and laying in position lime concrete and red sand stone drain cover.

2. AKBAR'S TOMB, SIKANDARA, DISTRICT AGRA

In continuation of previous year, the work of providing stone flooring of area to the west side of Kanch Mahal to *dak* bungalow was taken up and completed. Pathway was provided for physically challenged person. Wooden ramp for access to toilet block was provided. A toilet block in fiber glass reinforced plastic (FGRP) was provided for the differently abled persons.

3. BARA KHAMBA, KAGAROL, DISTRICT AGRA

The works taken up during the period under review included replacement of red sandstone flooring as per original in place of the decayed one, replacement of missing or damaged *chhajja*, veneering, *dab*, *quid*, *pan dasa* and carving veneering including pinnacle in place of decayed or missing stones. Boundary wall was constructed after demarcation of land. The work is in progress.

4. GROUP OF MONUMENTS, FATEHPUR SIKRI, DISTRICT AGRA

The conservation works carried out at

Bahauddin's tomb and mosque included restoration of damaged portion of the boundary wall which was damaged due to accident by a loaded truck. The *pan dasa* of boundary wall was provided with new one in place of damaged one. A Mughal pattern wooden door was provided at the main entrance door of the monument complex. The other works included laying lime concrete in place of dead concrete of roof terrace where required to arrest seepage of water in mosque. The inner side of parapet walls was replastered after removing the decayed and damaged plaster. Few damaged red sandstone flooring of the mosque was replaced with red sandstone as per original. The missing or damaged *chhajja*, veneering, *dab*, *quid*, *takhari* designs veneering in mosque were replaced with new ones as per original. The missing part of pinnacle including *guldasta* of north-eastern corner minarets and adjoining minaret of mosque were restored as per original.

The missing or decayed white marble inlay work in inner side of Badshahi gate and inner side of Buland *darwaza* were restored as per original design.

Repairs to the Karawan *sarai* was also taken up by replastering the *kangura* after removing of decayed and damaged plaster and providing *gola* below *kangura* as per original.

The roof of the Khawbgah monument was watertightened by laying lime concrete in place of dead concrete and laying lime plaster in south and west sides of verandah adjoining Panch Mahal and Girl's school after removal of decayed and damaged plaster. Stained pointing in open joints with lime mortar in floor and ceiling was also carried out. Few red sandstone flooring stones, missing or damaged *chhajja* and brackets were replaced as per original. The collapsed portion of the fortification wall including *kangura* near Lal Darwaza was restored.

To arrest water seepage from the roof of the

Treasury building, lime concrete was laid in place of dead concrete. The parapet walls were lime plastered after removal of decayed and damaged plaster. The staircase leading to the roof in eastern side was covered to avoid water flow into the museum gallery. The north-west corner portion of Taksal was conserved which included removal of the debris to clear the existing structure buried underneath, rubble masonry work with lime mortar including recessed pointing in outer face and made base for dome as per original.

The ruined bath to the east of octagonal *baoli* was repaired by way of underpinning after removal of debris and vegetation growth. The structures on either side of pathway near Hathi Darwaza was repaired by underpinning and pointing.

The excavated remains and *dalan* to the south-west of Diwan-i-Am parking were repaired. The cells facing east located to the south-west of parking area were conserved including replacement of red sandstone member as *dasa*, *dab*, veneer and red sandstone flooring in front of it. Similarly, the *dalan* facing north was also repaired. Pointing and underpinning to the random masonry wall was also carried whenever required. The drainage system in this area was also revived as per original (pls.203-204). The excavated remains located to the east of Tansen Baradari, were strengthened by underpinning and pointing with lime mortar after exposing of dumped debris and uprooting the trees, bushes etc.

In compliance of the order of Hon'ble Supreme Court of India, boundary wall/ fencing from Agra gate to Shakhuli *baoli* was constructed.

5. IBRAHIM KHAN'S TOMB, RASULPUR, DISTRICT AGRA

The Ibrahim Khan's tomb was conserved by

providing red sand stone flooring in the courtyard of tomb complex including resetting of graves in the north-west of tomb (pls.205-206). Lime concrete was also laid in the cells on the south-east of the tomb. The *jali* with frames were also replaced with yellow buff color sandstone on the west and north arched openings of the tomb. The approach path from the road was also provided .

6. JAMA MASJID, AGRA, DISTRICT AGRA

Repair to the missing inlay pieces, pointing in lime mortar etc. were completed.

7. KALA GUMBAD, AGRA, DISTRICT AGRA

The north and west side dwarf wall of the monument complex was badly damaged and the earth below the foundation was displaced. The wall was restored (pls.207-208).

8. MARIUM'S TOMB, SIKANDARA, DISTRICT AGRA

Access pathway for physically challenged persons was provided which included providing and fixing thick semi-finished red sandstone edging for protection of lime concrete base of red sandstone flooring set in lime mortar. Toilet facilities for physically challenged persons and also separate block for general visitors was provided.

9. MEHTAB BAGH, AGRA, DISTRICT AGRA

The barbed wire fencing on the north-eastern side was replaced with MS grill fencing over dwarf wall in brick masonry.

10. MOUND KNOWN AS ULTA KHERA AND THE MOUND OF RAGHUNATHJI, HASTINAPUR, DISTRICT MEERUT

The work of providing boundary wall around Ulta Khera, was carried out and completed.

11. MOUND KNOWN AS OLD FORT AT KANNAUJ,

DISTRICT KANNAUJ

The work of construction of boundary walls in north, east and western sides of the old fort was completed.

12. MOSQUE AND SARAI, KHUDAGANJ, DISTRICT FARRUKHABAD

South side of *sarai* was repaired by way of underpinning and pointing.

13. RAM BAGH, AGRA, DISTRICT AGRA

The brick masonry walls of the platform in western side of the garden was repaired by providing and laying thick lime plaster in the east-north and south side. The brick enclosure wall in the eastern side of the wall was repaired by stained lime pointing. The *sarai* and gateway was conserved by repair of structures in north side and east side by dismantling of old damaged *lakhauri* brick work very carefully to avoid any damage to structure

14. GROUP OF MONUMENTS, TAJ MAHAL, AGRA, DISTRICT AGRA

The forecourt of the Taj Mahal was repaired by replacement of old decayed and worn out red sandstone members as *dasa*, *dab* and veneer etc. of verandah on the east and west gateway. Patch repairs to the floor of forecourt was attended by resetting. The red sandstone edging along the lawns of forecourt.

The old decayed and dislocated red sandstone members such as cusped arches, pillar base, cap and beam etc. at the north facing top of main entrance gate was replaced. Provided and fixed inlay pieces of various pattern on the north facing the parapet and outer facade panels facing north from bottom to top including replacement of red sandstone inlaid panels in place of decayed and missing one.

The eastern enclosure wall of Taj Mahal to the back of Mehman Khana was taken up for



199



200

Anguri bagh, Agra fort: 199, before; 200, after conservation of cell, See p.237



201



202

Anguri bagh, Agra fort : 201, before; 202, after conservation of outer structures, See p.237



203



204

Diwan-i-Am, Agra : 203, before; 204, after conservation of excavated remains to the south-west of parking, See p.238



205



206

Ibrahim khan's tomb, Rasulpur : 205, before; 206, after conservation of old graves inside the tomb complex, See p.239



207



208

Kala gumbad, Agra: 207, before; 208, after restoration of collapsed wall of platform, See p.239

conservation. The old decayed red sand stone members such as *dab*, *quid*, veneer having deep grooving all around the veneer panel, *dasa* having ornamental carving on front of it at the eastern enclosure wall back of Mehman Khana from south-east *burj* to north-east corner of Taj Mahal were replaced as per original. The red sandstone *jalis* (screens) have been repaired and replaced wherever missing or fragile. Red sandstone columns members as veneer and *dab* on the octagonal columns were replaced in place of missing and dislocated and set in lime mortar with copper clamps as per original.

The conservation of dome and *burjis* of mosque was undertaken by replacement of old decayed red sand stone members as *dab*, *quid*, veneer, *dila* having depressed moldings all around, *dasa* having ornamental carving on front of it. The red sand stone *jalis* and *mutakkas* have been replaced wherever missing from the south-west *burj* of the mosque. The red sandstone *dasa* plinth stone and missing/ broken *chhajja* for corner *burji* on the top roof of mosque were fixed. Restored the intricate inlay pieces with white, black and yellow marbles of various pattern on the north and south facing of parapet including replacement of red sand stone inlaid panels wherever decayed and missing.

Old and decayed red sandstone flooring in front of mosque were replaced wherever broken as per original pattern in hexagonal and square/ rectangular slab on the south-west of *wazoo* tank. The works taken up included providing red sand stone flooring on the platform of Kali *masjid* after removal of dead lime cement concrete. Replaced *dasa* stones wherever badly decayed and reset where it was dislocated.

Repairs to pathways and flooring for holding area on the east and west gates at Taj Mahal was undertaken. The drainage system have been revived from the inner complex main hole to outside on the road and then to *nallah*.

AURANGABAD CIRCLE

MAHARASTRA

15. AN OLD TEMPLE, KOKAMTHAN, DISTRICT AHMEDNAGAR

The work of providing and laying dressed stone flooring around the temple as per original pattern is in progress.

16. MALLIKARJUNA TEMPLE, KARJAT, DISTRICT AHMEDNAGAR

The work of fixing dressed stone around the temple for plinth protection is in progress and the reconstruction work of damaged and fallen veneering wall by using old as well as fresh stones set in lime mortar including core filling, providing coping over was completed.

17. SALABAT KHAN TOMB, MEHKARI, DISTRICT AHMEDNAGAR

Removal of dead concrete and water tightening of roof using burnt brick-bats in lime mortar was completed. Reconstruction of fallen arch in dressed stones as per original was completed (pls. 209-210).

18. DHOKESHWAR CAVES, DHOKE, DISTRICT AHMEDNAGAR

The reconstruction of damaged retaining wall around the small temple including core filling, the resetting work of old bulged *samadhi* wall and platform including providing stone pitching in cement mortar to avoid the erosion were completed (pls. 211-212). The work of constructing of retaining wall around the shrine is in progress.

19. TRIPLE SHRINED TEMPLE OF BHAWANI, TAHAKARI, DISTRICT AHMEDNAGAR

The work of fixing dressed stone apron around the temple plinth and the reconstruction work of damaged and fallen veneering wall by using old as well as new stones set in lime

mortar including core filling etc., is in progress.

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

The leveling of surrounding area of tomb and filling the earth on north-west corner including construction of ancient fallen wall on north-west corner of the tomb and removing old decayed plaster of dome and re-plastering the same in lime mortar is in progress.

21. NAWAB ISMAIL KHAN AND GATES, ACHALPUR, DISTRICT AMRAVATI

The construction of a dwarf wall for erection of chain link fencing to the city wall and gates near Zilla Parishad School is in progress.

22. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD

The work of removal of loose and disintegrated rock surface in front of rock scarp along the pathway of forest nursery for filling the cavity of Caves nos. 16 to 18 are in progress. Providing of base for foundation in soft rock by chiseling including trimming and levelling the bed as per the requirement is in progress. Providing and laying *in situ* concrete with trap granite metal for foundation including the curing etc. is in progress. Underpinning the rock at joints, curing, etc. is in progress.

Removing loose and disintegrated rock manually by chiseling and cleaning the surface with brush including drilling holes up to sufficient depth in rock for anchoring of cantilever of projected portion of the slab of the facade of Cave 6 is in progress.

Removal of earthwork average depth 30 to 40cm for providing drain network over Cave nos. 26 to 30 was completed. Excavation in soft rock manually for foundation and maintain gradient for providing drain and providing and laying concrete for foundation is in progress.

23. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

The work of providing and fixing stones flooring outside of the Cave no.1 including providing drainage to drain out the rain water has been completed. Reconstruction of damaged pillar which was found outside of the cave and providing new props in coarse rubble masonry inside Cave no.1 for supporting the cracked roof has been completed (pls.213-214). For restoration of facade of Cave no.12, the work of removing loose and disintegrated rock by manually, chiseling and cleaning the surface with brush, filleting the cracks along with plastering and rendering the surface keeping in conformity with original rock surface was completed. Providing of stone pillar in Cave no. 6 of the cell was completed.

The work of providing galvanised iron crimped wire mesh in teak wood frame to the doors, windows and opening of the Cave nos. 22, 23 and 24 to prevent the entry of bats inside was completed.

The work of providing GI crimped wire mesh in teak wood frame to the doors, windows and opening of the Cave no. 33 to prevent the entry of bats inside the caves has been completed.

24. GROUP OF CAVES, PITALKHORA, DISTRICT AURANGABAD

Filling the cavities in stone masonry and plastering the exterior surface including providing rock texture is in progress. The existing flooring of Cave no.3 is disintegrated and destroyed at places. The work of removing existing dead flooring and providing and laying new dressed stone flooring is in progress

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

The work of removing the existing damaged



209



210

Salabat Khan tomb, Mehkari : 209, before; 210, after reconstruction of a fallen arch, See p.245

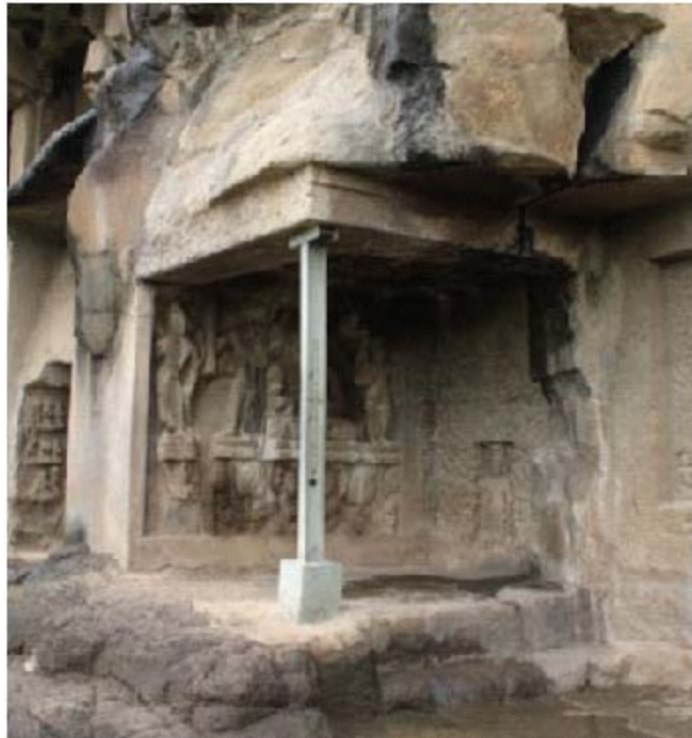


211



212

Dhokeshwar caves, Dhoke : 211, before; 212, after the conservation of retaining wall around the small temple, See p.245



213



214

Cave no. 1, Ellora : 213, before; 214, after the conservation of pillar Buddhist group of caves, See p.246

chain link fencing and construction of a boundary wall in stone masonry at the rear side of *Baradari* is in progress.

26. DAULATABAD FORT, DAULATABAD, DISTRICT AURANGABAD

Providing and fixing dressed stone over the base of concrete in proper level and maintain proper gradient of pathway from main gate to Kalakot is in progress. Collecting and stacking useful material from fallen fort wall for reuse is in progress. Construction of parapet wall near newly constructed toilet block is in progress.

Providing and laying water tightening of roof in lime concrete of Rangmahal and fixing of teak wood door was completed.

27. AURANGABAD CAVES, AURANGABAD, DISTRICT AURANGABAD

The work of filling and grouting the cavity of Cave no.8 is in progress.

28. GROUP OF TEMPLES, LONAR, DISTRICT BULDHANA

The laying of roughly dressed stone over cement concrete bed after earth work excavation including construction of retaining wall in front of Kumareswar temple is in progress. The construction of a dwarf wall for erection of chain link fencing around the protected area (eastern and northern sides) is in progress.

29. BALAPUR FORT, BALAPUR, DISTRICT AKOLA

The work of collection of fallen stone members of fortification wall, bastions and stacking them for reuse at the site including the earthwork excavation for foundation is in progress.

30. FORT WALL, CHANDRAPUR, DISTRICT CHANDRAPUR

Removal and reconstruction work of partly fallen bastion inside the Gond Raja tomb is in progress. The reconstruction of fallen portion of veneering and core filling of fort wall (back side of Bhawani temple near Pathanpura gate) using old and fresh stones in lime mortar is in progress.

31. TEMPLE OF BANDARESHWAR, DISTRICT GADCHIROLI

Earthwork excavation for proposed stone pathway and repairs to temple is in progress.

32. MARKANDADEO GROUP OF TEMPLES, MARKANDA, DISTRICT GADCHIROLI

Dismantling the out of plumb and disturbed members carefully, numbering and stacking them carefully was completed. The earth work excavation for construction of lime stacking tank is in progress.

33. PADAMPUR, DISTRICT GONDIA

The work of construction of boundary wall to north-west of Padampur is in progress.

34. GROUP OF TEMPLES, ANJANERI, DISTRICT NASIK

The work of removing the existing damaged chain link fencing and construction of a boundary wall of Temple 5 and 7 in stone masonry is in progress.

BANGALORE CIRCLE

KARNATAKA

35. VIRUPAKSHA TEMPLE BAZAAR, HAMPI, DISTRICT BELLARY

The modern accretions in the *bazaar mandapas* in the northern and southern wings were dismantled. The debris accumulated in the process was shifted and the work is in progress.

The work of dismantling and restoration of

the *mandapa* in the northern side of Virupaksha temple and the shrine of Veerabhadraswamy is in progress. The work of scientific clearance of debris, on either side of the *mandapa* to expose the buried *adhistana* (plinth) of the *mandapas* is in progress.

36. VITTALA TEMPLE, VENKATAPURAM, DISTRICT BELLARY

The undulated floor slabs had been dismantled and relaid with requisite gradient over gravel bed. Restoration of dismantled stone members of ancient 'T' shaped tank in Vittala bazaar per original was completed. The earth work excavation to expose the ancient working level was in progress.

37. FORT AND TEMPLES, CHITRADURGA, DISTRICT CHITRADURGA

The fallen portions of fort wall and bastions were dismantled and restored with available stone blocks and coping was also provided. The overhanging, out of plumb wall portion of Akka- Tangi Honda (Sister's tank) was dismantled and properly restored.

38. FORT AT CHANNAGIRI, DISTRICT DAVANGERE

The fallen portions of fort walls and bastions were restored using available material. Required granite stone slab flooring was laid around the Ranganatha temple. Dwarf wall fencing was provided around the fort.

39. HILL FORT AND RUINED PALACE, UCHANGIDURGA, DISTRICT DAVANGERE

The existing undulated stone flooring was dismantled and relaid after providing necessary cushion bed with proper alignment as per the original with requisite gradient for easy discharge of rain water. In addition a new pathway was laid by using stone slabs.

40. MUSAFIRKHANA AND HONDA, SANTEBENNUR,

DISTRICT DAVANGERE

The undulated stone parapet all around the Honda has been dismantled and reconstructed as per original. A new stone approach pathway was provided. The retaining wall of the Aane Honda has been restored by using rubble stones.

41. GUMBAZ, SRIRANGAPATNA, DISTRICT MANDYA

The outer wall of *gumbaz*, mosque and Khan khana was rendered water proof and applied with colour wash.

42. FORT AT MADHUGIRI, DISTRICT TUMKUR

Stone pathway was provided up to the fort for easy movement of visitors. The damaged wall of the tank was veneered and restored (pls.215-218).

BHOPAL CIRCLE

MADHYA PRADESH

43. PATALESHWAR TEMPLE, AMARKANTAKA, DISTRICT ANUPPUR

To display the sculptures scattered at the site of Pataleshwar temple, a sculpture shed was constructed at the site to display the artifacts. Besides, the monuments of Amarkantaka were awarded with "Best Maintained Tourist and Disabled Friendly Award".

44. KARAN TEMPLE, AMARKANTAKA, DISTRICT ANUPPUR

Conservation works like providing of apron, pathway, resetting of ashlar stone masonry including making mouldings were taken up.

45. SHIV TEMPLE, AMARKANTAKA, DISTRICT ANUPPUR

A dwarf wall was constructed around the



215



216

Madhugiri fort, Tumkur : 215, before; 216, after construction of pathway, See p.251



217



218

Madhugiri fort, Tumkur : 217, before; 218, after conservation of a well, See p.251

monument for security.

46. CHANDERI FORT, CHANDERI, DISTRICT ASHOK NAGAR

The on going works of conservation of the fortification wall of the fort was completed (pls.219-220) and the work of providing and fixing of flag stone flooring complex near Khilji mosque was taken up (pls.221-222).

47. ATER FORT, ATER, DISTRICT BHIND

Recess pointing and underpinning were carried out at various locations. The fort wall and the bastion were conserved by providing laterite stone masonry in lime mortar. The work of conserving terracotta brick tile in lime mortar was completed.

48. ADIL SHAH/NADIL SHAH TOMB, BURHANPUR, DISTRICT BURHANPUR

Conservation of stone masonry in lime mortar, underpinning and stitching work of the wall of the terrace is in progress.

49. BIBI-KI-MASJID, BURHANPUR, DISTRICT BURHANPUR

The conservation works like ashlar stone masonry work, underpinning, stitching in brick masonry along with fixing of MS grill were taken up during this period.

50. ASIRGARH FORT, ASIRGARH, DISTRICT BURHANPUR

At Siva temple, Asirgarh, rubble masonry work was taken up. During debris clearance of the *baoli*, rock-cut cells exposed.

51. EXCAVATED SITE BIJAMANDAL, KHAJURAHO, DISTRICT CHHATARPUR

Reburial of mound, resetting of lower platform and refixing of ashlar masonry was carried out at this site.

52. RUINED FORT OF MARIADEO, DISTRICT

DAMOH

The course rubble stone masonry work in lime mortar was taken up at the ruined fort, Mariadeo in order to support its remaining structure of south-west bastion. Apart from this the work of underpinning of missing portion has been taken up.

53. SIDDDESHWAR TEMPLE, NEMAWAR, DISTRICT DEWAS

The work of stone pitching of apron facing river side was carried out at Siddeshwar temple, Nemawar to prevent the overflow water of river Narmada damaging the plinth of the temple.

54. JAMI MASJID, MANDU, DISTRICT DHAR

The inner surface of the dome of Jami Masjid was repaired and mended at its north-west corner. The arches of the *masjid* were also conserved by providing *zeerabad* stones as a veneering.

55. EXCAVATED SITE, PAWAYA, DISTRICT GWALIOR

In order to prevent seepage of rain water, the upper platform of the excavated site was conserved by removing old bulged brick pavement and by resetting of original brick work in lime *surkhi* mortar.

56. CHAUSATH YOGINI TEMPLE, BHERAGHAT, DISTRICT JABALPUR

The work of recessed pointing in lime mortar to the temple floor and surrounding courtyard was attended to.

57. TAPSI MATH, BILHARI, DISTRICT KATNI

Conservation works such as providing and fixing of stone *chhajja* and bracket and providing of brick masonry at missing portion of the walls were taken up.

58. ROCK-CUT TEMPLE OF DHARMARAJESHWAR, DHAMNAR, DISTRICT MANDSAUR

The masonry work of stair case and filling of cavities in the wall by adopting laterite pack technique was taken up. The *chhajja* stones were also repaired by the same method.

59. YASHODHARMAN'S VICTORY PILLAR, SONDHANI, DISTRICT MANDSAUR

The ongoing work of providing and laying dressed stone slabs over lime concrete on main approach road at the site was completed to improve the ambience of the ancient site.

60. KAKANMATH TEMPLE, SIHONIA, DISTRICT MORENA

Conservation of *nandi mandapa* was taken up and stone artifacts were documented and photographed.

61. GROUP OF TEMPLES, BATESHWAR, DISTRICT MORENA

The work of lifting and lowering down of bulge stones from the temple after carefully documentation is in progress.

62. GROUP OF TEMPLES, NARESAR, DISTRICT MORENA

Removal of heavy stones from drain with the help of chain- pully and dry stone masonry work of boundary wall have been carried out including disposal of debris from the site.

63. CHOUMUKHNATH TEMPLE, NACHNA, DISTRICT PANNA

Conservation works like water tightening, providing of apron and recess pointing were carried out. A cultural notice board was also provided at the site.

64. AJAYGARH FORT, AJAYGARH, DISTRICT PANNA

At Ajaygarh fort staff quarters were provided with proper doors and windows. Construction of dwarf wall is in progress.

Resetting of stone, slabs, pillars and beams of Temple no.2 was taken up and the stone members were fixed in actual position by providing copper dowels. The work of filling rubble stones on the platform of the temple is on going.

65. RAISEN FORT, RAISEN, DISTRICT RAISEN

Conservation of bulged and out of plumb small *chhatra* and dry stone masonry of the fortification wall near Gadi gate is in progress.

66. SIVA TEMPLE, BHOJPUR, DISTRICT RAISEN

The on going work of providing *kota* stone flooring on the base of cement concrete was completed. The work of providing pathway is in progress. Stone masonry work near rock engraving area is in progress.

67. SIR JOHN MARSHALL HOUSE, SANCHI, DISTRICT RAISEN

The work of constructing the dwarf wall with MS grill was carried out. The masonry wall between the museum building and Sir John Marshall house was removed and serviceable materials kept for re-use.

68. BUDDHIST STUPA AND REMAINS, BHARHUT, DISTRICT SATNA

The work of providing *kota* stone flooring in the interpretation hall was carried out.

69. RAHATGARH FORT, SAGAR, DISTRICT SAGAR

The entrance gate was strengthened through stone masonry work on the fort wall of its either side. Resetting and removal of fallen debris from the *baoli* at Badal mahal, Rahatgarh fort is in progress.

70. LARGE SHIV TEMPLE, MAHUA, DISTRICT SHIVPURI

A compound wall was provided for the safety and security of the monument.

71. NEELKANTHESHWAR TEMPLE, UDAYPUR, DISTRICT VIDISHA

The original stone flooring of the platform which was sunken, broken, has been taken up for resetting on concrete base one by one carefully and providing necessary dowels wherever required. The work is in progress.

BHUBANESWAR CIRCLE

ODISHA

72. KEDARESVAR TEMPLE, CHOUDWAR, DISTRICT CUTTACK

The conservation work of the sub-shrine was completed by way of water tightening, pointing, grouting and resetting of khondalite stone with traditional lime mortar.

73. ANCIENT SITE, BANESWARNASI, DISTRICT CUTTACK

In continuation of previous year's work the restoration and repair of the damaged *pidha* portion of *jagamohana* of Padmesvara Mahadeva temple was completed.

74. EXCAVATED BUDDHIST SITE, LALITAGIRI, DISTRICT CUTTACK

The conservation work of the monastery and *chaitya* complex is in progress by way of water tightening, pointing, grouting with traditional lime mortar.

75. KANAKESVARA MAHADEVA TEMPLE, KUALO, DISTRICT DHENKANAL

In continuation of previous year's work the repairing work of sub-shrines and flooring of the compound is in progress by laying khondalite stones.

76. GANGADHARASVAMI TEMPLE, KOTAKOLLA, DISTRICT GANJAM

In continuation previous year's work the periphery development work with the stone masonry is in progress. The repair to guard wall and pointing work of the ancient steps was completed.

77. ASOKAN ROCK EDICT, JAUGARH, DISTRICT GANJAM

In continuation of previous year's work the construction of the boundary wall with MS grill is in progress. The construction of duty shed and providing drinking water facility was completed.

78. JAGANNATHA TEMPLE, JAJPUR, DISTRICT JAJPUR

The conservation work of the temple was completed by way of water tightening, pointing, grouting, plastering and repair to the doors.

79. EXCAVATED BUDDHIST SITE, UDAYAGIRI-2, DISTRICT JAJPUR

The conservation work of the shrine complex in front of the monastery of the Udayagiri-2 by way of water tightening, pointing, grouting with traditional lime mortar is in progress.

80. VARAHANATHA TEMPLE, JAJPUR, DISTRICT JAJPUR

The conservation work of the temple has been completed by way of water tightening, pointing, grouting, plastering and repair to the doors.

81. TRILOCHANESVARA TEMPLE, JAJPUR, DISTRICT JAJPUR

The construction of the boundary wall with laterite stone masonry fixed with MS grill was completed.

82. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT KHORDHA

The repairs to the miniature sub-shrines in

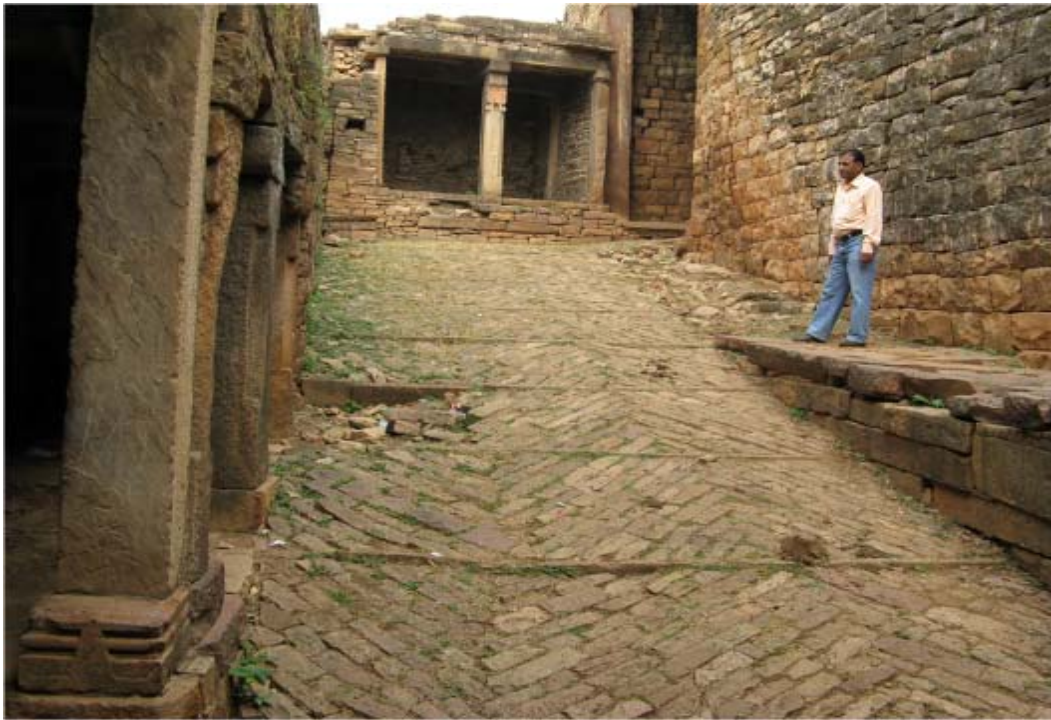


219



220

Chanderi fort, Chanderi : 219, before; 220, after the conserved fortification wall, See p.254



221



222

*Chanderi fort, Chanderi : 221, before; 222, after the work of providing flag stone flooring,
See p.254*

the complex are in progress by way of renewing the missing *pidha* stones and resetting the dismantled stone members at its original place with sand stone blocks and traditional lime mortar.

83. ANANTAVASUDEVA TEMPLE, BHUBANESWAR, DISTRICT KHORDHA

The repair to *simhadwara* of the temple pedestal has been completed.

84. SAHASRALINGA TANK, BHUBANESWAR, DISTRICT KHORDHA

The restoration work of the dilapidated miniature shrines located all around the tank was taken up by way of resetting the architectural members to their original position. The decayed ones and the missing parts of the temple are being replaced with the new dressed sand stone as per the original. The work is in progress.

85. MAKARESVAR TEMPLE, BHUBANESWAR, DISTRICT KHORDHA

The water tightening of the temple is in progress by way of pointing with traditional lime mortar was completed.

86. MEGHESVAR TEMPLE, BHUBANESWAR, DISTRICT KHORDHA

In continuation of previous year's work the renovation of the ancient tank of the temple was completed.

87. PAPANASINI TANK, BHUBANESWAR, DISTRICT KHORDHA

The restoration work of the embankment wall of the dilapidated tank was completed.

88. UDAYAGIRI AND KHANDAGIRI CAVES, BHUBANESWAR, DISTRICT KHORDHA

The renovation of laterite stone paving in front of cave at the foot was completed.

89. ANCIENT SITE, HARIPUR GARH, DISTRICT

MAYURBHANJ

In continuation of previous year's work the structural repair to the excavated brick structures is in progress by way of dismantling, resetting and recess pointing of the brick joints, replacing the decayed bricks with old ones found during scientific clearance with traditional lime *surkhi* mortar as per the original.

90. SRI JAGANNATHA TEMPLE, PURI, DISTRICT PURI

The repair and replacement of damaged and worn out stones of *simhadwara* with new khondalite stone blocks as per original is in progress. The insertion of 4 nos. of stainless steel beams below the lintel of entrance passage was completed. The both side's walls of the entrance passage of *simhadwara* was strengthened by way of joint sealing and grouting with the help of polymer modified cement mortar. The work of repairs to the damaged *chalas* of *simhadwara* on eastern entrance with new khondalite stone after deplastering the loose cracked lime plaster is in progress.

The removal of the dead plaster from the *jagamohana* of the main temple on north-west corner was completed and on north-east corner is in progress. Besides, deplastering of northern entrance to the temple complex for conservation is in progress. Besides, laying of khondalite stone flooring to the western side of the main temple is in progress by way of replacing the damaged stones with new ones.

Repairs to the *garbhagriha* was attended and after shifting of the presiding deities. As per the recommendation of the Technical Expert Committee and the Temple Administration, the conservation measures, initiated are

- i) Dry cleaning of the inner walls of *garbhagriha* to remove the deposited dust lichens and white patches formed due to evaporation of smokes from

“mahaprasada”.

- ii) Painting with synthetic enamel paint, red oxide primer, coaltar epoxy, rubber paint to the existing iron and wooden members situated in the *garbhagriha* with golden yellow painting to the newly installed “*kanakamundi*” over the *ratna simhasana*.
- iii) Weather coat painting over the plastered surface of *antarala*, *garbhagriha* entrance wall as per the request of the temple administration.
- iv) Checking of the inner pocket of *jagamohana* with detail documentation i.e. photography, drawings, laser photography as per the advice of the Core committee.
- v) Drilling holes in the roof of *garbhagriha* by widening from one inch (1inch) to (3inches) *dia.* with the help of non-vibratory drilling stand machine under the supervision of Core committee to evacuate more air circulation through *garbhagriha* with detail documentation of the existing vent holes for future study.
- vi) Construction of collapsed dwarf wall in the eastern side of Lord Jagannatha temple, Puri for landscaping purpose.
- vii) Painting of *bijerasta* from *satapahacha* to *baisipahacha* with matching cement paint/weather coat inside the temple complex and enamel painting over iron and wood members.
- viii) Minor repairs to Ananda *bazaar bijerasta* to *snanavedi* including pot hole repairing, replacement of damaged stone slabs, joint sealing, and painting of cast iron grills of *snanavedi* on eve of *Snana purnima* dated 04.06.2012.
- ix) Sealing the wide joints with PMC mor-

tar to the khondalite floor of *bhogamandapa* with red oxide priming to the MS jally fitted with ceiling. (Works attended during car festival).

Erection of scaffolding for inspection of *kalasa* and Nilachakra has been done as per decision taken in the Core committee meeting.

91. SUN TEMPLE, KONARK, DISTRICT PURI

Digging of drain with laterite sidewalls and base was completed.

CHANDIGARH CIRCLE

HARYANA

92. DARGAH OF HAZRAT SHEIKH JALALUDIN, KURUKSHETRA, DISTRICT KURUKSHETRA

Restoration of bulged underground cells after taking out of uneven portion and restoration of tile brick flooring after dismantling uneven portion with lime concreting is in progress

93. KARAN-KA-TILLA, THANESAR, DISTRICT KURUKSHETRA

The work of provided grill fencing around the area was completed.

94. NABHA HOUSE, THANESAR, DISTRICT KURUKSHETRA

Provided wooden roof with rafter, planks including laying lime concrete and tile brick flooring after dismantling slabs on the roof, modern structure on the back of Nabha house, is in progress.

95. CHURCH TOWER, KARNAL, DISTRICT KARNAL

Providing apron around graves, boundary wall besides pathway with tile brick on edge flooring with lime concreting is in progress.

96. KALA AMB, PANIPAT, DISTRICT PANIPAT

Providing red sandstone flooring on pathway of remaining portion was completed.

97. WAR MEMORIAL SITE AT KALA AMB, PANIPAT, DISTRICT PANIPAT

Providing, laying lime concreting and red sand flooring on pathway of remaining portion was completed.

98. KABULI MOSQUE, PANIPAT, DISTRICT PANIPAT

Providing pathway of tile brick on edge for smooth movement of tourist/visitors was completed.

99. ADI BADRI COMPLEX, YAMUNANAGAR, DISTRICT YAMUNANAGAR

Providing dwarf wall in tile brick with grill fencing around the area was completed.

100. ANCIENT MOUND, AGROHA, DISTRICT HISSAR

Providing dwarf wall in tile brick with grill fencing, tile brick masonry, brick-on-edge on pathway was completed.

101. GUJRI MAHAL, HISSAR, DISTRICT HISSAR

Water tightening of roof, stone masonry work and lime plastering on the exterior was completed

102. FEROS SHAH-KI-LAT, FATEHABAD, DISTRICT FATEHABAD

Lakhauri and tile brick work, pointing etc. was attended and completed.

103. ANCIENT SITE, NAURANGABAD, DISTRICT BHIWANI

Earth works in excavation, brick tile masonry, pointing, concreting and MS grill railing on dwarf wall completed.

104. SURAI KUND, LAKKARPUR, DISTRICT FARIDABAD

Restoration of dislodged stone steps, leveling of the bed of tank was completed. Grill fencing is in progress.

105. JAL MAHAL, NARNAUL, DISTRICT MAHINDERGARH

Stone masonry, pointing and MS grill fencing over dwarf wall around the existing parking area near Jal Mahal was completed.

106. GROUP OF TOMBS, JHAJJAR, DISTRICT JHAJJAR

Stone masonry work concreting, pointing and MS grill over boundary wall was completed.

107. KOS MINAR, SECTOR 29, FARIDABAD, DISTRICT FARIDABAD

Conservation and restoration of Kos *minar* was completed.

108. KOS MINAR, BANCHARI NO.2, HODAL, DISTRICT FARIDABAD

Lakhauri brick masonry, concreting, plastering and tile brick-on-edge in platform was completed.

PUNJAB

109. MACHIGARH AND HAMMAM BUILDING/COMPANY BAGH, AMRITSAR, DISTRICT AMRITSAR

Tile brick-on-edge apron and flooring and red sandstone *jalis* was provided. Water tightening of rooms is in progress.

110. ANARKALI BARADARI, BATALA, DISTRICT BATALA

Work of over all development excluding boring of tube well and structural repairs/sta-

bilization of foundation phase I and II was completed.

111. SHAMSHER KHAN TOMB, BATALA, DISTRICT BATALA

Lakhauri tile brick masonry, grill fencing with dwarf wall, fencing to enclose the area was taken up and completed.

112. TAKHT-E-AKBARI, KAIANAUR, DISTRICT GURDASHPUR

Taking out dislodged masonry and providing tile brick masonry and MS grill fencing, lime plaster and lime concreting of flooring etc. is in progress.

113. GATEWAYS OF SARAI, AMANAT KHAN, AMRITSAR, DISTRICT AMRITSAR

Repairs to the cells of western gate on the south-western side was taken up after, removal of earth, underpinning, pointing, stitching etc. besides flooring and restoring of roof.

114. GATEWAY OF OLD SARAI, FATEHAFAAD, DISTRICT FATEHAFAAD

Lakhauri brick masonry, stitching of cracks, pointing lime concreting, flooring is in progress.

115. DAKHNI SARAI, NAKODAR, DISTRICT JALANDHAR

The pointing, concreting, edging, tile brick flooring was attended and MS grill fencing on south portion completed. Work on western side wall is in progress.

116. NUR MAHAL SARAI, NURMAHAL, DISTRICT JALANDHAR

The work of *lakhauri* brick masonry, pointing, concreting, edging, tile brick flooring and MS grill fencing work was completed.

117. MUGHAL BRIDGE, JAHANGIR, DISTRICT

JALANDHAR

Plastering, pointing and edging of arches, niches, including concreting was undertaken and completed.

118. ANCIENT SITE THEH, GHATI NAGAR, DISTRICT JALANDHAR

Earth work in excavation, brick tile masonry, pointing, concreting and provided MS grill fencing have been done and completed.

119. ANCIENT SITE KATPLON, DISTRICT JALANDHAR

Earth works in excavation, brick tile masonry, pointing, concreting and MS grill fencing has been done. Work was completed.

120. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA

Taking out loose, decayed brick masonry, flat brick terracing and old lime concreting, provided mud brick masonry first class brick masonry and *lakhauri*/tile brick masonry at fortification wall and buttress platform wall in south side, provided and laying lime concreting in foundation and terrace. Brick terracing at upper terrace and platform terrace, pointing etc. is complete. Taking out of loose, decayed brick masonry, flat brick terracing and old lime concreting, provided and laying lime concrete in foundation of the wall of north side, work in progress. Earth work in excavation, brick tile masonry, pointing, concreting and MS grill fencing done in outer southern side Bhatinda fort, Bhatinda have been completed.

121. AAM KHAS BAGH, SIRHIND, DISTRICT FATEHGARH SAHIB

Removal of vegetation growth, taking out loose, decayed, damaged old brick masonry, concreting work, plastering, restoration of *lakhauri* brick masonry, brick on edge floor-

ing, brick tiles, lime *surkhi* mortar, pointing etc. have been completed under deposit works.

122. QUILA ANDROON, BA'GCHI GHAR, PATIALA, DISTRICT PATIALA

Fixing first class *sal* wood seatlings of different sizes in roofs, *deodar* wooden planking on the roofs was provided with laying of lime concreting in roofs, rooms etc. 50mm thick lime *surkhi*. Applying pointing of joints in *lakhauri* brick masonry was done. The work is still in progress.

CHENNAI CIRCLE

TAMILNADU

123. FORT ST. GEORGE, CHENNAI

The works of water tightening the terrace of the rampart wall on the north-western side and the work providing gates to the underground cells of the fortification wall were completed. Railing was provided at the entrance gate on the eastern side of the fort wall.

The works of conserving damaged joists in Gallery nos. 8 and 9 of Block no. xxxvi and removing damaged partition walls and floor of the toilets and providing with new ones were completed.

The works of removing the damaged plaster and replastering on the western side of the Clive house work of conserving the terrace of toilet block of Clive's house were completed.

The fallen debris of the southern wing walls within the last house on the left of Snob's Alley was removed. Conservation works are in progress.

124. DHARMESWARA TEMPLE, MANIMANGALAM, DISTRICT KANCHIPURAM

The work of conserving the damaged steps in front of the main shrine and Amman shrine and work of providing apron around the temple

with stone flooring were completed.

125. MEGALITHIC CISTS, MAGANIYAM, DISTRICT KANCHIPURAM

The work of providing fencing around the site was completed.

126. MEGALITHIC CISTS AND CAIRNS, VADAMANGALAM, DISTRICT KANCHIPURAM

The work of providing fencing around the site was completed.

127. MEGALITHIC CISTS AND CAIRNS, SIRUKALATHUR, DISTRICT KANCHIPURAM

The work of providing fencing around the site was completed.

128. LARGE GROUP OF MEGALITHIC CISTS AND CAIRNS, MELAKOTTAIYUR, DISTRICT KANCHIPURAM

The site was demarcated and partly fenced on the western side of the protected site.

129. DOLOTSAV MANDAPA, MAMALLAPURAM, DISTRICT KANCHIPURAM

The work of providing fencing on the northern side of the protected area was completed.

130. SHORE TEMPLE, MAMALLAPURAM, DISTRICT KANCHIPURAM

The damaged fencing was removed and provided with new one on the southern side of the monument between the first and second entrance gates.

131. GROUP OF MONUMENT AT HILLOCK, MAMALLAPURAM, DISTRICT KANCHIPURAM

The work of repairing the badly damaged path way is being carried out.

132. JALAKANTESWARA TEMPLE, FORT VELLORE, DISTRICT VELLORE

The outer *prakara* of the temple on the south-west corners, western side and northern corner was provided with stone flooring to

avoid the stagnation of water. The work of providing grill fencing on the southern and eastern sides of the temple has been completed.

133. FORT VELLORE, VELLORE, DISTRICT VELLORE

The work of removing undulated fallen, lower moat wall stone member on the western side of the monument is in progress.

134. THE MASJID AND TWO PONDS IN THE WEST OF THE CITADEL, ARCOT, DISTRICT VELLORE

The work of providing fencing on the western and northern side of the monument with iron Gate at the entrance has been completed.

135. DELHI GATE, ARCOT, DISTRICT VELLORE

The work of providing grill fencing on the south side and west side of the monument with iron gate at main entrance has been completed.

136. RAJAGIRI FORT, FORT GINGEE, DISTRICT VILLUPURAM

The sunken stone steps on the northern side of the Chettikulam tank has been conserved. The precousiously standing capital, beams and stone slabs of the cloister *mandapa* of Elephant's tanks was rearranged and completed (pls. 223-224).

137. KRISHNAGIRI FORT, GINGEE, DISTRICT VILLUPURAM

The work of fencing the protected area of the fort on the northern side was completed.

138. PONDICHERRY GATE, DISTRICT VILLUPURAM

The grill gate was provided to the northern and western entrance of the Pondicherry gate.

139. ROCK-CUT CAVE, NARASAMANGALAM, DISTRICT TIRUVANNAMALAI

The work of providing fencing to the protected monument on the southern side was com-

pleted.

140. APATHSAHAYESWARA TEMPLE, SENDAMANGALAM, DISTRICT VILLUPURAM

The work of conserving the *chhajja* on the south-east corner of *mandapa* and southern corridor has been carried out. The works of conserving the stone flooring on the northern and southern corridor and conserving the *prakara* wall on the eastern side of the temple were completed.

141. CHENNARAYAPERUMAL TEMPLE, ADIYAMANKOTTAI, DISTRICT DHARUMAPURI

The work of providing fencing on the south-west corner of the temple was carried out.

142. FORT ON ROCK, DINDIGUL, DISTRICT DINDIGUL

The work of providing fencing around the pond has been carried out.

143. SIKKANATHASWAMY TEMPLE, KUDUMIYANMALAI, DISTRICT PUDUKOTTAI

The work of conserving a part of *thirumadil* on the northern side of the monument was completed (pls. 225-226).

144. FORT AND TEMPLE, TIRUMAYAM, DISTRICT TIRUMAYAM

The work of providing fencing, on the eastern side of the tank (*puskarani*) was completed. The work of conserving the brick merlon was completed.

145. TIRUMALAI NAYAKA'S PALACE, SRIVILLIPUTHUR, DISTRICT VIRUDHUNAGAR

The ornamental parapet wall on the eastern, northern and western sides was cleaned. The works of removing old damaged plasters and replastering part of the wall surface of palace and conserving the damaged roof were completed.

146. ROCK-CUT SIVA AND VISHNU TEMPLE,



223



224

Rajagiri fort, Gingee : 223, before; 224, after conservation of stone steps on the northern side of Chettikulam tank, See p.264



225



226

Sikkannathaswamy Temple, Kudumiyānmalai : 225, before; 226, after conservation of a part of northern side Thirumadil, See p.264

NARTHAMALAI, DISTRICT PUDUKOTTAI

The work of providing fencing around the monument was completed.

147. DOLMEN SITE, CHOKKANATHAPATTI, DISTRICT PUDUKOTTAI

The work of providing fencing around the protected site was completed.

PONDICHERRY

148. PANCHANADISVARA TEMPLE, TIRUVANDARKOIL, UNION TERRITORY OF PONDICHERRY

The works of conserving the terrace of *mahamandapa* and the *vimana* and *thirumadil* wall have been carried out.

149. MULANATHASVAMI TEMPLE, BAHOUR, UNION TERRITORY OF PONDICHERRY

The work of providing fencing on the south-west corner, western side and north-west corner of the temple was completed.

150. CONSTRUCTION WORK IN VISITOR'S TOILET BLOCK

The work of constructing visitor's toilet block in the Krishnagiri fort, Gingee, district Villupuram is in progress. The work of constructing visitor's toilet block at Venkatesa Perumal temple, Thirumukkudal, district Kanchipuram is in progress. The work of constructing visitor's toilet block at Muruganathaswamy temple, Thirumurganpoondi, district Coimbatore was completed.

DEHRADUN CIRCLE

UTTARAKHAND

151. JAGESHWAR GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA

In continuation of previous year's work,

damaged stone floor of the temple complex was repaired and old drainage system was revived. Compound wall around newly built staff quarters at Jageshwar was raised and earth deposited through land slide removed.

152. GROUP OF TEMPLES, PANDUKESHWAR, DISTRICT CHAMOLI

In continuation of previous year's work, repair to floor and providing proper drainage system was continued and completed.

153. SUN TEMPLE, KATARMAL, DISTRICT ALMORA

Eastern compound wall was consolidated and restored to strengthen the base of the temple. In addition to this, stone flooring to the eastern and north eastern parts of the temple complex was laid and completed to check the ingress of water.

154. SIVA TEMPLE, LAKHAMANDAL, DISTRICT DEHRADUN

Access to the monument was provided by providing a retaining wall and approach pathway on the north-east corner. Rotten wooden rafter, planks and patal stone of the sculpture shed were removed and provided with new *sal* wood rafters and planks. The floor was also laid with wooden laminated floorings.

155. CHANDPUR GARHI, DISTRICT CHAMOLI

Eastern side fort wall was conserved and restored.

156. MAHASU TEMPLE, HANOL, DISTRICT DEHRADUN

Roof of sculpture shed was provided with corrugated iron sheet, floor is laid with wooden laminated floorings.

157. RUDRANATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI

Heap of dumped *malwa* in the backyard of Rawal palace was removed to bring back the complex in original form.

158. ADIBADRI GROUP OF TEMPLES, DISTRICT CHAMOLI

Roof of *kirtan mandap* has been repaired during period under review. Rotten wooden rafters, planks and broken patal stones have been removed and provided with new ones as per original. The work is completed.

DELHI CIRCLE

DELHI

159. BARA BATASHE WALA MAHAL, DELHI

The structural repairs by way of stone masonry with lime mortar and lime plaster along with different colour decoration work are in progress.

160. BARBER'S TOMB, DELHI

The damaged tiles were replaced with the new ones, as per the original.

161. BU-HALIMA'S TOMB AND GARDEN, DELHI

After dismantling the worn out and decayed cement concrete flooring, the masonry work of the pathway is in progress. In the Bu-Halima's tomb, the red sand stone paved floor was provided and masonry work on the *kanguras* of the dome is in progress.

162. CHAUSATH KHAMBA, DELHI

The structural repairs, to the ceiling of dome is in progress.

163. CHOTA-BATASHE WALA MAHAL, DELHI

Scientific clearances have been completed and rubble masonry work of the boundary wall is in progress.

164. FATEHPURI MASJID, DELHI

Damaged and pulverized lime-plaster and veneering stones were restored as per original.

165. HUMAYUN'S TOMB, DELHI

Patch plaster, RR masonry, pointing of masonry joints, providing of apron and other petty repairs to the complex were attended to. The cells of lower platform were provided with MS doors having steel-mesh. On the exterior of the drum damaged and missing black marble stone in geometrical design inlaid over red sand stone and veneering stones were restored as per original. Tile work provided at the small *chhatti* on the top roof, dome of pavilion and small canopy of western side with lime punning work is in progress.

166. ISA KHAN'S TOMB AND MOSQUE, DELHI

The structural repairs comprising inlay work of main dome and marble pinnacle had been laid on the top of the dome. Relaying of stone pathway around the Isa Khan's mosque is in progress.

167. LAKKAR WALA GUMBAD, DELHI

Damaged and pulverized lime-plaster were restored as per the original on the main platform of tomb is in progress.

168. NILI MOSQUE, DELHI

Damaged and pulverized plasters were restored as per the original on the eastern and southern side walls of the monument.

169. QUDSIA MOSQUE, DELHI

Ornamented red sand stone slabs were restored as per original. Restoration work carried out on main entrance gate by way of lime plaster, *pan-patta* design on red sand stone and dasa stone.

170. RAJON-KI-BAIN, DELHI

The structural repair by way of lime *surkhi* plaster in combination of mortar was carried out to cells of *baoli*.

171. RED FORT, DELHI

Restoration of damaged and missing semi-precious stone of floral motifs, damaged red sand stone *chhajja* and *jali* were replaced as per original in Rangmahal and replacement work of broken and missing tiny mirror pieces is in progress. In *Sawan* pavilion damaged marble stone of *chhajja* and damaged semi-precious stone of floral motifs were replaced as per the original. Repair work of damaged red sand stone of *chhajja* and *jali* is in progress. The masonry pathway and fixation of MS railing between Naubat Khana and Diwan-i-Am were attended to. The masonry pathway on northern side of colonial building was completed and fixation of MS railing on the back side of Institute building is in progress.

In Lahore gate the restoration work of damaged red sand stone *chhajja* and *chhatris* were also undertaken.

172. SAFDARJUNG'S TOMB, NEW DELHI

Damaged and pulverized lime-plasters were restored over the western side wall of Jangli *mahal* and repair works in wooden door were attended to. Red sand stone slabs were paved over the pathway. Wooden ramp was provided to main platform for disabled tourist. Repair work of water drain system on the first floor of the monument is in progress.

173. SARAI SHAHJI, NEW DELHI

The structural repairs comprising the work of stone masonry with lime mortar and lime plaster were undertaken in the northern and southern sides. Dismantling and leveling work in notified area is in progress.

174. SHEESH MAHAL, NEW DELHI

The structural repair comprising the fixation of MS railing on the dwarf wall of all around the monument.

175. TRIPOLIA GATEWAYS, DELHI

Damaged red sand stone of gateway complex, which had been damaged extensively due to collision of overloaded trucks and buses. Besides these the damaged and pulverized lime plasters were restored as per original.

176. TUGHLUQABAD FORT, DELHI

The repair to the damaged portion of the wall of Tughluqabad fort were undertaken by way of pointing and lime-plaster as well, as per the original.

177. UNKNOWN TOMB, DELHI

The masonry work to the boundary wall of monument is in progress.

178. USUF QATTAL'S TOMB, DELHI

The structure was strengthened by way of stone masonry in combination lime mortar and fixing of MS railing over low masonry wall to stop encroachment.

DHARWAD CIRCLE

KARNATAKA

179. DURGA TEMPLE, AIHOLE, DISTRICT BAGALKOT

Earth work excavation for wall and flooring was carried out. Providing and removing stone masonry wall, dismantling the dislodged out of plumb portion with proper documentation. Reconstructed the dismantled structure by fixing new stone members wherever missing, laying concrete bed to support wall and flooring, laying sand stone flooring all around shrine and pathway connected to each temple and veneered dwarf wall was constructed.

180. FORT WALL AT MEGUTI TEMPLE, AIHOLE, DISTRICT BAGALKOT

Earth work of excavation, dismantling and constructing the dislodged fallen dry stone masonry, laying concrete bed to the foundation wherever necessary and lime concrete over the wall which acts as water proofing material was attended.

181. BADIGER GUDI, AIHOLE, DISTRICT BAGALKOT

Earth work excavation for foundation of the compound wall and flooring was done. Laying concrete bed, constructing sandstone masonry, laying concrete for the plinth. Fixing coping stone, curbing stone for sides of flooring, MS grill over the compound wall and plastering.

182. JYOTIRLINGA GROUP OF TEMPLES, AIHOLE, DISTRICT BAGALKOT

Earth work excavation for foundation of the drainage line for sub shrines, flooring and dwarf wall was attended to dismantling, reconstructing and consolidating the sunken sub-shrine and sand stone flooring was also provided. Construction of veneered dwarf wall by fixing coping stone and providing new stone members to roof slabs, lintel, *kakshasnas*, beams, *gopura* missing portions etc. was attended.

183. MALLIKARJUN GROUP OF TEMPLES, AIHOLE, DISTRICT BAGALKOT

Earth work excavation for foundation of the drainage line and laying concrete bed was done. Removal of rank vegetation, providing new stone members to roof slabs, lintel, *kaksasana*, beams, *gopura* missing portions etc. were also done. Construction of veneered dwarf wall and compound wall was completed.

184. OLD JAINA TEMPLE (MELGUDI) HALLUR,

AIHOLE, DISTRICT BAGALKOT

Removing rank vegetation and debris clearance was done. Earth work excavation for flooring and ramp. Laying concrete bed to the flooring pathways and retaining wall was attended to providing and laying sand stone flooring for pathways and apron, construction of veneered of compound wall, fixing coping stone to the compound wall top, construction of sandstone masonry for foundation and core of veneered compound wall, providing and fixing wooden door, dismantling of existing steps in front of temple, providing and fixing new stone members (steps) as per requirement as per original were done. Repairs to the angle frame embedded with mesh including fixing repair and oil painting over a coat of metal primer was successfully attended.

185. GROUP OF TEMPLES AT PATTADAKAL, PATTADAKAL, DISTRICT BAGALKOT

Stone flooring pathway leading to the temples (pls.227-228) was provided.

186. FORTIFICATION WALL, GULBARGA, DISTRICT GULBARGA

Construction of the fallen and bulged out western side fortification wall bastion including missing merlon two part detailed description given below was done. Removing dislodged and loose part of the wall in the adjoining area of the collapsed fort wall its core filling very carefully and stocking the same usable materials and disposing unwanted materials, exposing the foundation and checking its integrity by excavation were done. Construction of fort wall bastion as per original using same deccan trap stone block and providing the pointing construction of the fort wall after racking out joints in lime mortar water curing, etc. were also done (pls.229-230).

Repair and renovation to structure inside the fort (ladies mosque) was attended. It is a dilapidated ancient structure and entire structure load bearing pillars and vertically cracked and structure bearing to fall and domes, as detailed work done given below was done. Mending broken arches inner decorated domes, ceiling and wall very carefully as per original was provided. Construction of plastering and parapet wall, providing in front *chhajja* as per original was done. The missing *chhajja* bottom supporting stone and 1" thick *kadapa* top stone and construction of compound wall as per original by laying lime concrete flooring, finishing neatly was completed.

187. HAFT GUMBAZ, GULBARGA, DISTRICT GULBARGA

Missing and fallen portion of basement veneering wall of back side (southern side) of Firoz Shah, Dawood Shah, Muzahid Shah tombs was constructed as per original by using special trap stone block after stone dressing and side cutting in required size and shape.

188. EXCAVATED SITE, KANAGANAHALLI, SANNATI, DISTRICT GULBARGA

Construction of temporary shelter for keeping panels providing pile foundation, plinth beam in RCC, stone flooring safety wall and top fabricated iron roof etc. completed.

189. SIDDESHWAR TEMPLE, HAVERI, DISTRICT HAVERI

Construction of underground tank in brick masonry and laying the RCC slab for stocking water and providing and fixing water cooler to provide drinking water to the visitor was successfully carried out.

190. SOMESWARA TEMPLE, HARLAHALLI, DISTRICT HAVERI

Earth work excavation for leveling the un-

dulated area and filling the earth to the depression area and removing the old wall accessories towards east, west and south side of the temple shifting and stocking of old architectural members and laying the lawn was done. Earth work excavation and laying cement concrete bed and paving schist stone slabs over it with proper dressing, cutting, pointing etc., complete to the path way of main temple towards eastern side was attended. Construction of dwarf compound wall with rubble masonry and fixing the MS frame wire mesh over it including painting etc., providing and paving schist stone apron with proper dressing and cutting after earth work excavation and laying concrete was also provided.

191. TARKESWARA TEMPLE AT HANAGAL, DISTRICT HAVERI

Outer veneering wall with new schist stone in two line dressing and proper side cutting at main entrance *mandapa* with proper core filling in rubble stone masonry was reconstructed, paving schist stone apron with earth work excavation and laying concrete was provided. Bed all around the main entrance *mandapa*, removing of rubble stone masonry wall at Parvati and Ganapati shrines and providing and fixing *kaksasana* stone with proper dressing cutting at Ganapati shrine was carried out. Providing and fixing of MS grills with using MS angel and MS square bar with proper fabrication and fixing at main entrance of *mandapa* and rear side of the shrines of main temple was also attended.

192. BILLESHWARA TEMPLE, HANAGAL, DISTRICT HAVERI

Fallen portion of porch with available schist stone blocks in proper dressing cutting including providing beam, roof slabs etc. by reconstruction.



227



228

*Group of temples at Pattadakal, Pattadakal : 227, before; 228, after laying of stones for pathways,
See p.270*



229



230

Gulbarga fort, Gulbarga : 229, before; 230, after restoration of fortification wall, See p.270

193. KADAMBESHWAR TEMPLE, RATTIHALLI, DISTRICT HAVERI

Weather proof course and damaged roof slabs, beams, pillars and base stones was removed. Base stone, pillar, beam, roof slabs with using new schist stones with proper dressing design and patterns and laying weather proof course including fixing old *harar* stone of main *mandapa* and roof of the temple was reconstructed.

194. MUKTESHWAR TEMPLE, CHAUDADANAPUR, DISTRICT HAVERI

Schist stone cladding to the existing compound wall with proper dressing and cutting etc., towards south of the temple was fixed and provided. Schist stone flooring and curving to the pathway in proper dressing cutting after earth work excavation and laying paving the stone over concrete towards south side was provided. Stone masonry retaining wall to avoid sliding of earth was constructed. MS frame wire mesh with proper fabrication and painting towards south, east and north sides of the temple was provided and fixed.

195. NAGARESHWARA TEMPLE, BANKAPUR, DISTRICT HAVERI

Drainage in rubble masonry towards east, south and north sides of the temple including earth work excavation, plastering to the wall in cement mortar, etc. was provided.

196. FORT AT MIRJAN, DISTRICT UTTARA-KANNADA

Fortification wall by reconstruction of dismantled including missing and fallen portions was restored.

197. MADHUKESHWAR TEMPLE, BANAVASI, DISTRICT UTTARA-KANNADA

Construction of schist stone wall after re-

moving the existing modern laterite stone wall at main entrance towards eastern side was done. The cladding / veneering wall to the parapet wall of Narasimha temple with in the premises of temple was provided.

GOA CIRCLE

GOA

198. SE' CATHEDRAL CHURCH, OLD GOA

The damaged and sunken transept Mangalore tiled roof towards north and south sides of the church was repaired after dismantling and replacing the damaged/broken/worn out wooden members of the roof with the new ones with a coat of wood preservative along with GI sheets placed at the four corners of the roof for easy flow of rain water. The damaged/cracked plaster of the roof portion above the main altar was re-plastered and top have been watertightened and applied with the rubber seal compound (pls.231-232).

199. ST. FRANCIS OF ASSISI CHURCH, OLD GOA

The undulated and sunken Mangalore tiled roof towards northern side (museum side), southern side (road side) and also the quadrangle roof of the museum has been repaired after dismantling and replacing the damaged/broken/worn out wooden members with new ones. The rusted GI gutters have been removed and fitted with new ones at both north and south sides (museum side and road side) for easy flow of rain water. The edge roof portion of the church has been applied with rubber seal compound.

200. RACHOL SEMINARY AT RAIA, GOA

The damaged laterite stone/concrete pavement/apron has been removed around the seminary and has been laid with new laterite stone pavement by earthwork excavation, rubble soling, PCC bed and with jointing. The underground water tank has been watertightened by

removing the damaged plaster and re-plastering the same.

201. MAHADEV TEMPLE, TAMBDISURLA

Lawn has been developed in the entire complex of the Mahadev temple after removal of waste earth and laying good soil along with manure and cow dung. The schist stone pathways have been provided at all four sides of the temple along with curbing stone.

202. UPPER FORT, AGUADA, CANDOLIN

The missing/damaged portion around the tank and light house has been provided with laterite stone pavement after duly excavating the earth, rubble soling, laying PCC bed and pointing to the floor and existing floor. The damaged underground tank top surface and light house has been de-plastered and re-plastered.

203. SAFA MASJID, PONDA

The dislodged/undulated platform and steps of the tank on eastern side has been fully dismantled and reset after proper documentation by way of photography, drawing, numbering each stones, is completed along with pointing for the same and for the missing portion of the floor (pls.233-234).

GUWAHATI CIRCLE

ASSAM

204. THE ROCK- SCULPTURES KNOWN AS VISHNU JANARDHAN, GUWAHATI, DISTRICT KAMRUP

Construction of stone breast wall has been undertaken.

205. GROUP OF FOUR MAIDAMS AT CHARAIDEO, DISTRICT SIVASAGAR

Construction of brick retaining wall in

the excavated maidam was completed to check the soil erosion.

206. GAURISAGAR TANK, DISTRICT SIVASAGAR

A culvert was made with hume pipes to drain out excess water from this tank during heavy rains.

207. VISHNUDOL AT GAURISAGAR, DISTRICT SIVASAGAR

Strengthening and watertightening of the ancient compound wall was completed.

208. SIVADOL AT GAURISAGAR, DISTRICT SIVASAGAR

Strengthening and watertightening of the ancient compound wall was undertaken.

209. MONOLITHS, KASOMARI PATHER, DISTRICT GOLAGHAT

Painting to the MS grill over the compound wall was completed.

210. MASONRY REMAINS OF BAMUNI HILL, TEZPUR, DISTRICT SONITPUR

Construction of stone breast wall was undertaken.

211. IDGAH AT RANGAMATI HILL, DISTRICT DHUBRI

The height of the existing compound wall has been raised for fixing of MS railing over it. Plaster and painting of the compound wall have also been completed.

212. SRI SRI HAYAGRIVA MADHAVA TEMPLE, HAJO, DISTRICT KAMRUP

Construction of the drain was completed.

213. CACHARI RUINS AT KHASPUR, DISTRICT CACHAR



231



232

Se' Cathedral, old Goa : 231, during; 232, after renovation of transept roof, See p.274



233



234

Safa masjid, Ponda : 233, before; 234, after resetting of sunken platform and dislodges steps and arch of water tank, See p.275

Restoration of the ancient enclosure brick work including pointing has been completed. Providing pathway and other works for fixing of the chequer tiles are also completed. Cutting of earth for compound has been undertaken.

ARUNACHAL PRADESH

214. ANCIENT REMAINS AT BHISMAKNAGAR, DEBANG VALLEY, DISTRICT WEST KAMENG

Construction of compound wall was taken up.

TRIPURA

215. THAKURANI TILLA, PASCHIM PILAK, DISTRICT SOUTH TRIPURA

Tilted and damaged GI roof truss over the sculptures were replaced.

216. ANCIENT REMAINS AT BOXANAGAR, DISTRICT WEST TRIPURA

Painting on the MS grill of the compound wall has been done. Plastering and painting work of the compound was completed.

217. ROCK-CUT SCULPTURES AT UNAKOTI, DISTRICT NORTH TRIPURA

Cutting earth / soil for widening of flight steps. Foundation of the flight steps and fixing GI posts for railing have been taken up. Besides these, stone masonry work for widening of the flight steps has also been undertaken (pls.235-236).

NAGALAND

218. REMAINS OF A FORT AT DIMAPUR, DISTRICT DIMAPUR

Besides landscaping of the site, toilet block was provided.

HYDERABAD CIRCLE

ANDHRA PRADESH

219. CONSERVATION OF GATEWAY OF GOOTY FORT, DISTRICT ANANTAPUR

Conservation was carried out to the fallen gateway of fort by restoring to its original form with the available stones in lime mortar (pls.237-238).

220. EUROPEAN CEMETERY IN GOOTY FORT, DISTRICT ANANTAPUR

The damaged and bulged out tombs in the cemetery by repairing the affected portion and partly restoring damaged parts in lime mortar conserved and strengthened the tombs by grouting and plastering.

221. MADHAVARAYA SWAMY TEMPLE, GORANTLA, DISTRICT ANANTAPUR

With the originally exposed flooring members, even floor level around it granite flooring is provided over lime concrete bed around the temple. Necessary slopes have been provided to drain out the rain water which flows outside the temple through the channels.

222. BASAVANNA BHAVI, PENUKONDA, DISTRICT ANANTAPUR

Repairs were carried out to the damaged side walls of Basavanna *bhavi* with the available stones and re-plastered the standing bull at the entrance of the well with lime mortar. An ancient structure of *natyamandapa* with sculpture converted into a school building adjacent to Basavanna *bhavi* was exposed by removing the accretion walls and modern tiled roof with iron channels. The accumulated debris around the *natyamandapa* was cleared upto the plinth level. Barbed wire fencing was provided to avoid the trespassing of the public.

223. VENKATESHWARA VISHNU TEMPLE, MANGAPURAM, DISTRICT CHITTOUR

Repairs was carried out to the damaged



235



236

Rock-cut sculptures, Unakoti : 235, before; 236, after widening and fixing GI posts on the steps, See p.278

flooring of cloister *mandapam* on south-east corner and north-east corner of the temple.

224. WESTERN GATE ENTRANCE, LOWER FORT, CHANDRAGIRI, DISTRICT CHITTOR

The fallen breach “C” at western gate entrance of the lower fort was restored.

225. SRI CHENNA KESHAVA SWAMY TEMPLE, SOMPALEM, DISTRICT CHITTOR

For environmental beautification around the monument, a bed of lawn is provided in protected area.

226. GOLCONDA FORT, HYDERABAD, DISTRICT HYDERABAD

Pathway from steps to Ramadas prison was provided for the convenience of tourists by using rubble stones in lime mortar after clearing of debris and jungle growth. Repairs were done to the fallen breach near Ibrahim mosque by partly restoring the same in lime mortar to original. Grouting was done to the Camel Stable to fill up the voids inside to strengthen in lime mortar. Conservation of the damaged lime flooring in Camel Stable was done by applying lime plaster to the ceiling with brick *surkhi* after removing the dead lime mortar. Removed all fallen debris around the merlons area and fort wall for attending conservation works to the damaged merlons and fort wall etc.

227. SRI KAMALASAMBHAVESWARA SWAMY TEMPLE, PUSHPAGIRI, DISTRICT KADAPA

Pointing to the roof stone slabs for both top and bottom of the roof, brick jelly lime concrete over the roof of Kamalasambhaveswara Swamy temple, providing plain lime concrete with brick jelly for flooring of *mandapa* and *kadapa* stone slab flooring in *mandapa* was attended.

228. SRI VAIDHYANADHA SWAMY TEMPLE COMPLEX, PUSHPAGIRI, DISTRICT KADAPA

Stucco plastering to *vimana* of

Trikuteswara Swamy temple was provided. The damaged compound wall was reconstructed in front of Sri Bheemalingeswara Swamy temple in the Sri Vaidhyanaadha Swamy temple complex.

229. WATCH TOWER, GANDIKOTA, DISTRICT YSR

The damaged portions of the the watch tower were replastered with lime mortar by adding natural ingredients. Also provided stone pathway with available stone boulders in lime concrete.

230. SRI SOWMYANADA SWAMY TEMPLE, NANDALUR, DISTRICT YSR

Dilapidated lime concrete over the roof of cloister *mandapa* were removed. Roof slabs, beams, capitals, columns and veneer stones and stacked at site were reused. Earth work excavation and removal of debris has been carried out. The work is in progress

231. SRI UMA MAHESHWARA SWAMY TEMPLE, YAGANTI, DISTRICT KURNOOL

Re-laid dressed stone flooring with matching sandstone slabs after dismantling the modern damaged polished slabs in *garbhalaya*, cloistral *mandapa* and around entrance *gopura*.

232. GARUDA BRAHMA TEMPLE, ALAMPUR, DISTRICT MAHABOBNAGAR

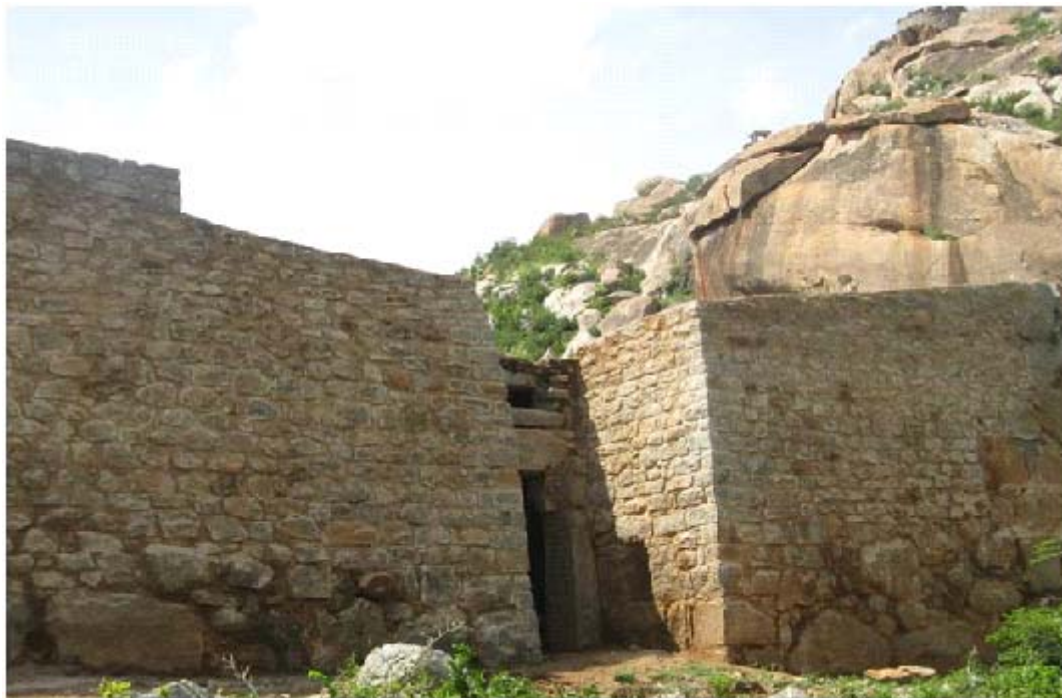
Dressed stone flooring with matching sandstone slabs inside the temple was attended.

233. ABDUL WAHAB KHAN TOMB, KURNOOL, DISTRICT KURNOOL

Watertightening of the roof of cellar of Hawa Mahal with *taki* stone slabs over bed of lime concrete, providing safety railing near river side, providing temporary steps and laid approach pathway to cellar with *taki* stone slabs were attended. Domes of tomb was also watertightened by lime punning



237

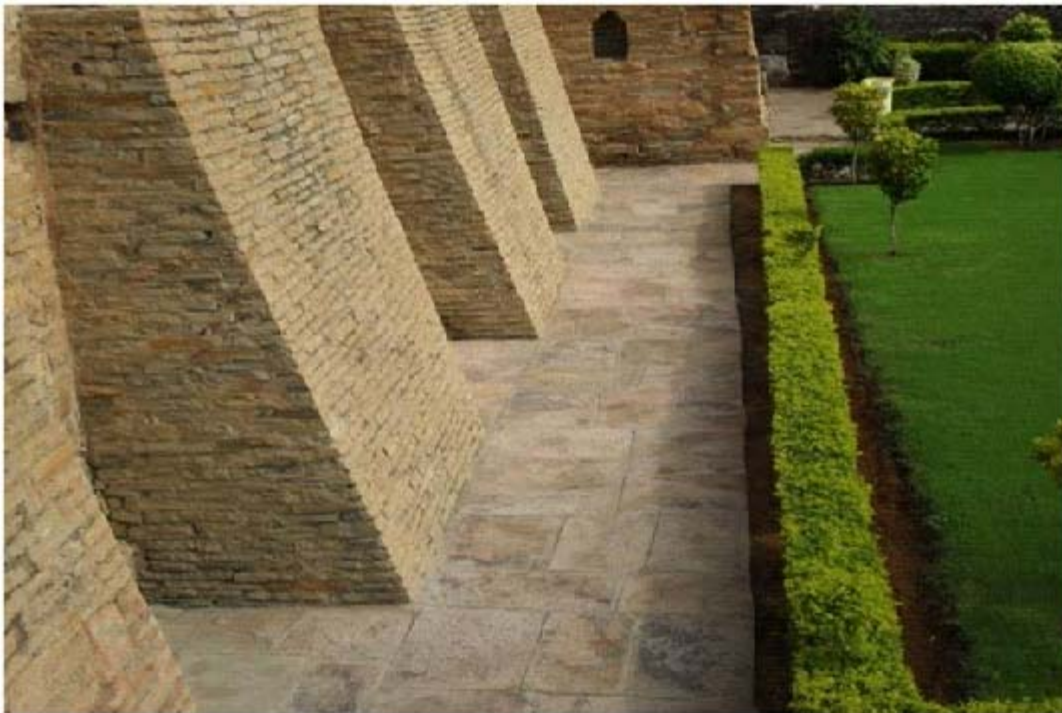


238

Gate way of Gooty fort, Anantapur : 237, before, 238, after conservation, See p.278



239



240

Konda Reddy burz, Kurnool : 239, before; 240, after laying out dressed stone apron, See p.283



Kalyana mandapa of thousand pillar temple at Hanumakonda : during resetting of kaksasana, See p.283

234. PAPANASI GROUP OF TEMPLES, ALAMPUR, DISTRICT MAHABOBNAGAR

To facilitate easy draining of water during the rainy season around the monuments stone apron with *taki* stone slabs was provided to prevent water logging of temples.

235. ASOKAN ROCK EDICTS, JONNAGIRI, DISTRICT KURNOOL

Approach steps with safety railing and temporary roof with transparent fibre sheets in place of damaged roofs over Asokan rock edicts were provided.

236. KONDA REDDY BURZ, KURNOOL, DIS-

TRICT KURNOOL

Dressed stone apron with matching stone slabs around bastion to prevent intrusion of rain water into foundation, approach pathways provided and also developed lawns (pls.239-240).

237. THOUSAND PILLAR TEMPLE, HANUMAKONDA, DISTRICT WARANGAL

As part of ongoing major resetting work of *kalyana mandapam*, this year the resetting was completed from 5th to 7th layer of *kakshasana* and erection of pillars have been started (pl.241).

JAIPUR CIRCLE

RAJASTHAN

238. BAYANA FORT, DISTRICT BHARATPUR

Fortification wall at northern and southern side was repaired by watertightening and pointing work (pls.242-243). Re-fixing the missing pillars, beams and roof slab at Gate 2,3 and 4, conservation and restoration of fort wall southern side of Gate 2 was completed.

239. ANCIENT SITES AT BHANGARH, DISTRICT ALWAR

The buried remains of structure was exposed and strengthened.

240. SIVA TEMPLE, NEELKANTH, DISTRICT ALWAR

Restoration at Bagh-ki-devri and Hanuman-ki-devri by fixing the available ornamental design stone, watertightening and pointing etc. is completed in all respect.

241. BHATNER FORT, DISTRICT HANUMANGARH

Conservation work of fortification wall between bastion 17 and 18, underpinning work and restoration work of *kanguras* of bastions completed.

242. ANCIENT SITE, KALIBANGAN, DISTRICT HANUMANGARH

Work of providing MS grill over dwarf wall around the mound was completed.

243. HARSHNATH TEMPLE, DISTRICT SIKAR

Restoration work of undulated flooring was attended. Providing apron and grill fencing work was completed.

244. CHITTAURGARH FORT, CHITTAURGARH, DISTRICT CHITTAURGARH

Restoration work of steps and ghats at Sukhadiya tank was partially completed

(pls.244-245). Restoration work of *topkhana* building was completed. Open sculpture shed was constructed to display the sculptures (pls.246-247). Repairs of the fort wall near *mrigavan* and providing dwarf wall for fixing of MS grill was taken up and completed.

245. JAISALMER FORT, JAISALMER, DISTRICT JAISALMER

Restoration work of pitching wall near police *chowki* was completed (pls.248-249).

246. SIVA TEMPLE, ARTHUNA, DISTRICT BANSWARA

Restoration work of plinth towards south-western side was completed.

247. KUBHESHWAR TEMPLE, ARTHUNA, DISTRICT BANSWARA

Restoration work of plinth towards south-western side has been completed.

248. RANTHAMBOR FORT, DISTRICT SAWAIMADHOPUR

Restoration work of broken brackets, pillars and *jali* was completed. Damaged *chhajja* stones wherever missing in *dargah* were replaced. Work of providing pathway from *Padam Talab* to *Kalika mata* temple was completed.

249. SIVA TEMPLE, KANSWA, DISTRICT KOTA

The work of re-plastering and fixing grill gates was completed.

KOLKATA CIRCLE

SIKKIM

250. CORONATION THRONE OF NORBUGANG NEAR YUKSAM, KHEOCHOD PHALRI, YUKSAM, DISTRICT WEST SIKKIM

Work is in progress on the religious site near the coronation throne.



242



243

Bayana fort, Bharatpur : 242, before; 243, after conservation of fort wall, See p.284



244



245

Chittaurgarh fort : 244, before; 245, after conservation of steps of Sukhadiya tank, See p.284



246



247

Chittaurgarh fort : 246, before; 247, after conservation of Topkhana building, See p.284



248



249

Jaisalmer : 248, before; 249, after of conservation of Fort wall, See p.284

251. RABDENTSE SITE OF ANCIENT CAPITAL OF SIKKIM, WEST SIKKIM, DISTRICT WEST SIKKIM

Repairs to cracks developed on walls due to earthquake and reconstruction of collapsed chorten etc. has been undertaken.

WEST BENGAL

252. ADINA MASJID, PANDUA, DISTRICT MALDAH

Strengthening of the walls and arches by necessary brick work laid in lime *surkhi* mortar to the mosque was done(pls.250-251).

253. ANCIENT SITE AND REMAINS OF PANDU RAJAR DHIPI, PANDU, DISTRICT BARDHAMAN

Fencing around the excavated site was completed.

254. BAISGAZI WALL, GAUR, DISTRICT MALDAH

Missing portion of *baisgazi* wall was restored.

255. BARADUARI MASJID OR THE GREAT GOLDEN MOSQUE, GAUR, DISTRICT MALDAH

Restoration work of missing portion of ancient brick wall around the mosque has been done(pls.252-253).

256. CURRENCY BUILDING, DALHOUSIE SQUARE, DISTRICT KOLKATA

Structural repairs by re-plastering, renewing, surface finish, relaying of floor, repairs to doors etc. was done(pls. 254-257).

257. DUPLEIX PALACE, CHANDAN NAGAR, DISTRICT HUGLI

Renewal of damaged false ceiling of central gallery has been done.

258. GOPALJI TEMPLE AND LALJI TEMPLE, KALNA, DISTRICT BARDHAMAN

Structural repairs by special work and re-plastering to walls have been done.

259. HANSESVARI AND VASUDEVA TEMPLES, BANSBERIA, DISTRICT HUGLI

Re-plastering with necessary repairs and surface finishing to the walls of Hanesvari temple at Bansberia has been done.

260. JATAR DEUL, JATA, DISTRICT SOUTH 24 PARGANAS

Structural repairs with peripheral development works around the monument have been done.

261. KOCH BIHAR PALACE, KOCH BIHAR, DISTRICT KOCH BIHAR

Repairs to surface drainage system around the palace building and face lifting to frontal portion have been done.

262. MOUNDS, BANGARH, DISTRICT DAKSHIN DINAJPUR

Restoration of missing brick walls and providing necessary surface drainage system to the excavated site has been conducted.

263. OLD BUILDING OF THE ASIATIC SOCIETY, PARK STREET, DISTRICT KOLKATA

Structural repairs by re-plastering, renewing, surface finish, relaying of floor, repairs to doors etc. has been done.

264. WARREN HASTING'S HOUSE, BARASAT, DISTRICT NORTH 24 PARGANAS



250



251

Adina masjid, Pandua : 250, before; 251, after conservation, See p.289



252



253

Baraduari masjid, Gaur : 252, before; 253, after conservation of wall, See p.289



254



255

Kolkata : 254, before; 255, after conservation of Currency building, Dalhousie square, See p.289



256



257

Kolkata : 256, before; 257, after conservation of Currency building, Dalhousie square, See p.289



258



259

Santiniketan : 258, before; 259, after conservation of Natunbari, See p.294

Structural repairs by re-plastering to interior and exterior wall surfaces has been done.

265. NATUNBARI, SANTINIKETAN, DISTRICT BIRBHUM

Restoration and repairs to Natunbari, a mud house at Santiniketan has been done under Civil deposit works (pls.258-259).

LUCKNOW CIRCLE

UTTAR PRADESH

266. KATCHERI CEMETERY, KANPUR, DISTRICT KANPUR

The old graves on the southern part of the monument were restored by underpinning and plastering of damaged surface with lime plaster. The soil lying between graves was leveled up and lime concrete was laid out.

267. ANCIENT BRICK TEMPLE, KANCHILIPUR, DISTRICT KANPUR

Boundary wall matching the original was constructed from the three sides eastern, northern and front sides of the monument to beef up security of the monument. A pathway from main entrance to the boundary wall was constructed for the convenience of visitors.

268. KAISERBAGH GATE (EASTERN), LUCKNOW, DISTRICT LUCKNOW

The damaged roof of the eastern gateway was restored by way of replacing damaged wooden planks, relaying of lime concrete over the roof and watertightening. The old and dead plaster of the wall was raked out and re-plastered with lime-*surkhi* mortar as per original.

269. TOMB OF MUSHIR ZADI, LUCKNOW, DISTRICT LUCKNOW

Structural repair to the fallen south-eastern corner *burj* of first floor was undertaken by utilizing the original material i.e. *lakhauri* bricks and sand stone laid in lime mortar. The stucco work was re-produced in lime mortar as per original.

270. GENERAL WALI KOTHI, LUCKNOW, DISTRICT LUCKNOW

Old and damaged plaster of walls of the building was removed and restored with old

lakhauri bricks laid in lime mortar and plastered as per original. Besides, floor of the main building was re-laid in flag stone after removing the modern brick paving (pls. 260-263).

271. ASAF-UD-DAULAH IMAMABARA, LUCKNOW, DISTRICT LUCKNOW

The damaged roof of the central hall has been restored by way of underpinning and plastering of damaged surface with lime plaster.

272. CEMETERY AT VILAYATI BAGH, LUCKNOW, DISTRICT LUCKNOW

New approach to the monument was constructed to facilitate the visitors and main entrance of the monument complex has also been conserved (pls. 264-265).

273. RAHILIYA TEMPLE, RAHILIYA, DISTRICT MAHOBA

Dismantling and resetting of stone mouldings was done as per original (pls. 266-267).

MUMBAI CIRCLE

MAHARASHTRA

274. KANHERI CAVES, KANHERI, DISTRICT MUMBAI SUB-URBAN

The old structure in dilapidation condition was repaired for display gallery. Its old doors, windows, ventilators, floors and roof were replaced with matching original material and design. The plaster and flooring were provided with combination mortar. The work like resetting, water tightening and pointing was carried out to the burial gallery with the help of combination mortar. Retaining wall was provided for leveling and support of the platform of burial gallery. Besides stone pathway and railing were provided.



261



260

Lucknow : 260, before; 261, after conservation of General Wali Kothi, See p.295



262



263

Lucknow : 262, before; 263, after conservation of General Wali Kothi, See p.295



264



265

Lucknow : 264, before; 265, after conservation of Cemetery at Vilayati bagh, See p.295



267
Mahoba : 266, before; 267, after conservation of Rahiliya Temple, See p.295



266

Mahoba : 266, before; 267, after conservation of Rahiliya Temple, See p.295

275. RAIGAD FORT, RAIGAD, DISTRICT RAIGAD

The old Hathikhana was repaired. Half portion of the structure was converted into the display gallery while remaining half for the use of office. The work is in progress.

276. KASA FORT OR PADMADURG FORT, DISTRICT RAIGAD

Debris clearance and vegetation were cleared from the buried structures inside the fort and followed with watertightening and underpinning. Water tank inside the fort were desilted and repaired with combination mortar (pls. 268-269).

277. ELEPHANTA CAVES, ELEPHANTA, DISTRICT RAIGAD

A fallen retaining wall near booking counter and near Nizamchhatri were separately reconstructed. The work is still going on (pls. 270-271).

278. KONDAVITE CAVES, ANDHERI, DISTRICT MUMBAI SUB-URBAN

To stop the unauthorized access to the monument a retaining wall was provided at the northern side of the caves.

279. BASSEIN FORT, VASAI, DISTRICT THANE

The exposed structures unearthed near Saint Gansalo Garcia were restored by way of pointing, watertightening, edging and flooring. Earlier buried structures were cleared from the debris and vegetation and thereafter strengthened by pointing and watertightening with combination mortar (pls. 272-275).

280. PANHALA FORT, PANHALA, DISTRICT KOLHAPUR

The fallen fortification wall of the north side near Wagh Darwaza was reconstructed to check erosion of the wall in combination mortar.

281. NANEGHAT CAVES, NANEGHAT, DISTRICT PUNE

Stone pathways leading to the caves were provided. Main cave was protected with wooden barricading to stop unauthorized access. The floors of the main cave were consolidated with combination mortar.

282. KONDANE CAVES, KONDANE, DISTRICT RAIGAD

In continuation of previous year's work, the walls of the *chaityagriha* were consolidated with combination mortar. Ten pillars were provided to broken pillars to give support to the original ones. The stone pillars were provided with matching texture and design.

283. KRISHNAMAI TEMPLE, MAHABALESHWAR, DISTRICT SATARA

Debris accumulated around the main temple along with vegetation were cleared and a drain were provided to drain out the accumulated water on the back side of the temple. After clearance, *vedibandha* part of the temple was water tightened and pointed. The water *kund* and stone flooring of the courtyard was repaired and provided respectively.

284. FORT AND OLD PORTUGUESE REMAINS, BASSEIN, DISTRICT THANE

The structures were cleared from the debris and exclusive growth of plants and vegetation and successively followed by restoration by way of pointing, watertightening and stone flooring.

285. JANJIRA FORT, JANJIRA, DISTRICT RAIGAD

In continuation of previous year's work, the walls, structures, steps and platforms within fort which exclusively covered with thick vegetation and debris were cleared, exposed and

repaired by way of pointing, watertightening, edging and plastering (pls.276-279).

286. SIVA TEMPLE, AMBERNATH, DISTRICT THANE

The step well at the south-west corner of the temple was undertaken for repairing. The well was repaired by way of clearance of debris up to the natural level followed by CR masonry with combination mortar. The sculptures displaced from the corners of the well were re-fixed in their original place after proper documentation.

287. SINDHUDURG FORT, SINDHUDURG, DISTRICT SINDHUDURG

Fortification wall of bastion at north-western sides, fallen due to frequent current of the sea water was reconstructed with matching stones and combination of mortar. Work is still going on.

288. VIJAYDURG FORT, VIJAYDURG, DISTRICT SINDHUDURG

More than 5m wide fortification wall at the west side of the fort reconstructed which was fallen due to sinking of the foundation (pls. 280-281).

PATNA CIRCLE

BIHAR

289. IBRAHIM BAYU'S TOMB, BIHAR SHARIF, DISTRICT NALANDA

The conservation work was taken up southern side of outer wall from bottom to top by resetting of dry stone masonry, watertightening and pointing to the joints.

290. EXCAVATED SITE AT NALANDA, DISTRICT NALANDA

The conservation work was taken up in northern side of outer wall of Temple no.12, 13 and 14 from bottom to top by taking out old damaged, decorated ancient brick masonry and resetting, underpinning them with lime-*surkhi* mortar by using special size bricks and pointing by lime-*surkhi* mortar in traditional method. The work is in progress. Scientific clearance was taken up in the back side of Temple 3 and provided with lime concreting to the back side of temple.

291. SARAI MOUND, NALANDA, DISTRICT NALANDA

The conservation work was taken up from front portion by taking out old damaged, deteriorated ancient brick masonry and resetting them with lime-*surkhi* mortar by using special size bricks and pointing by lime-*surkhi* mortar in traditional method. The work is in progress.

292. ANCIENT SITE AT KUMRAHAR, DISTRICT PATNA

Pathway with brick-on-edge and lime concreting from front to back side was provided.

Upgradation of toilet block by fixing of sanitary fitting, providing granite slab, flooring by wetting tiles and fixing of glazed tiles of inner wall.

293. BUDDHIST STUPA, KESARIYA, DISTRICT EAST CHAMPARAN

The conservation of top drum portion of the stupa was attended by taking out old damaged deteriorated ancient brick and resetting, pointing and water tightening of top by using special size bricks and lime-*surkhi* mortar. The work is in progress.

294. STUPA, CHANKIGARH, DISTRICT WEST CHAMPARAN

The conservation of the northern wall of the



268



269

Kasa fort or Padmadurg fort, Raigad : 268, before; 269, after conservation, See p.300



270



271

Elephanta caves, Elephanta : 270, before; 271, after conservation, See p.300



272



273

Bassein fort, Vasai : 272, before; 273, after conservation, See p.300



274



275

Bassein fort, Vasai : 274, before; 275, after conservation, See p.300



276



277

Janjira fort, Janjira : 276, before; 277, after conservation, See p.301



278



279

Janjira fort, Janjira : 278, before; 279, after conservation, See p.301



280



281

Vijaydurg fort, Vijaydurg : 280, before; 281, after conservation, See p.301

main stupa was carried out by taking out old damaged deteriorated ancient brick masonry and resetting them with lime-*surkhi* mortar by using special size bricks. The work is in progress.

295. EXCAVATED REMAINS AT ANTICHAK, DISTRICT BHAGALPUR

Remaining portion of boundary wall around the excavated remains was provided with RCC pillars and new brick masonry. The work is in progress. The resetting of out of plumb brick wall of the Votive Stupa by using ancient brick and some new special size bricks masonry in lime-*surkhi* mortar was completed.

296. MAIN TOMB OF SHER SHAH SURI'S TOMB, SASARAM, DISTRICT ROHTAS

The cracks developed in the outer wall from top to bottom and inner portion upto 5m height of the main tomb were repaired by way of pointing in lime-*surkhi* mortar. Providing pathway on the east side of tank was taken up. The work is in progress.

RAIPUR CIRCLE

CHHATTISGARH

297. CHAITURGARH FORT, LAPHA, DISTRICT KORBA

Structural conservation work to the wing wall of main fort gate by laying approach was attended (pls.282-283).

298. MAHADEV TEMPLE, GATORA, DISTRICT BILASPUR

Strengthening the flooring to present capillary action, apron all around the temple etc. was done (pls.284-285).

299. NARAYAN TEMPLE, NARAYANPAL, DIS-

TRICT BASTAR

Restored the damaged and missing corbeling ceiling work of *mandapa* with the help of old and new stones of same texture (pls.286-287).

300. PALACE COMPLEX, SIRPUR, DISTRICT MAHASAMUND

Structural conservation with brick veneering, underpinning, core filling and watertightening was attended. Apron all around the structures was laid and the area was developed.

301. BALESWAR MAHADEV TEMPLE, SIRPUR, DISTRICT MAHASAMUND

Brick conservation work with necessary veneering, underpinning and watertightening and consolidating the stone platform.

302. VIHAR COMPLEX, SIRPUR, DISTRICT MAHASAMUND

Developed the area by laying flooring and the damaged fortification wall in the complex was revived.

303. NEWLY EXCAVATED STUPA, SIRPUR, DISTRICT MAHASAMUND

Construction of boundary wall around the site was provided.

304. NEWLY EXCAVATED STRUCTURE NEAR RAIKERA TANK, SIRPUR, DISTRICT MAHASAMUND

Construction of boundary wall around the site was done.

305. LAXMAN TEMPLE, SIRPUR, DISTRICT MAHASAMUND

Structural repair with necessary grouting, laying barrier free tactile pathway for blind person, Braille signage and stainless steel railing

with developing parking area.

306. BHAND DEUL TEMPLE, ARANG, DISTRICT MAHASAMUND

Repair to restore the plinth of temple with same stone texture was attended.

307. RAJIV LOCHAN TEMPLE, RAJIM, DISTRICT MAHASAMUND

Over all development by laying flooring, approach, constructing drain also adjacent to Jagannath temple by providing compound wall etc. was carried out and completed.

308. MAHADEV TEMPLE, TUMAN, DISTRICT KORBA

Structural conservation to the scattered shrines by consolidating the missing plinth and laying approach around shrines was attended.

309. DANTESHWARI DEVI TEMPLE, DANTEWADA, DISTRICT DANTEWADA

The back side of temple was developed by constructing drain to prevent stagnation of water and laid the flooring around the temple and its approach.

310. CHHOTIMA TEMPLE, DANTEWADA, DISTRICT DANTEWADA

Renewing and fixing the damaged wooden members with due painting.

311. BHAI RAMDEO TEMPLE AREA, BHAI RAMAGARH, DISTRICT BIJAPUR

Development of the site by cutting/filling with due laying approach and apron all around the shed was successfully done.

312. SAVARI TEMPLE, KHAROD, DISTRICT JANJIRI-CHAMPA

The site was developed by cutting/filling with laying approach and by painting and grout-

ing the temple.

313. RATANPUR FORT, RATANPUR, DISTRICT BILASPUR

Structural repair to minor shrines within fort area was attended. The existing pond was developed by laying dry pitching all around with providing approach etc.

314. KESHAVANARAYAN TEMPLE, SHEORINARAYAN, DISTRICT JANJIR-CHAMPA

Structural repair to main temple by way of underpinning and brick veneering work was carried out.

315. RAMA TEMPLE, SIRPUR, DISTRICT MAHASAMUND

Conservation of newly excavated structure by way of brick/stone veneering, underpinning etc. was attended.

316. CHANDRADITYA TEMPLE, BARSOOR, DISTRICT DANTEWADA

Laying approach, developing the existing tank by way of laying dry pitching etc. was done.

RANCHI CIRCLE

JHARKHAND

317. ANCIENT SITE AND TANK, BENISAGAR, DISTRICT WEST SINGHBHUM

Restoration of missing worn out, damaged and decayed structural members of ancient brick work in south west corner of the site has been taken up and work is in progress. Restoration of decayed and out of plumb brick structures at south east corner phase II has been taken up and the work is in progress. Laying, fitting and fixing of dry RR stone pitching in slanting area of ancient tank has been executed and completed. Construction of RR stone retaining wall adjacent to the ancient tank



282



283

Chaiturgarh fort, Lapha : 282, before; 283, after conservation, See p.309



284



285

Mahadev Temple, Gatora : 284, before; 285, after conservation, See p.309



Narayan Temple, Narayanpal : 286, before; 287, during conservation, See p.309

at Benisagar has been executed and completed in all respect (pls.288-291).

318. ANCIENT SIVA TEMPLE, KHEKPARTA, DISTRICT LOHARDAGA

Repairing and painting to existing stone compound wall mounted with MS grill has been taken up and work is in progress. MS railing in and around the Siva temple at Khekparta was provided. The work of fitting and fixing of MS grill and gate to the existing stone compound wall with laying PCC coping over the compound wall have been taken up and work is in progress.

319. BARADARI, MANGALHAT, DISTRICT SAHEBGANJ

Construction of PCC pathway from main gate to store room has been taken up and work is in completed.

320. JAMI MOSQUE, HADAF, DISTRICT SAHEBGANJ

Re-setting and renewing of old, damaged, missing and worn out brick structural members of the southern part of Jami mosque, Hadaf has been completed.

SHIMLA CIRCLE

HIMACHAL PRADESH

321. MANI MAHESH TEMPLE, BHARMOUR, DISTRICT CHAMBA

The repairing of roofs of the Ganesh and the Lakhna Devi temples within the main temple complex were taken up by way of replacing the old decayed wooden members with the new ones. Relay the roof slate stones by replacing the broken, and filling up the missing spaces of roof as per original was taken up. The work is in progress.

322. NURPUR FORT, NURPUR, DISTRICT KANGRA

In continuation of previous year's work, the ongoing work of repairs and restoration of cracked, bulged, decomposed and missing portions of the bastion of the southern side fortification wall, adjoining to ancient tank was continued and completed by stitching the cracks, underpinning the decomposed portions with dressed sandstone masonry set in lime mortar, including pointing of the joints matching with the adjacent stone masonry.

The ongoing work of repairs and restoration of the wall adjacent to Rani Mahal and the steps of ancient water tank were undertaken and completed. The cracked and decomposed wall portions of the structure adjoining the Rani Mahal were stitched by first taking out the cracked and decomposed masonry with the help of chisel and later stitching the cracked parts of masonry course by course.

323. KOTLA FORT, KOTLA, DISTRICT KANGRA

In continuation of previous year's work, the ongoing restoration work of fortification wall on the east, in front of the Baglamukhi temple was undertaken by pointing of joints. The work is in progress.

324. ROCK-CUT TEMPLES, MASRUR, DISTRICT KANGRA

The repairs to collapsed northern and southern side walls of ancient excavated tank were taken up and restored and pointed the joints.

325. RUINED FORT, KANGRA, DISTRICT KANGRA

The scientific clearance on the eastern side of the fort area adjoining the Ahini gate was carried out to expose the remains of buried structure and footings of the collapsed fortification wall. The work is in progress.

The ancient pathway which leads one from the Andheri gate to the Kapoor *sagar* inside



288



289

Embankment of ancient tank, Benisagar : 288, before; 289, after conservation, See p.314



290



291

Pathway along the ancient tank, Benisagar : 290, before; 291, after conservation, See p.314

the fort complex and was already provided with dressed sandstone paving upto the Sukha *talab* which was extended further to facilitate visitor's movement. The pathway made of dressed sandstone was laid over base lime concrete. The work is in progress.

Further, in continuation of previous year's work, the lime concrete across the passage of the Andheri gate was laid and the collapsed portion of inner fortification wall towards the north-eastern side of the fort complex was raised with dressed sandstone set in lime mortar as per the original pattern after carefully tracing out the footing of the wall with the help of scientific clearance. The work was completed.

326. KATOCH PALACE, SUJANPUR TIRA, DISTRICT HAMIRPUR

In continuation of previous year's work, the ongoing work of repair and restoration of fortification wall on eastern side which had got damaged, decomposed and cracked involving certain portions of the wall was continued and completed by dismantling. The damaged portions of the wall and restoring the same, including pointing the joints as per original pattern.

The structure opposite *baradari* of the palace complex known as Hawa Mahal was also taken up for repairs. As the best parts of Hawa Mahal having wooden ceiling and the lime concrete floor were already in ruins which were further disintegrated by successive rains, ranked vegetations and trees. First the dead lime mortar was removed from the roof walls along with deposition of moss and growth of vegetation, followed by laying a layer of lime mortar mixed with brick *zira* (brick granules) and molasses upon the roof for the purpose of water tightening of the roof. The collapsed portion of Hawa Mahal was restored with the ancient *lakhauri* bricks, which were extracted from the fallen

structure within the palace complex, and set in lime mortar, including pointing of the joints as per original pattern. The work is in progress.

The work of restoring the decomposed, cracked and damaged stone masonry of the fortification wall on northern side behind the Gauri Sankar temple was also undertaken by cutting and removing the rank vegetation, and taking out the damaged stone masonry step by step and restoring the same including pointing of the joints as per original pattern. The work is in progress.

327. BUDDHIST MONASTERY, TABO, DISTRICT LAHUAL AND SPITI

The repairs to the damaged, cracked and peeled off mud plaster of outer surface of all Gompha walls were attended to by way of taking out the old plaster with the help of scrapers and re-plastering the wall with the mud mortar and mud punning. The work is in progress.

328. PHOO GOMPHA, TABO, DISTRICT LAHUAL AND SPITI

The work of providing a pathway, leading from the main road at the foot of hillock to the Phoo Gompha a little distance above was undertaken by laying stone paving over a bed of cement concrete base. The work is in progress.

329. HADIMBA DEVI TEMPLE, MANALI, DISTRICT KULLU

The work of repairing the decayed and damaged wooden rafters and planks of first floor level of this wooden temple was taken up by replacing these wooden members with the new ones, and the work was completed. The stone laying over a bed of cement concrete to consolidate the old pathway which runs across the *mela* ground was taken up. The long flights of steps running along the inner edge of *mela*

ground where the spectators would sit to watch *mela* activities. The steps were restored with dressed sandstone masonry set in cement mortar including pointing of the joints. The work is in progress.

330. PANCHVAKTRA TEMPLE, MANDI, DISTRICT MANDI

To prevent the flood waters of the river Beas that flows close by to enter the temple premises, the river side of the temple was provided with a retaining wall and strengthened by providing concealed RCC columns and tie-beams, including filling the granules behind the wall towards temple. The work is in progress.

SRINAGAR CIRCLE

JAMMU AND KASHMIR

331. ANCIENT SITE, AMBARAN, DISTRICT JAMMU

In order to expose the buried Votive Stupas, the old and out-of-plumb retaining wall towards the west of modern Pota cabin was dismantled and reconstructed in combination mortar, after necessary earth excavation and laying of base concrete. The face of the retaining wall is veneered with stone pebbles in order to match with the natural look of adjoining river sections. Underground hume pipes have been provided to drain out the rain water from the site which otherwise would get inundated by the accumulated rain water. The brick-work masonry as per original is provided to the votive stupas and other associated structures as per original by laying a brick-edged pathway over lime concrete foundation.

332. ANCIENT FORT ATTRIBUTED TO RAJA SUCHET SINGH AND SAMADHI OF QUEEN, RAMNAGAR, DISTRICT UDHAMPUR

The bastion of second fortification wall, which was out-of-plumb and fissured at places, was dismantled carefully and restored partly with rectangular stone blocks and partly with *lakhauri* bricks as per the original. The buried portions of the partition walls of rooms were exposed by removing debris that had accumulated over them and restored in coursed stone masonry in lime mortar after laying foundation concrete in lime mortar. The stone slabs were provided over the approach pathway from main entrance of *samadhi* till the toilet block in lime mortar after laying lime concrete under the pathway floors.

333. ANCIENT PALACES ATTRIBUTED TO RAJA SUCHET SINGH, RAMNAGAR, DISTRICT UDHAMPUR

The damaged and out-of-plumb stone masonry wall of front facade of Sheesh mahal was restored in lime mortar with new coarse stone blocks after laying brick concrete in foundation of the wall. Ornamental lime plaster was provided in wall of Nawa mahal facing north and wall between Diwan-i-Am and Sheesh mahal.

334. MOSQUE AND OTHER ANCIENT REMAINS IN THE ISLAND, WULAR LAKE, DISTRICT BANDIPORA

Out-of-plumb, bulged and missing enclosure wall at second terrace was restored in combination mortar following similar colour and texture to match with the original.

335. KHANPUR SARAI, KHANPUR, DISTRICT BAUGAM

To protect the structure from further deterioration brick concrete was laid in floors of rooms, apron, over roof of cells, top of walls and like places in combination mortar mixed with 20mm thick brick aggregate. To restore damaged, out of plumb and missing brick walls,

restoration work was undertaken with traditional tile bricks in combination mortar by applying lime pointing on exposed surfaces to match with the original.

336. MUGHAL ARCADE INCLUDING SPRING TOGETHER WITH ADJACENT LAND, VERINAG, DISTRICT ANANTNAG

Brick masonry of weathered, broken and decayed walls, arches and dome of the arcade cells was repaired with traditional tile bricks in combination mortar by using brick tiles as per original. Removal of debris and de-silting of arcade cells filled with water borne silt was undertaken and completed. The brick concrete was laid over the semi-circular domed roofs from Cell 13 to 22, besides by applying the lime plaster over the concrete to make domes water-light. Sunk pointing was also applied over the joints of brick masonry in lime mortar.

337. AVANTISWAMI TEMPLE, AWANTIPUR, DISTRICT ANANTNAG

An approach path of thick *devri* stones of assorted size was laid in lime mortar from entrance of the monument to lavatory block (running from north to south and further east). Ornamental grill panels were provided along the sides of approach path and steps leading from main entrance to the main temple.

338. AVANTISVARA TEMPLE, AWANTIPUR, DISTRICT ANANTNAG

The accumulated debris was removed carefully to expose the buried parts of the peristyle well. Restoration of weathered, broken and out-of-plumb ashlar stone masonry of south side peristyle wall was carried out with semi chisel-dressed stone blocks in plain and moulded courses as per original using salvaged and new stone blocks in combination mortar.

339. ANCIENT TEMPLE, KAKAPORA, DISTRICT

PULWAMA

In order to provide stability to the peristyle wall of the main temple, semi chisel-dressed ashlar stone masonry has been provided in plain and moulded courses with new stone blocks of similar texture and colour as per the original. Besides, to check soil erosion towards south side near modern Pota cabin, a retaining wall in stone masonry was constructed out after laying base concrete for consolidation of the foundation and thick brick concrete coping in lime mortar was laid over the top of the retaining wall in combination mortar besides pointing the exposed joints of stonework.

340. ANCIENT TEMPLE, LADUV, DISTRICT PULWAMA

Restoration of the weathered, broken, sunken and missing *devri* ashlar stone masonry of the flight of steps was done all along the western side of the pond. The work was carried out with semi chisel-dressed stone blocks in plain courses as per original with salvaged material and new stone blocks set in combination mortar.

341. PATHER MASJID, ZAINAKADAL, DISTRICT SRINAGAR

In order to drain out the seasonal rain and snow, which used to get accumulated close to the northern wall of the mosque and remained there longer resulting into soil erosion and fast deterioration of the land and structure, a retaining wall in RR masonry is constructed. A soakage pit connected through a surface was also provided to collect the seasonal water. The work is in progress.

342. MOSQUE OF AKHUN MULLA SHAH TOGETHER WITH ADJACENT LAND, KATHI DARWAZA, DISTRICT SRINAGAR

The matching brick work was provided in

arches and walls in combination mortar to match with the original. Stone works in arches and walls were consolidated by replacing the broken, damaged and missing portions with similar materials. Besides recessed pointing to seal the joints of exposed surfaces of brick and stone work was provided. Grill panels in arch opening, staircase openings and other places were provided to check trespassing and misuse of the monument. To expose the buried structures, debris was removed carefully without causing damage to any archaeological evidence, besides sorting and stacking of serviceable materials for re-use in future conservation works of these structures.

343. ANCIENT MONASTERY AND STUPA TOGETHER WITH ADJACENT LAND, HARWAN, DISTRICT SRINAGAR

To retain the architectural features of the monument, which were deteriorating, consolidation of stone masonry with combination mortar ashlar was carried out to make good the broken, weathered, out-of-plumb, damaged and missing portions of the Stupa. Diaper pebbles are fixed over the walls of apsidal stupa in combination mortar and later pointed with mud mortar in order to match with the original. A wooden projection, a *chhajja*, made of the first class *deodar* wood was provided over pebble wall to save the structure from vagaries of nature.

344. GROUP OF ARCHED TERRACES / STRUCTURAL COMPLEX, PARIMAHAL, DISTRICT SRINAGAR

In order to check the seepage through structures and to provide with easy access to the visitors, thick *devri* stone flooring of assorted shape and size was laid along the path in combination mortar and completed in lime mortar. Ashlar stone masonry in plain courses with semi chisel-dressed *devri* stones was provided in combina-

tion mortar. Thick brick concrete was laid over the top of the parapet walls, and path way in combination mortar. Besides, recessed pointing was applied over the exposed surfaces of stone work. After raking out the excess mortar joints were sealed.

345. GROUP OF ANCIENT TEMPLES, NARANAG, DISTRICT GANDERBAL

To check the soil erosion and its flowing into the premises of the temple complex, a retaining wall in stone masonry was provided towards north side of the temple starting from middle of first group of temples to the pillared hall of the second group of temples. Approach flight of steps was provided along the retaining wall with semi chisel-dressed *devri* stones set in lime mortar. To ensure further protection to the protected area of the temple complex, chain-link fencing raised over dwarf wall was provided towards south side of the first group of temples near the inspection room after laying concrete in foundation of the wall in combination mortar.

346. ANCIENT TEMPLE AT MARTAND TOGETHER WITH ADJACENT LAND (RAMBELPUR), DISTRICT ANANTNAG

With a view to provide structural stability and face lifting to the monument restoration of ashlar stone masonry both in plain and moulded courses was carried out with new large rectangular stone blocks of similar rock characteristics as were used in the monument.

347. SUGANDHESA TEMPLE, PATTAN, DISTRICT BARAMULA

To check soil erosion from the roadside (towards west), a stone retaining wall was raised towards west side of the monument in combination mortar. To strengthen the retaining wall a layer of brick concrete is laid below the foundations of the wall in combination mortar. Be-

sides recessed pointing was applied to the wall to seal joints.

THRISSUR CIRCLE

KERALA

348. BEKAL FORT, PALLIKERE, DISTRICT KASARGOD

Providing MS grill fencing with dwarf wall on the eastern side partly has been completed.

349. SIVA TEMPLE, PERUVANAM, DISTRICT THRISSUR

The madathilappan roof of second tier western and northern sides has been covered with copper sheet roof after repairing the damaged wooden members and providing new teakwood planks.

350. SIVA TEMPLE, CHEMMANTHITTA, DISTRICT THRISSUR

The *chuttambalam* (cloister) roof on the western and northern Mangalore tiled roof was conserved properly by replacing the damaged roof members (pls. 292-293).

351. SIVA TEMPLE, PALLIMANA, DISTRICT THRISSUR

The *Oottupura*, granery and *pathayapura* of the temple were conserved properly by providing traditional tiled roof by using wooden rafters, beams, etc. and also strengthening the *prakara* wall properly (pls. 294-295).

TAMILNADU

352. ROCK-CUT CAVE, THIRUNANDIKARE, DISTRICT KANYAKUMARI

Reconditioning the barbed wire fencing with 'L' angle on the south-west, west and north sides was completed including construction of dwarf wall.

353. SRI VILISWARA TEMPLE, TIRUVALISWARAM, DISTRICT THIRUNALVELI

Chain-link fencing with dwarf wall on the north, west and east sides of the protected area of the temple was completed.

354. SRI BHAKTAVATSALA TEMPLE, SERAMADEVI, DISTRICT THIRUNELVELI

Earth work excavation was done to expose the original features and to provide apron and proper drainage system around the *prakara* wall.

355. FORT, VATTAKKOTTAI, DISTRICT KANYAKUMARI

Construction of fort wall with veneer stone and brick masonry core is in progress. Inside rampart was conserved (pls.296-297).

VADODARA CIRCLE

DAMAN AND DIU

356. FORT WALL (INCLUDING STRUCTURE, GATE ETC.), MOTI DAMAN, DAMAN

The work of providing lime plaster to the inner fort wall of southern side with lime *surkhi* sand mortar and the work of underpinning the fortification wall wherever necessary was completed. The work of providing chain link fencing over dwarf wall is completed (pls.298-299).

357. FORT WALL, MOTI DAMAN, DAMAN

The work of providing rubble soling on the fort wall, scientific debris clearance within the fort wall area was completed.

358. FORT TOGETHER WITH THE BUILDING INSIDE DIU (ARMOUR HOUSE), DIU

The work of dismantling and re-setting of weathered and missing *bela* stone masonry in armour house is in progress.

GUJARAT

359. AHMED SHAH'S MOSQUE, DISTRICT AHMEDABAD

The work of dismantling bulged-out brick masonry wall and reconstruction of ashlar's stone masonry cornice (*dasa*) layer and *kangura* at the west side of the monument, after dressing, mouldings, and carving the stones as per original completed and the laying of *dhangadhra* stone flooring in front of the mosque is completed.

360. BHADRA TOWER BESIDE BHADRA KALI TEMPLE, DISTRICT AHMEDABAD

The work of removing dead lime/cement plaster from walls of side room, laying lime concrete on terrace beside clock tower, removing white wash from ceiling of room and stone pillars completed.

361. MALAV TANK, DHOLKA, DISTRICT AHMEDABAD

The work of providing chain link fencing over dwarf wall, dismantling badly worn out tilted ashlar stone masonry, and reconstruction of the same as per original completed.

362. SMALL STONE MOSQUE, PALDI, DISTRICT AHMEDABAD

The work of removal of old cement concrete flooring and laying of lime concrete for fixing stone flooring is in progress.

363. THE MANSUR TALAV AND SHRINES, VIRAMGRAM, DISTRICT AHMEDABAD

The work of dismantling badly worn out and tilted ashlar stone masonry parapet wall and; providing and reconstructing the same and laying of reconstructing of brick masonry para-

pet wall as per original was completed.

364. ANCIENT SITE AT LOTHAL, DISTRICT AHMEDABAD

The work of enclosing the protected area with grill fencing is in progress.

365. GREAT TANK, PALACE AND HAREM AT SARKHEJ, DISTRICT AHMEDABAD

The work of pointing, reconstruction of missing/broken and out of plumb ashlar's stone masonry steps was completed.

366. DARBARGADH, SIHOR, DISTRICT BHAVNAGAR

The work of removal of old damaged plaster from the entrance wall and the removal of damaged rubble stones from the entrance ramp and providing and fixing of *dhangadhra* stone flooring steps at the entrance to the monument is in progress.

367. GROUP OF TEMPLES AND KUND, KHED RODA, DISTRICT SABARKANTHA

The work of re-setting of fallen portion of northern side wall of the *kund* with necessary old and new stones including cutting and dressing of stones was completed.

368. DWARKADHISH GROUP OF TEMPLES, DWARKA, DISTRICT JAMNAGAR

The work of reconstructing the main wall, pillar, eave (*chhajja*) of Dwarkadhish main temple is in progress.

369. DURVASA RISHI'S ASHRAM, PINDARA, DISTRICT JAMNAGAR

The work of removing of old dry masonry wall and removal and providing RR masonry compound wall, stone flooring and structural



292



293

Siva Temple, Chemmanthitta : 292, before; 293, after conservation of chuttambalam roof, See p.321



294



295

Siva Temple, Pallimana :294, before; 295, after conservation of pathayapura, See p.321



296



297

Vattakkottai fort, Vattakottai : 296, before; 297, after conservation of fort wall, See p.321

repairs are in progress.

370. MAGDERU TEMPLE, DHRUSANVEL, DISTRICT JAMNAGAR

The work of cutting, dressing, fixing and setting of heavy *baradia* stone cover at main gate of *mandapa* and *ardhmandapa* is in progress.

371. RAHEMAT (BIBI) MASJID, MANGROL, DISTRICT JUNAGADH

The work of removal of old damaged concrete flooring and providing lime concrete flooring; watertightening the roof and fixing *kanguras* and providing of apron around the *masjid* completed.

372. KHAPRA KODIA'S CAVES, DISTRICT JUNAGADH

The work of laying lime concrete in foundation, providing dressed *bela* stone flooring, teak wood frame grill, and applying oil paint completed.

373. TOMB OF RAO LAKHA CHHATRI, DISTRICT KACHCHH

The work of reconstructing of collapsed main *chhatri*, resetting of arches, capitals, lintels by using old and new stones completed.

374. SIVA TEMPLE, KOTAI BHUJ, DISTRICT KACHCHH

The work of reconstructing *sabha mandapa* with ashlar stone masonry and providing pathway using stone over the base concrete is in progress.

375. ANCIENT SITE (KOTADA), DHOLAVIRA, DISTRICT KACHCHH

The work of dismantling and resetting of

bulged out masonry walls; repairs to structural remains of Bailey in lime, sand, *surkhi* mortar; de-silting of eastern and southern reservoirs; providing of chain link fencing over dwarf wall is in progress.

376. VITTHALBHAI HAVELI, VASO, DISTRICT KHED

The work of applying lime plaster laying lime concrete on terrace; dismantling of decayed and fixing wooden planks, beams, rafters etc.; dismantling and reconstructing of brick masonry wall etc. completed.

377. HINGLOJIMATA TEMPLE AT KHANDOSAN, DISTRICT MEHSANA

The work of reconstructing architectural members of two temples after documentation, by using new and old stone members keeping in view the fine dressing and molding as per original was completed.

378. SUN TEMPLE, MODHERA, DISTRICT MEHSANA

The work of excavation in foundation for flooring and providing bed of lime concrete for flooring; on the north side of temple is in progress.

379. RUINED HINDU AND JAINA TEMPLE, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of dismantling and reconstructing bulged *mandapa* of the temple near Suparasvanath temple and construction brick masonry walls for chain link fencing is in progress.

380. THREE CELLS INSIDE THE CITADEL WALL, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of providing *dhangadhra* stone pathway was completed.

381. PATAI RAVAL'S PALACE, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of reconstructing missing rubble stone masonry in lime mortar of the fort wall is in progress.

382. CITY GATE, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of reconstructing missing rubble stone masonry in lime mortar is in progress.

383. MINT ABOVE GATE 4, CHAMPANER - PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of dressing of stones for reconstructing missing lintel, roof, etc. is in progress.

384. KAMANI MASJID, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of reconstructing missing ashlar's stone masonry of courtyard, plinth and on terrace porch with new *dhangadhra* stone duly dressed, molded and carved as per original was completed.

385. CITADEL WALL, CHAMPANER - PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of dismantling and reconstructing bulged ashlar's stone masonry in lime mortar was completed.

386. LILA GUMBAJ-KI-MASJID, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of dismantling and reconstructing of bulged ashlar's stone masonry including hearting of moat as per original was completed.

387. LAKULISH TEMPLE, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work of dressing *dhangadhra* stones for approach pathway was completed.

388. CITY WALLS AT S.E. CORNER OF THE CITADEL, PAVAGADH, CHAMPANER-PAVAGADH, ARCHAEOLOGICAL PARK, DISTRICT PANCHMAHAL

The work reconstruction of fallen ashlar and brick masonry facing the wall was completed.

389. OLD TEMPLE WITH SCULPTURED SCREEN (RATANESHWAR MAHADEVA), RATANPUR, DISTRICT PANCHMAHAL

The work of reconstructing of stone flooring of the *jagati* of the temple is in progress.

390. RUINS OF RUDRA MAHALAYA TEMPLE, SIDDHPUR, DISTRICT PATAN

The work of providing new MS girder supports in place of the damaged ones dismantling and resetting the out of plumb, fallen, temple and mosque's architectural members after proper documentation is in progress.

391. SHAIKH FARID'S TOMB, PATAN, DISTRICT PATAN

The work of reconstructing plinth of the mosque by ashlar stone masonry is in progress.

392. SHIVAI MATA TEMPLE, SUNAK, DISTRICT PATAN

The work of providing chain link fencing over dwarf wall was completed.

393. GROUP OF TEMPLES (BIRDS' AND SHIVA TEMPLE), KHED-RODA, DISTRICT SABARKANTHA

The work of providing approach pathway was completed.

394. RANAK DEVI'S TEMPLE, WADHWAN, DISTRICT SURENDRANAGAR

The work of removing lime wash; dismantling and re-setting worn out steps of the temple and fort walls with necessary new stone; providing approach pathway; minor repairs to *chhajja* etc. is in progress.

395. NAVLAKHA TEMPLE, SEJAKPUR, DISTRICT SURENDRANAGAR

The work of excavation of foundation for laying concrete, constructing stone masonry dwarf wall fixing of iron grill was completed.

396. OLD ENGLISH AND DUTCH TOMBS, DISTRICT SURAT

The work of repairs to the small tombs, pillars, floral designs, burials by plastering and fine finishing is in progress.

397. FATEH BURJ, VYARA, DISTRICT TAPI

The work of providing and re-setting out of plumb ashlar stone masonry was completed.

398. EXCAVATED SITE, KAYAVAROHAN, DISTRICT VADODARA

The work of scientific clearance of back side of the excavated structure on the mound, and pointing of excavated structure was completed.

399. FRESCOES ON THE WALL OF BHAU TAMBEKARWADA, DISTRICT VADODARA

The work of providing and replacing dam-

aged and decayed beams, planks, joints, rafters and wooden members after dismantling of lime concrete over roof and floor was completed.

400. QUTBUDDIN MAHMAD KHAN'S TOMB (HAZIRA), DISTRICT VADODARA

The work of laying pathway from main entrance to the monument and up to the toilet have been laid with the *dhangadhra* stone over the concrete base, and joint filled up with lime mortar was completed.

401. SAPTMUKHI VAV AT DABHOI, DISTRICT VADODARA

The work of dismantling and reconstructing bulged and out of plumb ashlar stone/ brick masonry wall is in progress.

402. HIRA GATE WITH ADJACENT CONSTRUCTION, DABHOI, DISTRICT VADODARA

The work of providing roof over porch and laying of lime concrete has been completed.

403. NANDODI GATE WITH ADJACENT CONSTRUCTION, DABHOI, DISTRICT VADODARA

The work of laying core filling in ashlar stone masonry was completed.

404. ANCIENT SITE KNOWN AS SANDHIYAPURA, GORAJ, DISTRICT VADODARA

The work of providing dry stone pitching over the north side slope towards the river to check the erosion of soil and providing pathway is in progress.



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Fort wall, Moti Daman : 298, before; 299, after conservation, See p.321

VIII. ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS¹

ANDHRA PRADESH

1. SHRI VEERABHADRA SWAMY TEMPLE, LEPAKSHI, DISTRICT ANANTPUR

In continuation of previous year's work, the conservation treatment of the south and east *prakara* wall of the temple made of granite blocks were taken up in order to remove micro-vegetational growth, lime coat, red ochre, oil stains, settled dust and dirt etc. The affected area of stone walls was first cleaned by using a mixture of ammonia solution and non-ionic detergent solution in water in a ratio of 3:1 followed by gentle brushing with nylon brushes. Layers of lime coats and red ochre were removed by employing chemico-mechanical cleaning method using a mixture of glacial acetic acid in aqueous medium, followed by a thorough wash with plenty of plain water. After the surface cleaning of the stone, fungicidal treatment was done with sodium pentachlorophenate solution in water and finally, silicon based water repellent Wacker BS-290 diluted in Mineral Turpentine Oil (MTO)² solvent in a ratio of 1:12 was applied to the treated and dried stone surface as a protective treatment. The work has been completed successfully.

The ceiling painting of Visnu shrine was also taken up for cleaning and preservation measures. The murals executed on lime ground were cleaned for removal of surface deposits

to improve visibility. Organic solvents like 2-ethoxy ethanol, toluene and triethanol amine in the ratio of 2:2:0.5 was used as a first step of cleaning and finally mixture of ethanol and isopropanol was used for the removal of tough accretions followed by preservation.

2. GOLKONDA FORT, HYDERABAD, DISTRICT HYDERABAD

In continuation of previous year's work, some metallic objects such as iron cannons, iron cannon balls and metallic guns found affected by the corrosion of metals were taken up for conservation treatment. Cotton swabs soaked in paraffin oil were used to remove the rust/corrosion products followed by using different grades of emery paper. For the removal of greenish blue corrosion products a mixture of sodium potassium tartrate, sodium hydroxide and few drops of hydrogen peroxide in appropriate ratio were used with the help of cotton swabs. For the removal of copper oxide layer, sulphuric acid in aqueous medium was used. Mixture of sodium carbonate, sodium bicarbonate in aqueous medium was applied on the surface affected with corrosion products. The metal surface was then washed thoroughly with distilled water to remove traces of acids on dried and cleaned metal surface 1-2 % of Benzo Trizole Alcohol (BTA)² solution in alcohol was applied. Finally, after drying of BTA treatment micro-crystalline wax coat was given as a protective treatment. The work has been completed.

In addition to the above, the granite walls

¹ Information from : Director (Science) of the Survey, Dehradun

² Mineral Turpentine Oil and Benzo Trizole Alcohol are referred to in the following pages as MTO and BTA respectively.

coated with lime plaster of south African body guards rooms near the main gate of Golkonda fort have been properly cleaned and conserved. The layers of micro-vegetation growths were removed mechanically using a mixture of ammonia solution and non ionic detergent solution in water in 3:1 ratio, followed by thorough washing with plain water. Layers of lime accretions were removed mechanically using 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, followed by a thorough wash with plain water. The entire surface treated and dried surfaces were given a coat of sodium pentachlorophenate as fungicide and finally the surface was protected with a silicone-based water repellent material Wacker BS-290 diluted in MTO solvent in 1:12 ratio (pls.300-301).

3. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD

External façade of connecting walls at west side was taken up for removal of micro-vegetation growth and surface deposits of dust and soot by dry brushing with soft nylon brushes. The work is in progress.

4. ABDUL WAHAB KHAN'S TOMB, KURNOOL, DISTRICT KURNOOL

In continuation of previous year's work, the exterior sandstone walls (north and west) of this monument were subjected to cleaning treatment for the removal of micro-vegetation growths, rust patches, lime coats, oil stains and layer of dust dirt deposition by using a mixture of ammonia solution and non-ionic detergent solution. Thick and hard layers of lime coats were removed by chemico-mechanical means using acetic acid solution in aqueous medium and rust patches by using Oxalic acid. Later, the surface was given a wash with dilute ammonia solu-

tion for neutralizing the effect of acid present, if any, followed by a thorough wash with plain water. All the treated and dried stone surfaces were given a coat of sodium pentachlorophenate as fungicide in aqueous medium. Finally, the cleaned and dried stone surface was treated with Wacker BS-290 diluted in MTO solvent in 1:16 ratio to impart water repellency.

The domes and exterior walls (south and east) of this monument were also taken up for cleaning and preservation treatment for the removal of heavy micro-vegetation growths on domes and lime, iron incrustations, red ochre patches and other accretionary deposits from the walls of tomb. The work is in progress.

5. KUMARA BRAHMA AND GARUDA BRAHMA TEMPLES, ALAMPUR, DISTRICT MAHABOBNAGAR

The exterior sandstone walls of the temples were taken up for chemical conservation for removal of settled dust, dirt and micro-vegetation growths. Liquid ammonia mixed with non-ionic detergent was used for removal of superficial deposits. Nylon tooth brushes were also used for effective removal of accretions from the intricate carvings and designs. The cleaned surface was given fungicidal treatment using sodium pentachlorophenate in aqueous medium and finally, a silane siloxane based water repellent Wacker BS-290 in MTO was applied on the entire dried surface as protective coat.

6. KUDALI SANGAHAMESWARA TEMPLE, ALAMPUR, DISTRICT MAHABOBNAGAR

In continuation of the previous year's work, the exterior part of the temple constructed in sand stone was treated for the removal of micro-vegetation growth lime accretion coats, red ochre, soot and oil stains and other accretionary deposits along with layers of dust and dirt

by using a mixture of aqueous ammonia solution and non-ionic detergent, and layers of lime and red ochre coats were eliminated mechanically by using aqueous solution of glacial acetic acid followed by a thorough washing with plain water. The cleaned and treated surfaces were given a coat of sodium pentachlorophenate in water as fungicide and finally silicon- based water repellent material i.e. Wacker BS-290 diluted in MTO was applied to the exterior stone surfaces as a protective coat.

ASSAM

7. CACHARI RUINS, KHASPUR, DISTRICT CACHAR

The stucco surfaces of these brick structures were subjected to conservation treatments like cleaning, fungicidal and hydrophobic treatment by chemical and mechanical methods using a mixture of aqueous ammonia and teepol detergent and gentle brushing with the help of soft nylon brushes. On the completely dried surface, fungicidal treatment was given by using solution of santobrite followed by water repellent treatment with a silicone based Wacker BS-290 diluted in MTO.

8. DEVIDOL TEMPLE AND GOLAK GHAR, JAYSAGAR, DISTRICT SIVASAGAR

The exterior surface of this brick structure coated with stucco plaster was chemically cleaned and conserved during the period. Mixture of ammonia solution in water was used for the eradication of microbiological growth from the plastered surface. Neutral solution of a liquid detergent was used for the removal of accretionary deposits of dust, dirt, soot and bird droppings. After the complete cleaning the entire dried surface was subjected to fungicidal treatment with santobrite followed by water repellent treatment with Wacker BS-290 di-

luted in MTO solvent.

9. BARDOL TEMPLE, BISWANATH GHAT, DISTRICT SONITPUR

The exterior surface of this brick monument coated with lime plaster affected by a heavy growth of micro-vegetation, surface dirt, dust and bird's dropping were removed mechanically by using a mixture of ammonia solution and non-ionic detergent in water. The surface so cleaned and dried was subjected to fungicidal treatment with dilute aqueous solution of sodium pentachlorophenate followed by the surface application of two coats of silicone based Wacker BS-290 in MTO to provide water repellency.

BIHAR

10. SHAMSHER KHAN'S TOMB, SHAMSHERNAGAR, DISTRICT AURANGABAD

The tomb made of brick and lime plaster having sandstone *chhajjas* was taken up for chemical treatment and preservation in order to improve its aesthetic look as well as to protect its surface against natural deterioration. A mild alkaline solution of ammonia and teepol detergent was in general used for removal of micro-vegetation growths dust, dirt and bird's dropping etc. using soft bristle nylon brushes. The entire cleaned and dried surface was given fungicidal treatment with solution of sodium pentachlorophenate followed by water repellent treatment with Wacker BS-290 in MTO.

11. MAIN STUPA, KULHUA, DISTRICT MUZAFFARPUR

Brick built ancient excavated remains adjoining to small votive stupa was subjected to scientific preservation during the period under review. The cleaning process involved cleaning and removing micro-biological growth,

dust, dirt, bird's dropping and other extraneous deposits from the substrate surface by chemico-mechanical means by using aqueous ammonia and teepol mixture with the help of soft nylon brushes. On the completely dried surface fungicidal treatment was given with aqueous solution of santobrite. Finally, it was provided water repellency with a coat of Wacker BS-290 in MTO.

12. MONASTERY COMPLEX NO. 11, NALANDA, DISTRICT NALANDA

The brick structured monastery complex no. 11 was taken up for scientific treatment and preservation. The thick layers of microbiological growth, dust, dirt, bird's dropping were removed chemico mechanically by using a mixture of non ionic liquid detergent and an alkaline ammonia solution. The cleaned and dried surface was subjected to fungicidal treatment using aqueous sodium pentachlorophenate solution to arrest re-growth. Finally a silicone based water repellent Wacker BS-290 diluted in MTO in was applied to the cleaned and dried surfaces to protect the brick material for further bio-deterioration.

The four damaged stucco sculptures of Temple no.3 were taken up for consolidation and preservation measures. The materials used for restoration work consisted of plaster of Paris, lime; shell powder mixed with an ethyl silicate based stone strengthener. The stuccos so restored were given two coats of Wacker BS-290 diluted in MTO to make the stucco surface hydrophobic. The work is in progress.

CHHATTISGARH

13. PATALESWAR TEMPLE, MALHAR, DISTRICT BILASPUR

The whole temple is made of fine grained sand stone and due to its porous nature dete-

rioration of stone is taking place. Two such deteriorated sculptures are situated in the right and left sides of the doorjamb of the main temple. Dissolution of mineral component, stone chipping and vertical cracks were the main problems in sculptures. Removal of superficial accretions of dust, dirt and micro-vegetation was carried out with the help of soft nylon brushes followed by using aqueous ammonia solution with little non-ionic detergent and solution of sodium pentachlorophenate in water was applied on treated surface to arrest the further growth of micro-vegetation. To provide extra strength to deteriorated and fragile stone surface consolidation and strengthening was given by using an ethyl silicate based stone strengthener Wacker OH-100. The work is in progress.

14. DANTESWARI TEMPLE, DANTEWADA, DISTRICT DANTEWADA

The interior stone walls of the temple and sculptures were badly affected due to deposition of smoke, soot, greasy material, dust and dirt, etc. The sculptures and idols of this temple are made of fine grain black sandstone which is prone to deteriorate due to porous nature of stone. The carved pillars of *mandapa* were covered with thick layers of enamel paint and beneath this thick layer lime coating was present. Surface accretions were removed with the help of soft nylon brushes by using aqueous solution of non-ionic detergent. The painted area was cleaned with various organic solvents like dichloro methane, isopropyl alcohol, amyl acetate etc. followed by clay pack treatment to remove the paint residue present inside the fabric of stone. For improving strength, resistant to the effect of erosion, deteriorated part of the stone surface was treated with an ethyl silicate based stone strengthener, Wacker OH-100. Finally, the cleaned and dried stone surface was applied with a coat of silane-siloxane based water repellent material,

Wacker BS-290 diluted in MTO.

15. KARLI MAHADEV TEMPLE, SAMLOOR, DISTRICT DANTEWADA

The temple, a sandstone structure was found covered in thick layers of dried micro-vegetational growth. The conservation of stone surfaces consisted of chemical and mechanical cleaning with ammonia solution and neutral detergent solution in water; fungicidal treatment with sodium pentachlorophenate solution in water and finally applying two coats of Wacker BS-290 diluted in MTO solvent to stop further resettling of water.

16. MAMA BHANJA TEMPLE, BARSOOR, DISTRICT DANTEWADA

The temple made of sand stone and the whole exterior portion of temple was found black due to deposition of dried micro-vegetation. Removal of dried micro-vegetational growth was carried out by using aqueous ammonia solution mixed with non ionic detergent. The work is in progress.

17. MAHADEV TEMPLE, TUMAN, DISTRICT KORBA

The external as well as internal part of the temple had become blackish due to deposition of dried micro-vegetation growth, dust, dirt etc. Lime splashes on the doorjamb were also found. Sculptures and statues made of sand stone were also in fragile condition. Superficial accretions and dust, dirt, etc. were cleaned by using aqueous ammonia solution mixed with non ionic detergent. Lime splashes were removed by chemico-mechanical means using acetic acid followed by its neutralization with dilute ammonia solution. Chemical treatment was followed by consolidation of fragile stone surface with an ethyl silicate based material Wacker OH-100. To arrest further micro-vegetation growth the dried treated surface was given fungicidal

treatment by using aqueous solution of sodium pentachlorophenate. Finally silane-siloxane based water repellent Wacker BS-290 diluted with MTO was applied on dried stone surface as the preservative.

18. LAKSHMAN TEMPLE, SIRPUR, DISTRICT MAHASAMUND

The temple, a brick structure, was found in poor state of conservation due to dampness. For imparting strength to the powdery and deteriorated area of the interior brick surface, ethyl silicate based material was impregnated inside the weakened brick surface. Surface erosion in the form of minor cracks and fractures were treated by impregnation of ethyl silicate based compound. Minor cracks were repaired by using appropriate mortar containing stone powder mixed with ethyl silicate and there after its preservation was carried out with silane-siloxane based material diluted in MTO.

DELHI

19. RED FORT, DELHI

In continuation of previous year's work, the restoration work of (i.e. removal of lime wash layers) uncovering the hidden paintings and preservation of exposed paintings of the Naubat Khana was continued during the period under review. The entire surface was found covered with thick multiple layers of lime wash, dust, dirt, soot etc. with traces of paintings underneath visible at some places. To expose the upper most layer of paintings, thick coat of lime wash was removed skillfully by using glacial acetic acid as well as by mechanical means without causing any damage to the original paintings. The cleaning of exposed painted surface was carried out with organic solvents by using judiciously in different proportions (triethanol camine, ethoxy ethanol, acetone, ethyl alcohol)

with turpentine oil as restraining agent. Gaps and lacuna in the painted plaster were filled with a re-touching paste containing lime putty, mixed with PVA solution. Bulged out areas were fixed by injecting lime based putty in liquid form, filleting of broken edges was also made by a fine lime based retouching mortar. Colour integration of painting was minimum where deemed necessary ever required by using earth colours and finally a coat of solution of PVA in toluene as preservative. The red sandstone rampart wall (under flag mast) facing Chandni Chowk was taken up for the removal of surface dirt, dust, soot, bird's dropping, pollutants etc. besides remnants of calcareous deposits and other encrustations in order to improve monument's aesthetic look and also to prevent it from further deterioration. A mixture of aqueous solution of ammonia and non ionic detergent was used for general cleaning. Calcareous deposits were removed mechanically by using dilute acetic acid on affected area only followed by a thorough washing with plenty of water. The nine numbers metal finials were cleaned and suitably retouched using golden powder in varnish. Two black stone figures of elephants at Hathigate were cleaned and conserved. Cracks in the teeth were filled with lime based putty and araldite. Finally, the exterior surfaces of the elephant figure were coloured suitably as needed. The huge brass gate at entrance to the Meena *bazaar* was found to be covered in thick layers of dust, dirt, soot, bird's dropping etc. and the metal surface darkened due to atmospheric corrosion effects. The lower part of brass gate was badly disfigured having red spots due to visitor's spit. The treatment of the brass gate was carried out with alkaline solution of sodium potassium tartrate in distilled water followed by application of dilute solution of lacquer varnish in thinner as a protective coat.

20. LAL GUMBAD, MALVIYA NAGAR, DELHI

In continuation of previous year's work, the entire surface was affected by the deposition of dust, dirt, soot, smoke and bird's dropping and thick growth of micro-vegetation. The chemical treatment of sand stone, marble, quartzite and lime plaster surface was carried out with a mixture of ammonia solution and non-ionic detergent solution in water. The weak fragile surface was consolidated with an ethyl silicate based stone strengthener, Wacker OH-100. Lime plastered surface was subjected to bleaching powder treatment for the eradication of microbiological growths. After chemical cleaning, fungicidal treatment with aqueous sodium pentachlorophenate (except marble surface) was done.

Finally, a coat of Wacker BS-290 diluted in MTO was applied on lime plaster, quartzite and sandstone surface to improve water repellency. Treatment of wooden gate was carried out with iso amyl acetate and ethylene glycol as strengthener, finally preserved it with creosote diluted in turpentine oil.

21. JAMALI KAMALI TOMB, MEHRAULI, DELHI

The exterior of the tomb, one pillared *chhatra* and two enclosures were taken up for the removal of superficial accretionary deposits *viz.*; dust, dirt, soot, smoke, bird's dropping, graffiti and a heavy growth of micro-vegetation. The treatment of sandstone and stucco surfaces was mechanical cleaning with a mixture of ammonia solution and non-ionic detergent solution in water. Lime plastered surface was subjected to bleaching powder treatment to eradicate micro-flora. After cleaning treatment a coat of sodium pentachlorophenate dissolved in distilled water was applied over the entire surface and finally a coat of Wacker BS-290 diluted in MTO applied to the cleaned and dried surface to impart water repellency. Thick soot deposited on wooden door was removed with organic solvents.

GOA

22. SE' CATHEDRAL CHURCH, ST. FRANCIS CHURCH, VELHA GOA, DISTRICT PANAJI

Badly torn and damaged oil paintings on canvas supported by wooden panels and poly-chrome figures were adequately repaired and restored. Paintings were chemically treated for cleaning surface accretions as well as to remove picture varnish to improve visibility of the fine details. Loose pigment layers were fixed with the help of wax and resin mixture. Damaged and insect eaten portions were filled with matching suitable material. After insecticidal treatment retouching and colour reintegration were done wherever necessary. The canvas paintings were given new support from the back side with hot bee's wax and resin mixture very carefully. Finally, varnish was applied as preservative coating. All the broken pieces of poly chrome figures were joined together with saw dust, stainless steel nails, etc. The work is in progress.

GUJARAT

23. JAIN TEMPLE, PAVAGADH, DISTRICT GODHRA

In continuation of previous year's work, from the group of four Jain temples, Adinath temple and Parswanath temple were taken for chemical treatment and preservation work during the period under review. Micro-vegetation growth and other superficial accretions were removed by chemico mechanical method by using a mixture of ammonia and non-ionic detergent solution in water with the help of soft nylon brushes. Hard and thick lime coats and oil bond distempers from the surface were removed by chemico-mechanical means by using acetic acid solution in aqueous medium

followed by thorough washing with plenty of water. Fragile and pulverized stone surface was consolidated with an ethyl silicate based stone strengthener Wacker OH-100. Fungicidal treatment was given by applying solution of sodium pentachlorophenate in water and finally, Wacker BS-290 in MTO was applied on the exterior stone surface as water repellent treatment. The work is still in progress.

HARYANA

24. BAOLI GHAS ALI SHAH, FARRUKHNAGAR, DISTRICT GURGAON

In continuation of previous year's work the exterior portion of the monument comprising brick, stone and lime plaster was taken up for scientific conservation work during the period under review. The accretionary deposits were removed by using liquid ammonia and non-ionic detergent in the ratio with the help of different type of brushes. The fungicidal treatment was given to clean and dry plastered surface of the monument followed by hydrophobic treatment to entire treated surface with Wacker BS-290 in MTO two coats, wet-on-wet basis.

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

The four *burjis* at the four corners, eight *burjis* two each in between the corners and a subsidiary structure of the monument comprising marble and sand stone were taken up for scientific conservation work during the period under review. Removal of superficial accretions were carried out by using a mixture of aqueous solution of ammonia and non-ionic detergent. While the hard tenacious layer of yellowish accretions was removed by adopting clay pack cleaning method using fuller's earth with suitable additives. The rough surface of marble was polished manually with a paste of lead oxide, tin oxide and oxalic acid in equal

ratio with the help of polishing stones in order to retain the original luster of marble surface. The entire cleaned sand stone surface was given fungicidal treatment using aqueous solution of sodium pentachlorophenate followed by application of a silane-siloxane based water repellent material as protective treatment.

HIMACHAL PREDISH

26. CHAMPAWATI TEMPLE, CHAMBA, DISTRICT CHAMBA

The ceiling and pillars of *mandapa* was covered with thick deposition of dust, dirt, soot, smoke and other accretionary deposits. The treatment of wood consisted of chemical cleaning with mild organic solvents followed by the application of linseed oil as preservation coat. The micro-biological growth and other accretionary deposits from the stone surface of the compound walls and shrines were removed mechanically by using a mild alkaline solution of ammonia and non-ionic detergent in water. The ingrained deposition of the lime plaster in the carvings and thick lime wash coat on the shrines were removed chemico-mechanically by using dilute solution of acetic acid in water. The work also included consolidation of weakened stones having eroded surfaces with Wacker OH-100 an ethyl silicate based stone strengthener. The work has been completed.

27. RUINED FORT, KANGRA, DISTRICT KANGRA

In continuation of previous year's work the main entrance gate and adjoining walls of ruined fort were taken up for scientific conservation measures involving interventions like clearing, consolidation, fungicidal and hydrophobic treatments. The fragile and exfoliated surfaces were consolidated using Wacker OH-100 an ethyl silicate based stone strengthener. The superficial accretionary deposits were removed by using liquid ammonia and non-ionic

detergent. After thorough washing with plenty of water, on the dried surface fungicidal treatment was given with sodium pentachlorophenate solution in water. Finally, the cleaned and dried surface was given hydrophobic treatment with Wacker BS-290 in MTO, two coats, wet-on-wet basis.

28. NURPUR FORT, NURPUR, DISTRICT KANGRA

The Brij Raj Swami temple made of stone was taken up for scientific conservation measures involving interventions like cleaning, consolidation, fungicidal and hydrophobic treatments. Prior to cleaning, fragile surface was consolidated by applying Wacker OH-100 till saturation. The accretionary deposits were removed using mixture of liquor ammonia and non-ionic detergent. The surface was thoroughly washed with plenty of water and when dried, fungicidal treatment with aqueous solution of sodium pentachlorophenate was given. Finally the surface was preserved with Wacker BS-290 in MTO.

KARNATAKA

29. VIRUPAKSHA TEMPLE, HAMPI, DISTRICT BELLARY

In continuation of previous year's work the cloister *mandapa* affected by thick layers of lime coat, red ochre, dust, dirt as well as a heavy micro-biological growth was taken up for scientific conservation measures. The superficial accretions and micro-vegetational growth from the exterior area were removed by using aqueous ammonia solution and non-ionic detergent mixture. It was followed by washing with plenty of water. On the cleaned area sodium pentachlorophenate solution was applied as fungicide. Finally, Wacker SMK-1311 diluted in water was applied as water repellent in two coats (wet-on-wet basis). Aque-

ous acetic acid solution was used for the removal of lime and red ochre accretions followed by neutralization with dilute ammonia solution. The stucco portion was consolidated by lime water. The work is in progress.

Beside cloister *mandapa*, the granite stone surface of kitchen block (inner and outer blocks) was also taken up for chemical conservation work. The surface was covered with thick coat of dust, dirt, soot oily and greasy accretions, smoke etc. These superficial accretions were removed by using aqueous ammonia and non-ionic detergent mixture. Clay pack treatment was done by using fuller's earth, ammonium carbonate and ammonium bi-carbonate for removing sooty and oily accretions. Finally the area was washed with plenty of water. On the exterior area, sodium pentachlorophenate solution was applied as fungicide. Finally, Wacker SMK-1311 diluted with water was applied as water repellent in two coats wet-on-wet basis.

30. AMRITESWARA TEMPLE, AMRITPURA, DISTRICT CHICKMANGALUR

In continuation of previous year's work, the scientific conservation work of exterior as well as interior of the temple, which is made of chloritic schist stone was taken up. The exterior part of the temple was affected with thick micro-vegetational growth, bird's dropping, layer of red ochre and its interior was badly affected with dust, dirt and oily accretions. For the removal of these surface accretions, a solution of neutral liquid detergent and ammonia in water was used. After removing the harmful accretions completely, the area was washed with plenty of water. On the exterior portions, sodium pentachlorophenate solution was applied as fungicide. Finally, Wacker SMK-1311 a silicone based water repellent diluted with water was applied in two coats wet-on-wet basis as protective treatment.

31. DODDA BASAPPA TEMPLE, DAMBAL, DISTRICT GADAG

The scientific conservation work was taken up for the exterior portion of the temple covered with micro-vegetational growth, dust, dirt, birds excrement, layers of lime coating and human vandalism. The stone surface was cleaned by using neutral detergent solution and alkaline ammonia solution followed by application of sodium pentachlorophenate solution as fungicide. Finally, a silicone based water repellent emulsion, Wacker SMK-1311 with water was applied as protective treatment(pls.302-303).

32. SANNATI STUPA, KANAGHANAHALLI, CHITTAPUR, DISTRICT GULBARGA

Chemical treatment of the stupas was taken up for the removal of all types of superficial and ingrained accretions. Cleaning was done by using liquid ammonia solution mixed with non ionic detergent on the surface of the panel. Sodium pentachlorophenate was applied as fungicide on trial basis. A silicone based water repellent, Wacker BS-290 in MTO was applied on some specific panels on trial basis. The work is in progress.

33. ISWARA TEMPLE, ARASIKERE, DISTRICT HASSAN

The exterior part of the temple was affected with thick micro-vegetational growth and in some places, red ochre coatings were found. Interior area was badly affected with dust, dirt, soot and oily accretions. For the removal of red ochre coatings, oxalic acid solution was used followed by neutralization with aqueous ammonia solution. For the removal of micro-vegetational growth from exterior surface and dust, dirt, soot and oily accretions from interior surface ammonia and non-ionic detergent mixture was used. It was followed by washing with plenty of water. On the exterior portion

sodium pentachlorophenate solution was applied as fungicide. Finally, Wacker SMK-1311 diluted in water was applied as water repellent in two coats

34. SRI LAKSHMIDEVI TEMPLE, DODDOAGADDAVALLI, DISTRICT HASSAN

In continuation of previous year's work, the *vimana*, compound wall, entrance *mandapa* were taken up for scientific conservation work. The exterior of the temple was covered with dust, dirt and micro-vegetational growth where as the interior sculptures, walls and ceiling were covered with dust, dirt, oily and sooty accretions. The stone surface was cleaned by using neutral detergent solution and alkaline ammonia solution followed by application of sodium pentachlorophenate solution as fungicide. Finally, a silicone based water repellent emulsion, Wacker SMK-1311 diluted with water was applied as protective treatment.

35. KEKARESWARA TEMPLE, HALEBIDU, DISTRICT HASSAN

The interior as well as exterior walls of the temple built of schist stone were taken up for the surface cleaning and removal of dust, dirt, soot, oily accretions and micro-vegetational growth by using neutral detergent solution and mild ammonia solution. After removing the accretions completely the area was washed with plenty of water. On the exterior area 3% sodium pentachlorophenate solution was applied as a fungicide. Finally, Wacker SMK-1311 diluted with water was applied as protective coat.

36. TARAKESHWARA TEMPLE, HANAGAL, DISTRICT HAVERI

The exterior of this monument was black due to deposition of dust, dirt, birds excrement, micro-vegetational growth, layers of lime coating, soot and oil. The stone surface was cleaned

by using neutral detergent solution and alkaline ammonia solution. The lime accretions were removed mechanically using acetic acid solution in water. The work is in progress (pls. 306-307).

37. MAHADEVA TEMPLE, ITTAGI, DISTRICT KOPPAL

Scientific conservation work was taken up for the removal of dust, dirt, oil soot and layers of lime coat from the interior portion of the temple made of schist stone by cleaning with mild ammonia solution and a neutral detergent solution in water. The lime accretions were removed mechanically by using acetic acid solution in water. Sodium pentachlorophenate was applied as fungicide to arrest further micro-vegetational growth on open area. Finally, a silicone based water repellent emulsion; Wacker SMK-1311 diluted with water was applied two coats wet-on-wet basis on open *mandapa* and pillars.

38. MADHUKESHWARA TEMPLE, BANAVASI, DISTRICT UTTARKANNADA

The exterior surface of the main temple has very fine carvings. The exterior of the monument was completely black due to deposition of dust, dirt, birds excrement along with micro-vegetational growth. Splashes of lime wash, soot and oil accretions were also deposited on the stone surface. Removal of dust and dirt was carried out by dry brushing followed by using liquid ammonia solution mixed with non-ionic detergent solution. For the removal of lime coatings from the exterior portion acetic acid solution in aqueous medium was used. Fungicidal treatment was given using sodium pentachlorophenate solution in water. Finally, a silicone based water repellent emulsion Wacker SMK-1311 with water was applied as a protective treatment (pls.304-305).



300



301

Golkonda fort : 300, before; 301, after chemical treatment of Metal canon, See p. 331



302



303

Dodda Basappa temple (front view), Dambal : 302, before; 303, after chemical preservation, See p. 338

KERALA

39. SETTING UP OF LABORATORY, KAKKANAD, KOCHI, DISTRICT ERNAKULAM

Work initiated in the year 2011 to establish a laboratory for the table work of antiquities. The infrastructure for a lime plaster analysis laboratory was set up and instruments were purchased.

40. PALAKKAD FORT, PALAKKAD, DISTRICT PALAKKAD

Palakkad fort was taken up for chemical conservation and preservation. The estimated area of fort was treated with solution of ammonia and non-ionic detergent solution for the general cleaning and removal of dust, dirt etc. The area with the lime wash was first treated with acetic acid and washed with water. The residual acids were neutralised with ammonia solution. Finally the area was treated with sodium pentachlorophenate, a fungicide solution in water and finally coated with silane siloxane mixture as water repellent two coats wet-on-wet basis(pls. 308-309).

41. VADAKKUMNATHA TEMPLE, THRISSUR, DISTRICT THRISSUR

The work for the conservation of paintings and preservation of monument area estimated 241sqm started in the year 2012. The paintings were gently brushed with sable hair brushes. Removal of dust and dirt was carried out by using organic solvents with turpentine oil as restrainer. The missing portions were matched with the total paintings with water colours. Conservation work in the main shrine of Vadakkumnathan temple is in progress.

42. SIVA TEMPLE, THIRUVANCHIKULAM, DISTRICT THRISSUR

The work of regular up-keeping of paint-

ings of the temple, and 3D laser scanning of monuments namely; Siva temple, Thiruvanchikulam and Siva temple, Chemmanthitta work was initiated in the year 2013 and is in progress.

MADHYA PRADESH

43. GROUP OF TEMPLES, KHAJURAHO, DISTRICT CHHATARPUR

In continuation of the previous year's work the scientific cleaning and preservation work was taken up for Chitrugupta temple, Matangeswara temple and a small shrine between Kandariya Mahadev and Jagdambi temple along with platform wall. Deposition of dried micro-biological growth as well as other surface accretions was removed scientifically with the help of eco-friendly and non-residual mild chemicals. After cleaning, biocide treatment was given in order to check the further growth of micro-organisms. Finally, hydrophobic treatment to the cleaned and dried surface was given so as to develop water repellency to the surface of monument. Chitrugupta temple and small temple between Kandariya Mahadev and Jagdambi temple along with platform have been completed while work is in progress on Matangeswara temple (pls.310-311).

44. BUDDHIST CAVES, BAGH, DISTRICT DHAR

The work has been initiated during the period under review to attend conservation and restoration of paintings, stucco figures and stripped off panels of paintings displayed in the site museum.

45. BAJ BAHADUR'S PALACE, MANDU, DISTRICT DHAR

The exterior façade, courtyard and entrance gate of the monument were covered with thick deposition of dust, dirt dried and active micro-biological growth. The lime plastered portion of the monument was damaged due to deposi-



304



305

Madhukeshwara temple (exterior), Banavasi : 304, before; 305, after chemical preservation. See p. 339



306



307

Tarakeshwara temple (Exterior), Hanagal : 306, before; 307, after chemical treatment. See p.339



308



309

Bastion, Palakkad fort : 308 before; 309, after chemical treatment, See p. 342

tion of accretions. Scientific cleaning was carried out to remove dust, dirt and biological growth from the surface of the monument. Bleaching powder slurry was used for the cleaning of plastered surface. Biocide 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.

46. TOMB, NORTH OF DARIYA KHAN TOMB, MANDU, DISTRICT DHAR

In continuation to previous year's work, the scientific conservation work was carried out on this monument for the removal of dust, dirt, dried micro-biological growth from the lime stone surface. Scientific cleaning was done to make the surface free from accretions like dust, dirt and micro-biological growth. Biocide treatment was given to the cleaned and dried surface to sustained biological action. Finally, hydrophobic treatment was given using Wacker BS-290 diluted in MTO and stone surface.

47. TOMB OF BAHU SAHIBA, GHAUSPURA, GWALIOR, DISTRICT GWALIOR

The domes of this monument were plastered and remaining part of the structure is of sand stone partially covered with lime plaster. The exterior portion of the monument was covered with thick deposition of dust, dirt and dried micro-biological growth. The monument had big graffiti problem over the plastered walls. Scientific cleaning was done to make the surface free from accretions like dust, dirt and micro-biological growth. Bleaching powder slurry was used to clean the lime plastered portion. Biocide treatment was given to check the further growth of micro-organisms. Finally, hydrophobic treatment was given by using Wacker BS-290 diluted in MTO to impart water repellency to the treated plastered and stone surface. The work is in progress.

48. ROCK-CUT BRAHMANICAL TEMPLE,

DHAMNAR, DISTRICT MANDSAUR

The rock out temple of Dharmrajeshwar has been carved out in very porous and hard rock. The exterior surface of the temple was covered with the deposition of dried micro-biological growth including dust and dirt. In continuation to previous year's work, scientific cleaning was carried out to make the surface free from accretions like dust, dirt and micro-biological growth. Care was taken to preserve the remnants of plaster layers. The cleaned and dried surface was subjected to biocidal treatment followed by consolidation treatment was carried out with Wacker OH-100 in order to restore cohesion to the deteriorated stone. Finally, hydrophobic treatment was given using Wacker BS-290 diluted in MTO to impart water repellency to the stone surface.

MAHARASHTRA

49. SALABAT KHAN TOMB, MEHEKARI, DISTRICT AHMEDNAGAR

The exterior stone surface of the monument was cleaned and conserved by employing scientific conservation methods. The layers of encrusted dust, dirt, bird's excreta and micro-vegetational growth were removed mechanically using aqueous solution of ammonia and non-ionic liquid detergent followed by thorough washing with water. Tenacious white lime, an accretion was removed with diluted acetic acid solution. After surface cleaning fungicidal treatment was done with aqueous solution of sodium pentachlorophenate on exterior surface. Silicone based water repellent Wacker BS-290 diluted in MTO was applied a dried treated exterior area. The work is in progress.

50. AJANTA CAVES, DISTRICT AURANGABAD

General cleaning and removing loose dust

and dirt accumulated on the painted surfaces with soft feather brushes, paint and hog hair brushes on a regular basis was carried out. Spraying of pyrethrum extract solution in kerosene or MTO solvent fortnightly in unpainted areas or as needed in the caves in order to control insect activities was attended. The layers of old darkened and yellowed varnishes, Poly Vinyl Acetate (PVA), soot, dust, dirt and bats excreta and oily accretions from the painted surface in Caves no. 11 and 16 was removed and cleaned with the help of organic solvents like toluene, di-butyl phthalate and acetone with turpentine as restraining solvent. Secured the loose damaged painted plaster to the carrier i.e. rock surface in Cave nos. 1, 2, 16, 17 and 26 by way of filleting its broken edges using materials like lime or clay, fine shell powder, suitably mixed with an adhesive; fixing the flaking pigments to the ground (i.e. mud or lime plaster) using a very thick solution of PVA as reversible fixative. Finally, the filleted surface was retouched and colour matched with the surroundings. The rock cut sculptures in Cave nos. 1, 2 and 26 were washed clean of all surface dust, dirt and other extraneous substances. After the surface cleaning, the weak stones of the sculptures were consolidated with Wacker OH-100, an ethyl silicate based stone strengthener to improve strength. The work also included filling and mending of large and deep cracks in the sculptures with a mortar mixture of fine stone powder and epoxy resin. Micro-climatic conditions to assess the influence of the environmental agents, such as temperature, relative humidity and illumination on the degradation process of the paintings is being monitored regularly.

51. AURANGABAD CAVES, AURANGABAD, DISTRICT AURANGABAD

The scientific preservation work was taken for the consolidation of painted plaster of caves. The main conservation problem was loss of

pigments and lime plaster layers from the painted plaster. The fixing and filleting of bulged out painted plaster was carried out with the help of lime, shell powder, earth colour and PVA solution in toluene. Edges of painted plaster were mended retouched using the same paste.

52. BIBI-KA-MAKBARA, AURANGABAD, DISTRICT AURANGABAD

In continuation of the previous year's work, the exterior marble and stucco plaster surface of main tomb and side walls of main mausoleum, main entrance gate were cleaned and conserved by employing scientific conservation methods. The layers of cemented dust, dirt, bird's excreta and micro-vegetational growth from marble and stucco surface and were removed mechanically using aqueous solution of ammonia and non-ionic liquid detergent followed by thorough washing with water. In the first step consolidation and filling of small gaps in the plastered area was done by using lime mortar of similar property. A thin paste of calcium hypochlorite was applied a stucco plaster; it was left over night and then washed with plenty of water, for the purpose of consolidation. After surface cleaning of the stucco layers, fungicidal treatment was done with aqueous solution of sodium pentachlorophenate followed by protective treatment with Wacker BS-290, a silicone based water repellent diluted in MTO solvent.

53. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

The stone sculptures and paintings of the Cave nos. 3 and 4 were affected by the accretionary deposits like dust, dirt, soot. Bird's droppings and exterior exposed surface was affected by the growth of micro-vegetation. The cleaning treatment of basaltic stones was carried out with a mixture of diluted ammonia solution and non ionic detergent in water followed by the

application of sodium penatachlorophenate solution in water to prevent reoccurrence of microbiological growth on exterior surfaces. Finally, a coat of Wacker BS-290 diluted in MTO was applied to the treated and dried stone surfaces with paint brushes to impart water repellency. At Cave no. 16, deep and wide cracks observed in rock-cut figures of elephants in a row were filled with a mending mortar paste. At Cave no.12, the rock cut figure of Buddha, in Cave no.2, dwarapala, elephant leg had developed deep, multiple running cracks which were also mended and retouched using the same mortar paste. The strengthening measure also included consolidation treatment of the basaltic stone wherever required with Wacker OH-100 to prevent crumbling.

54. PITTALKHORA CAVES, DISTRICT AURANGABAD

The basalt rock cut cave sculptures were observed deteriorated due to water seepage. Missing of some carved portion from the elephant figures was also observed. Sculptures at Cave no. 3 had developed deep and multiple cracks. Consolidation of sculptures and elephant figures was carried out with basaltic stone powder and ethyl silicate based stone strengthener. Multiple cracks were mended using hydraulic lime and matched with surrounding material.

55. MAHAKALI TEMPLE, DISTRICT CHANDRAPUR

The scientific conservation work, during the period under review was taken for the removal of dust, dirt, bird's excreta, lime wash, oily smoke and other accretions from the mural paintings executed on the lime plaster. Removal of embedded dust, dirt and oily smoke was done with the help of suitable organic solvents and its mixture like dicacetone alcohol, acetone, toluene, n-hexane, cellosolve, triethanolamine etc. after cleaning the lost parts of the painted

figures were colour matched.

56. CHANGDEO TEMPLE, MUKTAI NAGAR, DISTRICT JALGAON

In continuation of the previous year's work, some of the stone sculptures on the exterior west and north side walls of the temple were cleaned and consolidated by removing all the unwanted accretions from the stone sculptures, consolidation treatment was done with Wacker OH-100, an ethyl silicate based stone strengthener in order to improve cohesive strength. The work also consisted of filling of cracks and mending of exfoliated areas with a mixture of powdered rock and Wacker OH-100, adhesive. The work is in progress.

57. TRIMBAKESHWAR TEMPLE, TRIMBAKESHWAR, DISTRICT NASIK

In continuation of the previous year's work, the scientific conservation work was taken up for surface cleaning and removal of thick layers of dirt, dust, bird's dropping and micro-biological growth from the exterior stone surfaces, application of fungicide and protective coating. After the surface cleaning and removing all the unwanted accretions from the stone sculptures, consolidation of fragile sculptures, fixing and filleting of loose fragments and filling up of cracks was done with Wacker OH-100, an ethyl silicate stone strengthener and powdered rock. The layers of encrusted dust, dirt, birds dropping and micro-biological growth were removed mechanically using aqueous solution of ammonia and non-ionic detergent followed by thorough washing with water. On cleaned exterior surface of the monument, fungicidal treatment was done with aqueous solution of sodium pentachlorophenate. Protective treatment was done by application of Wacker BS-290 diluted in MTO in two coats wet-on-wet basis on cleaned, dried and fungicidal treated exterior area.

ODISHA**58. EXCAVATED BUDDHIST SITE, LALITAGIRI, DISTRICT CUTTACK**

In continuation of previous year's work, Monastery nos. 1, 3 and 4 were taken up for chemical treatment and preservation work. The exposed parts of monastery, comprising brick and stone structural parts were cleaned and conserved. The micro-vegetational growth was eradicated using a mixture of liquid ammonia solution and non-ionic liquid detergent and encrusted dirt, dust etc. removed chemico-mechanically using non-ionic liquid detergent. Fungicidal treatment was done with aqueous sodium pentachlorophenate solution and finally, two coats of a silicone based Wacker BS-290 wet-on-wet diluted in MTO solvent were applied to the cleaned and dried stone/brick surfaces as a protective treatment.

59. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT KHORDHA

The *vimana*, *jagamohana*, *natamandapa* and *bhogamandapa* of Parvati temple was taken up for scientific removal of deposited dust, dirt, smoke etc. from the surface. The conservation treatment of stone surfaces consisted mainly of chemico-mechanical cleaning with ammonia solution and neutral detergent solution in water; consolidating the weak stones with Wacker OH-100, fungicidal treatment with sodium pentachlorophenate solution in water and finally applying two coats of Wacker BS-290 diluted in MTO solvent wet-on-wet basis. The work is in progress.

The brass sheets over the three wooden doors were treated clean of all surface dirt, dust and corrosion products using a mixture of tartaric and citric acids in distilled water followed by polishing with brasso.

60. CHAUSATHI YOGINI TEMPLE, HIRAPUR, DISTRICT KHORDHA

It is a circular temple having no roof and enshrined with chloritic stone images of sixty four yoginis in separate niches in the interior wall was taken up for cleaning, focusing mainly on the removal of accumulated dirt, dust and micro-vegetational growth from the stone surfaces. All the accretionary deposits were removed chemico-mechanically using a mixture of dilute ammonia solution and a neutral detergent solution in water. To strengthen the weak stone, Wacker OH-100 was applied as consolidant in the selected highly pulverized area. Fungicidal treatment was given by applying aqueous sodium pentachlorophenate solution and finally, two coats of a silicone based Wacker BS-290 (wet-on-wet) diluted in MTO solvent was applied to the cleaned and dried stone/brick surfaces as a protective coat. The work is in progress (pls. 312-313).

61. DAKSHYA PRAJAPATI TEMPLE, BANPUR, DISTRICT PURI

The exterior stone surface of *vimana* and *jagamohana* was found covered with thick layers of dust, dirt, soot and micro-vegetation growth. The conservation treatment consisted of chemico-mechanical cleaning with ammonia solution and neutral detergent solution in water, consolidating the weak stones with Wacker OH-100; and finally applying two coats of Wacker BS-290 diluted in MTO solvent wet-on-wet to impart water repellency.

62. SRI JAGANNATHA TEMPLE, PURI, DISTRICT PURI

The de-plastered southern wall of *simhadwara* was taken up for the removal of remnant lime from the carved stone surface. The treatment of stone consisted of mechanical cleaning with dilute acetic acid solution in

water followed by neutralization with mild alkaline ammonia solution. Finally, the stone surface was washed clean thoroughly with neutral detergent solution and water. The interior stone walls of *garbhagriha*, *ratna simhasana* and silver and brass doors were taken up for cleaning and removal of layers of accumulated dirt, dust, soot, oil stains and greasy matters from their surfaces and successfully completed.

PUNJAB

63. SHAMSHER KHAN TOMB, BATALA, DISTRICT GURDASPUR

The interior part of the tomb was taken up for chemical treatment and preservation work by removing the dust, dirt, soot, bird's excreta and hard tenacious accretions from plastered surface using suitable chemicals.

64. DAKHNI SARAI, DAKHNI, DISTRICT JALANDHAR

In continuation of previous year's work, the chemical treatment for eradication of dust, dirt, dried micro-vegetational growth, bird's excrement and other similar deposits from the brick and plastered surface of the mosque was carried out during the period under review by removing with the help of liquid ammonia and non-ionic detergent solution. After thorough washing the entire dried surface was given fungicidal treatment with aqueous solution of sodium pentachlorophenate in order to prevent re-growth of micro-vegetation. Finally, the surface was subjected to hydrophobic treatment with the help of Wacker BS-290 in MTO two coats, wet-on-wet basis.

65. MOHAMMAD MOMIN TOMB, NAKODAR, DISTRICT JALANDHAR

The exterior surface of this monument was covered in thick layers of atmospheric dust, dirt, bird's droppings and microbiological growth.

A mixture of liquid ammonia and non-ionic detergent solution in water was used for the removal of all these accretionary deposits from the exterior surface. The hard and firm accretions were removed using fuller's earth with additives followed by thorough washing with distilled water. Fungicidal treatment was done with the application of sodium pentachlorophenate solution in water and finally a coat of Wacker BS-290 solution in MTO solvent was applied on the treated and dried surface to impart water repellence. The work is in progress.

RAJASTHAN

66. JAWAHAR BURJ, BHARATPUR FORT, BHARATPUR, DISTRICT BHARATPUR

In continuation of previous year's work, the sloped brick walls on either side of the ramped approach pathway having affected by the damaging effects of micro-biological growth, encrusted dirt, lime wash was taken up for scientific conservation measures. Cleaning of sloped brick walls and pavilions on the Jawahar *burj* were carried out by adopting chemico-mechanical method using a mixture of dilute ammonia solution and non-ionic liquid detergent solution in water. The lime deposits were removed by using dilute acetic acid solution followed by cleaning with ammonical water and non-ionic detergent. The cleaned and dried surface was given application of aqueous solution of sodium pentachlorophenate as fungicide. The entire surface was given water repellent treatment by the application of a silicone based material Wacker BS-290 suitably diluted with MTO wet-on-wet two coats.

The wall paintings over the inner walls of the pavilion were cleaned by mixture of suitable organic solvents and the edging and filleting was done by suitably tinted plaster of Paris. The colour reintegration work was also car-

ried out wherever required. Finally, the painted surface was preserved by the application of PVA solution in toluene.

67. MAHAKAL TEMPLE AND MANDAKINI TANK, BIJOLIA, DISTRICT BHILWARA

In continuation of previous year's work, the interior surface of the temple covered in thick layers of soot greasy material and lime wash was taken up for scientific conservation measures. The lime wash coats were removed from the surface using dilute acetic acid solution and for removing the soot etc. 2-ethoxy ethanol was used. Thereafter, the entire surface was cleaned thoroughly with a mixture of non-ionic detergent and aqueous ammonia solution. The cleaned and dried surface was consolidated wherever necessary by impregnating the surface with an ethyl silicate based stone strengthener Wacker OH-100 followed by application of a coat of Wacker BS-290 suitably diluted with MTO, to impart water repellency.

68. CHITTAURGARH FORT, CHITTAURGARH, DISTRICT CHITTAURGARH

In continuation of previous year's work, the stone surfaces of Meera mahal and the adjacent portions were taken up for scientific conservation work. The walls were cleaned by using a mixture of diluted ammonia solution and non-ionic detergent in water for the eradication of micro-biological growths, bird's dropping, encrusted dust and dirt etc. The cleaned and dried surface was given a biocidal treatment by spraying aqueous solution of sodium pentachlorophenate. The consolidation treatment was done with Wacker OH-100, an ethyl silicate based stone strengthener to improve cohesive strength. Finally, a coat of Wacker BS-290 a silicone based water repellent product suitably diluted in MTO solvent was applied to the entire cleaned and dried stone surfaces by brush. The work is in progress.

69. JAGAT SHIROMANI TEMPLE, AMBER, DISTRICT JAIPUR

The interior temple has wall paintings, which were covered with thick, soot and oily depositions. Due to seepage water in the past, the portions of the paintings were washed away. The interior portion of the monument affected badly by the accretionary deposits like dirt, dust, soot and oily substances besides lime along with micro-vegetation growth was subjected to chemical and mechanical cleaning and consolidation treatment. The thick layers of lime were removed mechanically by using diluted acetic acid solution in water. The work is in progress.

70. KUMBALGARH FORT, KUMBALGARH, DISTRICT RAJSAMAND

In continuation of previous year's work, the interior portion of the Kumbha Mahal was taken up for the scientific conservation. The entire lime plastered surface was subjected to the scientific cleaning by the application of slurry of calcium hypochlorite (bleaching powder) followed by washing with plenty of plain water. Further, the surface was cleaned with mild alkaline solution of aqueous ammonia and non-ionic detergent. The cleaned and dried surface was sprayed with aqueous solution of sodium pentachlorophenate to arrest the growth of micro-vegetation. Finally the entire surface was imparted water repellency by the application of Wacker BS-290 suitably diluted with MTO.

The entire surface of the Hanuman pole affected badly by the accretionary deposits like dirt, dust, soot and micro-vegetational growth was subjected to chemical and mechanical cleaning by using a mixture of dilute ammonia solution and a non-ionic liquid detergent solution in water. The plastered portion was cleaned with slurry of calcium hypochlorite to remove biological growth. Surface application of aqueous solution of sodium pentachlorophenate

was given as fungicide. Finally, a coat of Wacker BS-290, a silicone based water repellent suitably diluted in MTO was applied to the entire cleaned and dried surface. (pls. 314-315).

71. SAAS-BAHU TEMPLE, NAGDA, UDAIPUR, DISTRICT UDAIPUR

In continuation of previous year's work, the *torana*, sub shrines and the platform wall of the Saas-Bahu temple was taken up for scientific conservation. The entire surface area was cleaned for the removal of biological accretions using aqueous ammonia and non-ionic detergent mixture. The cleaned surface was given fungicidal treatment with aqueous solution of sodium pentachlorophenate. The dried surface was then strengthened by the application of an ethyl silicate based stone strengthener, Wacker OH-100 wherever necessary. Finally, the surface was imparted the water repellency by the application of water emulsions of Wacker SMK-1311 wet-on-wet two coats.

TAMILNADU

72. SHRI BRIHADISVARA TEMPLE, GANGAI KONDACHOLAPURAM, DISTRICT ARIYALUR

The exterior surfaces of this granite stone temple covered with thick layers of dirt, dust, soot and microbiological growth have been cleaned and conserved during the period under review. For the removal of the moss, lichens, dust, dirt and other accretionary deposits ammonia and non-ionic detergent was used. When the accretions were removed completely sodium pentachlorophenate solution was applied as fungicide. Finally when the stucco surface was completely dried preservative coating was applied over the surface by applying Wacker BS-290 in MTO. The thick oily, soot and greasy matters were removed from the interior areas by using aqueous solution of ammonium carbonate and bi-carbonate mixture

in fuller's earth (Clay pack treatment) followed by treating the surface with ammonia and non-ionic detergent. The work is in progress.

73. GROUP OF TEMPLES, KANCHIPURAM, DISTRICT KANCHIPURAM

In continuation of previous year's work, the Temples was taken up in order to strengthen the deteriorated stone surface and to clean and conserve by adopting mechanical-chemical methods as per requirement. In order to strengthen the deteriorated stone surface one coat of Wacker OH-100 as stone strengthener was applied over the fragile and loose portions and it was left for 15 days for proper polymerization. After that for removal of the moss, lichens, dust, dirt and other accretionary deposits aqueous ammonia solution and non-ionic detergent was used. When the accretions were removed completely sodium pentachlorophenate solution was applied as fungicidal coating. Finally when the surface was completely dried preservative coating/water repellent coating was applied over the surface by applying Wacker SMK-1311 in water.

74. SHORE TEMPLE, MAHABALIPURAM, DISTRICT KANCHIPURAM

As a preventive measure, the process of removal of water soluble salts from the infested areas of granite walls through wet paper pulp poultice technique continued on a regular basis. After the surface cleaning of stone, fungicidal treatment was done with sodium pentachlorophenate solution in water followed by the water repellent treatment with Wacker SMK-1311 diluted in water. The work is in progress.

75. MUNKUDUMI ESWARAN TEMPLE, PONIVILAINTHAKALATHUR, DISTRICT KANCHIPURAM

In continuation of previous year's work, the exterior surface of main *vimana* and Amman shrine of this temple coated with stucco plaster

of varying thickness was taken up for chemical conservation and preservation work. The methods and materials employed in the conservation of stucco consisted of surface cleaning and removing all such accretionary deposits chemico-mechanically with a mixture of ammonia solution and non-ionic detergent solution in water fungicidal treatment with solution of sodium pentachlorophenate in water; and finally protective treatment with Wacker BS-290 in MTO solvent.

76. FORT AT VATTAKOTTAI, DISTRICT KANYAKUMARI

Removal of dust and moss accretions from the surface was taken up by using soft brushes and afterwards cleaned the granite portions by using ammonia and non-ionic detergent. Again sodium pentachlorophenate as fungicide with silane siloxane mixture was applied with water as water repellent.

77. SRI VARADARAJA PERUMAL TEMPLE, TIRUBHUVANAI, DISTRICT PUDUCHERRY (U.T.)

In continuation of previous year's work, the stucco layer and stone surface of the temple was taken up for chemical conservation and preservation work during the period under review. The treatment of stucco surfaces has been mechanical cleaning for the removal of microbiological growth and other accretionary deposits with a mixture of dilute ammonia solution and non-ionic detergent solution in water followed by fungicidal treatment with sodium pentachlorophenate solution in water. The cleaned and dried stucco surface was given protective treatment with Wacker BS-290 diluted in MTO solvent to impart water repellency. As for the protective treatment of stone surface it was done with Wacker SMK-1311 diluted in water. In the interior, carved pillars and sculptures were washed clean of all surface dirt, soot, oil and greasy accretions using a mixture of

ammonium bicarbonate and ammonium carbonate solution in water followed by cleaning with ammonia solution and non-ionic liquid detergent.

78. ROCK-CUT VISHNU TEMPLE, THIRUMAYAM, DISTRICT PUDUKOTTAI

During the period under review, the exterior of main *vimana* and other sub shrine *vimanas*, which were badly affected by micro-vegetation and interior areas covered by oil, soot and other accretionary deposits were taken up for chemical conservation and preservation work. The temple is built up of granite stone with stucco *vimanas*. For the removal of moss, lichens, dust, dirt and other accretionary deposits ammonia and non-ionic detergent mixture was used. When the accretions were removed completely sodium pentachlorophenate solution was applied as fungicide. Finally when the stucco surface was completely dried preservative coating was applied over the surface by applying Wacker BS-290 in MTO. The thick oily, soot and greasy matters were removed from the interior areas by using aqueous solution of ammonium carbonate and bi-carbonate mixture followed by treating the surface with ammonia and non-ionic detergent.

79. SRI BRIHADISVARA TEMPLE, DISTRICT THANJAVUR

In continuation of previous year's work, the scientific conservation of main *vimana*, *keralanthaga gopuram* and other small *vimanas* was carried out during the period under review. The exterior surfaces of some of these structures have been subjected to mechanical and chemical cleaning using a mixture of ammonia solution and non-ionic liquid detergent solution in water, followed by the application of sodium pentachlorophenate solution in water as fungicide. Finally, as protective treatment, a coat of Wacker SMK-1311

(a silicone based emulsion) diluted in was applied to the treated and dried surface with brush. The interior areas also received conservation treatment for the removal of oil and sooty accretions. The wall paintings around Siva and Amman shrines also received conservation treatment which included measures like surface cleaning, consolidation, strengthening and application of a protective coat with PVA solution in toluene. The work is in progress.

80. CHANDRAMOULESWARA TEMPLE, NATTERY, DISTRICT TIRUVANNAMALAI

In continuation of previous year's work, the highly deteriorated temple was taken up for the chemical conservation and preservation work. The highly deteriorated and weakened stone carved blocks have been subjected to preventive consolidation treatment with Wacker OH-100 prior to cleaning to prevent crumbling. The stone sculptural and structural surfaces have been scrubbed clean of all accretionary deposits, dirt, dust, soot and bird's dropping and micro-biological growth using a mixture of non-ionic liquid detergent and ammonia solution in water. After the cleaning of stone, fungicidal treatment was done with sodium pentachlorophenate solution in water. The marks of lime wash coats on the inner side wall of the main shrine have been removed mechanically using acetic acid solution in water followed by treating the stone surface with ammonia solution and neutral detergent.

81. JAIN TEMPLE, TIRUMALAI, DISTRICT TIRUVANNAMALAI

The stone sculptures were affected by ingrained dust, dirt, accretionary deposits where as figures on the *vimana* and *gopuram* were affected by micro-vegetational growth. Patches of paintings on stucco figures were also observed in the *garbhagriha*. Dust, dirt and other deposits were accumulated on the painted surface, besides the flaking of pigments and cracks

at some area. For the removal of the moss, lichens, dust, dirt and other accretionary deposits ammonia and non-ionic detergent was used. When the accretions were removed completely sodium pentachlorophenate solution was applied as fungicide. Finally when the stucco surface was completely dried preservative coating was applied over the surface by applying Wacker BS-290 in MTO. The thick oily, soot and greasy matters were removed from the interior areas by using aqueous solution of ammonium carbonate and bi-carbonate mixture followed by treating the surface with ammonia and non-ionic detergent.

82. GINGEE FORT COMPLEX, DISTRICT VILLUPURAM

The stucco surfaces of these granite Pattabhirama Temple, Naraisingarayan Pettai And Siva Temple were covered with thick layer of dust, dirt and other accretionary deposits. The lime coat patches were also present in some portions. Thick oily, sooty accretions, greasy matters were deposited at many parts on the interior portion and also on some pillars and sculptures. The stone surface covered with micro-vegetational growth. The conservation treatment to the substrate materials of these temples (granite, sandstone and stucco) consisted of mechanical cleaning with a mixture of ammonia solution and non-ionic liquid detergent solution in water, fungicidal treatment with sodium pentachlorophenate solution in water and finally protective treatment with Wacker SMK-1311 diluted in water. Thick oily, soot and greasy matters were removed by using aqueous solution of ammonium carbonate and bi-carbonate mixture followed by treating the surface with ammonia and non-ionic detergent. The lime wash removed by using acetic acid solution followed by treating the surface with ammonia and non-ionic detergent. The work is in progress.

83. TIRUMALAI NAYAKA'S PALACE,

SRIVILLIPUTHUR, DISTRICT VIRUDHUNAGAR

The interior of the palace is adorned with exquisite Nayaka paintings with great workmanship of art. The beautiful paintings were found beneath the very thick multiple layer of lime coat. Similarly paint layers were applied on the wall portions. In order to expose the paintings chemical conservation and preservation work was taken up during the period under review. The hardened and thick lime coat applied over the painted surface was removed by physico-chemical means using suitable tools and by using mixture of organic solvents in appropriate proportion. The work is in progress.

TRIPURA

84. ROCK-CUT RELIEF, UNAKOTI, DISTRICT NORTH TRIPURA

The rock-cut sculptures and carvings of Unakoti were subjected to chemical treatment and preservation during the period under review for eradication of thick layers of micro-biological growth, dirt, dust and bird's droppings etc. The superficial accretions and microbiological growth were removed from the substrate by chemico-mechanical method using aqueous ammonia and teepol mixture with the help of soft nylon brushes. The cleaned surface after thorough washing was given fungicidal treatment using sodium pentachlorophenate and finally protected with Wacker BS-290 in MTO solvent.

UTTAR PRADESH

85. AGRA FORT, AGRA, DISTRICT AGRA

The red sandstone fort wall facing Yamuna from Musamman *burj* to Jahangiri Mahal and Amar Singh gate to military gate have been cleaned of all surface dirt, dust, soot, air pol-

lutants, bird droppings and micro-biological growth. The treatment of sandstone has been mechanical cleaning with a mixture of ammonia solution and a little of non-ionic liquid detergent solution in water followed by the application of a coat of sodium pentachlorophenate solution in water. Finally, a coat of Wacker BS-290 diluted in MTO solvent was applied to the cleaned and dried stone surfaces to impart water repellency.

The exterior marble surfaces of Khas Mahal was affected by smoke, dust, dirt, greasy/oily accretions, where as the parapet wall made up of lime plaster had become black due to deposition and growth of micro-vegetation. The metallic pinnacles and *chhatris* over the Khas *mahal* were also taken up for conservation treatment. The lime plaster surface was treated with aqueous ammonia solution containing a little liquid non-ionic detergent in order to remove dust, dirt and micro-biological growth. The treated surface was given a coat of sodium pentachlorophenate solution. Finally, the surface was preserved with Wacker BS-290 diluted in MTO. The marble surface was cleaned by applying the paste of fuller's earth containing little ammonium carbonate and other additives as required. Finally treated marble surface was washed with plenty of distilled water to remove the traces of chemicals. Metallic surface and pinnacle over the *chhatris* were treated by suitable chemicals like rochelle salt, sodium hydroxide and hydrogen peroxide as per requirement. The cleaned metal surface was preserved by applying two coat of solution of PVA diluted in sulphur free toluene.

86. BURIA-KA-TAL, AGRA, DISTRICT AGRA

The exterior side of the structure was taken up for chemical conservation work during the period under review, for the removal of dust, dirt and tarry matter. Some portion of tomb and pavilion is very fragile and need consolidation

and strengthening. The general cleaning with ammonia and non-ionic detergent has been initiated. The work is in progress.

87. ITMAD-UD-DUALLA, AGRA, DISTRICT AGRA

In continuation of previous year's work, the paintings in the central hall and western verandah of this monument received conservation treatment during the period under review. In general, the painted surface was found covered with layers of accumulated dirt, dust, soot and tar accretions pigeon droppings. Paintings in the hall have been destroyed due to human vandalism and seepage of rainwater in the past. The conservation treatment consisted of surface cleaning and removing all extraneous substances with mild organic solvents; consolidating the flaking paint layer with PVA strengthening the damaged painted plaster by way of measures like fixing, filleting and edging the broken ends of painted plaster with fine lime based restoration mortar; and finally protective treatment was done with PVA solution in sulphur free toluene. The existing cracks and fissures in the paintings wherever noticed were repaired with a mixture of lime based restoration mortar with water and re-touched.

The imposing gateway decorated with inlay work of marble in sandstone was taken up for the removal of accumulated dirt, dust, soot, tar accretions, bird droppings and micro-biological growth from its stone surface. The treatment of sandstone was carried out chemico-mechanical using a mixture of dilute ammonia solution and non-ionic liquid detergent solution in water followed by the fungicidal treatment with sodium pentachlorophenate solution in water. Finally, the surface so treated was preserved with Wacker BS-290 dilute in MTO.

88. DIWAN-E-AM, FATEHPUR SIKRI, DISTRICT AGRA

The exterior surface of the sandstone monu-

ment has become grey-black at many places due to deposition of dust, dirt and growth of micro-vegetations. White patches were also observed due to deposition of bird's droppings inside the judgment hall. A mixture of ammonia solution and non-ionic detergent solution in water was used for surface cleaning. The work is in progress.

89. TOMB OF NAWAB ISLAM KHAN, FATEHPUR SIKRI, DISTRICT AGRA

In continuation of previous year's work the stucco surfaces of the main central dome and *chhatris* were treated with calcium hypochlorite solution and an aqueous mixture of dilute ammonia solution and neutral detergent followed by fungicidal treatment done with sodium phentachlorophenate solution in water to prevent microbiological growth from re-invasion.

90. AKBAR TOMB, SIKANDRA, DISTRICT AGRA

In continuation of previous year's work, the four marble *chhatris* and corner *burjis* on the first floor of this tomb were taken up for conservation treatment. The treatment of sandstone surfaces consisted of mechanical cleaning with a mixture of dilute ammonia solution and non-ionic liquid detergent in water, and the marble was washed clean of all surface dirt and deposits with a water based pack of fuller's earth charged with chemical additives. The cleaned sandstone surface was given a coat of sodium pentachlorophenate solution as fungicide and finally the dried surface was preserved with Wacker BS-290 diluted in MTO.

91. PRITHVINATH TEMPLE, KHARGUPUR, DISTRICT GONDA

In continuation of previous year's work, the interior plastered surface of the temple, verandahs of the monument which was thickly covered with dust, dirt and multiple layer of lime wash was taken up for chemical conservation. The lime wash was removed using aqueous solution

of acetic acid by physico chemical method. The plastered surface was chemically treated with aqueous solution of ammonia and non-ionic detergent to eradicate the accretions deposited on the surface with minimum intervention. The biocide treatment was given to the treated and dried plastered surface followed by silane and siloxane based preservative coat.

92. RANI MAHAL, JHANSI, DISTRICT JHANSI

In continuation of previous year's work, the consolidation and restoration of wall paintings continued. Wall paintings were badly covered with dust, dirt, soot, tarry and other hard accretions and also having minor cracks and graffiti on the painted wall. Filleting and filling work of the minor cracks along with edging of the painted plaster was done followed by chemical treatment using different organic solvents and their mixtures as required. The work is in progress.

93. SIKANDAR BAGH, LUCKNOW, DISTRICT LUCKNOW

The exterior and interior portions of main gate of monument was taken up for scientific conservation work. The plastered surface of the gate was thickly covered with micro-vegetations, bird excreta, dust, dirt and hard accretions. For the removal of superficial and hard accretions aqueous solutions of ammonia and non-ionic detergent along with different chemicals depending upon the problems were used. The entire chemically treated surface was thoroughly washed with water. The chemically treated and dried plastered surface was given biocide treatment by using aqueous solution of sodium pentachlorophenate followed by silane and siloxane based water repellent treatment(pls.316-317).

94. GOVIND DEV TEMPLE, VRINDAVAN, DISTRICT MATHURA

In continuation of previous year's work, the interior surface of this sandstone monument covered with layers of dirt, dust, soot and bat excrement was subjected to mechanical and chemical cleaning with a mixture of neutral detergent solution and ammonia solution in water.

UTTARAKHAND

95. JAGNATH TEMPLE, JAGESHWAR, DISTRICT ALMORA

The interior walls of *garbhagriha*, *sabha mandap*, pillars, ceilings and wooden doors had become black due to deposition of soot and oily matters by constant burning of oil/ghee lamps, *dhoop* and *agarbatti*. The stain of *kumkum/sindure* was also seen at various places in interior surface of temple. The exterior surface was badly affected due to deposition of dust, dirt and micro-vegetational growth. The exterior surface was cleaned by using aqueous ammonia solution and non-ionic detergent followed by washing with plenty of water using various type of soft nylon brushes. To arrest re-growth of micro-vegetation solution of sodium pentachlorophenate was applied. A water repellent Wacker BS-290 diluted in MTO was applied as preservative coating two coats wet-on-wet basis in the exterior surface of the temple. The interior surface was cleaned by using clay pack treatment to remove oil and soot deposits.

96. JAGESHWAR GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA

The exterior surface of Pyramidical shrine was affected by accretionary deposition of dust, dirt and pollen grains along with micro-vegetation growth. The small shrines adjoining to the temple shows the tendency of extensive erosion and exfoliation due to extreme climatic conditions and weathering. The interior surfaces

of shrine become black due to deposition of soot and oily matter by continuous burning of oil/ghee lamp and incense sticks. The exterior surface cleaned by using mixture of aqueous ammonia solution and non-ionic detergent in water using soft nylon brushes. Consolidation of the weathered stone surface was done by using Wacker OH-100. To arrest re-growth of micro-vegetation solution of sodium pentachlorophenate was applied (two coats). A water repellent Wacker BS-290 diluted in MTO was applied as preservative coating in the exterior surface of the temple. The interior surface was cleaned by using clay pack treatment to remove oil and soot deposits.

97. RAKSHAS DEVAL TEMPLE, TALLIHAT, BAIJNATH, DISTRICT BAGESHWAR

The exterior stone surface of the monument was found covered in thick layers of dust, dirt, soot, bird's dropping and micro-biological growth. The methods and materials of stone treatment consisted of mechanical cleaning with a mixture of dilute ammonia solution and non-ionic detergent solution in water by applying fungicide, aqueous sodium pentachlorophenate was sprayed on to the cleaned stone surfaces; and finally by applying of coat of Wacker BS-290 diluted in MTO solvent to the treated and dried stone surfaces with paint brushes as protective treatment.

WEST BENGAL

98. KALACHAND TEMPLE, BISHNUPUR, DISTRICT BANKURA

The chemical conservation work was carried out for the removal of dust, dirt, thick micro-biological growth from exterior laterite stone and lime plaster surface of the monument. For the removal of dust, dirt and micro-biological growth mixture of liquid ammonia solution and non-ionic detergent was used. On dried and

cleaned surface fungicidal treatment was done by using solution of sodium pentachlorophenate in water. After complete drying, water repellent treatment was given by applying a silane-siloxane based material Wacker BS-290 in MTO.

99. MANDALAL TEMPLE, BISHNUPUR, DISTRICT BANKURA

The exterior stone and lime plaster surface in some portion was covered with thick micro-vegetational growth, dust and dirt. For the removal of accretionary deposits and ingrained dust aqueous solution of ammonia in water and non-ionic detergent was used. Fungicidal treatment was done on properly cleaned and dried surface by using solution of sodium pentachlorophenate in water followed by silane and siloxane based water repellent treatment by applying two coats of Wacker BS-290 in MTO solvent wet-on-wet basis.

100. PATHPUR TEMPLE, BISHNUPUR, DISTRICT BANKURA

The exterior portion which was covered with micro-vegetational growth, dust, dirt, etc. was cleaned by using neutral detergent solution and alkaline ammonia solution followed by application of sodium pentachlorophenate solution as fungicide. Finally, a silicone based water repellent, Wacker BS-290 with MTO was applied as protective coat.

101. RADHAMADHAV TEMPLE, BISHNUPUR, DISTRICT BANKURA

The temple was found covered with thick growth of micro-vegetation, dust and dirt. The conservation treatment of stone surfaces consisted chemico-mechanical cleaning with ammonia solution and neutral detergent solution in water, fungicidal treatment with sodium pentachlorophenate solution in water and finally applying two coats of Wacker BS-290 diluted in MTO solvent wet-on-wet basis.

102. CHAITANYADEV TEMPLE, GUPTIPARA, DISTRICT HOOGLY

The brick and lime plastered structure was taken up for scientific treatment and preservation. The thick layers of micro-biological growth dust, dirt and bird's droppings were re-

moved chemico- mechanically by using a mixture of non-ionic liquid detergent and an alkaline ammonia solution. The cleaned and dried surface was subjected to fungicidal treatment using aqueous sodium pentachlorophenate solution to arrest re-growth.

CIVIL DEPOSIT WORK

LAHERIPURA GATE, VADODARA, DISTRICT VADODARA, GUJARAT

Out of the four historical gates, the Laheripura gate is the part of western ramparts of the fort, made of sandstone upto certain height. The upper part of the gate made of bricks and lime plaster. The conservation problem includes micro-vegetational growth, deposition of soot, smoke, dust, dirt, bird's droppings, layers of lime coat and oil bond distemper. Wooden area of gate was badly affected by insect's activity. Micro-vegetation growth and other superficial accretions were removed by chemico-mechanical method by using a mixture of ammonia and non-ionic detergent solution in water with the help of soft nylon

brushes. Hard and thick lime coats and oil bond distempers from the surface were removed by chemico-mechanical means by using acetic acid solution in aqueous medium followed by thorough washing with plenty of water. Fragile and pulverized stone surface was consolidated with an ethyl silicate based stone strengthener Wacker OH-100. Fungicidal treatment was given by applying solution of sodium pentachlorophenate in water and finally, Wacker BS-290 in MTO was applied on the exterior stone surface as water repellent treatment. Wooden portion was treated with mixture of methanol, toluene and triethanol amine followed by insecticidal treatment with chloro pyriphose. For the removal of rust from iron area very dilute oxalic acid solution was used. The work is in progress.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS

1. ZONAL LABORATORY, CHENNAI

- One hundred fiftyfive ast objects received from Excavation Branch-1, of the Survey was chemically treated and preserved.
- Out of thirtyseven swords received from Fort Museum, Chennai, five iron swords with brass and wooden handle were treated and preserved and treatment of remaining swords is under progress.

2. ZONAL LABORATORY, DELHI

- Chemical treatment of thirtyseven metal

objects received from excavation at Roopnagar, Punjab was carried out.

- Treatment of some three hundred objects of Archaeological Museum (Mumtaz Mahal museum), Red fort, Delhi was carried out.
- Restoration and preservation of twelve books out of two hundred books received from Central Archaeological Library of the Survey have been carried out.

3. ZONAL LABORATORY, MYSORE

Chemical treatment of two canvas paintings,

eight litho prints, five silver, two copper antiquities and five pencil sketches received from Tipu Sultan Museum, Dariya Daulat Bagh, Srirangapatna was carried out.

4. SCIENCE LABORATORY, DEHRADUN

Out of two hundred ninety-nine books received from Central Archaeological Library, of the Survey one hundred twenty books were restored and preserved.

AIR QUALITY MONITORING

The Science Branch of the Survey is carrying out air quality Monitoring at Taj Mahal, Agra, Bibi-ka-Maqbara, Aurangabad and Charminar, Hyderabad with the objectives to assess the impact of changing environmental conditions

on the structure and building materials of ancient monuments and historical buildings. The air quality monitoring activity consists of ambient air quality monitoring and meteorological conditions.

1. AMBIENT AIR QUALITY MONITORING STATION, TAJ MAHAL, AGRA

Air Pollution Control Laboratory, Agra continuously monitors the following major atmospheric pollutants round the clock at the monitoring station located at Taj Mahal.

Sl. No.	Parameter	Sampling Technique	Sampling Time
1	Sulphur dioxide (SO ₂) (µg m ³)	Modified West and Greek Method (Sequential Air Sampler)	4 hourly basis
2	Oxides of Nitrogen (NO _x) (µg m ³)	Jacob and Hochneisser or Sodium Arsenite Method (Sequential Air Sampler)	4 hourly basis
3	Suspended Particulate Matter (SPM) (µg m ³)	Respirated dust sampler and High volume sampler	8 hourly basis
4	Sulphation Rate Gm SO ₃ /m ² /day	Lead Candle Method	Monthly basis
5	Dust Fall Rate (MT/KM ² /Month)	Dust Fall Jar	Monthly basis

A. The status of ambient quality observed during April 2012 to March 2013 at Taj Mahal is presented in the table below.

MONTHLY AVERAGE CONCENTRATION OF POLLUTANTS IN THE AMBIENT AIR OF TAJ MAHAL

Month	Pollutant								
	SO ₂ (µg m ³)			NO _x (µg m ³)			SPM (µg m ³)		
	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.
Apr. 12	3.67	3.00	3.07	09.58	04.57	6.52	430.95	114.48	239.60
May 12	5.21	3.00	3.51	13.84	04.08	7.73	419.28	158.33	275.58
Jun. 12	4.29	3.00	3.24	12.23	4.51	7.52	474.37	85.39	347.64
Jul. 12	3.10	3.00	3.01	8.92	3.00	4.57	418.11	32.74	115.91
Aug. 12	3.13	3.00	3.01	8.32	3.08	5.59	157.76	19.68	57.61
Sep. 12	3.43	3.00	3.02	6.34	3.02	4.00	310.55	17.89	114.73
Oct.12	5.38	3.00	3.19	22.51	3.21	8.55	597.14	215.46	344.37
Nov.12	8.04	3.00	4.45	22.72	5.86	15.51	597.86	268.06	424.87
Dec.12	6.44	3.00	4.02	22.08	4.98	11.83	468.46	148.07	237.98
Jan. 13	3.25	3.00	3.02	14.97	4.93	8.25	422.11	128.03	297.25
Feb. 13	4.57	3.00	3.21	15.64	3.88	8.61	361.77	39.49	180.75
Mar.13	7.68	3.00	3.91	13.25	4.03	7.28	402.70	131.33	248.78

B. The Meteorological parameters like temperature, relative, humidity, wind speed, wind direction, atmospheric pressure, solar radiation are monitored through automatic weather monitoring station (Wind Monitor, WM-271) installed at the site Taj Mahal. Meteorological data is recorded on hourly basis throughout the year and is presented for monthly maximum, minimum and average values in the following table:

Month	Parameter						
	Temperature			% Relative Humidity			Rain fall (in mm)
	Max.	Min.	Avg.	Max.	Min.	Avg.	
Apr. 12	41.1	20.0	17.1	79.4	10.2	55.1	4.0
May 12	44.0	23.2	16.1	53.3	08.2	33.3	1.0
Jun. 12	44.1	27.0	13.2	67.1	13.2	40.8	2.0
Jul. 12	42.1	24.1	12.9	97.5	18.1	59.0	214.0
Aug. 12	35.0	24.0	9.0	93.5	50.0	38.9	248.5

Month	Parameter						
	Temperature			% Relative Humidity			Rain fall (in mm)
	Max.	Min.	Avg.	Max.	Min.	Avg.	
Sep. 12	36.0	24.0	9.6	92.4	27.2	47.1	86.5
Oct.12	35.5	17.3	13.5	79.2	18.0	55.9	0.00
Nov.12	31.5	13.0	16.3	87.3	18.0	57.4	0.00
Dec.12	29.2	7.0	15.2	97.6	22.1	56.5	0.00
Jan. 13	26.0	5.0	10.1	97.6	21.0	40.5	19.0
Feb. 13	28.5	10.0	10.2	96.0	25.0	41.6	40.0
Mar.13	35.2	15.1	12.1	78.1	18.0	44.0	1.0

C. The data showing Sulphation rate and dust fall rate measured at Taj Mahal have been compiled in the following table:

Month	Sulphation Rate Gm SO ₃ /m ² /day	Dust fall rate (MT/KM ² /Month)
Apr. 12	0.0236	6.51
May 12	0.0097	7.47
Jun. 12	0.0081	3.85
Jul. 12	0.0072	2.44
Aug. 12	0.0086	2.16
Sept. 12	0.0097	3.61
Oct.12	0.0357	2.34
Nov.12	0.0474	3.91
Dec.12	0.0368	3.67
Jan. 13	0.0268	3.21
Feb. 13	0.0330	4.87
Mar.13	0.0148	6.62

2. AMBIENT AIR QUALITY MONITORING STATION, BIBI-KA-MAQBARA, AURANGABAD

The ambient air quality monitoring has been carried out at Bibi-ka-Maqbara, Aurangabad to generate data for the following parameters during the period under report.

- (i) Suspended Particulate Matter (SPM)
- (ii) Sulphur dioxide (SO₂)
- (iii) Dioxides of Nitrogen (NO_x)

The meteorological parameters such as temperature, relative humidity, rainfall, atmospheric pressure, wind speed, wind direction and sunshine have also been monitored using the equipment satellite link automatic weather station installed at the site. The data collected have been useful in assessing the impact of pollutants on the preservation and stability of the ancient monument and historical buildings.

RESEARCH AND ANALYSIS

1. SCIENCE LABORATORY, DEHRADUN

- Research and Development of natural resin product *vajralepa*, an ancient coating material for stone conservation has been in progress.
- Laboratory analysis of stones/plaster samples from old temple Sitabani, District Nainital; rock painting samples from Lakhudiyar, Almora and soil samples from Baijnath, District-Bageshwar, Uttarakhand was carried out.

- Lime mortar samples from Sri Jagannatha Temple Puri, (Odisha); Stone and mortar samples from group of temples Narnag, District-Ganderbal, Srinagar were analyzed for chemical composition.

- Scientific investigations of textile material from the archaeological site, Gol Gumbaz, Bijapur, Karnataka was carried out.

- Microscopic, metallographic and analytical studies of the metal samples received from Almora district of Uttarakhand, plaster samples of Sri Jagannatha Temple Puri, (Odisha) copper ingot from lake superior region Keewinow Penunsula, Michigan, USA; brick and stone sample from Nalasopora stupa, Thane, Maharashtra have been completed.

- Scientific analysis of plaster and mortar samples received from Chennai Circle was carried out for chemical composition.

2. STONE CONSERVATION LABORATORY, AGRA

Petrography studies of some stone samples collected from Chunar queries have been carried out to determine the texture, grain size, distribution pattern, binding medium and mineral composition of rock employed in the construction. The thin sections of stone samples were subjected to microscopic studies to obtain photomicrographs by using polarizing microscope (NIKON make- Model E- 600 POL). The transmitted light microscopy used in identifying the constituent materials reveals the inner matrix of the rock.

THE DESCRIPTION OF PHOTOMICROGRAPHS OF THE STONE SAMPLES

1. **SANKAT MOCHAN** : This is a sedimentary rock with rock name lithic Wacke. The matrix is composed of microcrystalline quartz, schist and ferruginous material.

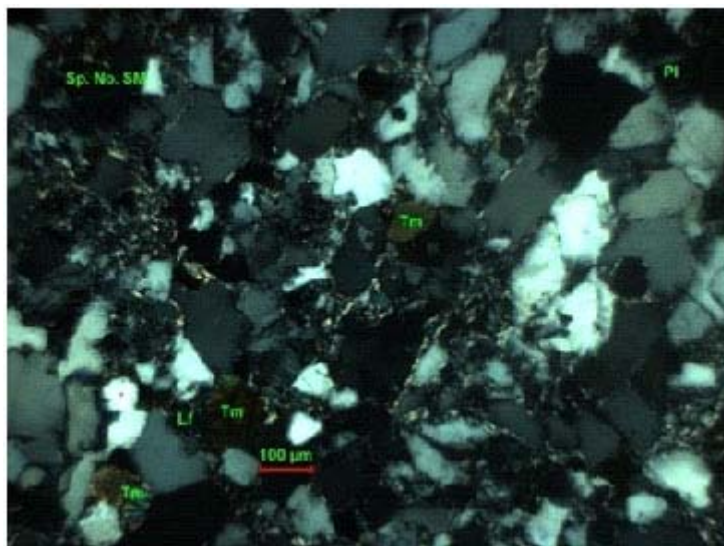
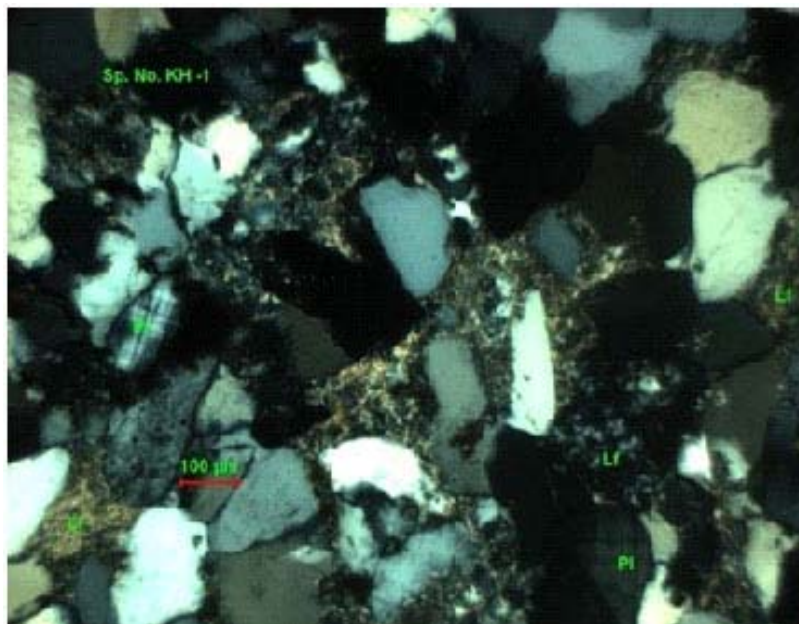


Fig.1: Photomicrograph at high magnification illustrating the nature of matrix-supported quartz grains providing overall granular texture to the rock. 10x, cpl

2. **KALI KHOH** : The frame work constituent of the rock is quartz. Sporadically quartz grains occur in clusters displaying interlocking habit. Microcline and plagioclase occur as inter granular to quartz. These framework constituents are set in a matrix consist mainly of microcrystalline quartz, hydro mica and ferruginous material. Detrital grains of tourmaline and apatite occurs as accessories. The rock is texturally immature. The rock name is lithic Wacke.



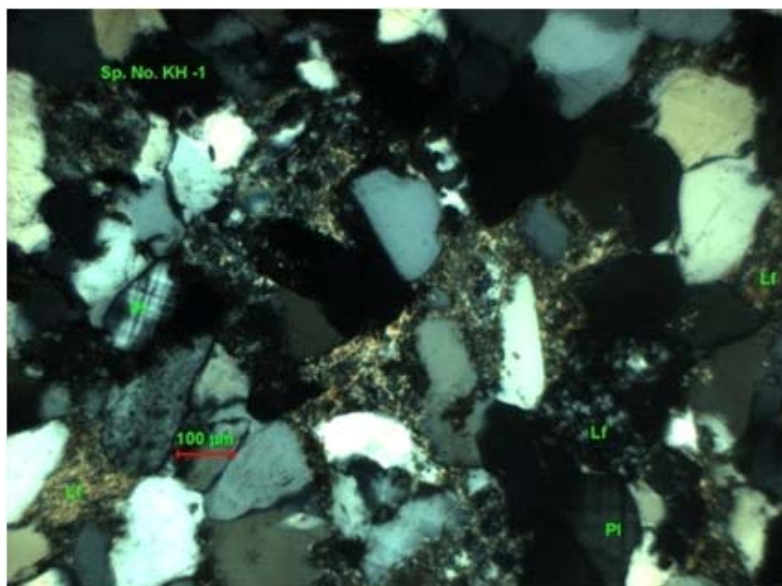


Fig. 2: Photomicrograph at high magnification showing the nature of matrix, supporting the framework quartz. Note the presence of lithic fragments (marked as Lf) and plagioclase (marked as Pl), crossed- polars, 10x objective.

3. DURGA KHOH (RED) : Abundant xenomorphic quartz is constituting the frame work of rock along with plates of detrital biotite and muscovite. Other constituent minerals are microcline and plagioclase. These grains are set in a matrix made up of fine grained quartz and sericite. Appreciable amount of hematite (red-brown colour) occupy the interstitial spaces of quartz and forming reams at peripheries of these quartz grains in a mesh like pattern. This ferruginous cement sporadically forms coarse patches. The rock is in general fine grained, but overall texture of the rock is granular. Rock name is Ferruginous sand stone.

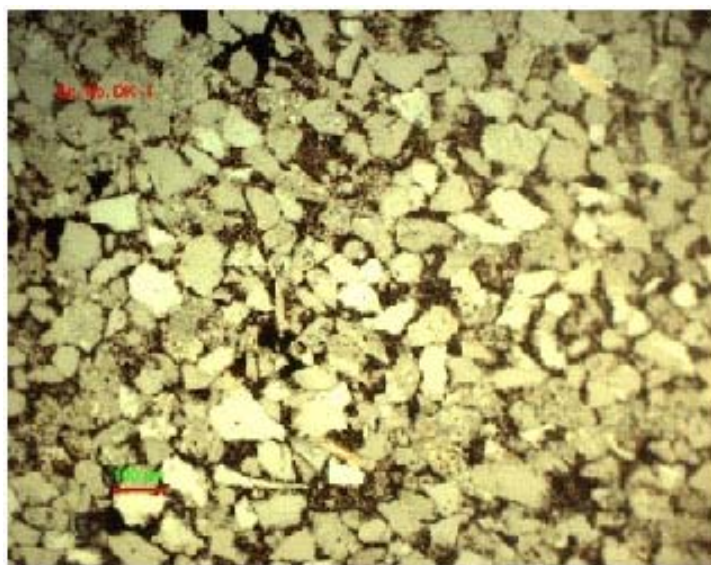


Fig. 3a: Photomicrographs showing the ferruginous material (red-brown colour) occupying the interstitial space of fine grained quartz, plan- polar, 10x objective.

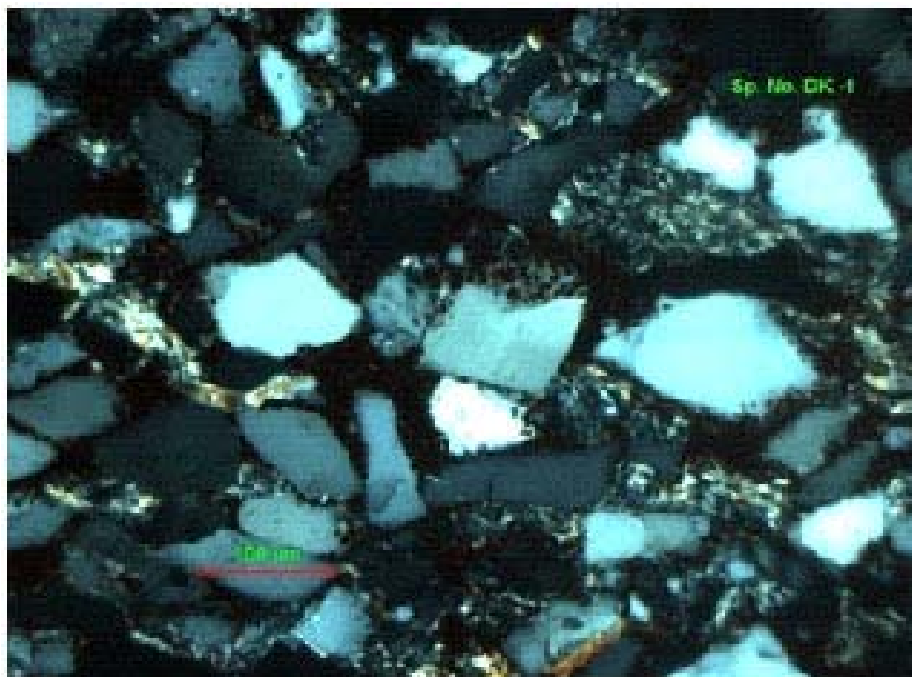


Fig. 3b.: Photomicrographs in higher magnification illustrating the texture of the rock. Note the presence of bend, kinked muscovite mica plate with strained shadow. Crossed- polars, 20x objective.

4. DURGA KHOH (YELLOW): Compositionally the rock is similar to as described in case of Sankat Mochan and Durga Khoh.

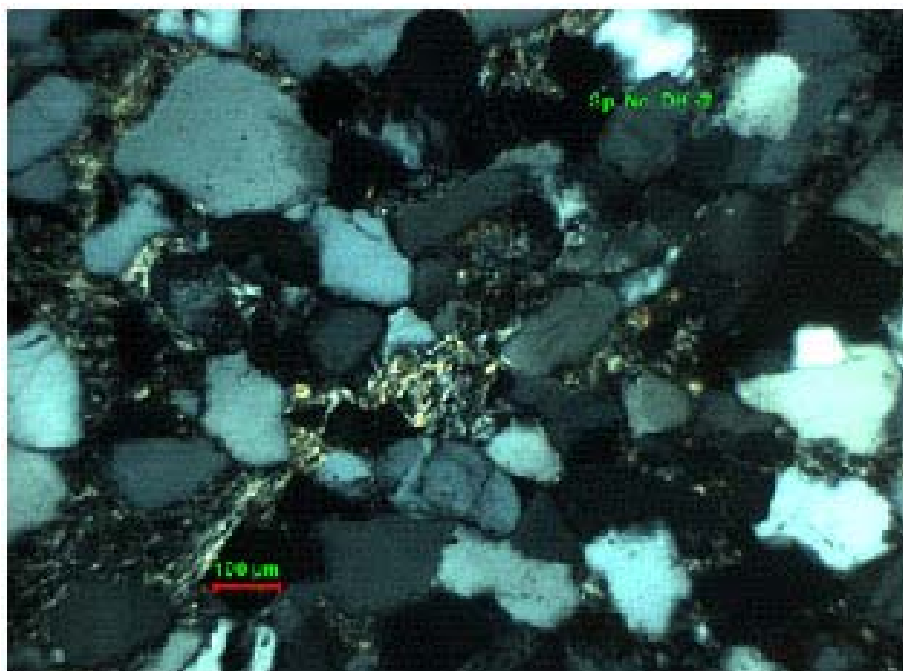


Fig. 4: Photomicrograph in high magnification displaying the matrix supported quartz grains along with feldspar and mica. Crossed-polars, 10x objective.



310



311

Chitragupta temple, Khajuraho : 310, before; 311, after chemical treatment, See p. 342



312



313

Chausathi Yogini temple, Hirapur : 312, before; 313, after chemical treatment, See p. 339



314



315

Hanuman pole, Kumbalgarh fort, Kumbalgarh : 314, before; 315, after chemical treatment, See p. 352



316



317

Siva temple, Gingee fort complex : 316, before; 317 after chemical treatment, See p. 357

IX. ARCHAEOLOGICAL GARDENS

ANDHRA PRADESH

1. HILL-TOP GARDEN, NAGARJUNAKONDA, DISTRICT MACHERALA

Improvement of water supply system at hill-top garden including extension of surface water tank (50,000 litres capacity) providing new suitable pump sets accessories, etc. were successfully done.

ASSAM

2. MOUNDS AND RUINS OF STONE TEMPLE AT DA-PARVATIYA, TEZPUR, DISTRICT SONITPUR

The laying-out of garden development work has been taken-up to maintain good environment as well as to beautify the surroundings of the monument by laying of lawn, dot plantation, shrubbery border and flower beds. The garden development work has been completed and the same is being maintained in good condition (pls.320-321).

CHHATTISGARH

3. RATANPUR FORT, RATANPUR, DISTRICT BILASPUR

The tree plantation and laying-out of garden development work has been taken-up to maintain good environment as well as to beautify the surroundings of the fort area by laying of lawn, dot plantation, shrubbery border and flower beds completed and the same is being maintained in good condition.

4. BOUDH VIHARA, SIRPUR, DISTRICT MAHASAMUND

The garden development work including laying of lawn, dot plantation, shrubbery border and flower beds has been completed and the same is being maintained in good condition.

5. BALESWAR MAHADEV TEMPLE, SIRIPUR, DISTRICT MAHASAMUND

The garden development work including laying of lawn, dot plantation, shrubbery border and flower beds has been completed and the same is being maintained in good condition.

JAMMU & KASHMIR

6. KHAN SARAI, KHANPUR, DISTRICT BUDGAM

After the shaping of area and spreading of good earth and manure, the area has been grassed and pathway laid. The garden has been developed within enclosure wall of *sarai*. Laying of GI pipe for irrigation purpose is completed. In the garden, *lagerstroemia*, *walnut*, etc. are planted.

KARNATAKA

7. KASHI VISHWESHWAR TEMPLE, LAKKUNDI, DISTRICT GADAG

The land around the temple was developed (pl.318).

8. NANESHWAR TEMPLE, LAKKUNDI, DISTRICT GADAG

Development of garden around this temple was successfully completed (pl.319).

UTTAR PRADESH

9. MEHTAB BAGH, AGRA, DISTRICT AGRA

A bore well of 200mm diameter has been drilled up to a depth of 330ft to meet out the water requirement to maintain the garden in proper condition.

10. TAJ MAHAL, AGRA, DISTRICT AGRA

New grass has been laid out after trenching in front of the Taj Mahal followed by other operations for making of a weed free lawn.

11. ADIG-KA-TILA, MATHURA, DISTRICT MATHURA

A bore well of 200mm diameter was also drilled up to a depth of 330ft to meet out the water requirement to develop a new garden for plantation of various trees and shrub plants at the site.

12. KANKALI TILA, MATHURA, DISTRICT MATHURA

During period under review a bore well of 200mm diameter was drilled up to a depth of 330ft to meet out the water requirement of garden in order to maintain the garden in proper condition.

13. MAHET, SRAVASTI, DISTRICT SRAVASTI

A bore well of 200mm diameter has been drilled up to a depth of 330ft to meet out the water requirement for plantation of various trees and shrub plants at the site.



318



319

Kashi Vishweshwar temple, Lakkundi : 318, development of garden; Naneshwar temple, Lakkundi : 319. development of garden, See pp. 371 and 372



320



321

Da-parvatiya, Tezpur : 320, before; 321, after laying out of garden, See p. 371

XI. PUBLICATIONS

Publications of the Survey

1. Indian Archaeology A-Review: The issues for 1998-99 and 1999-2000 were reprinted.
2. Memoirs of The Archaeological Survey of India: Number....., Further Excavations at Udayagiri-2, Odisha was brought out.
3. South Indian Inscriptions: The Volumes XXX and XXXII were published.
4. Custodians of The Past: 150 years of the ASI was brought out.
5. Brochures on Exhibition ‘Rediscovering India: 1961-2011’ and World Heritage Monuments both in English and Hindi were brought out.
6. Catalogues on Exhibition ‘Rediscovering India: 1961-2011’ and Terracotta Figurines from Rajghat Excavation (1940) were brought out.
7. Guide Books: Kumbhalgarh, both Hindi and English by C. Dorje and D. N. Dimiri and Rani ki Vav by, Mankodi were brought out. Sarnath (Deluxe Edition) was reprinted.



ARCHAEOLOGICAL SURVEY OF INDIA