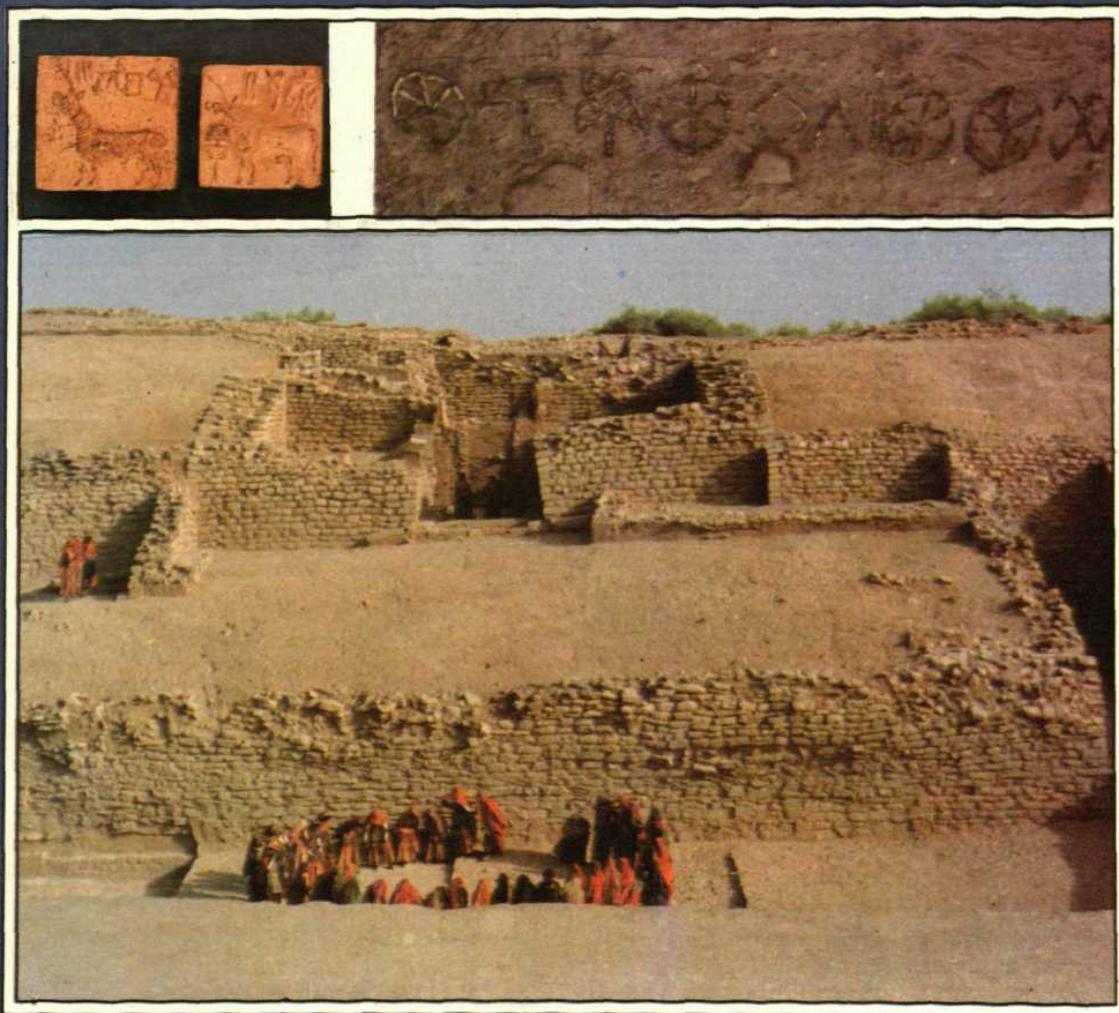


Indian Archaeology

1990-91—A REVIEW



INDIAN ARCHAEOLOGY 1990-91 — A REVIEW

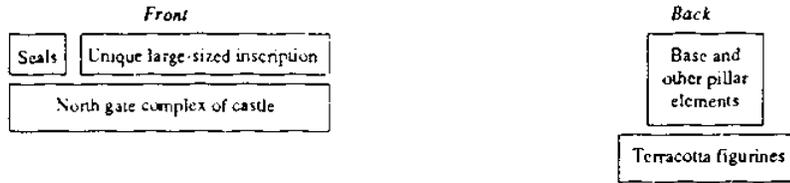
EDITED BY

S.K. MAHAPATRA
Secretary
Department of Culture
&
Director General
Archaeological Survey of India



PUBLISHED BY THE DIRECTOR GENERAL
ARCHAEOLOGICAL SURVEY OF INDIA
JANPATH, NEW DELHI
1995

Cover : Dholavira, a Harappan site in District Kutch, Gujarat



1995

ARCHAEOLOGICAL SURVEY OF INDIA
GOVERNMENT OF INDIA

Price : Rs. 370.00

PRINTED AT BENGAL OHSI-T WORKS, 335, KHAJOUR ROAD, KAROL BAGH, NEW DELHI-1 10005

PREFACE

I am happy to place before the readers *Indian Archaeology 1990-91 —A Review* not long after the publication of the *Review* for the year 1989-90. We are deeply aware of the delay in their timely publication. This is primarily due to non-receipt of material from several contributors despite reminders. We hope that in future all contributing institutions/agencies including universities, State Departments of Archaeology and Museums, different museums who are having or have acquired archaeological material in their collection, and officers of the Survey send us required information so that it becomes possible to bring this important publication upto date. I am sure, with the cooperation of all, it should not be difficult to achieve the goal. I would also like to assure all that on our part we shall be trying our best to expedite the publication of the *Review*. Needless to add, material for inclusion in the *Review*, if sent keeping in view its format and style would make our task easier and would help us in its expeditious publication.

The present issue of the *Review* contains, as usual, information about archaeological activities and investigations within the country besides the important work of conservation carried out by the Archaeological Survey of India at Angkor Vat in Cambodia. While field work by way of explorations and excavations was carried out in different parts of the country, the important excavations carried out during the year which are included in the *Review* are : Buddhist remains at Kolhua (Bihar); major Harappan site at Dholavira (Gujarat); historical site at Harsh-ka-Tila.Thanesar (Haryana); mediaeval sites at Hampi and Gudnapur (Karnataka); early historical site at Adam (Maharashtra); early mediaeval fort at Barabati, neolithic site at Golbai Sasan and Buddhist site of Lalitagiri (all in Orissa); Late Harappan site at Brass (Punjab); and Pallava remains at Mahabalipuram (Tamil Nadu), etc. Several new inscriptions, both in Sanskrit and Dravidic as well as in Arabic and Persian, found during the year are also included in the *Review*.

The matter for publication in this *Review* has been received, as usual, from diverse sources—the State Departments of Archaeology and Museums, Universities, research institutions and laboratories and various offices of the Survey. I gratefully acknowledge the cooperation that I have received from all of them.

I am sure, scholars and other interested readers would find in this *Review* much useful information as in the previous issues. I would also like to acknowledge my colleagues B.M. Pande, Director, Chhering Dorje, Superintending Archaeologist, Arundhati Banerji, Deputy Superintending Archaeologist, A. Jha, Assistant Archaeologist and other staff in the Publication Section of the Survey for their efforts in bringing out this work.

DR. S.K. MAHAPATRA

New Delhi,

June 26, 1995

CONTENTS

		PAG
E		
I.	Explorations and Excavations Andhra Pradesh, 1; Assam, 2; Bihar, 3; Goa, 4; Gujarat, 6; Haryana, 18; Himachal Pradesh, 23; Karnataka, 23; Kerala, 33; Madhya Pradesh, 35; Maharashtra, 41; Manipur, 50; Orissa, 53; Pondicherry, 57; Punjab, 58; Rajasthan, 59; Tamil Nadu, 62; Uttar Pradesh, 68; West Bengal, 80	1
II.	Epigraphy Sanskritic and Dravidic Inscriptions, 82 Andhra Pradesh, 82; Karnataka, 83, Madhya Pradesh, 84; Tamil Nadu, 84; Uttar Pradesh, 87; Arabic and Persian Inscriptions, 88 Bihar, 88; Gujarat, 88; Kerala, 89; Lakshadweep Islands, 89; Punjab, 90; Rajasthan, 90; Tamil Nadu, 90; West Bengal, 90	82
III.	Numismatics and Treasure Trove Andhra Pradesh, 92; Karnataka, 92; Rajasthan, 92; West Bengal, 92	92
IV.	Other Important Discoveries Andhra Pradesh, 93; Bihar, 93; Karnataka, 93; Madhya Pradesh, 94; Maharashtra, 95; Manipur, 95; Rajasthan, 95; Tamil Nadu, 96; Uttar Pradesh, 96	93
V.	Radiocarbon Dates Arabian Sea, 97; Assam, 98; Gujarat, 98; Haryana, 99; Himachal Pradesh, 99; Jammu and Kashmir, 99; Madhya Pradesh, 99; Maharashtra, 100; Rajasthan, 100; Tamil Nadu, 101; Uttar Pradesh, 101; West Bengal, 101 Samples from Abroad, 101 Ireland, 101; Nigeria, 102	97
VI.	Palaeobotanical and Pollen Analytical Investigations Bihar, 103; Gujarat, 104	103
VII.	Museums	105
VIII.	Architectural Survey Temple Survey, Northern Region, 111	111
IX.	Preservation of Monuments Monuments of National Importance, 118 Agra Circle, 118; Bangalore Circle, 119; Bhopal Circle, 123; Bhubaneswar Circle, 127; Calcutta Circle, 129; Chandigarh Circle, 130; Delhi Circle, 131; Guwahati Circle, 132; Hyderabad Circle, 134; Jaipur Circle, 135; Lucknow Circle, 136; Madras Circle, 139; Mini Circle Goa, 143; Mini Circle Shimla, 144; Srinagar Circle, 144; Vadodara Circle, 145	118

	Monuments Maintained by the States, 146				
	Andhra Pradesh, 146; Delhi, 146; Gujarat, 146; Karnataka, 146;				
	Manipur, 147; Nagaland, 147; Rajasthan, 147				
X.	Expedition Outside India	...	...	...	148
	Preservation of Angkor Vat Temple, Siem Reap, Cambodia, 148				
	Structural Conservation, 148				
	Chemical Preservation, 150				
XI.	Archaeological Chemistry	...	...	...	151
	Treatment of Monuments and Paintings, 151				
	Andhra Pradesh, 151; Bihar, 151; Delhi, 151; Goa, 153;				
	Gujarat, 153; Himachal Pradesh, 154; Karnataka, 154;				
	Kerala, 155; Madhya Pradesh, 155; Maharashtra, 156;				
	Orissa, 157; Pondicherry, 157; Tamil Nadu, 158				
	Uttar Pradesh, 159; West Bengal, 160				
	Treatment of Excavated Objects and Museum Exhibits, 160				
	Research and Analysis, 162				
XII.	Archaeological Gardens	...	...	...	166
	Andhra Pradesh, 166; Delhi, 166; Gujarat, 167; Himachal Pradesh, 167;				
	Jammu and Kashmir, 167; Madhya Pradesh, 167; Manipur, 167;				
	Punjab, 168; Rajasthan, 168; Uttar Pradesh, 168; West Bengal, 168				
XIII.	Publications	...	...	...	169
	Publications of the Survey, 169				
	Other Publications, 169.				

INDIAN ARCHAEOLOGY 1990-91— A REVIEW

L EXPLORATIONS AND EXCAVATIONS

ANDAMAN AND NICOBAR ISLANDS

1. EXPLORATION IN SOUTH ANDAMAN AND GREAT NICOBAR ISLANDS.—In continuation of the earlier work (*Indian Archaeology 1986-87—A Review*,¹ pp. 3-7), S. B. Ota, assisted by S.S Gupta, J. S. Dubey, C. L. Yadav and N. K. Nimje, of the Prehistory Branch of the Archaeological Survey of India², while carrying out the exploration in South Andaman and Great Nicobar Islands, brought to light the following shell middens (numbered here in continuation of the sites discovered earlier) :

<i>Village</i>	<i>Sites</i>
Flat Bay	Flat Bay I
-do	Flat Bay II
-do-	Flat Bay III
Lalpahar area (village Chouldari)	Lalpahar I
—do—	Lalpahar II
—do—	Lalpahar III
—do—	Lalpahar IV
Mithakhari	Mithakhari VIII
Dundas Point	Dundas Point III
Kadakachang	Kadakachang II

Few traverses confined to part of the west coast hinterlands and bank of the river Galathea were taken up for further probe in Great Nicobar with a view to ascertaining the archaeological remains in the island. Unfortunately, no traces of either shell middens or any other early cultural remains were encountered.

ANDHRA PRADESH

2. EXPLORATION IN DISTRICT ADILABAD. — The Department of Archaeology and Museums, Government of Andhra Pradesh, noticed an upper palaeolithic site, rock-cut caves and a medieval fortress at Gandharikota near Bokkalagutta village in the district.

3. EXCAVATION AT GANGADHARA, DISTRICT KAREEMNAGAR. — The Department of Archaeology, Government of Andhra Pradesh, unearthed some broken sculptures and the foundation portion of a medieval temple.

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

²The Archaeological Survey of India is referred to in the following pages as the Survey.

4. EXCAVATION AT NELAKONDAPALLI, DISTRICT KHAMMAM. — The Department of Archaeology, Government of Andhra Pradesh, excavated the remains of a *mahastupa* and other brick structures at the village Nelakondapalli in the District. Other finds included a head of Buddha and coins of the Ikshvaku and Vishnukundin periods.

5. EXPLORATION IN DISTRICT KURNOOL. — The Department of Archaeology, Government of Andhra Pradesh, reported discovery of a medieval cave temple at village Jagannadhagattu in the District.

6. EXPLORATION IN DISTRICT PRAKASAM. — The Department of Archaeology, Government of Andhra Pradesh, reported a neolithic habitation site at the foot of the hills near Ramatirtham in the District.

7. EXCAVATION AT GOPALAPATNAM, DISTRICT VISHAKHAPATNAM. — The Department of Archaeology, Government of Andhra Pradesh, conducted excavations at the village Gopalapatnam near Tuni. The excavation brought to light the remains of a *chatussala* type of vihara complex on a hillock known as Bubhikonda. At the foothills was exposed a group of votive stupas. Other finds included member of stucco figures, sherds of rouletted ware and black and red ware and beads of terracotta and 'ones. The establishment, on the basis of the finds, can be dated between the first and fourth century AD.

8. EXCAVATION AT THOTLAKONPA, DISTRICT VISHAKHAPATNAM. — The Department of Archaeology, Government of Andhra Pradesh, took up excavations at Thotlakonda. The excavation revealed brick-built *mahastupa*, viharas, apsidal and circular *chaityas*, stone-pillared hall, stone-paved paths, rock-cut cisterns of various dimensions, besides Satavahana and Roman coins.

ASSAM

9. EXPLORATIONS IN THE LANGTING VALLEY, DISTRICT NORTH CACHAR. — H.C. Sharma and A. A. Ashraf of the Department of Anthropology, Gauhati University, alongwith a group of post-graduate students of the Department explored the area around Langting and Maibong (93° 08' E and 26° 17' N) in the valley of the river Langting. Besides discovering stone tools and pottery, the team also surveyed the Quaternary formations in the North Cachar Hills to understand the background of Quaternary geology of the stone age site at Daojali Hading.

The exposed Quaternary deposits were examined in the valley of river Langting at places like Langting, Mupa reserve forest and Doyang. The area preserves two or three erosional surfaces by cutting cretaceous and tertiary rocks. These surfaces often received sediments of the local streams. There are two valley-fill terraces present on the banks of the river Langting on either side. In fact, these are unpaired type and developed following the weathering pattern of the river.

The younger terraces, having the average elevation of 10 m is inset into the older terraces. This has considerably thick alluvium. The remnants of the older fills consist of unsorted weathered pebbly gravels exposed on the river bank and also on the bed of the river. These are highly cemented but contain no stone tools. Careful examination of the conglomerate shows that it is sometimes covered by the sediment of the younger fills. It is further overlain by reddish brownish sandy / clayey silt. At

places this is succeeded by unweathered consolidated pebbly deposit which again is superimposed by yellowish/brownish clay-sandy silt.

Although no dating materials have been found but their occurrence above the tertiary rocks like shale and slate, nature of deposition, content, etc., are suggestive of their Quaternary origin.

The area around Daojali was re-surveyed. The surface collection in and around the area included double shouldered axe (6.25%) and broken celt (non-shouldered 25%). A good number of potsherds, predominantly cord-impressed, were also collected from the surface.

Besides this collection, stone implements and potsherds were also unearthed from stratified context on the eastern flank of the site exposed by Langting-Haflong road. An exposed section of 10 m stretch was further scooped out to get a clear picture of the material *in-situ* in the section.

The section exhibited 4 layers, upper three of which were implementiferous. All these layers belonged to the single culture deposit of ceramic-Neolithic phase. Detailed analysis of the section is given below :

In layer 1 (12 cm thick) the soil is of blackish-brown colour and clayey in nature, mixed up with pebbles of various sizes. Artifacts were celts (4.7%), grinding stones (0.85%), clay balls (pallet 0.85%) and a good number of potsherds of red (27.6%), brown (35.6%) and buff (36.8%) colour. Potsherds were predominantly cord-impressed.

In layer 2(15.5 cm, thick) the soil is brownish in colour and coarse in texture and clayey-sandy in nature. It contains gravels and pebbles of various shape and sizes alongwith broken celts (12.62%) and grinding stone (1.5%). The potsherds, predominantly cord-impressed, were red, brown and buff in colour.

In layer 3 (26.5 cm thick) the colour of the soil is reddish-yellow and the texture is medium and sandy in nature. It contains a good number of cord-impressed potsherds of red (38.7%), brown (27.5%) and buff (33.8%) colour and one miniature shouldered celt

Layer 4 is a sterile layer of reddish-yellow colour and coarse in texture.

BIHAR

10. EXCAVATION AT KOLHUA, DISTRICT MUZAFFARPUR.— In continuation of previous year's work (1989-90, pp.11-13), L. C. Singh assisted by D. K. Ambastha, Vijay Shankar, P. C. Das and S. K. Arora of the Excavation Branch III, Patna, resumed excavation at Kolhua with the objective to understand the stratigraphic relationship of the Main Stupa and the Asokan pillar in Area 'A' and to trace further extension of the monastery in Area 'B'.

Excavation in Area 'A' resulted in the exposure of the *ayakas*, an extension in the last phase of construction of the main stupa, at regular intervals and a large number of votive stupas (pl. I), some having ornate niches at the cardinal points. The drum and the dome portion of these votive stupas were chamfered to accommodate the ornate and carved bricks. A large number of closely put votive stupas, with no space in-between, were found around the Asokan pillar (pl. II). The votive stupas were built over the *surkhi* and lime plastered floor of the Gupta period. A brick-lined tank (pl. III A),

20 m south of the Asokan pillar, was partly exposed. A burnt brick drain, coming from the side of the votive stupas, was found terminating in this tank (pl. III B).

The excavation, to the south of the main stupa (Area 'B') brought to light a massive shrine with a *chaitya* at its back (pl. IV). The shrine is almost square on plan measuring 3.30 x 3.45 m. The extant courses of the structure was found to be 43 belonging mainly to the foundation of the structure. The width of the outer wall measured 2.10 m. The projections were provided to the outer walls of the main shrine on all the cardinal points. The measurement of these projections were 2.10 X 0.80 m (southern side), 2.20 X 1.0 m (northern side), 1.80 X 1.0 m (eastern side) and 2.0 X 1.0 m (western side).

During the succeeding two phases, the shrine was used for residential purposes and was provided with a set of four rooms in the north-south orientation. The whole complex was provided with an enclosure wall, two construction phases of which were noticed.

To the south of the shrine, remains of a *chaitya*, measuring 10.50 X 1.0 m, longer axis being north-south, was noticed. Outer wall of this structure was 2.75 m in width. A small *chaitya* was found enshrined at the north-eastern corner of the structure. The *chaitya* measured approximately 1.0 m in height and 0.80 m in diameter. It has niches at the three cardinals (north, west and south) adorned with the figures of the *Dhyani-Buddha* sitting in *padmasana* and exhibiting *bhumisparsamudra*. The eastern face of the *chaitya* was found abutting the wall. During the later phase, the *chaitya* was converted into a closed solid platform, the inner space of which was filled by dividing them into blocks.

The antiquities unearthed from the site included beads, balls, gamesman and hopscotch in terracotta, stone and glass. An inscribed amulet in Asokan Brahmi characters was found from the earliest level. Other important antiquities included a terracotta seal inscribed with the Buddhist formula *'Ye dhamma hetu prabhava hetu'* from the upper level, a terracotta figurine showing the birth scene of Buddha from the late level, etc.

The ceramic assemblage from the site was represented by red ware, NBP ware, grey ware, and black ware. The shapes in the NBP ware included bowls of different sizes and dishes with incurved rim. Bowls and dishes are the common types in grey ware. Fabric in this ware ranges from coarse to fine. A few of them were treated with slip. Types represented in this ware included storage jars, basins, *tawa* with loop, handle, vase, lid-cum-bowl, sprinkler and spout with stainer. Red ware was predominant also in the Gupta levels. The pottery types of this period included vase, basin, lamp, lid-cum-bowl, deep bowl and long handled deep bowl. Most of the pots were well fired except storage jars and basins, showing unoxidized smoky mid section and treated with thick and bright red slip.

GOA

11. EXCAVATION AT ST. AUGUSTINE CHURCH, OLD GOA, DISTRICT NORTH GOA. — In continuation of last year's work (1989-90, p. 14) B. Hanumant Rao assisted by S. K. Joshi, D. L. S. Sardeshpande and D. T. Asar, of the Mini-Circle Goa of the Survey resumed excavation with a view to exposing the plan of the sixteenth century monument known as St. Augustine Church complex. In the course

EXPLORATIONS AND EXCAVATIONS

of digging a large number of laterite blocks of larger dimension, some of them containing architectural mouldings, rectangular bricks and tiles of a circulated section were unearthed. The excavation exposed raised platforms of different dimensions in each chapel. Some of them were veneered with ornamental basaltic stone slabs containing geometrical and floral designs, originally painted with red ochre. The sides of said platforms are further decorated with pilasters abutting the walls on either side. The floor was paved with suitable basalt stone slabs. At places several grave stones, decorated with various designs, invariably containing epitaph in Portuguese language were found. The interior walls of these chapels are profusely decorated with beautiful floral designs in stucco as well as paintings in red ochre on white background. The chapels are provided with vaulted roof decorated with ribbed borders. The holes on the walls are suggestive of their use as sockets for fixing the carved and painted wooden panels.

Each chapel was provided with two niches, one above the other in the centre of its back wall, flanked by wide openings on either side, meant for light and air. In some of the chapels, there are label inscriptions in Portuguese denoting the names of benefactors. The partition walls of each chapel are pierced with openings.

The conservation work, taken up to strengthen the excavated remains, included the consolidation of the raised platforms in combination mortar, removal and relaying of sunken floor slabs; watertightening of the roofs; and resetting of the dislocated ornamental basaltic slabs of the platform.

Debris clearance at the southern belfry exposed a rectangular chapel, facing south and having a platform, measuring 3.45 X 1.50 X 1.50 m, provided with three steps in laterite with bevelled edges. The pedestal is further decorated with basaltic slab carved with geometric designs of squares and circles. This chapel also had another small platform facing east, along the western wall. The excavation yielded a ceremonial porcelain pot (bowl) broken into pieces and some iron spikes. The laterite walls were plastered with lime mortar and further decorated with paintings in red ochre depicting beautiful floral and geometrical designs. On the western wall, above the smaller platform, there is a small portuguese inscription carved on a small decorated panel of basalt.

Rectangular panels are carved into the projected buttress in the centre of the western wall. Two of the lower panels contain paintings of Christian saints executed in water colour on plastered surface. In the same chapel decorated water troughs of sandstone, broken into pieces, were also met with. The floor of the chapel at certain places had grave slabs. The internal area of the belfry was partitioned by a rubble wall, perhaps to separate the chapel from the belfry. On the western side was a wide opening which was provided to connect the chapel with quadrangular convent on the west. The floor slabs of the chapel were largely missing.

Conservation of the excavated remains was also taken up which included the levelling of the floor; strengthening of platforms in combination mortar putting back to the original position the dislocated decorated slabs of the platforms, watertightening of the wall-tops; restoring the missing structural portions as per the available original and pointing of the joints on the exterior portion of the structures in matching colour mortar.

GUJARAT

12. EXPLORATION IN DISTRICTS AHMADABAD, BANASKANTHA, KHEDA AND SABARKANTHA. — The Department of Archaeology, Government of Gujarat, reported following sites of archaeological interest:

<i>District</i>	<i>Taluk</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Ahmadabad	Ahmadabad city	Amdavad	Karnamuktesvar Mahadeva temple of Solanki period
-do-	-do-	-do-	Siva temple datable to the seventeenth century
Banaskantha	Meghraj	Mehudi	Metallic image of Rama and Lakshmana datable to seventeenth century
-do-	Palampur	Ambetha	Metal Jain <i>chovisi</i> dated to VS 1511 (AD 1445)
-do-	Vav	Janavada	Jain Tirthankara image belonging to Solanki period
Kheda	Anand	Anand	Sculptures of Siva and his family (ninth (both datable to the twelfth century), Ganesa (seventh century) and Ganga (nineteenth century)
-do-	Nadiad	Fatehpura	Step-well
Sabarkantha	Bhiloda	Shamalaji	Saptamatrika-patta datable to the seventh century AD
-do-	Himmatnagar	Raigadh	Ancient Siva temple and step-well of Solanki period and Jaina temple datable to the seventeenth century.

13. EXCAVATION AT BABAR KOT, DISTRICT BHAVNAGAR. — Gregory L. Possehl of the University Museum, University of Pennsylvania, Philadelphia (USA) and M. H. Raval of the Department of Archaeology, Gujarat, assisted by their respective team members, undertook the excavation at Babar Kot (22° 16' 30" N; 71° 34' 00" E) situated on the Goma Nadi in Paliyad village in Taluk Botad of the district. The 2.5 m high mound (190 X 140 m) corresponding to an area of 2.7 hectares, was subjected to excavation to understand the chronology, extent and economy of the Harappan people settled in this region of Saurashtra.

For the purpose of excavation (pl. V), the mound was divided into small grids, and altogether 25 trenches, in two different localities, were selected. The main excavation revealed identical stratigraphy at both the localities. The uppermost stratum contained rich brown soil having artefacts

EXPLORATIONS AND EXCAVATIONS

which may be placed between the early historical period represented by the Red Polished ware and the medieval periods. Below this stratum of brown soil was found another stratum of yellow-brown soil rich in Harappan artefacts. On the basis of ceramic evidence, the Harappan settlements at Babar Kot could be treated as equivalent to that at Rojdi B and C (2200-1700 BC).

Remains of the fortification wall, having foundation partly of stone and partly of *Kali-mate*, was encountered in the southern and western periphery of the mound. The width of western fortification wall was 4.5 m and the same at the southern end was found to be three metres wide. The western fortification wall perhaps had some kind of internal structure attached to it. The corner bastion seems to have undergone at least one phase of repair.

The chronology of the fortification wall has not been understood fully. At places (Trenches 40 P and 40 Q) the *Kali-mate* appears to have covered a portion of the wall, indicating the stone wall being earlier than the *Kali-mate* one. The exact nature of different constructional phases of the fortification needs further investigation.

Three structural phases were noticed during the season. The last building activity at the site was associated with the historical period. Phase II was associated with Rojdi 'C. The stone walls (at places 6 to 7 courses high) running either north-south, or east-west, meeting with each other without any intersection, were the main feature of this phase. The walls were two to three stone block thick corresponding to an average thickness of 30 cm. In one trench (26 M) were found remnants of floor. One complete pot (pl. VI A) and grinding stone were found on the surface of this floor. On the north-west corner of this floor were also found remains of a hearth.

The first structural phase (phase I) at Babar Kot was represented by the remains of walls oriented north-south and east-west. The north-south wall was five courses high and the east-west wall had only two courses intact. Due to the limited nature of excavation it was not possible to understand the exact nature of the structures. An interesting feature of these structures was the bowl-shaped pit, resting on the floor or occupational surface of this building phase.

Two types of ceramics were noticed at the site, the sherds of the historic period in the upper level and 'Rojdi C type of sherds in the middle and lower levels. Few stone artefacts noticed among the ceramic assemblage were grinding stones and chipped stones. Among the latter group of objects microlithic blades which came from the mid-levels are noteworthy. The finds from historical levels included beads, worked sherds, metal and bangles.

Palaeobotanical studies revealed the presence of seed samples in the archaeological midden of the site, pits, pot contents and lenses. Analysis of samples by the use of binocular microscope at 10 and 20 helped in identifying the seeds of *Panicum* sp., *Setaria* sp., *Eleusine* sp., and possibly *Enchinochola* sp. All of these are summer or Kharif crops. Other crops present were *Amaranthus*, *Chenopodium*, *Portulaca*, *Trianthema*, *Polygonum*, *Cyperus*, *Solarium* and possibly *Vigna*. Most intriguing finds was the "seed patch" consisting of about 500 charred seeds, associated with domestic trash. This was identified as *Panicum* sp. Further analysis is in progress.

The animal bones collected from the site were analyzed by P. K. Thomas and P. Jogelkar of the Department of Archaeology, Deccan College, Pune. The bones of domesticated animals and birds include those of zebu (*Bos indicus*), water buffalo (*Bubalus bubalis*), sheep (*Ovis Orientalis*), goat (*Copra aegagrus*), domesticated pig (*Sits scrofa domesticus*), dog (*Canis familiaris*), and fowl (*Gallus* sp.) (the¹ domestic status undetermined with certainty). Among wild animals, probably hunted for food, were the wild boar (*Sus scrofa cristasus*), nilgai (*Boselaphus tragocamelus*), chital or spotted deer (*Axis axis*), black buck (*Antilope cervicapra*), gazelle (*Gazella gazella*) and four-horned antelope (*Antilope cervicapra*). Other animals noticed were the mongoose (*Herpestess edwardsi*), hare (*Lepus* sp.), rat (*Rattus rattus*), lizard (*Varnus* sp.) and freshwater turtle (*Trionyx* sp.).

14. EXCAVATION AT PADRI, DISTRICT BHAVNAGAR. — Vasant Shinde with assistance from R. K. Mohanty, Y. S. Rasar, Sonya Bhagat, M. Koiso, Chihiro, M. Hoque, Seema Pavankar and Savita Pandey of the Department of Archaeology, Deccan College Postgraduate and Research Institute, Pune, carried out excavation at Padri with the aim to find out the possible function of the site, to study the evolution and spatial distribution of the Harappan ceramic, and to know more about the rural Harappan life-style, for which very few attempts have been made. The village Padri Gohil (Lat. 22* 22'; Long. 72* 9.5") is roughly 8 km to the west of Talaja, the taluk headquarters and 50 km south of Bhavnagar town. The site, situated very close to the Gulf of Cambay, is roughly 2.5 km south of the present village. It is locally known as *Kerala-ne-Dhoro*. The site spreads over an area of 340 m (E-W) X 210 m (N-S). It was occupied during the Harappan and early historic periods. The total habitation deposit is 3.20 m of which the upper 1.2 m belongs to the early historical period. Between the two cultural periods was noticed a thick (60 cm) sterile layer, which, most probably, represents a break in the habitation. Nearly one fourth of the ancient site has been destroyed by indiscriminate digging by the villagers with a view to obtaining habitation soil for constructing and plastering walls of their houses.

Two trenches, one almost in the central pan (J2), and the other close to the southern periphery of the mound (C3) were selected for excavation. This limited digging has yielded the following features.

Period-I (Harappan) has yielded a large amount of fine painted and coarse pottery, which is similar to that of Rangpur IIB and Rojdi B. The former includes the sturdy red ware and buff ware. The most noteworthy contribution of the excavation at Padri is the recovery of three unique painted storage jars, evidence of mud houses and the discovery of a new coarse painted ceramic, which has not been reported from any other Harappan site.

The three intact painted storage jars recovered from Padri were in fact taken out by the village while digging the site to obtain habitation soil. However, with their help we could identify their exact find spots. Of the three jars, the largest one of sturdy red ware, was found very close on the southern side of trench J2. It is 81 cm high and has a circumference of 2.34 m. This is a globular jar with a beaded rim and has a small flat base. The painted designs in black on a red surface include a panel of a buff colour bordered by double horizontal bands which consists of a linear human figurine with a horned head-dress. This is flanked by two pairs of two curved lines on the right and three pairs on

EXPLORATIONS AND EXCAVATIONS

the left. They emanate from a group of three vertical wavy lines at the base of the motifs where two sets of curved lines join. The design which is represented by three curved lines, ends with hatched curves, the tips of which bear three short strokes attached to solid circles. The running loop like curved lines most probably represent leaves and the vertical wavy lines roots of some plant. The painted human figure is shown moving forward with its right leg and hand brought forward and the left ones backward. The large curved horns are hatched. Similar figures, but in a seated posture, noticed on some of the Harappan seals have been identified as Pasupati. This painted figure, therefore can also be identified as "Pasupati", which is the only evidence so far from Gujarat. There are two panels of buff colour near its base which are bordered by thin horizontal lines of black colour.

Of the other two jars, one is in buff ware and the other in sturdy red. These jars, compared to the first one, are slightly smaller in size but are identical in shape. The jar in buff ware bears three decorative motifs on the upper half of a horned head-dress with loose hair. They are bordered by double horizontal bands. The horns in this case are also hatched. This motif also could be taken to be the representation of "Pasupati" in different form. Similar motif has been reported from Kot Diji, which is painted on a Pre-Harappan jar. The jar in sturdy red ware (trench MX 2) is devoid of such motifs but is painted with a panel of buff colour, bordered by double horizontal bands on the shoulder. There are double horizontal bands on the neck and the waist also.

From the excavations of other Harappan sites it was thought that the Harappans mainly used mud bricks, burnt bricks and stone for constructing their structures. The excavations at Padri, however, have revealed rectangular mud houses, similar to those of the Deccan chalcolithic people. These houses had low mud walls, probably to prevent the rain water from entering them and well-made floors, plastered with lime and cowdung. Two such structures were exposed in the course of excavations. Structure 1 was unearthed in J 2 at the base of layer (7). Although the structure was not exposed completely, the rectangular shape of the structure can be discerned on the basis of its southern and eastern walls. Along the southern section of the trench was noticed a thick mud wall (thickness 25 cm), 5 m long and 20 cm high. Two post-holes were found along this wall. The eastern wall of the structure, visible in the section, was 45 m wide. The other structure, noticed in C 3 could not be exposed completely.

From the middle levels of the Harappan period, a considerably good number of sherds of a new painted ceramic have been collected. Similar ware has not been reported from any other site and therefore it was named Padri ware after the site. This is made from coarse clay and treated with a thick coating of red slip, which shows a tendency of developing cracks. Painted decorations, consisting mainly of linear patterns, were done in black colour. The vessel types represented in this ware are very limited but they are typical Harappan like convex-sided bowls, perforated jars and globular pots.

No objects of any significance were found in the Harappan levels in the course of excavation.

Period-II (Early Historic), represented by the red-slipped ware, has not yielded remains of any structure in these two trenches. However, in the eastern part of the mound on the surface are seen rectangular and squarish plans of buildings of burnt bricks. This period can be assigned to the Kshatraps (first-second century BC - AD) on the basis of the evidence like a clay tablet bearing

Brahmi script, a copper coin similar to those issued by the Kshatrapa king Nahapana and the red-slipped ware. Among the objects recovered from this level mention should be made of a tortoise shaped copper lamp and a cylindrical chank shell rod. The copper lamp has a channel to accommodate a wick and four projections on four sides, possibly for tying it with a thread to suspend it. The evidence of two boat-shaped terracotta objects, having two perforations on the projected central portion resembling a mast and three grooves on the underside of one and two on the other, deserve special mention.

A human skeleton was found at the top of layer (2) in the southwest quadrant of trench 3. The skeletal remains were found to be lying in an extremely awkward position on the ground and were not buried intentionally in a pit. The right leg of the skeleton was bent and turned towards the west. Whereas the left one was brought straight forward towards the east. The skeleton faced east, with its head bent down and its chin almost touching the chest. The right hand was taken back towards the north with its hand bent backwards. The left hand was below the head and bent towards the east with its forearm twisted inwards. The position suggests that the person may have died an unnatural death.

15. EXCAVATION AT DHOLAVIRA, DISTRICT KUTCH. — In continuation of the previous year's work (1989-90, pp. 15-20), the Excavation Branch V of the Survey undertook further excavation at Dholavira under the direction of R. S. Bisht assisted by Y. S. Rawat, V. H. Parmar, N. B. Soni, J. B. Makwana and Ravinder Kumar of the Excavation Branch and M. S. Rawat of the Jaipur Circle of the Survey. Objectives of this season's work were : (i) surface digging to an average depth of 50 cm in western half of the middle town and eastern half of the lower town, and (ii) deep digging at selected points, one each in the middle town and the lower town and to complete vertical digging at the castle and its bailey. This season's work, besides confirming results of previous work, brought to light the earliest defensive wall belonging to pre-Harappan period in the citadel and has added several new details to Harappan town planning at the site.

The previous season's cutting across the southern rampart of the citadel was reopened and the area of operation extended across wall IA in order to unearth the earliest wall belonging to pre-Harappan period underlying the already exposed wall IA. Interestingly, the inner as well as the outer face of this wall was found veneered with stone and well plastered. The extant height of this wall is 4-30 m of which the upper 1.10 m height was found disturbed due to earthquake which had occurred in a later phase (pl. VII). The presence of mud brick debris in a contemporary layer (8) indicated that the core of the wall could be made of mud bricks. From outside, only the lowermost seven courses of this wall were available with an extant height of 110 m. The upper damaged portion might have been removed during later repairs. The basal width of this wall measures 11.20 m and it narrows towards top due to tapering faces. The contemporary deposit, 62-65 cm in thickness, was represented by layers (10) to (7) from bottom upward. This deposit had also been noticed in two other cuttings; one in the adjacent trench falling in trench 48 X 92 X 4 and another in the lowest levels of open space between the citadel and the middle town. Among antiquities, numerous copper fragments, implements associated with fire places, bangles of terracotta and shell, beads of steatite, blades of chalcedony and a few fragmentary roughly boat-shaped crucible of ill-baked terracotta were

recovered. So far the ceramic industry is concerned, all the types and fabrics, previously reported, were noticed besides the find of a handmade channel handled bowl. Interestingly, the presence of a few fragments of triangular terracotta cakes and sherds of perforated jar indicated that these items of classical Harappan repertoire had an earlier beginning at this site.

The present excavation has further confirmed that the wall IA belonged to second phase and was added to the earliest wall from inside after a deposition of 65 to 70 cm. This wall remained in use till the accumulation of 80 to 85 cm thick cultural debris against it. After this phase, another addition to the existing wall (comprising of wall I and IA) was made from inside thus making a combined unit of three successive walls of 17.50 m basal width. This massive wall from the base of second addition measured about 10 metres. This wall was carefully maintained till the desertion of the site by mature Harappan.

Of the house building activities of mature Harappan period many house walls built with mud bricks with occasional use of stones were exposed. In the lower levels of this period interesting structures like scooped out water tube lined with lime in two cases and with clay in the other two have been exposed. The first two were in association with a stone block-platform which was found associated with an underground earthen pipe—the precise use of which remains still unknown.

More area of the open space in front of the north gate was excavated upto the latest working floor. The front terrace of the gate was found extending as well as gradually sloping down further east (pl. VIII). Inside the gate, in its eastern chamber, other pillar elements—including a reel-shaped base and a bead-shaped architectural member were exposed and found in dismantled condition. These were exactly similar to the pillar elements found in the east gate chamber.

The remaining northern part of the east gate exposed this year was found badly damaged, bulged out and tilted by natural forces certainly after its disuse. After exposing the structure, it is now clear that this gate was designed differently from the north gate in so far as it consisted of only one chamber on southern side instead of two in the latter. Further, the reel-shaped pillar base lying *in-situ* (pls. IX-X) appears to be in the centre of the entire complex. Interestingly, the gate seems to have remained in use in the later Harappan time when it had started showing up serious structural defects. In the process, these later people, considerably reduced the width of stairway by solid stone masonry work at both inner and outer ends. As a result, 3-20 m wide opening was reduced to 1.28 m at the inner end and just to 0.85 m at the outer end.

New trenches were laid in the area near north of the east gate and the eastern embankment of the previously exposed water structure (1989-90, p. 18) was exposed and found abutting a 2.65 m wide peripheral path that runs along the fortification wall of the citadel. Furthermore, there were found two stone-paved platforms right on the fortification wall meant for receiving rain water falling on the wall. Water seems to have been allowed to fall in a chamber from which issues a nicely made drain which carried the water into the water structure (pl. XI). One of the platforms, which was fully exposed, was found having a water chute of stone bearing smooth finish—a feature hitherto known from the Mughal gardens. Besides, many new architectural elements, such as two nicely cut and polished monolithic pillars with hemispherical top were found (pl. VI B). The one which was fully

laid bare measured 175 cm and was embedded in the deposit of the water structure by the later Harappans.

Besides, turning of both the inner as well as outer of the citadel wall were exposed at the north-east corner of the citadel (pl. XII A).

The water structure was further taken up for excavation and the previous trench was further taken up for excavation and the previous trench was excavated further down upto a fine floor level. This floor gives an interesting evidence of floor-preparation which consists of frame-work and good earth filling. It seems that first a grid of hard and clayey grey earth was laid and each grid was carefully filled in with yellowish brown sticky clay, perhaps to render the floor of the water structure impervious and resistant to stress and strains.

Of the city wall, the existing three corners - the north-eastern (pl. XII B), north-western (pl. XIII A) and south-western were exposed completely (pl. XIII B) and were found to be having corner bastions. Interestingly, at the first as well as at the last mentioned corners, there was found a broad road running inside along the fortification walls, while provision of a similar road at the north western one is also discernible on the surface. There was found an evidence that the south-western corner was badly damaged by the gushing water during the days of neglect but was made good by the late Harappans.

Important antiquities of this period included seals, complete or fragmentary; sealing of clay; copper and terracotta objects; beads of semiprecious stones; potsherds bearing graffiti; and other usual items of mature Harappan cultural repertoire. Apart from these, the other most interesting finds were nine human figurines of ill-baked clay, all from the drain (No. IC) of the water structure.

Of the late Harappan period, multi-roomed rectangular houses were brought to light near the south-western (pl XIV) and north-western corners of the citadel. At the north-western corner, at least two phases of house buildings of this period associated with a deposit of 0.80 m to 1.00 m were noticed. So far the stratigraphic interrelationship between the mature and the late Harappans is concerned possibility of a hiatus could not be ruled out. However, during late Harappan period also many Harappan elements such as ceramics, weights, triangular cakes and lithic tools and seals remained in use, albeit in somewhat transformed form. Further, the Jhukar related pottery on the one hand and the Ahar related pottery on the other also came into corpus.

16. EXCAVATIONS AT LOTESHWAR, DISTRICT MAHESANA. — V. S. Parekh and V. H. Sonawane, assisted by K. K. Bhan, P. Ajithprasad, K. Krishnan and Prakash Chaudhary of the Department of Archaeology and Ancient History, M. S. University of Baroda, carried out excavation at Loteswar. The site, locally called Khari-no-timbo, is located about half a kilometre east of Loteswar village (23° 36' N; 71° 50' E) on a high sand-dune close to the left bank of the Khari Nadi, a small tributary of the Rupen.

The excavation was undertaken to know the cultural sequence, to understand the significance and ascertain chronology of the regional ceramic tradition characterized by the gritty red ware, and to understand the nature and significance of intra-site pattern of microlithic artefacts and faunal

EXPLORATIONS AND EXCAVATIONS

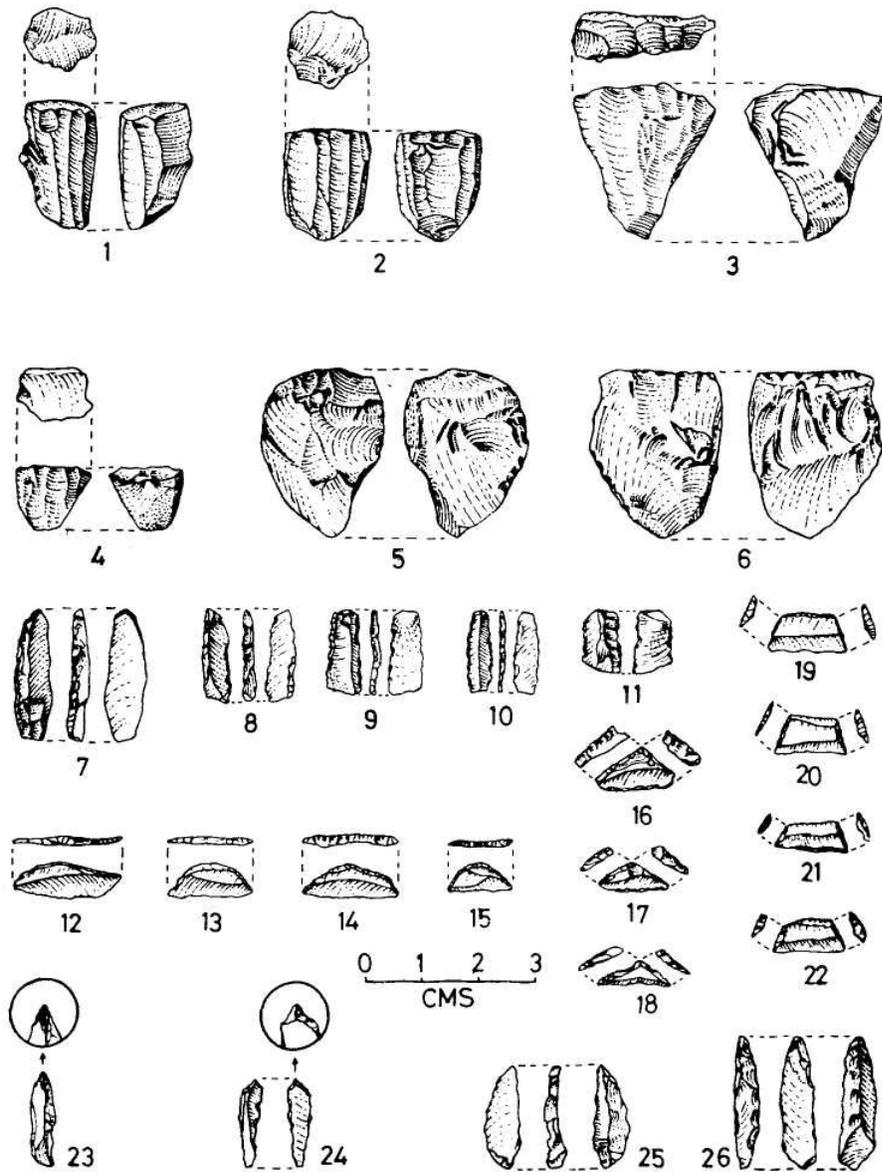


FIG. 1. Loteshwar : 1-4, Cores; 5-6, scrapers; 7-11, blades; 12-15, Lunates; 16-18, triangles, 19-22, trapeziums; 23-24, burins; and 25-26, points

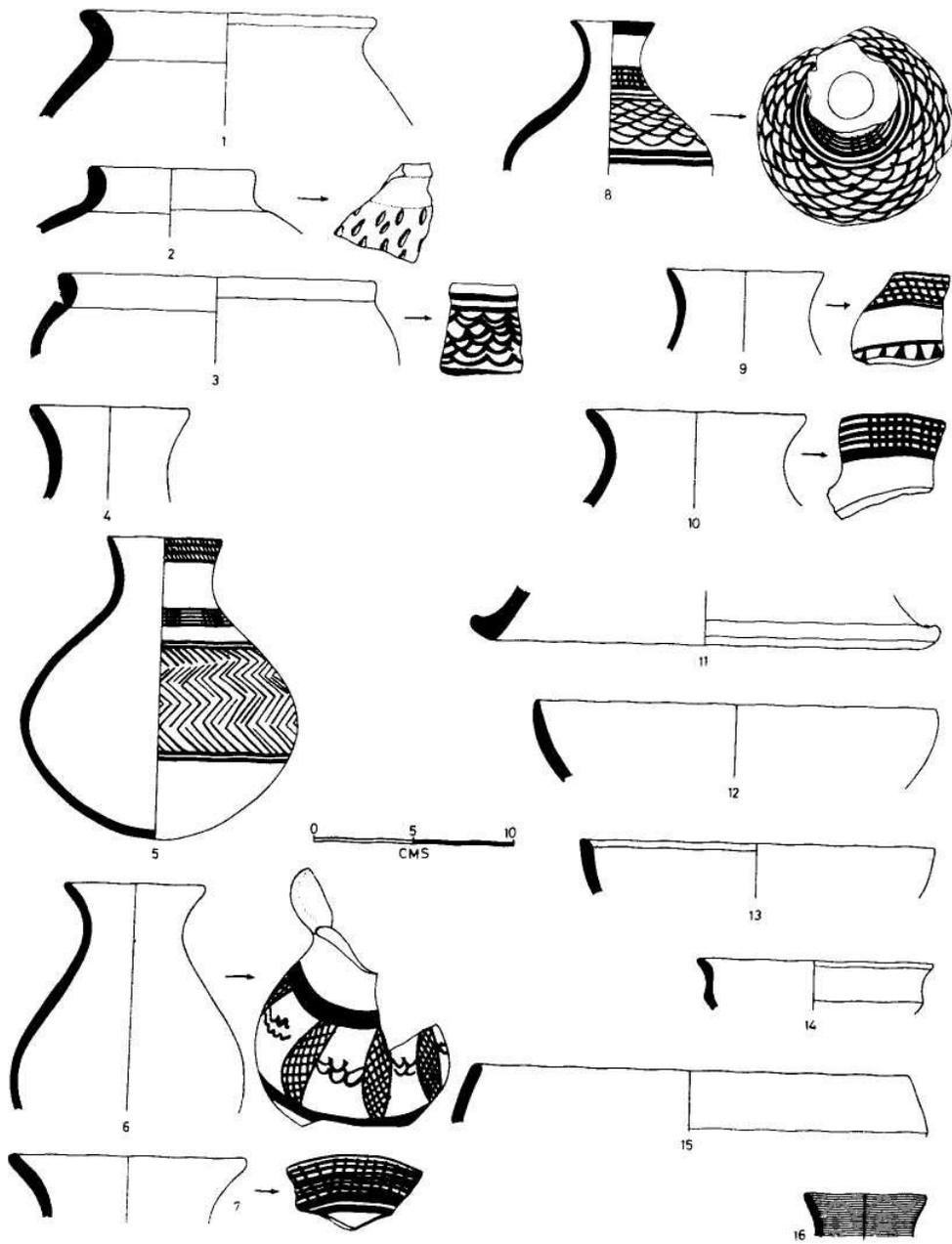


FIG. 2. Loteshwar : Pottery types, Period II

EXPLORATIONS AND EXCAVATIONS

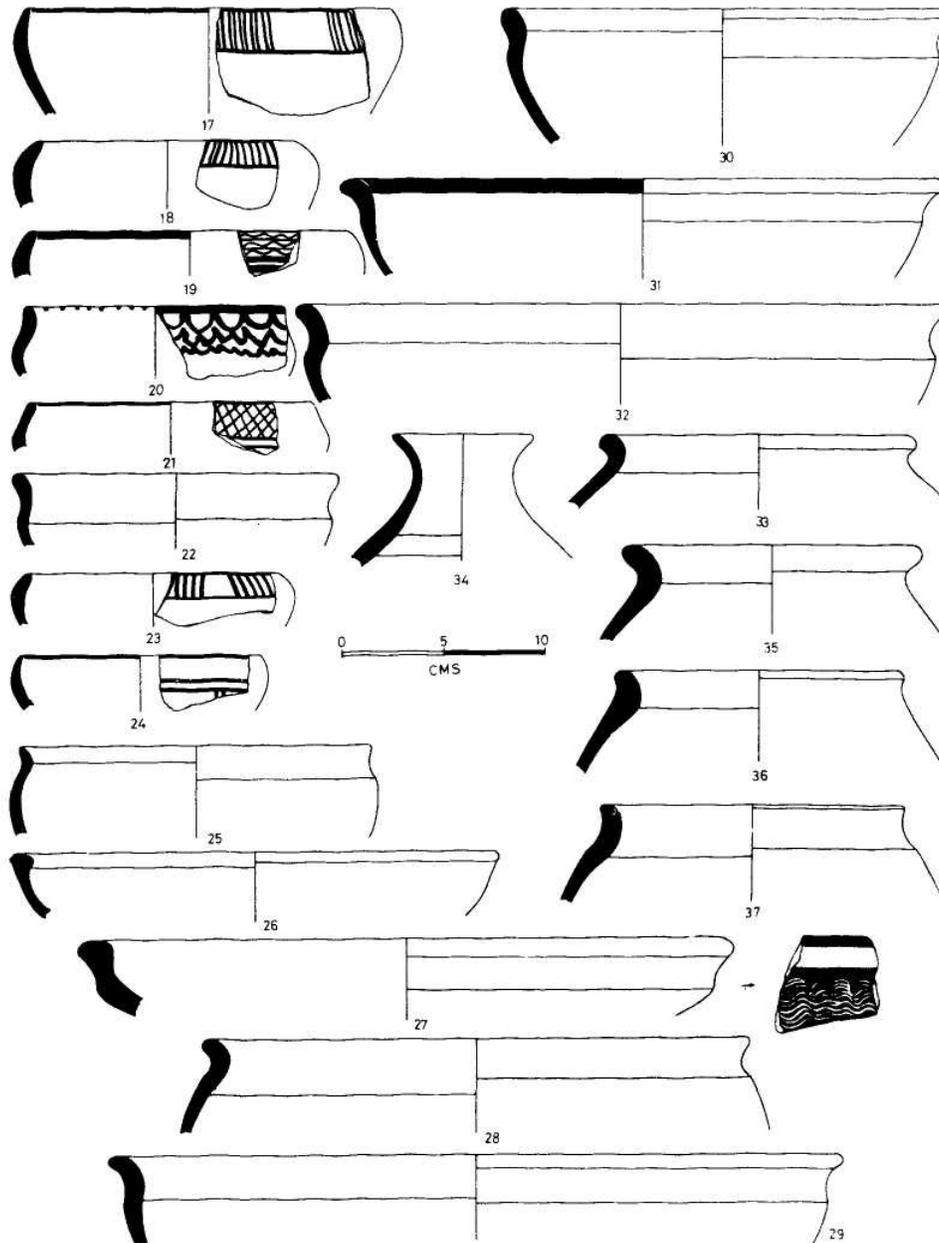


FIG. 3. Loteshwar : Pottery types, Period II

remains in terms of occupational history of the site. Systematic surface collection and excavations were carried out at four different areas of the mound assessing the surface indications like the spread of pottery, lithic artefacts and macro-faunal remains. The excavation revealed a maximum habitational deposit of 1.65 metres belonging to two different cultural periods, Period I belonging to the Mesolithic culture and Period II to the Chalcolithic period having affinity with the Harappa culture.

Period I was represented by 60 cm to 1 m thick deposit lying directly on a stabilized sand dune. It yielded a large number of microlithic tools (fig. 1) and other lithic artefacts like flat sandstone 'palettes', grinding stones and hammer stones. The microlithic industry included both geometric and non-geometric types. The tools were made of chert, chalcedony, jasper, agate and quartz. Among other important material remains belonging to this period were two small shouldered bone points and a few prismatic or faceted red and yellow ochre crayons. The excavation had also brought to light two human burials belonging to this period. One of these was in the type of extended articulate position; hands below the head and the lower extremity of the legs drawn upwards. The second burial was found at the western slope of the mound and was in crouching position (pl. XV).

Period II was represented by a maximum of 80 cm deposit composed of a large dump of rubbish. The regular habitation deposit was hardly 20 to 25 cm. No structural remains of this period were encountered. However, a conspicuous feature noticed at the site was the occurrence of a large number of pits which were dug during this period. These pits were cut through the Mesolithic deposit down into the natural soil. Their size varied as much as from 2 m in diameter and 2 m in depth to 0.5 m in diameter and 0.5 m in depth. They were invariably filled with ashy soil, potsherds, animal bones and other waste materials. The significance of these pits has not been fully understood.

The pottery belonging to Period II included gritty red, red, Black-and-red, burnished black, coarse red and coarse grey wares. No classical Harappan pottery type was met with in any of the trenches. The collection, however, was predominated by gritty red ware and red ware. These two types were analogous in shape and decoration, with similar types of pottery from Nagwada and the coarse red ware and polychrome pottery from Surkotada. The gritty red ware was characterized by predominantly handmade or partially wheel made vessels having a gritty core and indifferent firing. The red ware was by and large well fired and made of fine clay. Prominent shapes in both the types included bowls, basins and medium size pots/jars (figs. 2-3). Most of the bowls and pots were decorated with different shades of black or red colour in a cream or white background, thereby producing a bichrome effect. Sherds of other pottery types like black and red ware, and burnished black ware were very few in number. Sherds of coarse red ware and coarse grey ware pots were decorated with incised designs. A few sherds of red ware decorated by "reserved slip" technique were also met with. Among other artefacts belonging to this period were a few terracotta pinched type lumps and *mushtika* type lumps, a large number of steatite micro-beads and a few beads of agate, carnelian and amazonite.

A large quantity of faunal remains of exploited fauna was also found from both the periods. This included skeletal remains of not only land animals but also aquatic fauna like fish and turtle. Besides, floral samples were also collected as light fraction component by floating selected soil samples using water floatation method.

EXPLORATIONS AND EXCAVATIONS

17. EXPLORATION IN DISTRICT MAHESANA. — The Department of Archaeology, Gujarat, reported the following sites of archaeological interest in the district:

<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
Chanasama	Dhinoj	Step-well of Solanki period Siva temple of Solanki period Bahu Smarana Mata temple of Solanki period
	Gorad Kanoda	
Kadi Mahesana	Virta	Temple of Solanki period Maratha (Gaikwadi) fort Sculptures of Vaishnavi, Kaumari, Brahmi, Vayavi, Varahi, Chamunda, Mahesvari, Aindri, Virabhadra, Hara-Gauri, Ganesa and Chamundi, all datable to the eighth-ninth century Siva temple of Solanki period
	Kadi	
	Palaj	
Vijapur	Veda	

V. S. Parekh, V. H. Sonawane, P. Ajithprasad, K. K. Bhan and Prakash Chaudhary of the Department of Archaeology and Ancient History, M. S. University of Baroda, Vadodara, during the course of their exploration around Loteshwar village in Sami Taluk discovered the following sites of archaeological interest:

<i>Village</i>	<i>Site</i>	<i>Nature of remains</i>
Kathi 23°37'N; 71°49'E	Ajivino Timbo	Microliths and bones
Kukrana 23° 38' N; 71° 54' E	Kamboya Timbo	Microliths and bones
Loieshwar 23° 36'N; 71° 50" E	Gokhijadio Timbo	Harappan Microliths and bones
	Kalario Timbo	
—do—	Khari-no-Timbo	Microliths and bones
—do—	Khidhadia Timbo	Microliths and bones
—do—	Odhera Timbo	Harappan and Late Harappan
—do—	Chotaria Timbo	Harappan?
—do—	Gachino bor	Harappan
—do—	Navapura	Mesolithic rich in bone remains
—do—	Rajwadio Timbo-I	Microliths and bones
—do—	Rajwadio Timbo-II	Late Harappan
Orumana 23°36'N; 71°54'E	Orumana	Late Harappan

<i>Village</i>	<i>Site</i>	<i>Nature of remains</i>
Palipura 23° 37'N; 71° 51'E	Okada Timbo	Microliths and bone remains
Palipur	Palipur	Sculptures datable between sixth and ninth century
Rawad 23° 39'N; 71° 50'E	Hanuman Kathi	Microliths
	Rawad-H	Microliths and bone
	Rawad-m	Microliths and bones

HARYANA

18. EXCAVATION AT HARSH-KA-TILA, THANESAR, DISTRICT KURUKSHETRA. — The Institute of Archaeology of the Survey continued (1989-90, pp. 27-32) excavation at Harsh-Ka-Tila, under the direction of B. M. Pande, assisted by R. P. Sharma, C. B. Mishra, Arundhati Banerji, A. K. Patel, D.N. Dimri, A. Jha, K. C. Nauriyal, R. Dalai, H. Thapliyal of the Headquarters office and Jasmer Singh and Vinod Kumar of the Chandigarh Circle of the Survey.

Besides imparting field training to the students of the Institute, the other objectives of the excavations were to ascertain if the mud-rampart of the Kushana period on the southern slope of the mound in TSR-3 extended further towards the west on the same side; to expose the western bastion forming part of the fortification wall in TSR-2 in the portion envisaged as an entrance to the town; to re-examine the presence of Painted Grey Ware (PGW) levels on the northern side of the mound in TSR-1; to trace further the palatial building-complex in TSR-3; and to expose further the extent of remains of the Mughal garden-complex on the northern side of the mound in TSR-1.

In TSR-1, in the small trench taken in the rain gully for ascertaining the nature of the PGW deposit, only a Kushana baked brick wall of four courses height was found. Absence of PGW sherds in the lower levels further suggested that the PGW settlement may have been a small one.

Excavations in the southern slope of the mound revealed continuation of the mud rampart which had been exposed in earlier seasons. Here also, it was built in two phases. As usual, charred bone pieces, tiny potsherds and other evidence of human occupation were sparingly found in the makeup of the mud rampart. The width of the rampart was almost the same as exposed in the rain gully, i.e. about 15 metres. At this point, the top of the mud rampart was superimposed by a north-south oriented mud brick wall, 1.35 m long, the brick size used being 35 X 23 X 7 cm. The construction of the mud brick wall here suggested that the rampart may have fallen into disuse for some time or was laid out with some purpose during the same period. As already stated above, in the rain gully on the northern side in TSR-1, four courses of a baked brick wall, possibly forming part of a room, were exposed.

The representative pottery types of this period were the same as reported earlier and include sprinklers, small vases, Spouted vessels, incurved bowls, jars, basins, knobbed lids, storage jars and

EXPLORATIONS AND EXCAVATIONS

sherds of red polished ware. Pieces of decorated spouts, some having the shape of *makara-head*, terracotta human and animal figurines, lion-head with incised mouth and eyes, ear stud, beads of terracotta and semiprecious stones, copper rod and bangles of bone, ivory and shell were some of the items of this period.

Only limited excavation was done in the Gupta levels in a small area in the rain gully of TSR -1 and on the southern slope of the mound in TSR-3". Besides the usual pottery wares and types, spouted vessels, lids, bowls, jars and basins, some terracotta beads and shell bangles such as sprinklers were found.

This season's excavation of the Post-Gupta or Vardhana deposits, though confined to a small area, revealed an earlier phase of construction of the large building-complex partly exposed in previous seasons. This early phase was represented by two side walls of a room in one of the trenches and excavated lowermost wall in another trench. Both were of bricks : the size, however, remained almost the same during both the periods, i.e., 32 X 22 X 5 cm and 31 X 22 X 5 cm.

No new pottery types were found from the deposits of this period. The important objects of this period include a terracotta seal with floral decoration, a couchant lion made out of double mould, bull, elephant, two moulds of terracotta—one depicting a human figure with a crest, curly hair and prominent ear-stud and the other of a female figure having curly hair and wearing ear-ring and necklace depicted inside a beaded oval border, terracotta ball with incised lines, dabbers — one with incised lines on the neck — shell bangle pieces, antimony rod, iron axe and beads of terracotta and semiprecious stones.

Excavations were extended in Rajput levels in TSR-3 where a large building-complex had been partially exposed earlier. It revealed actually two complexes following almost identical building plan. It seems that around a brick-paved courtyard there were rooms, of which nine have been exposed so far. On the southern side were three steps 1.05 m in width each having four courses of bricks. Adjoining the steps, on the southern side, was a platform and a brick-built pillar base on the south-eastern corner of the courtyard.

Two of the rooms excavated earlier with fine brick masonry were found provided with a series of rectangular grooves at the corner where two walls joined in each of the two rooms. These grooves suggest possible device to descend into the rooms and thereby also indicate that these were used as basements.

Brick pillar bases were also encountered in the corner of another room suggesting thereby that it supported the roof. Belonging to the last phase was noticed a mud brick partition wall with a small doorway, 0.80 m wide. Evidence of fire on almost all the walls including the charred door frames, the remains of which are still seen with a big iron nail, suggest that fire had caused the collapse of the building.

Another complex closely connected with the above was partly excavated; it has revealed seven rooms so far (pl. XVI). All the rooms had two construction phases, one built right above the other without change in the basic plan. The bricks used in both the phases of the structure were of the same

size, i.e., 31 X 22 X 5 cm and 31 X 21 X 5 cm. The rooms of the upper phase were interconnected by doorway entrances of various dimensions. The find of brick pillar bases, both of the large and small size, in some of the rooms suggest that sometime during its occupation the roof of the building was resting on brick pillars. One of the partly-excavated rooms had brick flooring with fine joints; it was, however mostly damaged, its remains could still be seen on the southern side.

Not far from this palatial building-complex, 25 metres towards north in a trench (YA 6), were exposed remains of another structure (pl. XVII). Excavations here revealed two walls of a room, both having doorway-entrances, 1.20 m and 1.05 m wide respectively. A brick-covered drain was found running east-west inside the room measuring 3.02 m in length and 0.12 m in width, the brick size being 33 X 21 X 8 cm and 28 X 20 X 4 cm. Inside the room was also noticed portion of a structure of which one side measures 1.44 m. It has brick-on-edge border with moulded top on the inner side. The inner space was paved by finely-joined cut bricks, well-laid, edge-to-edge, the brick size being 29 X 18 X 3.5 cm. On the western slopes, in TSR-2, were exposed three parallel walls belonging to the Rajput period immediately below the bastion of the Sultanate period (pl. XVIII) : the function of these walls is yet to be ascertained.

Except for a few new shapes like incense burner and more varieties of stamped designs, the pottery of the Rajput period did not reflect any change from what has been reported last year.

The material belonging to the Rajput period recovered from the large building-complex included five terracotta sealings, one of which reads as *Sri Simhala* (?) and another having floral motif; terracotta animal figurines of horse, elephant, bulls with prominent hump, rams some of them bearing pin-hole decoration, incised lines and applique neck band; a potter's stamp with bold chequered pattern on one side and floral design on the other; decorated lid with floral motif, dabbers, some with stamped decoration on the neck; tripod stand, gamesman with incised lines, pendant, skin rubber, wheel and cubical dice, all of terracotta.

Among metal objects are a brass bangle, ear and nose ornaments of gold, copper antimony rods and coins. Besides, objects of bone, ivory and shell such as dice, bangle pieces, decorated ear ornament, large number of iron implements and weapons such as sword-blade, hilt, arrowhead, nails, clamps, rings, door-hinge, etc., were also found. Beads of terracotta and semiprecious stones were also recovered in fairly good number.

Though found from the debris of Sultanate and Mughal levels, the important sculptures and architectural fragments which are unmistakably of Pratihara period include mostly defaced and damaged figures of Vishnu, Ganesa (pl. XIX A), flying *vidyadharas*, standing *apsara*, portion of perhaps a *dvarasakha* with a standing female figure and another in the lower recess with a sitting figure below, a fragmentary sculptural panel depicting seated male and female figure, a standing male figure, a *kinnara* and *vyala* and door lintel depicting a figure of Ganesa in the middle, and a warrior couple. Particularly beautiful is a *navagraha* panel in stone, unfortunately badly damaged, with only three main and three attendant figures extant (pl. XIX B); these are respectively of Surya with his high boots, Chandra and Mangala. The face and the arms of the main as well as the attendant figures seem to have been deliberately chopped off. The base of the panel has a beautiful floral design.

EXPLORATIONS AND EXCAVATIONS

Particularly noteworthy is a beautifully carved *bhadra* pillar of sandstone having on each of four faces a medallion, a *mithuna* couple, *chakra*, a scroll and an eight-petalled lotus respectively. Above these are motifs of *purna-ghata* followed by a scroll design, and ornamental design respectively from bottom to top.

Limited excavation was done in TSR-3 in the Sultanate levels this year in which a brick-paved platform was exposed (pl. XXI A). The platform was damaged on the eastern half. It had brick-on-edge border on the northern side and a brick wall on the southern side. The bricks used for paving the platform also had three incised lines on one face, either curved or straight. The bricks are, mostly square in shape measuring 20 X 20 X 5 cm and 10 X 10 X 5 cm while some rectangular bricks measure 40 X 30 X 5 cm. These are similar to the terracotta tablets found on the northern slopes of the mound from Rajput levels except that the tablets are smaller in size. These were deliberately arranged on the eastern side in a specific manner with a row of medium-sized bricks alternately placed with two rows of small bricks and on the western side a set of nine small bricks arranged along four sides of a large brick.

The pottery types were the same as reported last year. The objects include terracotta animal figurines of camel, bull and horse, beads of terracotta, glass and semiprecious stones, iron and copper implements, shell bangles, etc.

The excavation on the western slope of TSR-2 brought to light a large semi-circular bastion at the entrance to the walled town from west. Similarly, another flanking bastion on the other side of the entrance was also noticeable. Our surmise that the depression in the mound between TSR-2 and TSR-3 was indicative of a longitudinal ancient street was substantiated by excavations. Stratigraphically, the bastion had two phases of construction, the upper one belonging to the Mughal period while the lower one belonged to the Sultanate period. The extant height of the bastion was 4.50 m and preserved 75 courses of baked bricks.

The lower portion belonging to Sultanate period had 41 courses of which the lower 24 courses formed part of the foundation. On almost the middle of the western entrance near the northern bastion was exposed a small oval brick structure of the Sultanate period. Its eighteen courses measure 1.10 m in height of which the lower seven offset courses may perhaps be a part of the foundation. In the absence of any interconnecting wall, the purpose of this structure is not clear. Among the objects found here are bone and iron implements including arrowheads of different sizes. Huge deposit of ash with plenty of charcoal pieces and burnt patches on the bastions and the defence wall suggest a large-scale conflagration.

Of the Mughal period, particularly important are a brick-paved street and a well (pl. XXI B), a garden-complex (pl. XXII) and the bastion. The upper part, having 35 courses of the bastion, already described above, belongs to Mughal period. The fortification wall, 6.50 m wide, attached to the bastion was exposed up to a length of 10 m. Adjoining the southern flank of the garden complex was a large sized building which on account of both stratigraphic evidence and style of construction appears to be part of the garden-complex (pl. XXIII). The brick-paved street was mainly oriented north-south with cross streets and houses on its sides.

This complex appears to be following the pattern of typical Mughal garden and is divided into four equal symmetrical parts with a square *hauz* in the centre. Water to the *hauz* was supplied by terracotta pipes from east concealed within the wall. This *hauz* had in the centre a copper or brass fountain-head and an outlet on each of the four sides. On the eastern side of the central *hauz* there was a small rectangular tank connected with a raised open drain coming from further east. Two pottery pipes were connected with this tank which were no longer functional in the last phase of the garden-complex. The evidence indicates that the original idea of distributing water into the garden underwent some modifications at least twice.

The raised open channel which supplied water to the small tank actually ran on top of the concealed pottery pipe supplying water to the central *hauz*. Thereafter, both the drains turned towards north through a globular pot. On the eastern side adjoining the drain was exposed a pathway and steps leading to a pavilion which was perhaps brick-paved and was exposed last year. The pathway was paved with hexagonal brick tiles. The open drain again turned here running eastward along the southern edge of the pavilion and joined the channel running all around on the top of the walls of a tank.

The tank, which was exposed last year, had on the northern side a cascade and a small cistern having cusped pattern on both longitudinal ends and a copper fountain in the centre. The water used to run through a concealed conduit pipe provided below the lime-plastered surface meant for flow of water from the cascade.

The garden complex had on the southern side a series of three arches which were related to the early phase of the garden-complex. Five steps were provided later when the ground level was raised. In front of the arches were exposed paved brick chambers. The chambers were provided with niches and arched passages of different size. Interconnecting doorways were also provided between the chambers.

All the structures were built of baked bricks laid in lime mortar, the brick size being 26 X 15 X 5 cm and 23 X 14 X 4 cm. The pottery of this period comprised of red ware, grey ware, glazed ware and porcelain. This year fairly good quantity of glazed ware and porcelain was recovered. Important items of this period include terracotta human figurines wearing conical, elongated caps, some bearing lamps over their head, a crudely-modelled deity with flexed stumpy legs. Among the terracotta animal figurines the important ones are bull, elephant, horse, wheeled-toy, lion and bird figurines, some of which were decorated with applique design and some with incised and pin-hole decoration. Also found were two inkpots, of which one is glazed having three perforations on the shoulder for suspension and another having four holes with inscription in Persian characters on the lower surface. There was also another inscription written in black ink on a lid. Among terracotta miscellaneous objects were pear-shaped pot used in fireworks, dabber, toycart wheel, ring, etc. The important copper objects recovered were ring bracelet, head-and ear-ornaments; a silver ring was also found from this level. Among the important iron objects, nails, axe, hooks, knife, nut-cracker, etc., were found. Besides, shell bangles, decorated bone stopper, bone arrowheads, ivory rings and bangles, beads of terracotta and semiprecious stones and two hoards of copper coins — one consisting of 199 copper coins alongwith a silver coin and the other having 25 copper coins were also found.

HIMACHAL PRADESH

19. EXPLORATION IN DISTRICT KANGRA. — The Archaeological wing of the Language and Culture Department, Himachal Pradesh, reported the discovery of a sandstone sculpture of Lakshmi from village Chari. The image, 90 cm high, is probably part of Vishnu-Lakshmi image. The goddess is standing in *dvibhanga* posture on lotus seat, wearing *mukuta* and having stylized *vaijayantimala* girdled around her body (pl. XXIV A). On stylistic grounds, the sculpture can be dated to the tenth century AD.

20. EXPLORATION IN DISTRICT LAHUL AND SPTTI.—The Archaeological Wing of the Language and Culture Department, Himachal Pradesh, reported wooden image of Mahishasuramardini (30 X 40 cm) in bold relief, in the heap of discarded material lying behind the altar in the Markula Devi temple at Udaipur. On stylistic grounds the image could be dated to early seventh century AD and may have served as a prototype of the Lakshana Devi image. The image is now preserved in the Himachal State Museum, Shimla.

21. EXPLORATION IN DISTRICT SHIMLA.—The Archaeological Wing of the Language and Culture Department, Himachal Pradesh, reported the finding of a Uma-Mahesvara image at Maudholghal village in Suni tehsil, situated at a distance of 50 km north of Shimla. This sandstone sculpture (pl. XXIV B) was found in pieces and half-buried in the ground. It depicts Siva and his consort Uma in *alingana-murti*. Siva, holding *trisula*, is shown as seated on the Nandi and is holding Uma by the left hand. Behind the image of Siva is carved *prabha-mandala* in the fashion of an *ashtadala* lotus.

22. EXPLORATION IN DISTRICT SIRMAUR.—The Archaeological Wing of the Language and Culture Department, Himachal Pradesh, reported about the Naganana temple complex, situated 15 km north-east of Paonta in District Sirmaur. This temple complex, datable to Pala-Pratihara period, was considered by the local people to be of Naga and gave it the nomenclature as Naganana (the tank of Naga), and built a new temple at the place by demolishing some of the existing old remains. Around this modern temple are scattered architectural members and broken sculptural pieces, majority of which are of Vaishnava affiliation.

KARNATAKA

23. EXPLORATION IN THE SUBMERGENCE AREA UNDER HIPPARGI BARRAGE, DISTRICT BELGAUM AND BIJAPUR. — S. V. Venkateshaiah, P. Venkatesan, M. V. Visvesvara, C- S. Seshadri, S. G. Samak and M. V. Mallikarjuna, under the direction of K. P. Poonacha, explored the submergence area under the Hippargi Barrage in Belgaum and Bijapur districts to assess the archaeological potentiality of the area. The sites having archaeological interest are as under :

<i>District</i>	<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
<i>Left bank of the river Krishna</i>			
Belgaum	Athani	Ayarkhod 16° 39' 35" N 75° 02' 15" E	Erotic sculptures fixed on the wall of Anjaneya temple of seventeenth century AD

<i>District</i>	<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
Belgaum	Athani	Hulgabali 16*39'45"N; 74*59'45"E	Ash mound
-do-	-do-	Ingalgaon 16*38'40"N; 74*59'50"E	Two-lined inscription written irregularly on an eroded sati stone
-do-	-do-	Mahiswadi 16*30'40"N; 74*07'31"E	Loose sculptures of naga-couple couchant bull, Ganesa and inscribed hero-stone of circa twelfth century
-do-	-do-	Molwad 16*34'40"N; 74*47'45"E	Loose sculptures of Ganesa and hero-stone ascribable to circa sixteenth-seventeenth century
-do-	-do-	Nagnur 16*36'28"N; 74*02'45"E	Bust of a Saptamatrika sculpture and a hero-stone depicted in three panels
-do-	-do-	Nandishwar 16*32'40"N; 74*06'07"E	Nagari inscription of seventeenth century, sixteenth century tomb, loose sculptures of sati and hero-stones
-do-	-do-	Satti 16*34'15"N; 74*05'15"E	Middle palaeolithic site, mesolithic site, ash mound, later Chalukyan temples loose sculptures, hero-stone, Kannada inscription of AD 1183
-do-	-do-	Saptasagar 16*38'15"N; 74*57'15"E	Mesolithic site and ash mound
-do-	-do-	Shegunshi 16*34'07"N; 75*03'20"E	Mesolithic, Middle palaeolithic sites and ash mound
-do-	-do-	Tirth 16*39'30"N; 75*58'15"E	Inscribed sati stone of 11-12 th century AD
-do-	-do-	Chandur 16*36'10"N; 74*39'40"E	Middle palaeolithic tools

Belgaum Athani

EXPLORATIONS AND EXCAVATIONS

<i>District</i>	<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
Balgaum	Chikodi	Krishna-Kittur 16° 52' 37" N; 75° 30' 12" E	Ash mound
-do-	-do-	Manjri 16° 33' 30" N; 74° 41' 15" E	Middle palaeolithic and mesolithic site
-do-	-do-	Bhirdi 16° 48' 15" N; 74° 48' 15" E	A stray chert blade
-do-	-do-	Chinchli 16° 38' 45" N; 74° 49' 15" E	Modern temple of Mayakkadevi
-do-	-do-	Khemilapur 16° 36' 40" N; 74° 56' 15" E	Early historical site and temple of twelfth century of Kadambas of Hangal
-do-	-do-	Kudachi 16° 38' 00" N; 74° 51' 15" E	Mesolithic site, ash mound and early historical site
-do-	-do-	Shrigur 16° 37' 15" N; 74° 15' 00" E	Mesolithic site, loose sculptures of Ganesa, Bhairava, hero-stone, Gajalakshmi and sati-stone
Right bank of the	river krishna		
Bijapur	Jamakhandi	Asagi 16° 31' 45" N; 75° 09' 50" E	Middle palaeolithic and mesolithic tools, neolithic-chalcolithic and early historic sites, burnished micaceous grey ware, burnished red ware, black-on-red ware, cream ware and early historic red ware
-do-	-do-	Halingli 16° 30' 15" N; 75° 05' 30" E	Megalithic burials, early Chalukyan temple built of sandstone and Ramalingesvara temple of Rashtrakuta period
-do-	-do-	Kalhalli 16° 30' 25" N; 75° 07' 58" E	Middle palaeolithic and mesolithic tools, neolithic-chalcolithic and early historical sites.

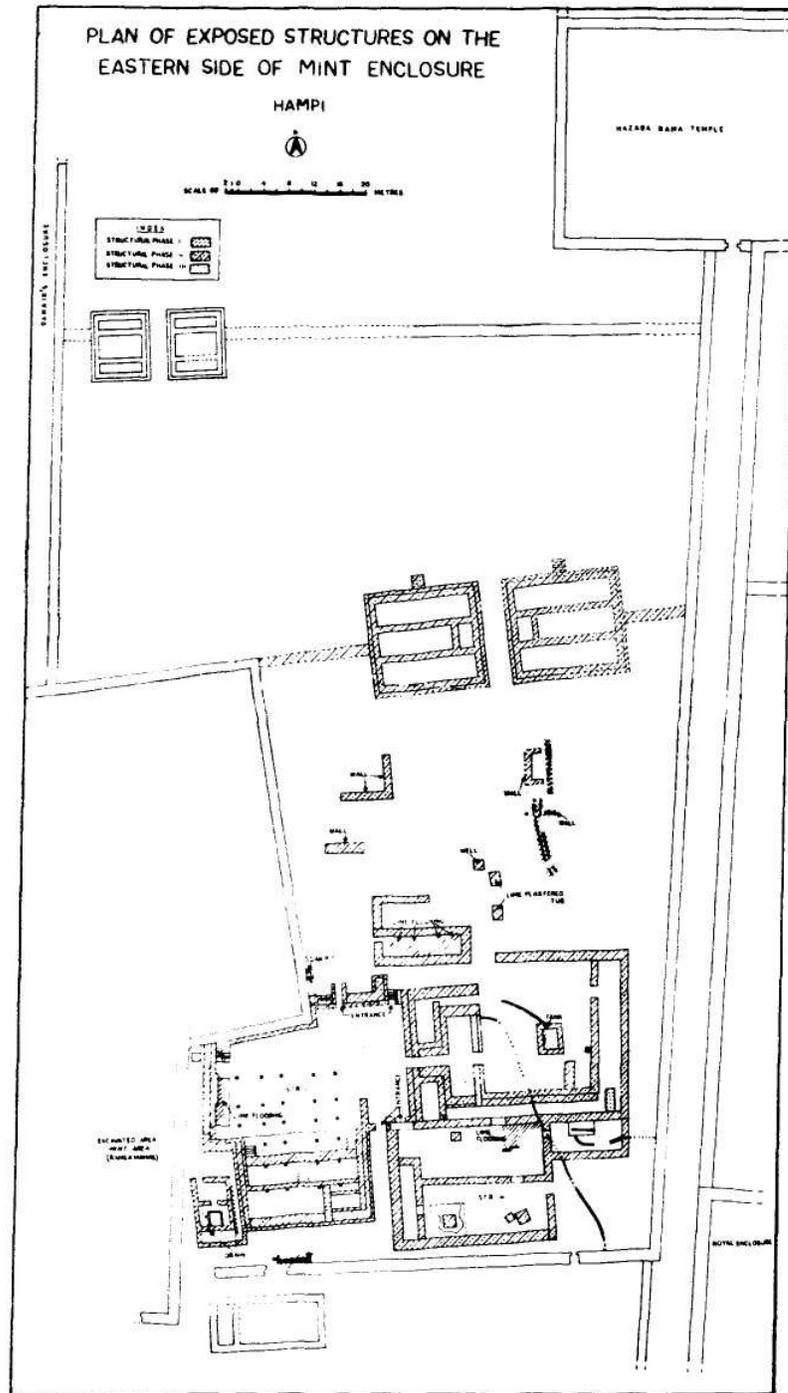


FIG. 4

24. EXCAVATION AT HAMPI, DISTRICT BELLARY. — In continuation of the previous year's work (1989-90, pp. 36-37), the Bangalore Circle of the Survey under the direction of K. P. Poonacha, assisted by S. V. Venkateshaiah, S. Seshadri, W. V. S. Narasimham and Ananda Tirtha, resumed excavation at Hampi in the eastern area of the Mint enclosure with the objective of exposing the structural complex and to ascertain its probable relationship with the palatial structure exposed earlier in the Rangamahala complex (1978-79, p. 43).

Excavation in the Mint enclosure laid bare a number of platforms with moulded plinths which are either completely dislodged or partly buried under subsequent structural activity, thus rendering it difficult to apprehend the specific plan of each of them. Three distinct structural phases (fig. 4), however, could be discerned by a scrutiny of the excavated remains. Complete plan of at least two north facing structures and a network of aqueducts connecting wells and lime plastered shallow tubs at various levels were also exposed.

The rectangular tank, running in east-west direction and having southeast-northwesternly orientation and other associated structures represent the earliest phase of structural activity in the area characterised by the use of large sized wedge-shaped granite blocks. The 5.8 m deep rectangular tank (7.8 X 4.15 m) exposed to the west of the southern passage leading to the Hazara Ramachandra temple from the Royal Enclosure, was found cut into the hard granitic gneiss with a flight of steps on the north. At the south-eastern corner of the tank, a stone-cut supply channel was also traced. To the south-west of the tank were exposed lengthy walls (1.2 m wide), presently, not conforming to any definite plan. A lime plastered rectangular (3.2 X 2.4 m) shallow trough connected to a supply channel on the northwestern direction, having gradient towards the tank and covered with roughly cut-stone members, was also laid bare in the area. A step (1.20 x 0.25 m wide) was provided on the eastern inner side of the tank.

In the second phase, characterised by the provision of well-dressed and moulded *adhithana* on the facing sides, the area appeared to have witnessed hectic structural activity. The enclosure was provided with a prominent central entrance and two north facing residential structures (STR 1 and 2) were built after deliberately filling the tank and dismantling the earlier walls wherever felt necessary. STR-1 located on the western part nearer to the Rangamahala was basically a rectangular unit raised at three levels. The lower level appeared to have been an open pillared verandah accommodating balustraded flight of steps (14 m wide) at the eastern and western extremities leading to the middle level as evidenced by the extant one on the western side. A 0.95 m high wall having moulding on the northern face differentiated the lower and the middle levels.

Probably a centrally positioned flight of steps led to the upper level comprising two rectangular portions; the western (12 X 5 m) being larger than the eastern (4 X 5m). The eastern portion comprised of rectangular room with a passage on the north. The structure had four equally-spaced pillar bases in each of the middle and upper levels. The lower level of STR-1 opened into a roughly rectangular, lime plastered pillared hall with two narrow entrances on the north. The courtyard has moulded basement veneering on the inner periphery which concealed the drains provided along the northern wall of the enclosure.

Another rectangular unit (10.8 m north-south x 6 m east-west) exposed to the west of STR-1 was probably meant for the use as a bath-cum-toilet. This unit had three rooms, the middle (4.9 X 3.2 m) accommodating a 2 m square bath attached to the southern wall provided with plastered brick and mortar copings on three sides and a toilet with facilities to drain the refuse. To the north of the bath-cum-toilet was a room (4.5 X 2.7 m) having lime plastered flooring and on the south an inspection chamber and a soak pit.

STR-2 built at a distance of 3.10 m east of STR-1 is much disturbed and subjected to alterations in the succeeding period. It had two rectangular halls, almost of the same size and level, arranged with their longer axis in the east-west direction. The northern hall had plastered floor with provision for bath and had another extension on its east. This rectangular extension (10.90 X 4.70 m) also appeared to have served as a bath-cum-toilet characterized by brick and mortar, dwarf parapet wall with a coping, curvilinear interior and straight outer edges. The southern rectangular hall, entered through an entrance of 20 m width, had two rectangular wells cut into the bedrock and lined with dressed stones. The area around the tank was also lime plastered. Attached to the western side of these two wells was a narrow rectangular (10.4 m north-south X 1.6 m east-west) chamber serving probably as a store room.

Further north of the above two halls was exposed an open courtyard accommodating the rectangular tank of the earlier phase at the centre. Subsequently, this squarish open courtyard was reduced to a rectangular one by raising walls parallel to the southern and eastern walls. Moulded basement veneering was provided on the interior facing of the southern and eastern walls besides providing two ornamental projections for the southern wall. The space between the southern and eastern outer and inner walls of the courtyard appeared to have served as a passage leading to the two halls as also to the guards chamber on the southern side of the western entrance through a narrow flight of steps.

The enclosure wall and the elaborate entrance *mandapa* built about 45 m north of the open courtyard of STR - 2 also belonged to the second phase of the structural activity in the area. The entrance was an imposing unit by itself and comprises two rectangular (18 m east-west X 16.5 m north-south) blocks with a 3.5 m wide passage in-between. Each of the blocks had a centrally positioned flight of steps (2 X 2 m) on the north. The blocks had on plan a central part, divided into two segments, one smaller (3.5 x 2.5 m) and the other larger (11.5 X 3.5 m) flanked by a rectangular hall (14.5 X 3.75 m) in north and south. In between the courtyard of STR - 2 and the entrance, remnants of a number of rectangular structures with lime plastered floors, lime plastered shallow rectangular tubs, well cut into natural bedrock, feeder aqueducts and drains, all assignable to the second phase of activity, were encountered (pl. XXV).

The third phase of structural activity was characterised by spatial reorganisation by additions and alterations to STR - 2 by raising rubble walls set in mud mortar. Moulded architectural members and even inscribed slabs of earlier period were freely reused in this phase and much attention was paid to the security. One interesting feature noticed in this phase was the closing down of the western main entrance connecting the courtyard of STR -1 and 2 and provision of narrow zigzag entrances

on the southern side obviously for additional security purposes. Near the northern wall of the courtyard of STR - 2 were exposed the skeletal remains of three quadrupeds — probably horses — at an average depth of 0.5 m. One of them is highly disturbed and the other two — forming one unit as it were — were laid in east-west direction. The head of one animal faced east whereas the other spaced at a distance of 108 m faced west.

The antiquities unearthed include a gold buckle, silver rings, copper coins and rings, iron nails and linch pins, an ivory pendant, lead ingots, beads of semiprecious stones, fragments of stone sculptures and stucco figures of animals besides a fragmentary inscription (pl. XXIVC).

The Directorate of Archaeology and Museums, Government of Karnataka, Mysore excavated in the Nobleman's Palace area and unearthed the Nobleman's Palace—16, having big enclosure (42.90 X 16.45 m) and lying to the south of NM Q 12. At the eastern end of this enclosure there was a small room (11.25 X 7.30 m) made up of small rubbles and with a partition at the centre. The southern part of the rooms abuts the southern enclosure wall. At the north-east corner of the structure were found slabs, meant for flooring. Enclosure walls were made up of big blocks of stone whereas rubble was used for the inner wall. To the west of the enclosure wall, outside the enclosed compound, small structures were noticed.

Iron nails, needle, copper rings, stucco figurines, cowrie and other shell materials were the main antiquities recovered from the excavation.

25. EXPLORATION IN DISTRICT CHITRADURGA AND MANDYA.—The Directorate of Archaeology and Museums, Government of Karnataka, reported the following sites of archaeological interest:

<i>Village</i>	<i>Taluk</i>	<i>Nature of remains</i>
Karumardikere	Chitradurga	<i>Sati</i> stone of medieval period
Basavankota	Jagalur	Medieval <i>sati</i> stone
Gurusiddapura	—do—	Image of Kalabhairava datable to medieval period
Magadi	Jagalur	Medieval image of Surya
Hulivanagrama	Mandya	Post-medieval sculptures of Bhairava, Vishnu, Ganapati and Alvar.

26. EXPLORATIONS AT BUDIHAL, DISTRICT GULBARGA.— As part of his research on the ash mounds, K. Paddayya of Deccan College, Postgraduate and Research Institute, Pune, undertook intensive explorations at Budihal (Lat. 16° 22" N; Long. 76° 23" E) in the District. The site lies on a sandstone plateau and is defined by deep ravines on the northern and eastern sides with perennial water pools. Hitherto part of agricultural land, a major portion of the site was acquired by the Karnataka Irrigation Department for resettling the present village. As part of this work over a dozen road-marker ditch-cum-drains (one metre broad and up to 250 m long) were excavated all over the area. This digging work as well as the soil-quarrying activities of local people made it possible to get a good picture of the extent of site, nature of deposits and cultural material forming part of the site.

The total site occupies an area of 400 m north-south and 300 m east-west. This season's intensive survey brought to light three ash mounds, each surrounded by Neolithic habitation deposit. Ash mound I is oval-shaped and measures 70 m X 45 m. It is cut into two equal parts by a village cart-track. The mound has a height of three metres and consists of various layers of soft and vitrified ash, and decomposed cow-dung. The habitation deposit around the ash mound extends for a distance of 75 to 100 m. The following layers were observed in the sections of Irrigation Department's road-cuttings (total thickness: about 75 m): light grey soil, dark grey soil, brownish grey soil and natural soil (sandstone bedrock).

Ash mound II is circular on plan. It measures 40 m across and has an extant height of about one metre. The habitation deposit around it is spread up to distance of 60 to 80 m. The deposit on the eastern side of the mound is covered by one metre thick medieval deposit.

Ash mound III lies close to the edge of northern ravine and is almost completely destroyed due to agricultural activities. Greyish soil mixed with fine ash and vitrified ash fragments was found as a distinct scatter covering an area of about 30 m across. Barring the medieval deposit around ash mound II the Budihal site has produced rich quantities of Neolithic cultural material comprising red and grey pottery, polished stone axes and other edge-tools, large number of rubberstones, hammer and querns, and a rich assemblage of chert blade-tools. In the course of these intensive surveys an extensive workshop of chert blade industry was discovered on the western side of the Budihal ash mound site. It produced rich amount of debitage, chert nodules, and hammerstones.

These intensive surface surveys conclusively proved that the Budihal site is not a mere ash heap but represents a regular pastoral settlement of the south Indian Neolithic culture.

27. EXPLORATION IN THE SUBMERGENCE AREA UNDER BHIMA (FLOW) PROJECT, SANNATI, DISTRICT GULBARGA.— Preliminary exploration to assess archaeological potentiality of the area likely to be submerged under the proposed dam across the river Bhima at Sannati (Sonthi as per toposheet 56 D/ 13; 16°49' 39" N; 76° 45' 26" E) a well known site for the recent discovery of a fragmentary edict of Asoka and for numerous relics of Buddhist affiliation was undertaken under the guidance of K. P. Poonacha, assisted by P. S. Sriraman and W. V. S. Narasimham of the Bangalore Circle of the Survey.

During the course of the exploration, the Survey team noticed a group of temples having *sikhara* belonging to the Kadamba period and epigraphical remains at Anbi. Architectural remains were also noticed on the bank of Sirwal halla falling in the limits of Hasargundgi (16° 48' 42" N; 76° 54'45" E). These included limestone sculpture of *yaksha*, two octagonal shafts, pillar base, fragments of *suchis*, *stambhas*, sculptured *ushnisha* (having the figures of elephant, horse, bull and lion in bas-relief) indicating the existence of a *yupastambha* enclosed by a *vedika*.

Another site yielding early historical vestiges and pottery was located at the head of the stream near Kollur (16° 52'51"N; 76° 57'06"E). A temple, built of dolerite and had different plan in having a unit of *garbha-griha* with a *sukanasi* added to all sides of a square common *mandapa*. The beams of the *mandapa* are relieved with panels depicting *Siva-tandava* flanked by other deities.

The exploration team also noticed a massive habitation site, locally known as Ranamandala, at Sannati. Finds from the site included sherds of rouletted ware, fragmentary terracotta figures and a potin coin of *circa* first-second century AD. The site, spreading over 60 acres with a deposit of over 5 m, was strongly fortified with a fortification wall, 2 km long and 5 m high, built across the meander. The wall consisted of twenty-four courses of brick revetment over an earthen core. From the debris of the fortification sherds of moulded pottery, sherds of bowls having everted rim and bearing motifs of *svastika* with extended arms set within fert-like wings (leaves ?), *ghata-pallava* were collected. The ceramic assemblage belong to the unslipped red ware variety.

In the limits of Sirwal (16° 48' 38" N; 76° 53' 38" E), a site yielding blades and scrapers made on chert and jasperiod chert, was located on the gravels of the river. On the bank opposite the famous Chandralamba temple, the find spot of the Asokan edict, mesolithic tools like blades, lunates, fluted cores made on quartz, chalcedony and agate were collected.

28. EXPLORATION IN DISTRICTS HASSAN AND MYSORE.— K. K. Subayya, B. T. Lakshme Gowda, K. Prabhu and B. Shivakumar of the Department of Ancient History and Archaeology, University of Mysore, while exploring the District Hassan and Mysore, found megalithic burials such as the menhirs at Bilagunda in Taluka Periyapatna and at Pungame in Hassan Taluk; stone circles at Nilavagalu, Thattekere and Heggandur on the Hunsur-Hanagoddu Road; and megalithic habitation site at Chennasoge in Taluk Hunsur. Shirangala in District Kodagu is another habitation site which was discovered. Other megalithic sites found during the course of exploration were at Chilkunda and Habbankoppe in Hunsur Taluk; Chennakallu, Chikkanerale in Periyapatna Taluk; Doddabemmalhi, Kaduvina-bosalli, Kesture, Mugalur, Seigodu and Voddarahosalli in Arakalgud Taluk; and Kenchamaranahalli and Mudlapura in Hasana Taluk.

29. EXCAVATION AT GUDNAPUR, DISTRICT UTTARA KANNADA.— In continuation of the previous season's work (1989-90, pp.43-45), K. P. Poonacha of the Bangalore Circle of the Survey assisted by P. Venkatesan, S. S. Nayak, M. V. Visweswara, C. S. Seshadri, S. G. Samak, T. P. Balakrishna Unnittan and M. V. Mallikarjuna, resumed excavation at the early medieval site (fifth-sixth century AD) at Gudnapur with the objectives of (a) exposing the complete plan of the buried structures; (b) ascertaining the layout pattern, constructional details and probable functions and (c) identifying the structures thus exposed with those mentioned in the inscription of Kadamba Ravivarman (AD 485-519).

Excavation has brought to light the complete plan of two structures built entirely of bricks, assignable to the first phase and a *trikuta* structure built of laterite blocks of the second phase of the structural activity.

Excavation in the eastern part of the mound laid bare rectangular pillared verandah on the eastern side of the main brick structure (STR-2) exposed earlier and separated by two parallel walls with a distance of 5m (pls. XXVI-XXVII). The eastern face of the outer wall and the western face of the inner wall are moulded. The western face of the inner wall also has small offsets and accommodates a series of squarish (20 cm square each) grooves for fixing wooden pillars. On the northern and southern extremities of this verandah, walls were raised to form rooms.

Extension of excavation, north of STR-2 adjacent to the northern wall of the *prakara*, brought to light a rectangular (800 m east-west X 400 m north-south) room built of laterite blocks. It has steps provided on the western and eastern sides. The external facing of the walls except of the south are moulded.

Excavation further north of STR-2 revealed a square (6 m on each side) platform within a rectangular (18-20 m east-west x 16-80 m north-south) hall (STR-3) with entrances on north and east (pl. XXVIII). The central platform was built of 0.70 m wide walls, extant to a maximum 0.45 m in height and accommodate squarish post-holes at the corners. The area within the platform was paved with full size bricks in the usual header-stretcher fashion. A narrow pathway, prepared by ramming brickbats, was also encountered between the central platform and the enclosing rectangular hall on the north-western corner. The wall of the hall is also 0.70 m wide and runs at an average distance of 4.75 m from the platform on the northern, eastern and southern sides.

The rectangular hall was found enclosed by another wall traced on northern and eastern sides. On the northern side, it runs at a distance of 4.50m whereas in the eastern side the distance increases to 7 m. This enclosure has entrance co-axial to the inner hall. Pillar bases (1 .50 m square) provided at the cardinal points of the northern entrance indicated its use as the main entrance probably accommodating a *mandapa* with tiled-roof as evidenced by large quantity of flat-tile fragments in the area. The eastern entrance was in the form of a rectangular platform with projections on the eastern and western sides.

The structural remains of the laterite blocks built right over the debris of the structures of Phase I marks the second phase of the structural activity in the site. The walls built of laterite blocks especially in the area east of STR-2 and north of the present Virabhadra temple gave a definite plan. It had three sanctums (3.50 X 3.25 m each) on the east, west and south, all opening into a common *mandapa* (6.5 m square) with an entrance from the north. The back wall of the southern sanctum was found buried beneath the *mandapa* of Virabhadra temple. The *adhithana* of the *trikuta* plan is moulded, *vritta-kunda* being prominent. In addition to the above, remnants of other structures in the form of dwarf-walls built both of laterite and bricks were also encountered.

The ceramic industry is represented by red polished, red slipped and fine greenish grey wares. The former is represented by medium sized pots, storage jars, variety of lids, spouts, sprinklers and vases, whereas in the latter, variety of plates and platters is noticeable. A large number of flat and curved tile-pieces with single or multiple grooves were also encountered (pls. XXIX A-B).

Noteworthy among the antiquities unearthed include a small copper casket, fragments of stone sculptures, a brick containing a *chaitya* motif, coins, bangles and rings of copper, a few silver objects, terracotta figurines of animals, a variety of beads, and a goldsmith's design-mould. The copper casket (10.30 X 9.00 X 3.00cm) unearthed from STR-3, the lid of which is fashioned like a tortoise, contained nine pieces of semiprecious stones and a gold inlaid stud (pl. XXIXC). This appears to have been kept beneath the foundation as part of ritualistic practice. The rectangular (7.00 X 2.00 X 0.8 cm) solid cast iron bar used by goldsmiths for making ornaments had sixteen designs of flowers and linear chain designs.

KERALA

30. EXPLORATION IN DISTRICT PATHANAMTHITTA.— P. Rajendran of the Department of History, Kerala University noticed earthen pots and other materials, covered with stone slabs associated with the megalithic burials, at road cutting near Chenkalthadam near Malayolapuzha. In one of the pots was found the bones, perhaps of an infant while in another pot was found an iron sickle. A few uncharred bones, long and small sized pots, two sherds of black and red ware were the other finds noticed at the site.

31. EXPLORATION IN DISTRICT QUILON.— P. Rajendran of the Department of History, Kerala University, noticed three cist-burials at Aripa in the District. Two cist-burials were placed side by side in north-south orientation, while the third, was in east-west orientation. Each burial was rectangular on plan and consisted of two large and two small orthostats. The length of the larger orthostat was 2 m while the smaller one was 1m in length. Both types of orthostats were 1-20 m in breadth and 9-5 cm thick. None of the orthostats had port-holes.

The excavation revealed the base of the burial was filled with fine sand, the upper 60 cm of which was devoid of any artefact whereas in the lower 60 cm various types of artefacts such as vases, pots, cups, lids and iron implements were recovered. Iron objects were found mostly at the base below the pots.

Ceramic assemblage from the grave included red ware, black-and-red ware, black-slipped ware, red-slipped ware, grey ware, etc. Some of the vases, cups and lids had black slip over both the surfaces. The iron objects included daggers swords, backed knives, etc , and most of them had long handles. An iron implement, having wide cutting edge at the middle, had two handles, one at each end.

32. EXCAVATION AT CHERAMANGAD, DISTRICT TRICHUR.— The Madras Circle of the Survey under the direction of B. Narasimaiah assisted by Sarvashri K. K. Muhammad, G. S. Narasimhan, M. Elumalai, R. Manickam and R. Kalaiselvan conducted excavation at the centrally protected megalithic burial site at Cheramangad having different types like the *topikal* hood-stone, multiple hood-stones, stone circle, and burials marked by a capstone only on the surface. One each of five types of burials was opened with a view to understanding the interrelationship between them. The following is the result of the excavation.

Megalith I, marked by a hood-stone revealed on excavation an interment of an urn within a pit measuring 1.05 m in depth, cut into the hard, compact, reddish, gravelly soil, in the shape of the urn buried. The burial furniture inside the urn included highly disintegrated bones, a vase in red ware and a russet-coated white painted ware bowl of concave profile with featureless rim. However, from outside the urn, a red ware vase, three bowls in black-and-red ware and an unidentified iron object, placed at different levels, were obtained. It was found that the urn, pyriform in shape in red ware (pl. XXXA), decorated with thumb impressed applique design on the shoulder was filled with sand upto the half and then with loose gravelly soil. The urn was closed by a granite slab (49 X 41 X 15 cm). The pit was filled with same soil retrieved while digging. It is sealed with neatly dressed semi-hemispherical laterite hood-stone (1 .55 m in diameter). Megalith II was of multiple hood-stone type

made of eight clinostats, of which only two were visible above the ground level. Interestingly, excavation upto 1-95 m below the ground level did not yield any kind of interment. It was observed that the clinostats were buried in a pit dug specially for them.

Megalith III was of *topikal* or Umbrella-stone type. The surface feature of this burial is characterised by four quadrantal clinostatic stones joining up into a square at the base on the outside and bevelled in such a way to close up along with diagonals of the square to carry a semi-hemispherical capstone. Interestingly, like Megalith II, this burial too had no interment below as the natural soil was reached at a depth of 0.70 m.

Megalith IV, marked by a granite capstone (1.75 X 1.50 m), revealed similar internal features like that of Megalith I with an urn interred in a pit (1.55 m in diameter, and 1-65 m in depth) cut into the lateritic natural soil; the urn contained, in all, eleven pots, majority of them being of red ware with fragments of bones deposited at the bottom (pl. XXX B). No iron implement was recovered from this burial.

Megalith V was marked by a circle of laterite stones on the surface. Excavation revealed that within the circle, there were three pit-burials.

Pit A located in the western half of the circle was found to contain a big, sagger based urn of red ware closed with a triangular granite stone lid and other earthen vases at the bottom. The urn contained four arrowheads, two lamps with hooks, two tripod-stands, a hook, knife, sickle, rod, all made of iron (pl. XXXI), and a copper bowl, all deposited over a sand bed at the bottom of the urn. The remaining portion of the urn was filled with clayey soil. Interestingly, a heap of granite rubble stones were also deposited at a corner of the pit. The pit was filled with loose lateritic soil and was covered by a well dressed lateritic hood-stone. Interestingly, the hood-stone had as many as twenty-five circular depressions on the top surface.

Pit B located in the north-eastern quadrant of the circle was similar to Pit A. The urn yielded four rods, three ring-stands, two arrowheads, two lamps with hook and a sickle, all made of iron, and a copper bowl. Instead of rubble, three granite slabs were recovered from the pit. The hood-stone had sixteen depressions.

Pit C located in the south-eastern quadrant was also similar to Pit A and Pit B in all features. The urn was bigger, and yielded two tripod-stands, a knife, a lamp with handle, a carved rod, all made of iron and a copper bowl as usual deposited over a bed of sand. The hood-stone had thirteen depressions and two circular holes drilled through thickness of the stone.

The circle containing the burials, 4.50 m in diameter, was made of irregular laterite blocks. Interestingly, a gap was noticed in the circle at the north-west side with a vertical granite slab buried below the stone. It is difficult, however, to say whether there was a passage. Three slabs were also seen in an arc-shape on the south-eastern side, possibly indicating a slab circle.

The excavation revealed several interesting features. The characteristic *topikal* and the multiple hood-stone type, probably symbolic burials, did not yield any interment. Secondly, Megalith V

EXPLORATIONS AND EXCAVATIONS

seems to be an important burial within the site because of its collective nature, large number of artefacts including the copper bowls, and the individual architectural features. Further, the filling of sand at the bottom of the urn and closing the urn with a stone as lid are other interesting features.

33. EXPLORATION IN DISTRICT TRIVANDRUM.—P. Rajendran of the Department of History, Kerala University, noticed mesolithic implements such as small scrapers, lunates, borers, blades, etc., made on quartz in the rock shelters near Ankodu. The rock-shelters have various types of carvings consisting of floral and geometric designs.

MADHYA PRADESH

34. EXPLORATION IN DISTRICT BASTAR.— A. K. Sharma, assisted by S. B. Ota of the Prehistory Branch of the Survey, along with the students of the Institute of Archaeology, discovered a group of rock shelters to the west of village Khiarkhera (20° 04' N; 81° 33' E), nearly 2 km west of Lakhanpuri on Dhamtari-Kanker road and a rock shelter with paintings on the right bank of Mutekadka river, about 3 km north of the bauxite mine locally known as Bhandarpal Khadan (20° 06' 15" N; 81° 23' 30" E). All the paintings in the later shelter are in red ochre. The subject matter of these paintings comprise of numerous palm and foot prints, animal figures and some geometrical designs. The roof in the front has partially collapsed and from underneath the debris microliths were picked up.

35. EXCAVATION AT KOTRA, DISTRICT DEWAS.— In continuation of the previous year's work (1988-89, pp. 40-41), R. G. Pandeya, I. S. Vishwakarma, B. R. Satputa and Manish Jhabak of the Prachya Niketan, Centre of Advanced Studies in Indology and Museology, affiliated to Barkatullah University, Bhopal, resumed the excavations at Kotra.

The north-south oriented and rain-gully cloven mound, measuring 250 x 30 x 11 m, lies 3 km upstream on the western bank of the Kalisindhu, tributary of the Chambal. The mound is to the south-west of Sonkachha, the Sub-divisional headquarter of the District. Northern half of the mound is inhabited by local people. Three trenches, measuring 5 x 5 m were laid. Initially KTR-IV on the southern slope, were taken up for the excavation. Later on the area for the excavation was extended towards the centre of the mound (KTR-V and VI). The excavation revealed the following cultural sequence.

Period I (*circa* 1700 to 1500 BC) rests on the natural soil comprising compact greyish clay mixed with *kankar*. The ceramics of this period were both hand-made and wheel-made. Some of them were turned on slow wheel. In fabric they vary from coarse to medium. Some pots were treated with thick chocolate and plum-red slip. The ceramic industry is represented by the lustrous-red-ware, white painted black-and-red ware and drab and rusticated ware. Some of the red ware pots had ochre wash. Some of the sherds also had incised decorations. The antiquities included parallel-sided blades and lunates. Remains of mud floor with ashy deposits and traces of irregular shallow drain channel, terminating in a small soak pit like depression were found in layer of KTR-VI. Traces of post holes were also found.

Period II (*circa* 1500 -800 BC) is marked by the appearance of Malwa Ware, the Black and red ware of Ahar variety continued in this period also. The black and red ware of Malwa fabric with

different designs were found. Stylized animal figure and bone objects were interesting finds. The antiquities included disc, hop scotches, stone balls, blades and lunates. A floor made of rammed bricks and burnt clay mixed with concrete blocks, probably brought from the adjacent river bed was encountered. Traces of post-holes on irregular pattern and impression of wattle and daub indicated the construction of houses with perishable materials like bamboo, wood and straw.

Period III (*circa* 800-300 BC) is marked by the occurrence of Black-slipped ware and Black and red ware of plain variety, the main types being bowls, lids and shallow dishes. The antiquities included gamesmen, bangles, glass beads, iron nails, etc. Remains of burnt clay lumps with reed and bamboo impressions and roof-tiles were suggestive of conflagration during this period.

36. EXCAVATION AT KARKABHAT, DISTRICT DURG.— The Prehistory Branch of the Survey, under the direction of A. K. Sharma, assisted by S. B. Ota, S. K. Lekhwani, S. S. Gupta, N. G. Nikosey, R. S. Rana, Lai Singh, J. S. Dubey, K. M. Girhe, R. K. Dwivedi, Pyara Singh, N. K. Nimje, C. L. Yadav, P. S. Pashine, P. C. Dogra, T. B. Thapa and R. G. Katole, undertook an excavation of megalithic burial site at village Karkabhat (Lat. 20° 41' 18" N; Long. 81° 19' 7" E) under Balod tehsil of the district. The site, located on an extensive quartzitic-sandstone, outcrop having more than 800 burials, lies 16 km from Balod on Balod-Dhamtari road. Excavations were carried out in 12 megaliths to ascertain the significance of seven different varieties of burial types, identified on the basis of morphological features and layout system. The main types are as under:

- Type A Stone cairn circle with loose packing and low cairn heap.
- Type B Stone cairn circle with distinct and high cairn heap.
- Type C Stone cairn circle with a single menhir at the centre and surrounded with heaped cairn packing.
- Type D Stone cairn circle with two menhirs erected side by side in the northern half of the circle and surrounded with heaped cairn packing.
- Type E Stone cairn circle with two menhirs, erected one each in northern and southern half of the circle, surrounded with heaped cairn packing.
- Type F Stone cairn circle with multiple menhirs in two rows, in northern and southern half of the circle. All the menhirs are surrounded with heaped cairn packing.
- Type G Stone cairn circle with a capstone, oriented in north-south direction, the centre resting over cairn heap.

The excavation revealed that (i) all the circles and menhirs were oriented north-south (in case of circles the longer axis was oriented north-south whereas all menhirs were having their finished smooth surface facing north); (ii) in most cases northern fringe of the cairn circle, upto nearly 1/3 of the circle, was lined with bigger sized boulders; (iii) presence of multiple stone circles of smaller size in the main cairn circle, with one or two stump like stones in the centre. (In one case, smaller circles belonging to different phases were noticed. From some of these smaller circles pottery of thin grey ware and rough black and red ware were recovered); and (iv) presence of multiple stone circles within a bigger cairn circle and presence of multiple menhirs indicating the family burials.

Karkabhat Megalithic people had an advanced knowledge of sepulchral architecture, involving cutting, shaping, transporting and erecting such huge menhirs as memorials. Even huge quantity of boulders was also transported and arranged around the menhirs meticulously. In case of multiple menhir memorials involving two or more than two menhirs, care was taken to erect them at the right place in the right direction and in case of multiple burials at equidistance. Each cairn circle was lined with big boulders in the northern half and then at the bottom level distinct stone circle was made. This circle was enlarged with great precision with the induction of more menhirs in course of time. Even in case of single menhirs the successive layers of boulders were arranged in a pyramidal fashion, slowly rising to the top. In each case, right from the bottom, the entire space around the menhirs/capstones was filled with boulders arranged in circles with a central stone. Each stone of the circle formed another circle, thereby creating a number of circles filling the entire area. After the creation of first stage of circles the entire area was filled with fine yellow or red silt. Over the filling the process of making circle was again repeated. This was done till the filling reached the desired height. A number of circles from bottom to top in different stages were thus created in a receding manner. It is not clear whether this process was completed at one time without break in course of few days/ months or was continued intermittently. The earlier appears to be more likely as per evidence.

This method of raising that cairn height with circles and successive filling is a new feature. It is in one of these circles that the offerings were deposited.

Thus the megalithic people of Karkabhat adopted the circles and pyramidal form for creating cairn heights.

Each menhir was erected in a manner that the finished surface faces north and the unfinished south. These menhirs have further been placed in east or west inclination. They are conical shaped pointing either to the east or to the west. The angle of deviation from the magnetic north shows that they were deliberately erected like this so as to indicate the sense of direction and solar position. It is not imperative that these memorial menhirs were erected immediately after lapse of time but their position indicates the time and period of the year when the deceased left the world. The menhirs had three types of shapes; fish-shaped, obliquely pointed and conical.

Some of the menhirs have one end pointed whereas the other is bifurcated in the form of tail of a fish. In case of standing menhirs of this type the bifurcated end is towards the top whereas in case of capstones it is towards the north.

In the obliquely pointed type, top of the menhir is obliquely pointed with the pointed end towards the east or the west.

The top of menhir is conical and erected in such a way that the magnetic line passes through the pointed end of the menhir.

Only a few fragments of red ware were recovered from some of the excavated megaliths. The pottery is wheel-made seemingly on a slow wheel, and fired at a comparatively low temperature. Common shapes are bowls, dishes and lids. The ware shows a dull terracotta red surface with a pale drab slip. The core is generally unoxidized. Other distinctive elements were the use of iron, copper, gold and silver.

The offerings recovered from the excavated megaliths are mostly iron objects, copper bangles and rings, gold rings, a silver ring and stone bead.

In all, 13 iron objects were recovered which comprised of spearheads, daggers, arrowheads, spikes and one agricultural implement.

In the collection there are hardly any agricultural implements except one, which is probably a hoe, similar to the one found at Ramapuram. This indicates that the megalithic people of the area around Karkabhat did not practise agriculture in a settled manner and led a pastoral life. Rest of the iron objects are instruments of defence and attack.

The copper objects recovered are mostly in the form of rings and bangles of different sizes. They are all solid. These rings and bangles are not joined at the end but are of 'open type' to facilitate increase or reduction in their diameter according to the requirements. In the megaliths from where bangles and rings were recovered, normally iron objects of defence/attack have not been found. Such objects were probably confined to female burials only.

Two gold rings were found one of which is single coiled, closed type while the other is of 'open end' wire type spiral ear ring. The gold is in very pure form. They were found from the Megalith F. 2 from different levels. One small ear ring of silver was also recovered from Megalith A. 2. One broken barrel-shaped limestone bead was recovered from Megalith B. 2.

The most startling and important find was the sculptured menhir. At the highest point in the area of memorials one of the biggest menhirs was found to be sculptured giving the profile of a man. The sculpted menhir had been put in the centre of cairn heap. Above the cairn heap the available height of the menhir is 2.57 m and the width is 1.91 m. It was erected in perfect north-south orientation, i.e., widthwise east-west with the finished surface looking to the north and the sculpted edge towards east. The masterly stroke of the sculptor has brought out a magnificent facial view of a man having receding broad forehead with prominent ridge in the upper lip below the nasal spine, pronounced lower lip and protruded chin. On the northern face the eyes had also been carved. In the absence of chisel marks it is difficult, at the moment, to find out the type of tool or tools used by the master sculptor to prepare the grand profile. In the absence of any such find of Megalithic times in India, this grand sculptured menhir gains considerable significance.

Factory site for cutting and shaping of menhirs of various sizes and shapes used for megalithic memorials was located very close to the site where the bedrock is exposed.

The location of a number of low rock shelters to the south and south-west of the burial site might have served as shelters for the megalithic people inhabiting the area.

From the location of hundreds of menhirs, cap-stones, cairn circles in the region of Karkabhat-Dhanora, spread over an area of nearly 5 km square and complete absence of any other such concentration west of the Mahanadi in an area of at least 50 km sq, it appears, that Karkabhat-Dhanora, due to its ideal location, easy accessibility, plenty of water and raw material for shaping and erecting megaliths, served as a nucleus point for performing the last rites of the departed souls whose mortal remains were disposed of either by cremation or by some other means. In the absence

EXPLORATIONS AND EXCAVATIONS

of any skeletal remains and burials in the area for which Karkabhat served as a nucleus point, cremation seems to be the most probable way. It was not necessary to erect these memorials immediately after the death of the person; these could be erected even later, when there used to be collective gathering at Karkabhat, depending on various religious, social and economic factors. There might have been a central authority to decide and declare the dates and control the event. A similar parallel is found amongst one of the tribes in Bastar today who erect memorial stones at one particular spot. This function was organised in May-June 1991 after a gap of nearly twenty-five years ago.

During the course of exploration while excavations at Karkabhat was in progress, another megalithic nucleus area of Karkabhat dimension was located east of Mahanadi on its right bank at Around-Lilar-Bhawanmara area. Here also, hundreds of megaliths and cairn circles of all varieties were noticed. A survey within an area of nearly 50 km sq, situated to the east of Mahanadi in this region did not reveal any other megalithic remains. It appears that Around-Lilar-Bhawanmara area served as a nucleus area for megalithic people, east of Mahanadi.

So far no dates are available for megalithic period in the Chhattisgarh region. On the basis of iron tool typology, which are dated elsewhere, megalithic memorials at Karkabhat could be dated to around the first half of the first millennium BC.

37. EXCAVATION AT SORAR, DISTRICT DURG.— The Prehistory Branch of the Survey, in course of the work at Karkabhat took up trial excavation at Sorar. According to the Annual Report of the Archaeological Survey of India 1930-34, 'near Sorar, Chirchari, Kahrabhat (Karkabhat), Majagahan and Karhibhadar, all in the Durg District, there are larger areas of what can tentatively be called a Stone Age Cemetery.....' All the six villages including the recently discovered site of Tengna are located within a circuit of 7 to 8 km. At present megalithic circles and menhirs from all other villages have been wiped out except at Karkabhat and Tengna megalithic circles. Even at the two above mentioned villages only half of them now exist.

In such an extensive megalithic memorial area there are bound to be habitational sites apart from the temporary rock shelters. Fortunately, just to the north of the megalithic memorial concentration at Karkabhat, three mounds were located at Sorar. The present village is located right over these mounds. In search of possible habitation area of megalithic people, a trial trench 3 m X 3 m was laid in the centre of one of the mounds. The dig yielded 4-5 m of habitational deposit. From the last but one layer, i.e., layer 15, megalithic black and red wares were recovered. Along with pottery a number of hopscotches, shaped out of potsherds, were also found. At this level a rammed plastered floor with a hearth sunk into it was also found. The working level corresponds almost with the working level in the megalithic memorial area. The evidence shows that Sorar was one of the habitational areas of the megalithic people. Exposure of large area is likely to reveal house plans, etc.

38. EXPLORATION IN DISTRICT DURG.— The Prehistory Branch of the Survey, under the supervision of A. K. Sharma, assisted by S. B. Ota, J. S. Dubey, R. K. Dwivedi, N. K. Nimje, C. L. Yadav and P. C. Dogra discovered microlithic sites at Karkabhat (20° 41' 18" N; 81° 19' 7" E) and Tengna (20° 34' 45" N; 81° 21' 20" E) and several rock shelters on the banks of a small stream and

fortification made of boulders and having gateway leading to the said stream were noticed near village Naragaon.

A group of rock shelters was found on a hill at village Bilai Dongri lying 6 km south-east of village Karkabhat.

A huge painted rock shelter (7 m high and 10 m wide) facing west, known as Madvathra has been located to the north-east of village Madvathra on Balod-Ghotia road in Balod tehsil. Though large chunks from the ceiling have already come down, paintings in red ochre can still be seen on the remaining portion. Paintings comprise both free hand and geometric designs. Just below the rock shelter on the hill slope Middle Stone Age tools made on quartzite were found.

Microlithic as well as an extensive megalithic site with more than 150 menhirs and cairn circles at village Tengna on the right bank of Chorha *nullah* is situated 4 km south of village Dhanora on Balod-Dhamtari road in Balod tehsil. Two fairly large mounds yielding early historical pottery were located on the bank of Chorha *nullah* in village Borra.

39. EXPLORATION IN DISTRICT RAIGARH.— A. K. Sharma, assisted by S. B. Ota, N. K. Nimje, C. L. Yadav and P. C. Dogra of the Prehistory Branch of the Survey, undertook the photo documentation work of two painted rock-shelters at village Ongna (22° 25' N; 83° 15' E), 6 km from Dharamjayagarh in District Raigarh. During the course of documentation work a large number of stone artefacts were noticed scattered in front of these rock-shelters. The assemblage included large sized scrapers, flakes and cores of quartzite and microliths made up of milky quartz, chalcedony, chert and carnelian. Apart from these artefacts, a broken ring stone of coarse grained sandstone, and a broken piece of celt, fully grounded and polished, made up of limestone, were also recovered.

40. EXPLORATION IN DISTRICT RAIPUR.— A. K. Sharma, assisted by R. S. Rana, P. C. Dogra of the Prehistory Branch and the students of the Institute of Archaeology of the Survey, discovered a Megalithic site (20° 41' N; 81° 39' E) on the eastern bank of the Mahanadi between the village Around and Bhanwarmara under Dhamtari Tahsil of the District. The cairn circles and menhirs were located on rocky outcrops confined to both the banks of Jharjhara *nala*, one kilometre before it joins Mahanadi. Nearly 90% of cairn circles and menhirs have already been destroyed. The types of megaliths are similar to those at Karkabhat in District Durg.

Apart from this, two mounds on the left bank of Jharjhara *nala*, one kilometre north of village Lilar appeared to be fortified at some stage as suggested by the presence of dressed stone blocks lying on the slopes. Apart from antiquities like saddle quern, tool sharpener, pounders, spindle-whorls, hop-scotches, terracotta marble and an engraved stone slab, pottery ranging from hand-made thick dull red ware to wheel-made black and red ware and polished red ware were collected from this mound.

From pottery types bigger mound at Lilar appears to have a deposit from neolithic to late historical period, whereas the site at Tendukona belongs to early and late historical period.

41. EXPLORATION IN DISTRICT RAISEN.— Krishna Kumar of the Archaeological Museum, Chanderi, of the Survey; revisited the rock-shelters at Sanchi and Nagori in District Raisen and

noticed the cave decorated with various types of hunting scenes. The animals shown on the walls included horses, bisons, stag, boars, etc. At places, the elephants, camels and serpents were also painted. The human figures, sometimes seated on horse back carrying spears, bow and arrows were also noticed among the painted motifs. In one scene, the hunters were shown carrying the prey by suspending it on a bamboo. A decorative motif consisted of a group of triangles arranged in parallel rows. The painting was executed in red ochre.

The microliths collected from around the rock shelters included short fluted cores, parallel-sided flakes bearing cortex, core rejuvenation flakes, short parallel-sided blades, different types of scrapers, borers, arrowheads, triangles and burins, all made on chalcedony and chert.

42. EXPLORATION IN DISTRICT RAJNANDGAON.— A. K. Sharma, assisted by S. B. Ota, N. K. Nimje and P. C. Dogra of the Prehistory Branch of the Survey, discovered a cluster of three extensive mounds (20° 2' 27" N; 80° 55' 48" E) on the right bank of Ten *nullah*, a tributary of river Seonath, situated about a kilometre north-east of village Pain. The antiquities collected from these mounds included copper earring, stone hop-scotches and pestles, chalcedony flake, etc. The pottery types and

heavily mineralised nature of bones collected from these mounds suggest that the antiquity of these sites may go back to Neolithic or Chalcolithic times.

MAHARASHTRA

43. EXPLORATIONS IN THE DISTRICT AHMADNAGAR.— Ajitkumar of the Aurangabad Circle of the Survey noticed following antiquarian remains :

<i>Taluk</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Sangamner	Dhandharphal 19° 32' N; 74° 7' E	Eighteenth century temple, memorial pillar and inscription of fourteenth-fifteenth century, mound, pottery, etc Temple, late medieval loose-sculpture
	Dhandharphal (Khurd) 19° 32' N; 74° 7' E	
	Golewadi 19° 36' N; 74° 12' E	Mound yielding early historic pottery, loose sculptures of dancing Siva and Nandi datable to eleventh-twelfth century Medieval pottery
	Gunjawadi 19° 35' N; 74° 10' E	Early historic and medieval pottery
	Javalekadlag 19° 35' N; 74° 7' E	Chalcolithic, early historic and medieval pottery
	Karhe 19° 41' N; 74° 10' E	
	Nannaj 19° 42' N; 74° 15' E	Pottery, memorial stones datable to eighteenth-nineteenth century, ruined temples, medieval loose-sculptures of Vishnu and Uma-Maheshvara

<i>Taluk</i>	<i>Village/Site</i>	<i>Nature of Remains</i>
Sangamner	Nimbgaon 19° 37' N; 74° 7' E	Early historic and medieval pottery
	Nimon 19° 43' N; 74° 11' E	Early historic and medieval pottery
	Rajapur 19° 35' N; 74° 10' E	Medieval pottery
	Saikhindi 19° 38' N; 74° 10' E	Chalcolithic and early historic pottery
	Sonoshi 19° 41' N 74° 14' E	Medieval pottery
	Velhale 19° 35' N; 74° 10' E	Eleventh-twelfth century fortification and step-well and late medieval image of Ganesa

44. EXPLORATIONS IN THE DISTRICT BEED.— S. L. Jadhav of the Aurangabad Circle of the Survey noticed following antiquarian remains :

<i>Taluk</i>	<i>Village/site</i>	<i>Nature of remains</i>
Georai	Ambal	Sari-stone, eighteenth century sculpture of Mahishasuramardini
	Aridhmhasta	Stone mill (<i>ghani</i>) and stone wheel of bullock cart
	Bhend (BK)	Stone mill (<i>ghani</i>)
	Bhend (Khd)	Stone mill (<i>ghani</i>)
	Chincholi	Eighteenth century ruined Siva temple
	Deopimpari	Ruins of temple and floating bricks
	Dhanora	Late medieval pottery
	Gondi (Khd)	Eighteenth century sculpture of Vithoba (Vishnu)
	Kakat-Pimpri	Loose sculpture of Vishnu and goddess
	Khopati	Late medieval pottery
	Kumbhe Jalgaon	Sculpture of Gorakhnath (?)
	Manyarwadi	Stone mill (<i>ghani</i>)
	Malliwadi	Donkey stone
	Mategaon	Medieval pottery and stone mill
	Marphal	Late-medieval temple of Siva and Donkeystone

EXPLORATIONS AND EXCAVATIONS

<i>Taluk</i>	<i>Village/site</i>	<i>Nature of remains</i>
Georai	Mudhapuri	Stone mill (<i>ghani</i>)
	Raj-Pimpari	Late medieval pottery, loosesculpture and Nandi
—do—	Rohithal	Stone mill (<i>ghani</i>)
—do—	Rokda	Sculpture of Khandoba
—do—	Rameshwar	Ruined brick temple of late medieval period
—do—	Shirata	Loose sculpture of Siva
—do—	Takali	Bronze statues of Jaina tirthankaras datable to eighteenth century
—do—	Takadgaon	<i>Sati</i> stone, stone mill, sculpture of Siva-Parvati
—do—	Thakar-Adgaon	Stone mill (<i>ghani</i>)
—do—	Talwada	Medieval temple of goddess with <i>deepamala</i> bearing an inscription, A rock-cut cave on the hill locally known as <i>Devi'che Bhuyar'</i> with <i>sabha-mandapa</i> and shrine measuring 12 X 7.50 m and 3.60 X 3.55 m
	Wahegaoh	Hemadpanthi temple of Siva with <i>Kirtimukhas</i> on the outer wall, Vishnu sculpture and copper-plate in Modi script.

45. EXPLORATION IN DISTRICT BHANDARA.— In continuation of the previous year's exploration (1989-90, p. 58) in the area to be submerged under Gosikhurd Dam Project, N. G. Nikosey and P. C. Dogra of the Prehistory Branch of the Survey, brought to light the following archaeological remains in tehsils Pauni and Bhandara of the District

<i>Tehsil</i>	<i>Village</i>	<i>Nature of remains</i>
Bhandara	Bela	Stray sculptures (Nandi, <i>Siva-linga</i> , <i>naga</i> and some unidentified pieces)
—do—	Belgaon	Historical mound
—do—	Bhandara	Stray sculptures (Hanuman, Ganesa, <i>Siva-mga</i> and Siva-Parvati)
	Chicholi	Stray sculptures (Hanuman, Nandi and <i>Siva-linga</i>)
	Chowa	Historical mound

<i>Tehsil</i>	<i>Village</i>	<i>Nature of remains</i>
Bhandara	Dauripar	Loose sculptures (Hanuman, <i>naga</i> , Nandi and some unidentified pieces)
—do—	Ganeshpur	Historical mound
—do—	Golewari	Historical mound
—do—	Hasapur	Historical mound
—do—	Jakh	Some unidentified stray sculptures
—do—	Karajkhera	Loose sculptures (Hanuman, Nandi, <i>S'wz-linga</i> and some unidentified pieces)
—do—	Kardha	Historical mound
—do—	Kawarsi	Microliths
—do—	Khairi	Historical mound
—do—	Lawesar	Loose sculptures (Nandi, <i>Siva-linga</i> and some unidentified pieces)
	Lohara	Microliths and historical mound
	Manegaon	Loose sculptures (Hanuman, Nandi and some unidentified pieces)
—do—	Mandawi	Microliths
—do—	Paghora	Some unidentified stray sculptures
—do—	Pandhi	Historical mound
—do—	Sahuli	Loose sculptures (Hanuman, Nandi and some unidentified sculptures)
	Salebardi	Loose sculptures (Hanuman, Nandi and some unidentified sculptures)
	Silli	Loose sculptures (Siva, Parvati, Ganesa, Nandi and some unidentified pieces)
	Takri	Historical mound and stray sculptures (Hanuman, Nandi and some unidentified pieces)
	Tiddi	Stray sculptures (Nandi, <i>Siva-linga</i> and some unidentified pieces)
	Usaragondi	Microliths
Pauni	Adyal	Historical mound and stray sculptures (Ganesa, <i>Siva-Parvati</i> , Surya, Hanuman and Nandi)
—do—	Chakara	Historical mound
—do—	Chichal	Stray sculptures (Hanuman, <i>naga</i> , and some unidentified pieces)
—do—	Khapri chaoras	Microliths and historical mound

EXPLORATIONS AND EXCAVATIONS

<i>Tehsil</i>	<i>Village</i>	<i>Nature of remains</i>
Pauni	Lendejhari	Microliths
—do—	Nerla	Microliths
—do—	Sawudar	Historical mound
—do—	Sawargaon	Historical mound

46. EXCAVATIONS AT ADAM, TALUK KUHI, DISTRICT NAGPUR. — In continuation of the previous year's work (1989-90, pp. 61-65), Amarendra Nath assisted by S. N. Raghunath, N. C. Prakash, S. Pratapchandran, N. K. S. Sharma, S. V. Sutaone, P. M. Bhope, H. J. Barapatre, D. K. Kasbi, D. S. Shambharkar, Shahid Akthar and Sultan Singh of the Excavation Branch I of the Survey, resumed excavations at Adam (21° 00' N; 79° 27' E) with the objective to understand the settlement pattern and material culture of Period V and collecting archaeological data from the preceding cultural horizons. For this purpose some of the grids, filled in earlier, were preferably opened (pl. XXXII) and studied carefully.

The five-fold chronology noticed earlier, was further confirmed from the cuttings. Some significant material remains unearthed from each of the five cultural deposits are enumerated below.

Period I : Over the lateritic outcrop the deposit of reddish brown soil of varying thickness, yielded microlithic tools consisting of small blades and geometric tools like the triangles and trapezoids primarily on chert, chalcedony, agate, jasper and a few on quartz nodules. In one of the cuttings, below the rampart, some post-holes cutting the lateritic outcrop and a circular platform were noticed indicating some sort of camping place of the first settlers at the site (pl. XXXIII). This deposit did not yield any potsherds.

Period II : The period is represented by the dark brownish soil. The microlithic tools of the preceding period continued. The tools on the new material such as the copper and bone, made their first appearance. Bone scrapers and stone implements like small blades, points, etc. on chert and chalcedony were in vogue during this period. A notable discovery of the season was of a neolithic celt made on schist. It was found over a mud floor adjacent to two circular pits containing ash and charcoal. Earlier, also (1975-76, p. 36) during the exploration at this site, one celt was reported. The ceramic assemblage, typical to the Wardha-Wainganga Valley, included red ware of dull to brick red colour, black ware and Black and red ware. Some of the red ware sherds showed painted design in black colour which included oblique criss-crosses and horizontal parallel lines.

Period III: It represented the beginning of iron technology. The soil deposit, quite similar to that of the preceding period in the initial period, changed its colour from dark brown to medium to light brown soil with admixture of ash. Post-holes and floors made of rammed black clay were exposed.

The ceramic industry' showed a continuation from the earlier period with the occurrence of red burnished black and Black and red ware. The painted designs indicated an increase with new patterns added to the already existing ones. Significant to note is the appearance of the white paintings over

the red and black wares. The design-elements did not show any variation from the known ones. Fresh patterns introduced in black on red surfaces are floral motifs, parallel horizontal and vertical slashes, thick lines and chequer over the thick coarse micaceous red fabric. Prominent ware was the red, followed by Black-and-red and black wares. Except for the Black on red ware dish-on-stand, other types remained identical to the preceding period. The antiquities from this period included iron implements like spearheads, knives, etc., terracotta beads, fragments of copper rings, etc.

Period IV had a deposit of brownish clay with less of ash content. The dominating pottery was again red ware of the medium to coarse fabric while Black and red ware remained secondary. The black burnished ware was completely abandoned, while highly polished black ware resembling the Northern Black Polished Ware was introduced in meagre quantity. Paintings were all black on red; the designs were restricted to parallel lines of varying thickness over the shoulder portion of vases. The Black-and-red ware were unpainted and the types were mostly bowls and other table wares.

The remains of a public drainage system, running east-west parallel to the inner fringe of southern rampart, was traced to a length of 20.50 m. At least three domestic drains running north-south were noticed joining the above drain at right angle. Built of burnt-brick in mud mortar, the base of these drains were brick paved. The upper course of the drain had plano-convex type bricks of which the side profile of outer longer axis had vertical cutting. Another significant engineering device noticed was the formation of a step in the drain-bed; it has a vertical stone slab inserted at the edge of a fall. Such provision in a drain helps in increasing the velocity of discharge of refuse water in order to keep the upper level of the drain clean. Out of three domestic drains connected to the main drainage system, one in the middle was more intact than the rest. It originated from a brick paved bathing space attached to a terracotta ring well serving as water source to the household (pl. XXXIV A).

The antiquities of this period included terracotta figurines, both of human and animals, beads, hopscotches, iron implements and pottery wheels, etc.

Period V is represented by the material remains of an affluent society. The digging in a major area, limited only to the upper layers, gave a somewhat clear picture of the settlement pattern of the people of this period. Broadly, it followed a lay-out of the preceding period; however, a marked increase in the structural activity during this period indicated the demographic density and the prosperity of the people.

The red ware remained the predominant pottery type while kaolin and black wares were in less use. A good number of decorated pottery have come to light, the decorations on some of which being suggestive of their affinity with the Satavahana sites in Andhra Pradesh. A sherd of deluxe variety of the rouletted ware was also noticed.

The lay-out of the settlement reveals at least three concentric U-turned streets originating at intervals from the main street connected with the main gateway on the east. It is quite likely that U-turn streets were inter-connected either by a number of radial lanes or undefined passages. None of the lanes or street reveal any surface treatment. The houses were constructed parallel to streets or lanes. One of the streets, approximately seven metre wide, was exposed upto thirty-five metres in

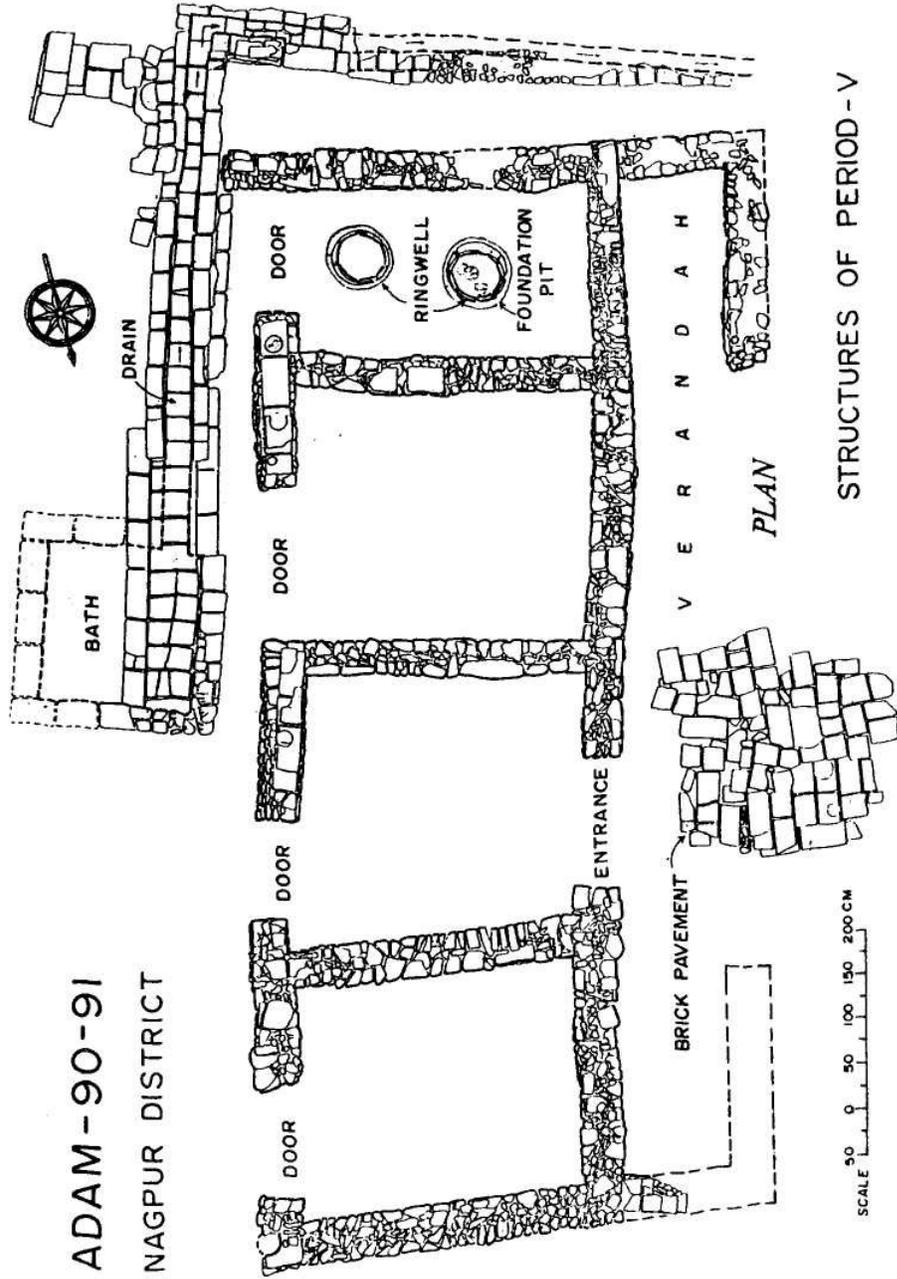


Fig. 5

length; perhaps this street was connected to the western gateway. Here, a significant feature in the layout was the door-projections of uniform sizes laid in alignment, facing each other, on either side of the street; the third projection of similar nature was facing the T or H-shaped junction of the street. Above evidences are suggestive of a kind of symmetrical planning in general lay-out.

A large number of structures, made of stone, and varying in plan such as rectangular, square, oval and circular, most of them being free built, were encountered. Most of these structures had single entrance, and interconnected rooms. The rectangular houses had series of two, three and four rooms in a juxtaposed order. A four-roomed structure with a verandah in front had a passage across one of the rooms to reach in the courtyard, while the remaining three rooms had independent openings in the courtyard. The room on the southern flank had two ring wells which might have been used as 'privy' or refuse-pit as the deposit inside was of pale green soil. By the side of this room a brick paved bathing space, connected by a drain terminating into the street in front, was noticed (fig. 5). Another type of five roomed structure had L-shaped corridor of which four rooms were opening towards courtyard while the fifth had an opening in partially paved courtyard. One of the rooms on the western end had provision of a brick bench (fig. 6). The combination of three independent structural units facing a common courtyard from north, south and east sides and an indication of a screen wall with an entrance on the west is an interesting feature. The post-holes of different diameter and depth were sunk haphazardly directly over the walls. Few elliptical structures in stone were also exposed, all compartmented into three, having doorways connecting each other. A few of the elliptical structures had murrum as mortar while some had mud as binding material.

In addition to stone structures some burnt brick structures were also noted. The four-roomed rectangular brick structure (approx. 23 X 5 m) had total twenty-two courses out of which fifteen were collapsed inside the room on the eastern flank. It had single brick (50 X 32 X 8 cm) courses in the 'stretcher' method, laid in mud mortar. In some brick structures tiles were also used for maintaining the level of the courses, while some brick courses were laid over the dressed stone. One such structure (6.30 X 5.40 m) serving as an enclosure to four uniformly distributed circular stone platforms had mixture of stone, brick and tile masonry (pl. XXXIV B). A number of such circular platforms raised with or without enclosure wall were noticed all over the excavated area. Tradition of reusing of tiles as 'apron' to floor was also noticed.

Two circular wells exposed during the season had upper ten to twelve courses in random rubble while the remaining lower courses right upto the base were of bricks. In one of the wells a huge stone slab with eight grooves towards the longer axis was found in a dislodged position suggesting its use as foothold (pl. XXXV). Drain in burnt-brick masonry was preferred to the rubble ones. Traces of private disposal of refuse water were noticed. At times the drains were noticed terminating either into the soak-pits or into streets. An example of square soakage tank (1.40 m) of thirty-two brick courses, brick drain running west to east, was very interesting. Terracotta ring wells used as soakage-pits have also been noticed inside the structure. A few ring wells also functioned as draw wells.

Among the antiquities reported were the types of coins on silver, copper and lead of Punch-marked, cast and die-struck varieties, attributed to the Bhadras, Satavahanas, Maharatha and Roman

rulers. The symbols, generally found were tri-arched hill with flanking rivers on either sides, sometimes at its base also, crescent, tree-in-railing, *srivatsa*, taurine, *swastika*, Ujjain symbols, triangle headed standard, bull, horse, elephant and king's portraits. Except for Roman coins, rest of the inscribed coins of Indian origin bore legends in Brahmi of respective issuer. Copies of the Roman coins were found on faience and terracotta. The Punch-marked coins were of three types; the most common one had five symbols—sun, six-armed symbols, tree, triangle headed standard and bull on its obverse, all on copper. Besides these, out of three hoards of copper coins found in earthen pots two of them contained Punch-marked coins and the third had elephant and Ujjain type coins of Satakarni.

The site is equally rich in sigillographic finds; it includes inscribed seals, sealings and signet. Some of the uninscribed sealings bore coin devices.

Various shapes of beads and pendants made on semiprecious stones namely carnelian, agate, chalcedony, jasper and crystal, respectively, besides gold, copper, glass and terracotta were found in large number. The semi-finished beads, raw material and the polished stones indicate a flourishing bead industry at the site. Pendants of different shapes like triangle headed standard, *srivatsa*, mango and turtle, etc., have come to light. Etchings were mostly on carnelian beads in white with an exception of black etching on a chert bead. Other cosmetic items included stylus on chalcedony, agate, bone and ivory; bangles of ivory and shell; and ear studs on jasper and terracotta.

Artistically moulded male and female figurines with a variety of head dresses and ornamentation and those of animals such as horse, bull, cow, dog, elephant, ram and birds were some of the important specimens of terracotta art. Examples of double-mould terracottas outnumber the hand-made ones.

Terracotta spindles and wheels were found in plenty. Other terracotta objects worth mentioning are crucibles, skin rubbers, votive tanks and model of a legged quern. A broken votive tank depicting birds on its corner and a sanctum on its longer axis deserves special mention (fig. 7).

Iron implements included arrowheads, spearheads, points, knives, sickles, ferrules, etc. Copper objects include antimony rods, lamps, spoons, mirror, wheels, cart, frame, axles, finger rings, ear rings, tiny image of *yaksha* in low relief, laddle, horse head, etc.

Sandstone pestles, both the saddle and legged varieties and pestles of all the hitherto known types were encountered. Other important stone objects included dabbers, white stone and small cubical weights in other stone. Presence of moulds of sandstone and steatite suggested the use of the site as workshop for such art objects. One of the moulds bears a standing *Salabhanjika* in *tribhanga*, a ramification of Sanchi style (pl. XXXVI A).

MANIPUR

47. EXCAVATION AT KANCHIPUR CAPITAL COMPLEX, DISTRICT IMPHAL. — S. Rupobam Singh of the State Archaeology, Government of Manipur, assisted by K. Indrani Devi, N. Kumar Singh, L. Ibomeha Singh and A. Koiha carried out an excavation at Kanchipur capital complex belonging to Maharaja Gambhir Singh (1825-34), 8 km south of Imphal to know the historicity of the site.

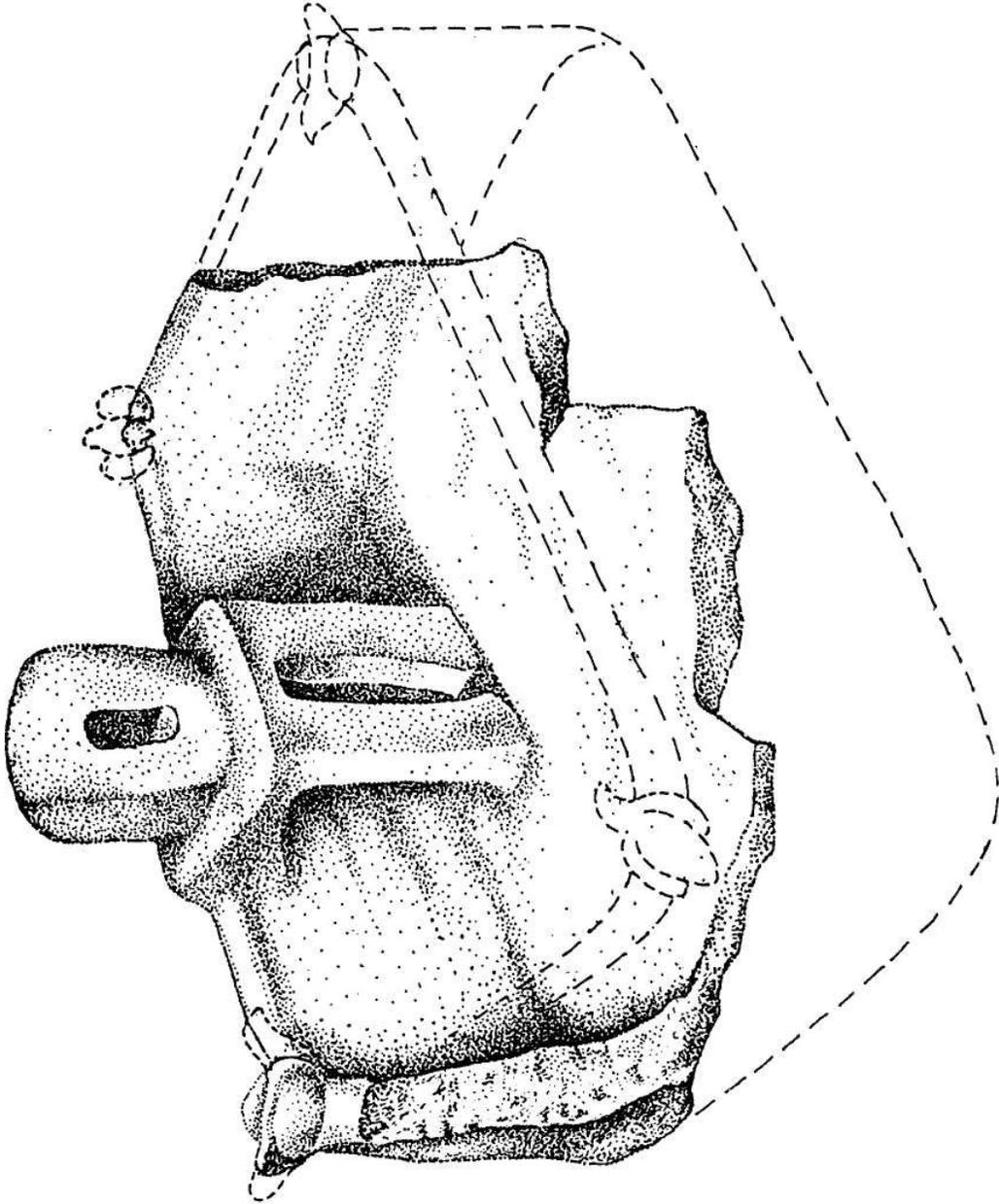


Fig. 5 : Adam : Terracotta Votive Tank, Period V.

Centre of the palace complex was taken up for the excavation which revealed a 7-8 m long and 0-90 m thick brick wall running in north-east south-west direction. This wall was found turning at right angles toward west to which side it was found to be running to a length of 7-8 m. This wall had eleven courses of bricks and was exposed to a depth of 0-45 m only. The size of the bricks are 26 X 14-5 X 3 cm; 24 X 12 X 3 cm; 23 X 12 X 3 cm and 21 X 18-5 X 3 cm.

The antiquities recovered from the site included two circular bell-metal (white bronze) coins, having legend 'Sri' and 'R' in Nagari character and potsherds of red, reddish-brown and grey colours. Some of the sherds are decorated with designs either impressed or hand-made. Main ceramic types included bowl, dish, dish-on-stand, etc.

48. EXCAVATIONS AT SEKTA, DISTRICT IMPHAL. — A. K. Sharma, assisted by S. B. Ota, S. K. Lekhwani, N. G. Nikosey, R. K. Dwivedi, Pyare Singh, N. K. Nimje and C. L. Yadav of the Prehistory Branch of the Survey, undertook the excavations at Sekta (94° 24' N; 24° 53' 24" E), situated 18 km north-east of Imphal on the left bank of the Iril river, a tributary of river Manipur. A trench measuring 10 X 10 m was taken up for excavation at the highest point of the burial site where a total deposit of 1.95 m was encountered belonging to seven successive cultural periods.

The excavation brought to light the urn burials of seven periods. Due to heavy erosion, the top of most of the urns of the available last period have been washed off. It was noticed that all these burials were secondary burials wherein inside the largest urn, fragments of human bones, particularly skull fragments, teeth, pieces of long bones along with other funerary goods were interred. Each burial had at least 6 to 7 pots. The pots were mostly jars, lids, globular vases in red ware. Nearly in all cases, in the centre, a small black vase was placed. Almost all the pots interred were hand-made except in Periods I and II wherein one or two wheel-made red ware pots were interred. The number of interred pots indicated increasing trends from Period I to Period VII. In Period VI and VII in each burial at least 6 to 7 pots were interred.

In each period, groups of pots belonging to one individual were kept in such way that they do not overlap with the other group of pots. In Period IV and V, in some of the pots, human skulls were found to be interred inside the pot. These skulls had copper mask covering their faces. In such cases, at least 3 to 4 pots were put inside starting from the biggest to the smallest and the skull was kept in the central pot. From all the three skulls exposed from within the urns, teeth were found to be removed. In one case it is the skull of a child nearly 10 years of age, whereas in the second case it was a middle aged man. This skull had cut marks on the right parietal region inflicted by some sharp instrument.

All the skulls kept in the pots were found to be facing south-west.

In case of bigger *handis* containing bones and antiquities, the top were invariably covered either with an inverted lid or by keeping another smaller globular jar upside down over the bigger jar.

The central vase was always a black ware without any mat or other decorations and was the finest in the group.

EXPLORATIONS AND EXCAVATIONS

Hand-made pots had variety of mat, cord, pinched, stamped, criss-cross, sunray and fish bone designs.

The antiquities recovered from the jars contain bones, terracotta, paste, and semi -precious stone beads, brass and copper rings, bangles, bracelets, bell-metal miniature pots and iron implements such as arrowheads, spearheads, scythes, knives, daggers, etc. From one of the burials of the middle levels a bell-metal relic casket of Buddhist origin has been recovered.

In order to ascertain the availability of wheel-made pottery in the habitation area and to find out their relation between the ceramics of the burials and habitational area, small trenches were taken up in the fields. From the lowest levels plenty of fine wheel-made red ware sherds were recovered. Apart from the pottery tripod legs, a piece of glazed ware and some cattle bones having cut marks were recovered.

It appears that the people of Sekta were making pottery locally. Bulk of the pottery recovered was hand-made with several designs and shapes. Several patterns of mat designs, cord impressions, fish bone impressions, tortoise shell-impressions, punched designs, stamped designs, etc., were noticed. Pots were mostly jars, bowl platters, vase and dishes with straight and flaring rims. Red ware, grey ware and partly black and red ware completed the ceramic assemblages. Over the hand-made pots a very thin slip was applied that got dissolved in water and turned the pot ochreous, was applied. Wheelmade pottery recovered from lower levels was generally thin, fine slipped red ware, prepared from well levigated clay and was well-fired.

The very limited dig in the habitation area revealed a house floor made up of yellow compact clay. In the floor at least two post-holes were clearly visible. This shows that the houses as in the present days, were made on bamboo or wooden poles and were covered on sides with mats plastered with wattle and daub.

The present indications suggest that the first habitation at Sekta started some time during the first-second century BC to first-second century AD. But this dating needs to be confirmed by absolute dating.

ORISSA

49. EXCAVATION AT BARABATI FORT, CUTTACK, DISTRICT CUTTACK. — In continuation of the previous year's work (1989-90, pp. 75-76), B. K. Sinha, assisted by K. Veerabhadra Rao, K. M. Suresh, N. K. Sinha, P. Bishwas, P. N. Biswas, M. P. Singh, R. N. Sahoo, B. Patnaik, S. C. Gupta and S. K. Bhoi, of the Excavation Branch IV of the Survey, resumed the excavation at Barabati fort with the objective (a) to know the cultural sequence; (b) to expose the complete plan of the palace; (c) to expose fully the partially exposed citadel wall on the southern and eastern sides.

The excavation indicated the rising of the water level since the first occupation at the site. Water level was reached at three places — two points inside and one point outside the citadel. No regular occupation level was met with in the sandy deposit below the present water level; however, stray sherds were found embedded into this deposit at all the three places where water level was reached. The occupational deposit of the site was divided into following periods:

1. Early medieval period (thirteenth-fourteenth century)
2. Medieval period (fifteenth-sixteenth century)
3. Late medieval period (seventeenth-nineteenth century)

The remains of early medieval period were found in the form of a small portion of the moulding of the base of an otherwise ruined temple, covered with debris, the temple remains were found lying below the palace, built in the subsequent period. The remaining portion of the temple was found consisting of six courses of whitish sandstone blocks forming three base mouldings. The foundation of this temple was found to be built of the six courses of laterite stone. The height of the existing temple, including the foundation was two metre and the length, from east to west, was 4-25 m. The inner floor was found to be paved with laterite blocks in the early phase while during the later phase it was repaired and was strengthened by the use of twelve cm thick lime plaster of which only a patch measuring 1-80 m was found, remaining portion being destroyed by the foundation trench of subsequent period.

Overlying the temple remains was found a structure, consisting of a pillared central hall having corridors on the sides. The southern and eastern corridors had pillars. The central hall measured 25 X 8 m and 20 openings. 7 openings each on northern and southern sides and three each on the eastern and western sides. The present evidence indicated the height of the wall being more than six metres. To the south of the southern corridor was found a courtyard, measuring 6 X 6 m, having boundary walls of laterite stone blocks, 3 m in width and 20 courses high above the foundations. On the southern side of the palace, approximately 20 m south of the courtyard of the citadel wall, built of laterite stone, was found and exposed upto 50 metres running east-west and upto 20 metres running north-south on the eastern side. The citadel wall shows at least four phases of construction. The width of the wall of the earlier phase was 8 metres whereas its width is only 4.25 metres in the later construction. During the later phase this wall was externally plastered and was provided with one metre wide toe.

During the late medieval period, the entire palace was filled with about 5 m thick sand and debris. This debris filled the whole palace and adjoining area, turning the whole area into an earthen mound, about seven metres high above the present ground level. In the south-western corner of this mound was built a square structure, made up of dressed stone blocks, retrieved from the ruined temple of Period I. To the south of this structure was found a floor, measuring 20 X 10 m built of laterite blocks, laid over a course of uneven stones collected from the debris of earlier structure. The floor was found covered with a thick layer of earth from which was found a silver coin, of the Mughal King Shah Jahan, minted at Surat (pl. XXXVI B).

Other antiquities included seven iron arrowheads and a corner hall; mutilated sculptures of musician (pl. XXXVII A), erotic couples (pl. XXXVII B), maidens; and areca-nut shaped beads.

50. EXCAVATIONS AT LALITAGIRI, DISTRICT CUTTACK.— In continuation of previous year's work (1989-90, pp. 77-80), J. K. Patnaik, S. K. Ganguly, D. K. Lokhande, S. K. Dey of the Bhubaneswar

Circle of the Survey, under the guidance of G. C. Chauley, resumed the excavation at Lalitagiri. The area selected for the purpose was the slope of the Landa Pahar, towards the north of the apsidal *chaityagriha* complex, exposed earlier and the LTG-4, partly excavated last year, at the north-eastern corner of the hill. The main objectives of the excavation were (i) to ascertain the existence of the monastic establishment at the slope of the hill, if any, and their connection thereof with the main monastic area and (ii) to expose other important antiquities relating to the monastic establishment.

This season's work resulted in exposing the Brick Monastery 3. One more monastery, west of the Monastery no. 3 was also unearthed. Monastery 3 was a rectangular unit (28.5 X 27.5 m) with entrance (6.3 X 4.5 m) in the south-east direction. On plan it consisted of a courtyard, verandah all around the courtyard and the cells, a sanctum and one secondary exit, similar to that of the Monastery no. I. The main entrance has survived only upto the plinth level in the left side while at the right side it is missing. Fragmentary pieces of door-jamb, lintel portion, etc., were found lying scattered here and there.

The excavation has revealed so far 12 numbers of cells. Due to paucity of time whole area could not be exposed. On the left side of the monastery there were four cells. Two cells at the right side of the main entrance and only one cell at the left of the entrance was exposed. These cells were not of the same size and could be entered only from the verandah (a feature absent in the Monastery no. I).

The sanctum, facing main entrance measured 4.1 X 3.1 m. The niche in the right wall of the sanctum was found housing an inscribed image of Buddha in *bhumisparsa-mudra*, sitting on lotus pedestal (76 X 53 X 28 cm). The remaining portion of the sanctum is too damaged to have any idea of any other original features. Other antiquities recovered from this area included pillars of different shapes and sizes and decorated with the various motifs, viz., creepers, *kalasa*, *kirtimukhas*, *sardula*, etc., head of Buddha, upper portion of the image of Maitreya, fragmentary elephant figures, inscribed bricks and agate pieces, iron and copper objects, sculptures of female dancers, *amalaka* pieces, etc.

At LTG-4, a monastic-complex (approximately 17 X 18.5 m), facing east was partially exposed. On plan it comprised of a courtyard, verandah, cells and a sanctum. A stone outlet for the drain was provided in the northern outer wall to take out the refuse water of the complex through the western verandah.

The exposed southern wing of the monastery revealed the remains of the cells and verandah. Altogether four cells in the northern portion, and three cells including shrine in the western portion were found. Few late rectangular structure with receding tyres (as in the *samadhis*) were also exposed from within the cells which might have been constructed after the monastic unit fell in disuse.

Other finds from the area included the sherds of basins in red ware; architectural and sculptural members, etc.

51. EXCAVATION AT GOLBAI SASAN, GOLBAI, DISTRICT PURI. — The Excavation Branch IV of the Survey, under the direction of B. K. Sinha, assisted by P. N. Biswas, M. P. Singh and R. N. Sahoo, undertook a trial excavation at Golbai Sasan (20° 01' 05" N; 85° 33' 05" E) from where was reported

GOLBAI SASAN: 1990-91

DIST. PURI, (ORISSA)

Section facing south

Scale: 1 Cm = 20 Cms.

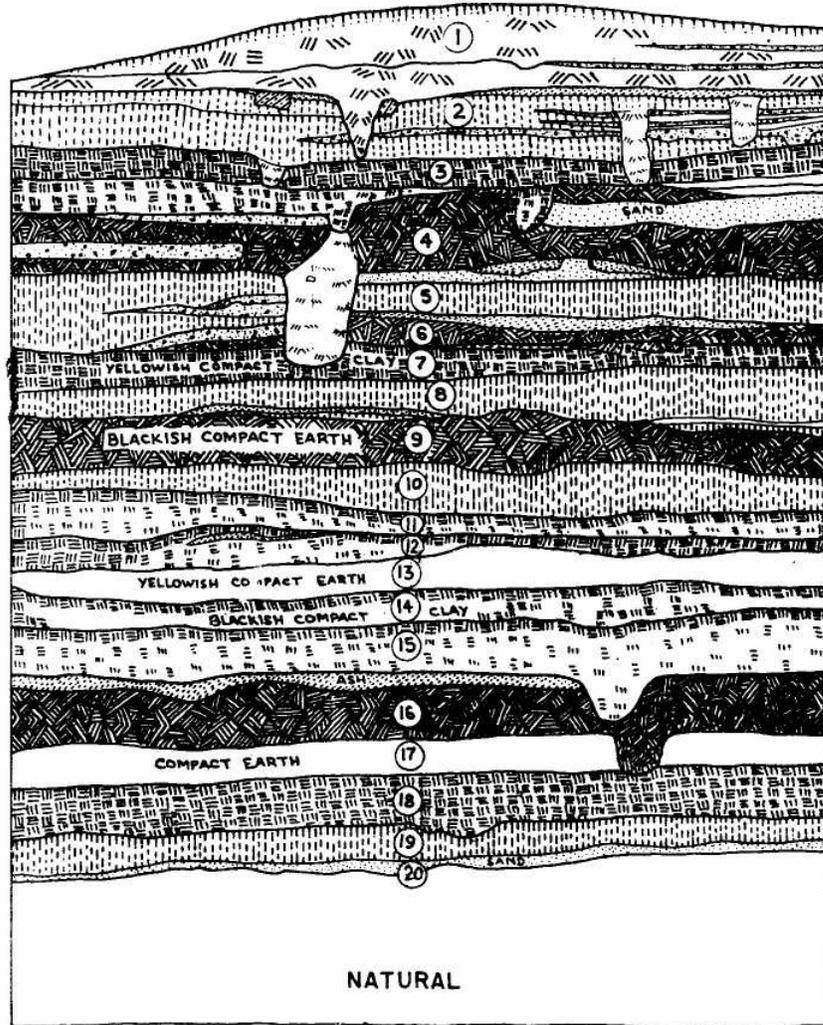


FIG. 8

the findings indicating Neolithic assemblage (1987-88, p. 95). A trench, measuring 5 X 5 m was taken on the southern slopes, towards the Mandakini river, and was excavated upto 5.65 m.

Altogether, 20 habitational layers were identified (fig. 8). Floor levels, made up of red murrum and clay, were found in association with post-holes. Ash, potsherds and tools were found over the floor level. At the upper level, the thickness of the floor was less in comparison to those at the lower level where they were yellowish or bluish in colour. At the lower level, the quantity of ash was also less.

Stone tools (pl. XXXVIII) were represented by one unfinished polished stone axe and two fragments of polished stone axes. A big assemblage of bone tools was of much interest (pl. XXXIX). Both crude and fine specimens of bone tools were dominant at the lower level. These tools included bone points, arrowhead, spearhead, scrapers and a harpoon. The harpoon was discovered for the first time in Qrissa. The presence of one cylindrical bead of faience was an interesting find.

The ceramics included red, grey and black and red wares. Some sherds had post firing paintings executed in red ochre. One sherd showed polychrome paintings. Both hand-made as well as wheel turned pottery was met with. Many pots were treated with a thick slip which ranged from dull red to chocolate brown colours. The shapes included rimless long and short-necked vase, basins, beakers, lids, disc bases, bowls and miniature pots. Some of the basins had carination at the waist. Decorations on the pots were both incised and painted; incised designs being mainly rope impressions. The painted designs consisted of only linear designs.

PONDICHERRY

52. EXCAVATIONS AT ARIKAMEDU, PONDICHERRY. — In continuation of the previous year's work (1989-90, pp. 86-88), a team of Archaeologist headed by K. V. Raman of the Department of Ancient Indian History and Archaeology, University of Madras and Vimala Begley of the University Museum, University of Pennsylvania, resumed excavations at Arikamedu with the view to ascertain the lay-out of the port area during the period of Indo-Roman trade contacts.

For this purpose five trenches, for measuring 5 X 5 metres and one 5 X 3 metres, were excavated in the Northern Sector. In the southernmost trench, east of the Brick Enclosures, excavated during the 1989-90 season, a complete terracotta ring well was exposed. The excavation during this season further exposed a furnace/foundry-like structure in one of the lower levels of AV 91-VII.

In trenches AV 91-VI and AV 91-VII over 200,00 pottery sherds were found. Apparently the area was densely populated, or at least, pottery was extensively used in this space. The ceramics recovered from the excavation included 283 pieces of Mediterranean amphoras (pl. XL A) and five sherds of terra sigillata but none with signature. Among the indigenous pottery mention may be made of many of the forms and fabrics in domestic pottery which are known Black and red ware and the Rouletted ware. Some sherds from previous excavations, new are painted sherds» and several with pictorial graffiti and also with graffiti in Tamil-Brahmi were also met with; most interesting among which is, perhaps, a three letter graffiti, read by I. Mahadevan as "Valava", perhaps a title of the early Chola rulers, written in the modified "Bhattiprolu" style of writing.

Other artifacts recovered from this season's work included beads of glass and semi-precious stones (pl. XL B), shell bangles and other products, a small fragmentary wooden comb, a gem stone and a small piece from an imported ribbed bowl of blue glass.

Excavations in the Northern Sector, so far, suggest that the northernmost area of this sector was perhaps densely populated. Moreover, large quantity of wastes of shell, glass and semiprecious stones in the pits of trench AV 91-VI, and a furnace/foundry-like structure, were indicative of the industrial use of some of the space in the area.

PUNJAB

53. SCIENTIFIC CLEARANCE AT DHOLBAHA, DISTRICT HOSHIARPUR. — K. K. Rishi and Kuldip Singh Sidhu, assisted by Gurdev Singh, Pardeep Singh and Heera Singh of the Department of Cultural Affairs, Archaeology and Museums, Punjab carried out scientific clearance of the area around state protected temple site, situated on sub-mountains at Dholbaha, a village 29 km towards north of Hoshiarpur, with an objective to unearth complete plan of the temple.

For this purpose, clearance work was undertaken at two temple sites, situated on two different hill tops (highest referred to as DLB-1 and DLB-2).

The scientific clearance at DLB-1 brought to light the remains of a temple built of sandstone blocks set in dry masonry. The temple is intact only upto the floor level of the rest being lost completely. The temple is square on plan with the entrance on all the four sides. It seems that the temple had also dosed circumambulatory passage. Presence of two types of pillars is suggestive of the use of the pillars in the circumambulatory passage to allow sunlight enter into the area freely.

The outer wall of the main shrine was 3-73 m high and 2-20 m wide. The inner side of the wall was built of gravel, rough sandstones which was veneered by cut sandstone blocks. The interior of the temple was dug up to the base level. It was noticed that the base (foundation ?) was built of three courses of quartzite pebbles, gravels and rough stones. The uppermost course was of fine gravels and pebbles, the total thickness of the terrace from base level upto floor level being 3.20 m.

Potsherds recovered from the site consisted of only sharp edged rim and bases of the bowls. These sherds were recovered mainly from the place where heavy weight was to be put to protect it from the shocks of tremor (earthquakes ?). On the stylistic ground the temple has been tentatively dated to fourteenth century.

At the DLB-2 locality, scientific clearance of the area resulted into the clearance of the debris upto the plinth level of the state protected temple at this site. Plinth of the temple measured 4.08 X 2.28 m. This rectangular temple has only the *garbha-griha*, the entrance to which is from the east. The main image but for the pedestal, once housed in the sanctum is missing. *The pranala*, attached to the sanctum to take out the water, opened towards the south. A stone path leading to the temple was noticed in the north-west side.

The pottery recovered from the area belongs to the medieval period. The temple seems to have been built in the sixteenth century.

EXPLORATIONS AND EXCAVATIONS

54. EXCAVATIONS AT BRASS, DISTRICT PATIALA. — K. K. Rishi and Kuldip Singh Sidhu, assisted by Gurdev Singh, Pardeep Singh and Heera Singh of the Department of Cultural Affairs, Archaeology and Museums, Punjab, carried out excavations at Brass, under Tehsil Sirhind of the District, with an objective to understand the settlement pattern and to ascertain the overlap between the Late Harappan and the Painted Grey Ware cultures.

The site is situated about 6 km east of G. T. Road near Rajindergarh. It can also be reached from Chuni situated on the Chandigarh-Sirhind section of the G. T. road. Most of the portion, except the south-eastern and north-eastern part of the mound is under habitation. In the open area near the mosque, five trenches altogether measuring 10 X 10 m were taken up for excavation.

Excavation revealed the occupational activities of medieval and Kushana period. The medieval period is represented by the ceramics such as knife-edged bowls, incense burners, glazed ware, *lota*, cooking vessels, etc. Other antiquities included terracotta objects such as animal figurines, balls, ear-studs, gamesmen, wheels, bangles; bone stylus and glass bangles.

Kushana levels were characterised by the structures made of burnt bricks (32 X 23 X 5 cm). Three parallel walls of burnt brick running east-west and in width 34 cm were exposed. These walls were found to be separated from each other by a gap of 1.34 m. These walls were found to join a 57 cm wide sun-dried brick wall, running north-south in the east. Due to the limited area of excavation, the exact nature of the structure could not be ascertained. Portion of a well was noticed under the Kushana structures. The well was made of wedge-shaped bricks measuring 42 X 23.5 X 19 X 5 cm. Floors made of brickbats and *surkhi* were also encountered.

The antiquities from this period included copper coins, balls, ear-studs, gamesmen, stamps, seals and sealing and iron objects. The ceramic types of the period included incurved bowls, vessels, basins, dishes, miniature pots, storage jars, etc. One sherd having inscription in Kharoshthi was also found.

RAJASTHAN

55. EXPLORATION IN DISTRICT ALWAR, JAIPUR, JAISALMER AND PALI. — P. L. Chakravarty and Vijay Kumar of the Department of Archaeology and Museums, Rajasthan, reported the following sites while exploring the region.

<i>District</i>	<i>Site</i>	<i>Nature of remains</i>
Alwar	Harsora	Mesolithic rock paintings
—do—	Kali-Pahar	Mesolithic rock paintings
—do—	Modi Dungri	Proto-historic rock paintings
—do—	Samda	Proto-historic rock paintings
Jaipur	Bainari Bandh	Mesolithic rock paintings
-do	Bhainsawal	Mesolithic rock paintings
-do	Budhi Gan-Gaur	Mesolithic rock paintings

<i>District</i>	<i>Site</i>	<i>Nature of remains</i>
Jaipur	Bramha Kund	Mesolithic rock paintings
Jaisalmer	Ki Dungari	Copper age culture represented by Ganeshwar-Jodhpura pottery
	Gogamerihi	
Pali	Desuri	Proto-historic rock paintings, petroglyphs and engravings
	Nadol	Proto-historic rock paintings and petroglyph
	Narlai	Proto-historic rock paintings, pottery, microliths

56. EXPLORATION IN DISTRICT BHARATPUR. — During the course of village-to-village survey, Kanwar Singh of Jaipur Circle of the Survey discovered following sites of archaeological interest.

<i>Tehsil</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Bayana	Bajna	Fortress and stepwell (late eighteenth century)
—do—	Dhadrain	Medieval pottery
—do—	Dhunaini	Siva temple datable to early nineteenth century
—do—	Jaspura	Medieval pottery and fragmentary Brahmanical sculptures
—do—	Kalsada	Haveli (late eighteenth century) Medieval
—do—	Kharakbas	pottery and fragmentary Brahmanical sculptures
	Moroli	<i>Chabutara</i> , locally known as <i>Thai</i> (early nineteenth century)
—do—	Naglahota	Medieval pottery
—do—	Pilupura	Medieval pottery

57. EXCAVATION AT JUNA KHERA, NADOL, DISTRICT PALI.—The Department of Archaeology and Museums, Rajasthan, under the direction of P. L. Chakravarty and Vijai Kumar undertook the excavation at Juna Khera, Nadol (25° 22' N; 73° 27' E) an important early medieval settlement of Chauhan period and situated on Rani-Desuri road in north west of Desuri. The epigraphical records describe Nadol or Naddula as the capital of Saptasata during the period of a collateral branch of Chauhans of Shakambhari.

The main objective of the excavation was to look for more evidence for study of the medieval archaeology of the region. For this purpose, three trenches, two of them measuring 10 X 5 m and the remaining one of 12 X 6 m were taken at different point of the mound. In addition, one section on

the north-east side of the mound was also scraped, in order to understand the nature of cultural deposits.

During the course of excavation temple in Maha Gurjara style was exposed. The temple, *trianga* in plan, had *apitha* consisting of *apattika* band above *bhitta*. Two images of this deity adorned either side of the entrance of the *garbha-griha*. On stylistic ground, the temple could be dated to tenth century AD.

The excavation also revealed a palace-complex and traces of living rooms, kitchen and well laid drainage system were exposed. Exposed structures revealed the use of massive stone blocks, sun-dried and kiln-baked bricks.

Evidence of later periods at the site was noticed in the form of hurriedly disposed dead bodies, without regular pit lines and grave furniture. War weapons like swords and daggers were also found. James Tod records that Mahmud of Ghazna passed through the territory of Nadol whose prince hesitated not to measure his sword with him.

A seal bearing an inscription in early Devanagari characters was discovered from the palace area. Literary sources ascertain that the founder of the dynasty of the Chauhan of Badol was Raval Lakha-Lakhana and Laksamana. Earlier, James Tod had referred to two inscriptions of this ruler bearing the date VS 1024 and VS 1039. An inscription of his descendant Kalhana dated VS 1233, incidentally speaks of Lakhana and his date VS 1039. Another inscription, in Nilkantha Mahadeva temple at Nadol, refers to Lakhmana and is dated 5th of the bright half of Phalguna VS 1025.

The pottery is typical of medieval period. It is mostly wheel-turned, of red colour having fine fabric, mostly treated with a wash or slip. The common shapes were bowl, lid-cum-bowl and lipped bowl with spouted-channels. Sherds, having designs like '*triratna* and '*svastika*' symbols were also found. Noteworthy antiquities of the period comprise of number of terracotta male and female figurines, having elaborate coiffure and jewellery, and animal figures such as horse and bull in traditional style. Stone sculptural pieces, representative of early medieval art, were also discovered. Indo-Sassanian coins and their later type popularly known as Gadhैया coins were also recovered. It is believed that some of the Indo-Sassanian and Gadhैया type coins were perhaps issued by the rulers of Mewar. The excavations have confirmed this hypothesis as Nadol is quite contiguous to Mewar. The discovery of the coins belonging to Shobita, Mahendra, Prithvipala and Raypala is of great archaeological significance. This is the only numismatic evidence of these rulers available so far. Cowries were found in good number. Probably, their use was common for the smaller transactions as testified by contemporary literary sources.

The excavations have given direct evidence about agricultural products which include wheat, black gram, (*Aung*, Moth, Rice, *Arhar* and *Kulthi*). The well known medieval chronicler Thakkura Pheru gives a detailed list of agricultural products in Chauhan dominion. The list includes the products available from the excavations of the pastoral products, Nadol, produced sheep, cattle, camel, milk and milk products.

Important antiquities include terracotta gamesman, disc, wheel, milkfeeder, sling ball, conch bangles, etc.

TAMIL NADU

58. EXCAVATION AT MAMALLAPURAM, DISTRICT CHENGALPATTU M. G. R.— The Madras Circle of the Survey undertook excavation under the direction of B. Narasimaiah assisted by G. S. Narasimhan, D. Dayalan, G. Thirumoorthy, R. Manickam and S. Sarangadaran with a view to expose completely the structural remains below the level of northern *prakara* of the Shore temple.

The excavation brought to light an ovalish stepped structure with four courses aligned in north-south orientation. The ovalish structure (pl. XLI A) was found to enclose a monolithic sculpture of Bhuvanaraha near the southern apse, and in the middle a miniature shrine with *adhishthana* portion carved in the bedrock (pl. XLI B) and a structural superstructure, and further north a well cut into the sands, all aligned in the north-south direction.

The Bhuvanaraha sculpture was carved out of the same bedrock on which the image of reclining Vishnu has been carved between the two shrines of the Shore temple. The Bhuvanaraha image was found broken into several pieces. On restoration, it was found that the Bhuvanaraha image was depicted on a rectangular *pitha* with a curvish profile. The Varaha was depicted boring the sea with its snout. In order to capture this action, the artist has depicted the forelegs fully stretched and the hind legs slightly flexed. The rock portion below the belly has been relieved with marine vegetation. The *pitha* bears a single line inscription in the usual Pallava-Grantha script which, on tentative reading, gives the *birudas*—*Srirajasimha, Sriranjaya, Sribhara, and Srichtrakarmukha* of Narasimhavarman II Rajasimha (AD 700-727). In all probability, the image was broken into pieces with a purpose but it is difficult to ascertain whether the image had already been broken before the construction of the *prakara* or it was broken to facilitate the construction of the *prakara*. However, the chisel marks on the body piercing from the side indicate the former may be case.

The miniature shrine is another unique find. It was erected at the tip of the bedrock, where the height of the rock was the least. Hence, the shrine has a *adhishthana* carved out of the bedrock whereas the superstructure is structural in having a block carved as its *pada*, another as its *prastara* and the third its *sikhara*. The *adhishthana* has a *upopana, kshudropana, padmopana, tripatta-kumuda, and a pattika*. The first moulding is octagonal, the second is sixteen sided, whereas the others are circular in plan, has a rectangular cavity housing a panel of Vrishabantika-Siva in a slit niche facing out and two more figures on the other two sides. The *pada* is relieved with *simhapada* pilasters, the lion depicted in the characteristic rampant posture. Two such pilasters flank the cavity whereas three more occupy the *vidik* positions. The *prastara* has a prominent roll-type *kapota*, featureless except for a band at the rim. Above the *kapota* are some recessed mouldings with lion-heads jutting from them. The *griva* bears reliefs of *ganas*. The *Rudrachchhanda-sikhara* has the usual *kudu* motifs depicted with Ganesa figures in the cavity. Interestingly, this is the only temple-model at Mahabalipuram to have a *Rudrachchhanda-sikhara*, whereas all others generally have the *Vishnuchchhanda* type. This model also differs in form the *eka-tala vimana* models depicted in the famous Arjuna's penance bas-relief or in the Ramanuja-*mandapam*.

The well, cut into the sand bed, had two courses of stone rings. In the top ring, an image of a goddess is depicted in a square slit-niche. Interestingly, the well yields portable water in spite of its location nearer to the sea.

The ovalish structure has two almost parallel walls running north-south connected by two apses on northern and southern sides. The northern apse has a flight of steps leading into the structure. It further runs straight beyond the apse at the eastern end of the flight of steps. The southern wall also extends further northwards beyond the flight of steps taking slight turn towards west and stopping abruptly due to disturbances. Unfortunately, the whole area beyond the extant portion is completely disturbed and is filled with sand and boulders. Therefore, whole original plan of this structure could not be reconstructed. The southern apse was also disturbed while constructing the *prakara* of Shore temple complex.

The entire structure has six courses in elevation. The topmost course is moulded into a *urdhva-padma* moulding. The other courses are projected inwardly as offsets. The floor area, enclosed by the structure, was paved with stone slabs. A single line inscription, tentatively reading, *Sri Rajasimha yaha kshatriyasimha iti visruta punyakirti jian mehesvara* was found on the *urdhva-padma* moulding.

The stone used in the construction of the structural members seems to be leptenite, the stone with which the Shore temple was constructed. The dislodged and out-of plumb architectural members of the ovalish structure were reset in their original position. The dislodged and fallen aside structural members of the miniature shrine were reset facing east. The broken fragments of the Bhuvanaraha were mended using epoxy resin.

In general, the discovery has a bearing on the evolution of south Indian temple forms, it is now established that initially there were functional *ekatala* miniature shrines. Such models hitherto were known only from the sculptural representations. Further, the bedrock itself seems to have been an active loci for artistic activities during the Pallava period making it imperative to probe further the bedrock towards south. Tentatively, on the basis of the appearance of the titles of Rajasimha on the Bhuvanaraha and the ovalish structure, the entire remain is dated to his reign. But there is a possibility that these activities may prove to be early in further excavations.

59. EXPLORATION IN DISTRICT CHENGALPATTU M. G. R.— During the course of village-to-village survey, G. Thirumoorthy of Madras Circle of the Survey noticed the following cultural remains :

<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
Madurantakam	Andavakkam	Dolmenoid cist, Siva temple of late medieval period
	Araiypakkam	Cairn circles, Vishnu temple, sculpture of Durga of late medieval period
	Attimanam	Siva temple of late medieval period
	Budur	Habitation site, Siva temple of medieval period

<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
Madurantakam	Chittalamangalam	Stone and cairn circles
do	Chittamur	Medieval habitation mound
do	Chittatur	Medieval habitation site
do	Erivakkai.	Siva temple of late medieval period
do	Esur	Megalithic habitation mound, sculptures of Vishnu, <i>linga</i> , Nandi of medieval period
	Karikili	Middle palaeoliths, cairn circles, dolmenoid cist
	Karunakaracheri	Siva temple of Nayaka period
	Karunguli	Microliths, neoliths, stone and cairn circles, dolmenoid cists, inscriptions of twelfth century, <i>mandapa</i> of Nayaka period, seventeenth century fort
	Katiricheri	Early historical site
	Kilvalam	Microliths, Vishnu temple with Tamil inscriptions of twelfth century, Siva temple and sculptures of Vishnu and his consort (late medieval period)
	Kodithandalam	Habitation site, Siva temple, sculptures of Ganesa, Parvati, and Nandi, inscriptions of medieval to late medieval period
	Kulathur	Stone circles
	Kumaravadi	Siva temple and Durga sculpture of Pallava period; Tamil inscriptions in ninth century characters; Siva temple and sculptures of Ganesa, <i>linga</i> , Nandi of late medieval period
	Kunankulathur	Middle palaeoliths, um burials, early historical habitation site
	Kunnathur	Wood fossil remains, middle palaeoliths, microliths, stone and cairn circles, eighteenth century Tamil inscriptions
	Kunnavakkam	Cairn circles and dolmenoid cists
	Lakshminarayanapuram	Vishnu temple and Tamil inscriptions of Chola period; early medieval habitation site
	Malaiyaiyavur	Middle palaeoliths, microliths, cairn circles, dolmenoid cists, Vishnu temple of Nayaka period

EXPLORATIONS AND EXCAVATIONS

<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>	
Madurantakam	Mambattu	Cairn circles, dolmenoid cists, sculptures of <i>linga</i> and Nandi of late medieval period	
	Mangalam	Middle palaeoliths, microliths, cairn circles, dolmenoid cists, urn burials, early historical mound, glazed pottery of medieval period	
	—do—	Mamandur	Siva temple of Vijayanagara period
	—do—	Melma	Stone circles
	—do—	Melvalam	Tamil inscription of fourteenth century, Siva temple of Nayaka period
		Meyyur	Early historic habitational site, Si va and Vishnu temples of Nayaka period
		Nelli	Late Stone Age tools, sculptures of <i>linga</i> and Nandi of late medieval period
		Nelvoy	Siva temple, sculpture of Vishnu of late medieval period
		Neykuppi	Stone circles
		Nilamangalam	Middle palaeoliths, microliths, neoliths, stone and cairn circles, early historical site
	—do—	Padalam	Siva temple of late medieval period
	—do—	Palamathur	Early medieval habitation site
	—do—	Paliyanur	Early medieval habitation site, Siva temple of Chola period, Tamil inscriptions of thirteenth century characters, Vishnu temple of Nayaka period
		Palliyagaram	Middle palaeoliths, stone circles, Siva temple of late medieval period
		Papanallur	Sculptures of Vishnu with his consort, Brahma, Dakshinamurti, Subrahmanya of late medieval period
		Pasumbur	Urn burials
		Pattur	Vishnu temple and Tamil inscriptions of Chola period, early medieval habitation site
	Pilappur	Early historical habitation site, Vishnu temple of Nayaka period	
	Pillandikuppam	Middle palaeoliths, dolmenoid cists, early historical and medieval habitation sites	
	Puducheri	Early historical habitation site, glazed pottery of medieval period, sculpture of goddess of late medieval period	

<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>	
Madurantakam	Pudupattu	Middle palaeoliths, dolmenoid cists, late medieval Siva temple	
	Pukkathurai	Late Chola Vishnu temple, Tamil inscriptions of thirteenth century characters	
	Pulipparkoil	Early medieval habitation site, Siva temple with Tamil inscriptions of late Chola period	
	—do—	Puludivakkam	Cairn circles, dolmenoid cists, urn burials
	—do—	Sambadinallur	Early historical habitation site
	—do—	Sanur	Middle palaeoliths, microliths, late Stone Age tools, cairn circles, dolmenoid cists, late Chola Siva temple
		Sattamai	Cairn circles
		Sidandi	Siva temple, sculptures of Durga and Bhikshatana of late medieval period
		Surai	Middle palaeoliths, late stone age tools, microliths, cairn circles, urns, sarcophagus
		Tandalam	Early medieval habitation site, <i>linga</i> and Nandi of late medieval period
		Vaiyavur	<i>Mandapa</i> of Vijayanagara period, Vishnu temple of Nayaka period
		Valiyaputhur	Cairn circles, dolmenoid cists, urns
		Valluvapakkam or Kallabiranpuram	Late stone age tools, stone circles
		Valluvapakkam	Lower and Middle palaeoliths, cairn circles, dolmenoid cists
		Vedantangal	Cairn circles
	Vellaputhur	Middle palaeoliths, cairn circles, sculptured stone slab of eighteenth century	
—do—	Vilagam	Late stone age tools, neoliths, dolmenoid cists	
	Viranakunnam	Stone and cairn circles, habitation site and <i>linga</i> of late medieval period	

60. EXPLORATION IN DISTRICT NORTH ARCOT-AMBEDKAR.— K Moortheswari of the Madras Circle of the Survey brought to light the following cultural remains during the course of her village-to-village survey in the district.

<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
Arcot	Narayanapuram	Jaina rock-cut beds

EXPLORATIONS AND EXCAVATIONS

<i>Taluk</i>	<i>Village</i>	<i>Nature of remains</i>
Arcot	Pudhupadi	Megalithic habitation site, Siva and Vishnu temples, Tamil inscription of Chola period
	Puttuthakku	Megalithic habitation site
	Thimmanacheri	Jaina rock-cut beds
Walajah	Ammur	Microliths
	Gudimallur	Siva temple with inscriptions of Chola period
	Kallur	Microliths
—do	Kanchanagirimalai	Hero-stones of Nayaka period
	Karai	Megalithic habitation site
	Kathiyavadi	Stone circles
	Kechakuppam	Sculpture of Vishnu
	Keerai-sathu	Draupadi temple
	Lalapet	Megalithic habitation site
	Neelakandarayanapatti	<i>Mandapa</i> of Nayaka period
	Nellikuppa	Microliths
	Sevur	Vishnu temple of Vijayanagara period
	Thengal	Medieval habitation site
	Tiruppanmalai	Megaliths
	Tiruparkadal	Sculpture of Krishna

61. EXCAVATION AT KODUMANAL, DISTRICT PERIYAR.—Department of Epigraphy, Tamil University, Thanjavur continued excavation at Kadumanal. In all 17 trenches were laid in three groups. The first group of 10 trenches, put in the northern part of the habitation, yielded a crucible furnace, somewhat similar to the one found in the previous season, confirming the occupation of iron smelting people in this part of the habitation. Quartz lumps, found placed on floor level, were suggestive of their use as raw material for bead making industry. One of the trenches yielded five well defined floor levels made of gravel plastered with lime with post-holes at regular intervals at the periphery of the floor. Another trench yielded a furnace with forceps like tool.

The second group consisting of three trenches, taken in the eastern part of the habitation to understand the eastern extension of the habitation, yielded a small furnace and a number of unfinished beads.

The third group of four trenches, laid in the southern part of the habitation, yielded circular pits dug into the natural soil, perhaps to be used as silos.

Evidence for gemstone industry was obtained in the form of rock crystal, amethyst and carnelian. There were also some lapis lazuli beads. A smooth stone having cylindrical form, as if turned on lathe, was an interesting find. The technique used in finishing this stone object is very similar to the one used by the present jewel stone industry of the area. Other antiquities included

lapis lazuli beads, bead and bangles of glass and shell, varieties of iron objects, whorls and bone points.

During this season three megaliths, all in the form of cairn circles entombing a transepted cist each, were opened.

The first burial comparatively bigger than the other two was built of triangular slab circle placed in two courses above the present ground level encircling a transepted cist. The cist was facing east and had two trapeze-shaped portholes on the eastern side scooped out against each chamber. In addition to this main cist there was one subsidiary south-facing cist erected on the left side of the main cist facing the rectangular passage. This burial yielded two small gold rings, stirrup, iron swords, carnelian beads, arrowheads, knife, etc.

The second burial yielded one gold bead, animal bones, part of a skull and etched carnelian beads and the third megalith yielded antiquities such as iron dagger, copper pieces, carnelian beads, etc.

62. EXCAVATION AT ALAGANKULAM, DISTRICT RAMANATHAPURAM.—A. Abdul Majeed assisted by S. Vasanthi, D. Gopalan, S. Paranan and N. Ganesan of the Department of Archaeology, Tamil Nadu, carried out excavation at Alagankulam under the overall direction of Natana Kasinathan. The excavation of this season revealed two fold cultural periods, viz., Period I and II.

Period I is characterized by the presence of Black and red ware, NBP Ware, Rouletted ware, grey ware, coarse red ware, and inscribed potsherds, as on the basis of the ceramic evidence the period was datable between fifth century BC to first century BC. Other antiquities from this period were potsherds having graffiti marks, metallic weight, a circular and square copper coins (not identified), a large number of beads, made of green and blue glass and coral; shell bangles; conches, cowri-shells iron nails and slags.

Period II is characterized by the occurrence of amphorae pieces, Black-and-red ware, Rouletted ware, grey ware with impression, Alagankulam ware and coarse red ware sherds. Main ceramic types of this period were basins, storage jars and sherds of dishes in Black-and-red ware, grey ware and Rouletted ware. An interesting piece among the ceramic assemblage was the occurrence of the pink ware, not found from other sites in Tamilnadu. This ware, till its identification is settled, has been named as Alagankulam ware. On the basis of the occurrence of the amphorae pieces, Black-and-red ware, grey ware and Rouletted ware and a copper coin of Roman emperor Arcadius I (AD 383-408) and a square copper coin of a Pandya king; this period is tentatively dated to a period between first century BC to fifth century AD. Other finds from this period included beads of semiprecious stone such as agate, crystal, carnelian, aquamarine, jasper and glass of different hues such as green, blue, black and yellow and shell beads.

UTTAR PRADESH

63. EXPLORATION IN DISTRICT ALIGARH.—G. N. Srivastava of Agra Circle of the Survey while exploring the area in Hathras Tehsil under Lakhnu-Pura Rural Integration Project, discovered the following sites of archaeological interests.

<i>Village</i>	<i>Nature of remains</i>
Astmadi <i>alias</i> Nagla Astal Bergaon	Ruins of brick temple datable to tenth century AD Stray sculptures datable to <i>circa</i> tenth century AD
Bhogaon	Stray sculptures datable to tenth century AD
Chintapur	Mound yielding red ware of medieval period
Chursian <i>alias</i> Turseen	Stray sculptures datable to tenth century AD
Gangauli	Stray sculptures datable to tenth century AD
Gangchauli	Loose sculptures of tenth century AD
Jafrabad	Stray sculptures and architectural pieces datable to tenth-eleventh century AD
Kharwa	Loose sculptures of tenth century AD
Khera Chaturbhuj (sub village of Sikandarpur)	Medieval mound yielding red ware of thick fabric
Koka	Stray sculptures datable to tenth century AD
Kumarai	-do-
Lakhnau	Building datable to nineteenth century, fortress
Majhola	Stray sculptures datable to seventh-eighth century AD
Nagla Katta (sub village of Gangauli)	Stray sculptures datable to tenth century AD
Parsara	-do-
Surjapur (sub village of Majhola)	Buildings datable to late nineteenth century and early twentieth century

64. EXPLORATION IN DISTRICT ALMORA.— Suresh Kumar Dubey of Regional Archaeological Unit, Almora, discovered a group of temples datable to early medieval period at village Gureda (Sangar) located at the ancient route joining Champawat and Jageshwar. Twelve stone sculptures of Sun, Vishnu, and Ganesa datable between eighth century AD and twelfth century AD were lying scattered at the site.

65. EXPLORATIONS IN DISTRICT BASTI.— In the course of village-to-village survey of both banks of the Kuwans river, a tributary of the Ghaghara in Khalilabad and Sadar tehsils of the district, Purushottam Singh, Ashok Kumar Singh and Indrajeet Singh of the Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University explored the following sites yielding remains of Chalcolithic, NBP Ware, Sunga-Kushana and Gupta periods.

<i>Tehsil</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Basti	Bankatwa/Banni	Black-slipped, grey and red wares
	Banpur Kotiya	Black-and-red, black-slipped and red wares
	Bhatolwa/Bankatwa	Black-and-red, black-slipped, cord-impressed red and plain red ware

<i>Tehsil</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Basti	Chanderpur	Black-slipped and red wares
do	Chando	Red ware
do	Chharadahi	Red ware
do	Chaura Kalan	Red ware
do	Deoraon	Black-and-red, black-slipped, grey, NBP, cord-impressed red and plain red wares
	Dhaurahara	Black-slipped, grey and red wares
	Gerar	Black-slipped, grey, NBP, cord-impressed red and plain red wares
	Lalganj	Black and red, painted and plain black-slipped and red wares
	Masjidiya	Black-slipped, grey and red wares
Khalilabad	Mundiari	Black-slipped and red wares
do	Pachara	Black-slipped and red wares
do	Sarai	Black-slipped and red wares
do	Siswania	Burnished black and red, black-slipped, NBP, cord-impressed red and plain red ware
	Susipar	Black-slipped, grey, cord-impressed red and plain red wares
	Tendhiya Baragaon	Black and red, black-slipped, grey, NBP, red slipped, cord-impressed red and plain red wares

66. EXPLORATION IN DISTRICT BIJNOR. — N. K. Singh of Agra Circle of the Survey during the course of village-to-village survey noticed following sites of archaeological interest in Tehsil Dhampur of the District:

<i>Village/Site</i>	<i>Nature of remains</i>
Alampur	<i>Lakhauri</i> brick temple of eighteenth century
Amkhera	Mosque datable to eighteenth century
Balkishanpur	<i>Lakhauri</i> brick temple datable to seventeenth century
Bhagwan wala	<i>Lakhauri</i> brick temple of circa eighteenth century
Dhampur	Two medieval temples
Meghawala	Mound containing Kushana potsherds, Black-and-red ware with black painting and red ware of medieval period
Mirzapur	Medieval mosque

EXPLORATIONS AND EXCAVATIONS

<i>Village/Site</i>	<i>Nature of remains</i>
Narsiwala	Sixteenth century mosque, grey ware, black polished ware and red ware of medieval period
Roshanpur	<i>Lakhauri</i> brick temple of eighteenth century
Shahlampur	<i>Lakhauri</i> brick temple of <i>circa</i> seventeenth century
Sherkot	<i>Lakhauri</i> brick temple datable to <i>circa</i> seventeenth century, Mosque and mound containing coarse grey ware, black-slipped ware and red ware of medieval period

67. EXPLORATION IN DISTRICT DEHRA DUN.— P.K. Singh, assisted by B.P. Badoni, B.B.S. Rawat and R.S. Kailkhuri of the Regional Archaeological Unit, Pauri-Garhwal of the Uttar Pradesh State Archaeological Organisation, under the guidance of Rakesh Tewari, explored the area under Vikasnagar and Sahaspur blocks of the District. The sites having ancient remains are as under :

<i>District</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Dehradun	Bahadurgarh	Medieval red ware
	Bamangaon	Medieval temple
	Bulaquiwala	Sunga-Kushana ware, grey ware, Kuninda copper coins, red ware
—do—	Dhakrani (Colony)	Medieval red ware, late medieval temple
—do—	Kattapathar	Medieval temple remains and sculptures
—do—	Khera	Medieval red ware, late medieval temple
—do—	Langha	—do—
—do—	Lahun	Medieval sculptures
—do—	Majri	Sunga-Kushana ware, grey ware, terracottas, red ware
	Prithipur Jungle.	Medieval red ware, and late medieval temple
	Rajawala	Medieval sculptures

68. EXCAVATIONS AT DHURIAPAR, DISTRICT GORAKHPUR.— The Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University carried out trial digging at Dhuriapar under the direction of Purushottam Singh assisted by Ashok Kumar Singh and Indrajeet Singh. The ancient habitation of Dhuriapar (Long.. 83° 14' 30" E; Lat. 26° 25' 25" N) spreading over a length of 1.5 km along the left bank of Kuwana river, a tributary of the Ghaghara is presently occupied by three small villages namely, Jagdishpur, Vasudeopur and Dhuriapar. According to the tradition the history of the present settlement began with the invasion of Kaushika kshatriyas under their Raja

Dhurchand who established a fortified settlement in the middle of the fourteenth century. This settlement was named Dhuriapar after the name of its founder Dhurchand.

Five, 3 X 3 m, test pits excavated in the different parts of the ancient settlement yielded the following cultural sequence.

Period I (1300 — 600 BC) is represented by Black-and-red ware with linear paintings in white (having pedestalled bowls, basins and vases as the main types); black-slipped ware (main types bowls and dishes); grey ware (main types bowls and dishes) and red ware (bowls and vases). The small antiquities comprise terracotta beads, balls and points and combs of bone and pottery discs. This cultural deposit broadly conforms to the assemblage of Narhan culture. However, a few sherds of the cord-impressed red pottery and a handmade bowl of grey ware point to an earlier beginning of the site.

Period II is characterized by the NBP Ware and its associated ceramic industries. The NBP levels were found to be distributed in almost all trenches.

Period III (200 BC — AD 500) is marked by the presence of red ware comprising basins, vases and other types of the Kushana and Gupta periods; bangles made of terracotta and glass; iron objects; stone beads; and terracotta pestles.

Period IV (AD 900 — 1500) is represented by red ware with such characteristic types as spouted vases, cooking vases with flared featureless rim, multi-grooved concave neck carinated to a sagger base; knife-edged bowl and lids with featureless rim and a hollow conical knob rising above the rim level. This period yielded walls (75 cm wide) made of burnt bricks having several structural phases. These structures were traced upto a depth of 1-05 m in one of the trenches. Two, copper coins, ascribable to this level, are under examination.

The settlement was occupied during the British period as well and several burnt brick structures including dying vats (?) on indigo are still visible to the west of the present-day Dhuriapar village. Besides, a small fortified area just on the banks of the Kuwana river and located almost in the central part of the mound may represent the remains of the fortified settlements of king Dhurchand.

69. EXPLORATION IN DISTRICT HARDWAR.— Suresh Singh of Agra Circle of the Survey noticed the following sites of archaeological interest during the course of village-to-village survey.

<i>Village /Site</i>	<i>Nature of remains</i>
Bahdarpur	Medieval Siva temple
Garh	Medieval Mosque
Hardwar	Medieval temple of Ganga Daur and Mansa Devi and Bhimgoda tank
Jwalapur	Medieval mosque
Kankhal	Dakshineshwar temple
Mayapur	Temple of Bhairon and Mayadevi

<i>Village /Site</i>	<i>Nature of remains</i>
Ranipur	Medieval Siva Temple
Rohalki Kishanpur	Medieval Siva Temple
Telewala (Shivdaspur)	Medieval Siva Temple

70. EXPLORATION IN DISTRICT LALITPUR.— In continuation of previous year's work (1989-90, pp. 101-102) Ambika Prasad Singh of U.P. State Archaeological Organisation under the guidance of Rakesh Tewari, resumed exploration in Mehroni region of district Lalitpur.

The important finds of the exploration was a temple, datable to twelfth century AD. Situated in village Uldana-Kalan, it consisted on plan of a *garbha-griha* and an *ardha-mandapa*. The *garbha-griha* was having a flat roof. The *talatabimha* of the door lintel was adorned with an image of Uma-Mahesvara. Other sites having archaeological remains are as under :

<i>Village/Site</i>	<i>Nature of remains</i>
Agora	Medieval sculpture
Ajan	Medieval sculpture
Asora	Stone celt, black-and-red ware, black-slipped ware, red ware and medieval sculpture
Baijnath	Medieval temple and sculpture
Bamhori Bahadur Singh	Medieval sculpture
Bhaira	Medieval sculpture
Bamhori	Medieval sculpture
Bhonrat	Medieval pottery and sculpture
Baron	Medieval sculpture
Bhadora	Medieval sculpture and temples of eighteenth-nineteenth century
Bhaiyaepura	Medieval sculpture
Bhounra	Medieval sculpture
Chhaprat	Medieval sculpture
Chhapchhol	Medieval sculpture and temple
Chirola	Medieval sculpture
Deorankalan	Medieval sculpture
Dhurwara	Medieval sculpture
Dongrakhurd	Medieval sculpture
Gaganiya	Medieval sculpture
Gundrapur	Medieval sculpture
Gurha	Medieval sculpture and temple
Garholi Kalan	Medieval sculpture
Jakhora	Medieval sculpture and late temple

<i>Village/Site</i>	<i>Nature of remains</i>
Jarya	Medieval sculpture
Khiriyatkanju	Medieval sculpture
Kuwanghosi	Medieval sculpture and temple
Kumheri	Medieval sculpture, temple, fort and late temple
Kisarda	Medieval sculpture
Karonda	Medieval sculpture
Khatora	Medieval sculpture
Khera	Medieval sculpture
Korwas	Medieval sculpture
Mehroni	Medieval sculpture, fort and late temple
Midarwaha	Medieval sculpture and temple
Nainwara	Medieval sculpture and temple
Nawae	Medieval sculpture and temple
Niwaree	Medieval sculpture
Naikora	Medieval sculpture
Pali	Medieval sculpture
Patha	Medieval sculpture
Rameshera	Medieval sculpture
Rukwaha	Medieval sculpture
Saiydpur	Medieval temple and sculpture and late medieval temple
Samogar	Medieval sculpture
S animal	Medieval sculpture
Silawan	Medieval sculpture and temple
Sarkora	Medieval sculpture
Sindwaha	Medieval sculpture
Simiriya	Medieval sculpture
Sukalguwan	Medieval sculpture
Sojana	Medieval sculpture, pottery, fort and late medieval temple
Talau, Teekra	Medieval sculpture Medieval sculpture
Uldana Kalan	Medieval sculpture and temple

71. EXPLORATION IN DISTRICT LUCKNOW.— Raj Kumar and K.K. Singh of the Uttar Pradesh State Archaeological Organisation, under the guidance of Rakesh Tewari, conducted village-to-village survey in Sarojini Nagar block of Lucknow district and discovered the following sites :

<i>Village/Site</i>	<i>Nature of remains</i>
Ain	Kushana red ware
Amawan	Medieval sculptures
Andpur Siktia	Medieval sculptures
Arangabad	Medieval pottery
Ashraf Nagar	Medieval pottery
Auranwan	Medieval pottery
Bijnaur	Garhi, medieval pottery and sculpture
Banthara	Medieval pottery
Barauli	Medieval sculptures
Bhatgaon	Medieval pottery and sculpture
Dadupur-	Grey, PG and NBP Wares
Dhkebir Baba	Medieval sculpture
Kali Pachchim	Medieval pottery and sculpture
Latif Nagar	Medieval pottery
Mati	Medieval pottery
Mirzapur	Kushana red ware and medieval pottery
Natkur	Medieval pottery and sculpture
Newan	Medieval pottery and sculpture
Piparsand	Medieval pottery and sculpture
Purwar Pachchhim	Medieval pottery and sculpture
Ramdin-Khera	Medieval pottery
Shahdulla Nagar	Medieval pottery

72. EXCAVATIONS AT PATITA AND CHHILAHINA (CHUNAR), DISTRICT MIRZAPUR.—A team of Banaras Hindu University under P.C. Pant and Vidula Jayaswal conducted trial excavations at Patita and Chhilahina, about 15 km south-east of Chunar Railway Station.

The low mound had experienced severe erosion in the past, as is the case with most of the ancient habitations of this region. Three trenches (A1, A2 and B1) measuring 3X3 metres were laid. In one of the trenches (A1) there was evidence of a large dump, while in the other a series of post-holes were encountered. The entire deposit in the second trench (B1) did not exceed 1 metre. No other antiquity except pottery was found. The habitation assignable to the early century of the Christian era on the basis of the pottery types came to an abrupt end by largescale fire.

As many as fourteen megalithic structures were found on the slopes of a hill situated close to the village Chhilahina. One such structure was subjected to excavation, which revealed a chamber below a medium sized cairn (5 X 4.75 m). The chamber (1.50 X 0.55-0.80 m) was sealed by two large sized capstones. It was built by horizontally laid an upright stone slab in such a way that its one of the ends projected above the capstones. On superficial examination it was found that this custom was adopted in every case. The chamber has east-west orientation. It is surprising that the structure did not yield any antiquity, not even pottery.

73. EXPLORATION IN DISTRICT MIRZAPUR.— In the course of village-to-village survey, Girish Chandra Singh, under the guidance of Rakesh Tewari, discovered the various sites ranging from megalithic to medieval period. The sites having archaeological interest are as under

<i>Village/Site</i>	<i>Nature of remains</i>
Ahugi Kalan	Megaliths and medieval sculpture
Batohan	Medieval sculpture
Bardiha Khurd	Medieval sculpture
Birpur	Megaliths
Bari	Megaliths
Bandheta	Megaliths
Chunwa	Megaliths
Deori	Medieval sculpture
Dohar	Early historic remains
Halia	Medieval sculpture
Hathera	Megaliths
Kotar	Medieval sculpture and temple
Kubra	Megaliths
Mawai Khurd	Medieval sculpture
Sarahra	Medieval sculpture
Songarha	Medieval sculpture

74. EXPLORATION IN DISTRICT NAINITAL.— In continuation of previous year's work (1989-90, p. 105) Suresh Kumar Dubey of Regional Archaeological Unit, Almora resumed village-to-village exploration in the District. The archaeological remains noticed during the course of exploration were the three hero-stones known as Veer-Khambha from the villages Vargal, Gairkhal and Chhauri, stone sculptures of Vishnu, Surya *chatur-mukha Siva-linga* and Durga (datable between ninth and fifteenth century AD) from Suyalbari, Kamoli and Simalkha villages.

75. EXPLORATION IN DISTRICT PAURI GARHWAL.— In continuation of previous year's exploration (1989-90, p. 105) P.K. Singh, assisted by B.P. Badoni, B.S.S, Rawat and R.S. Kailkhuri of the Regional Archaeological Unit, Pauri Garhwal, of the Uttar Pradesh State Archaeological Organisation, under the guidance of Rakesh Tewari, conducted archaeological exploration in District Pauri - Garhwal. The sites having cultural remains are as under:

<i>District</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Pauri Garhwal	Baliangaon	Medieval sculptures, temple remains
—do—	Bidakot	Medieval temple and sculptures
—do—	Chakrauli	Medieval <i>naula</i>
—do—	Chorthu	Medieval sculptures and temple remains

<i>District</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Pauri Garhwal	Dhaneshwar	Medieval temple remains
—do—	Khola	Medieval sculptures
	Kotsara	Medieval temples
	Pavanpur	Medieval temple remains and <i>naula</i>

76. EXPLORATION IN TEHSIL CHAMPA WAT, DISTRICT PITHORAGARH.— In continuation of previous year's work (1989-90, pp. 105-106), Hem Raj of Regional Archaeological Unit, Almora, resumed village-to-village exploration in tehsil Champawat. In course of the survey the archaeological remains such as *pidha* and *nagar* style temples belonging to the medieval period in Golanseri, Vigarakot and Maunkande villages, a sun temple at Ramak village, an ancient *naula* and megalithic pits at the Gum and Punakot village (near Pati), stone sculptures of Vishnu, Mahishasuramardini and *Sahasra Siva-linga* (datable between tenth century AD and fourteenth century AD) in Maunkande, Churakot, Golanseri, Karoli, Chaurapita and Kharahi villages were noticed.

77. EXPLORATION IN DISTRICT PITHORAGARH.— Suresh Kumar Dubey of Regional Archaeological Unit, Almora, discovered a medieval temple with a stone sculpture of Lakulisa in village Kumalgaon near Thai in Tehsil Didihat.

78. EXPLORATION IN DISTRICT SONBHADRA.— In continuation of previous year's work (1989-90, pp.106-107), Girish Chandra Singh, under the guidance of Rakesh Tewari of Uttar Pradesh State Archaeological Organisation, explored the area in Ghorawal Block to document archaeological sites, monuments and cultural remains of the area. The sites having archaeological interest are as under:

<i>District</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Sonbhadra	Ashatali	Medieval remains
	Athauna	Pottery
	Audar	Medieval sculptures
	Babhani	Medieval remains
	Bagpokhar	Medieval temple remains
	Bal Dih	Medieval sculptures
	Bardiya	Mesolithic and megaliths
	Baraundhi	Medieval remains
	Baraya	Medieval sculptures
	Belkhuri Kalan	Medieval remains
	Belwaniyan	Medieval sculptures
	Bharkana	Medieval temple remains
	Bharauli	Medieval remains
	Bhairwa	Medieval sculptures and remains
	Bhagwas	Pottery

<i>District</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Sonbhadra	Bimauri	Medieval remains
	Bir Kalan	Medieval remains
	Bir Khurd	Medieval sculptures
	Chingauri	Medieval sculpture
	Dhanawal	Medieval sculptures and remains
	Dharmauli	Medieval temple remains
	Dharsanda	Medieval remains
	Devgarh	Mesolithic and Megaliths
	Dherhi	Mesolithic
	Dhuter	Medieval sculptures
	Dohari	Medieval sculptures
	Domhar	Medieval remains
	Dorihar	Medieval sculpture
	Garhwa	Medieval remains
	Ghorawal	Medieval remains and sculptures
	Guret	Medieval temple remains and sculptures
	Gunval	Medieval remains
	Hinauti	Medieval sculptures
	Janar	Medieval sculptures and temple remains
	Juriya	Medieval remains
	Jogini	Medieval sculptures
	Kandhari	Medieval sculptures
	Kaneti	Medieval sculptures
	Kari Baraon	Medieval remains
	Khagiya	Medieval sculptures
	Khajuri Kalan	Medieval remains
	Khardeur	Medieval sculptures
	Kharuanv	Medieval sculptures and remains
	Khatuha Chak	Medieval remains
	Khuthania	Medieval remains
	Kingari	Medieval remains
	Koldiha	Medieval remains
	Koldihwa	Mesolithic and Megalithic
	Konhartha	Medieval sculptures
Kusamba	Medieval remains	
Lilwahi	Medieval sculptures	
Lohandi	Medieval sculptures	

EXPLORATIONS AND EXCAVATIONS

<i>District</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Sonbhadra	Mahanv	Mesolithic and Megalithic
—do—	Majhili	Mesolithic and Megalithic
—do—	Mandaha	Mesolithic, medieval temple remains
—do—	Maranchi	Medieval sculptures
—do—	Marsanda	Medieval remains
—do—	Mijhun	Medieval sculptures
	Morahi	Medieval sculptures
	Mukha	Mesolithic, terracottas, medieval sculptures and remains
	Murtia	Medieval remains and sculptures
	Musaha	Medieval sculptures and temple remains
	Nangaain	Medieval sculptures
	Nischintpur	Medieval remains
	Padri	Medieval remains
	Parsauna Khurd	Medieval remains
	Parwaniyan	Mesolithic, Megalithic and medieval sculptures
	Purankha	Medieval sculptures
	Purkhas	Medieval remains and sculptures
	Purna	Medieval remains and sculptures
	Sahdeiya Baidand	Medieval remains
	Sahpurwa Khurd	Medieval remains
	Sikri	Medieval remains
	Silwar	Medieval remains
	Sirwat	Medieval remains
	Sotil	Medieval remains, sculptures
	Tenduhar	Megalithic
	Tenua	Medieval sculptures
	Tilauli Kalan	Medieval remains
	Tilauli Khurd	Medieval remains
	Usri Kalan	Medieval remains

79. EXCAVATION AT SANICHARA, DISTRICT SULTANPUR.— Girish Chandra Singh, Rakesh Kumar Srivastava and Krishna Kumar Singh, under the direction of Rakesh Tewari of Uttar Pradesh State Archaeological Organisation, carried out debris clearance work with a view to expose the buried temple at the village Sanichara. The work revealed remains of an early medieval temple.

The temple was built on an ornamented jagati measuring 26.70 X 1800 X 1 00 metres. On plan it consisted of a *garbha griha*, *antarala* and *mandapa*. The temple was oriented east-west with

entrance facing east. During the course of clearance a few antiquities were also found, noteworthy being four inscribed stone slabs, an image of Yamuna and a stone celt. Besides these, two copper coins of Muslim period and a few broken sculptures were also found.

WEST BENGAL

80. EXPLORATION IN DISTRICT BANKURA. — In the course of village-to-village survey work, T. J. Chakraborty of the Calcutta Circle of the Survey discovered the following sites of archaeological interest:

<i>Police Station</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Barjora	Dadhimukha	Late medieval temple
do	Gardardihi	Late medieval temple, <i>Rasamancha</i>
do	Gaderdi-Balarampur	Late medieval temple
do	Gopbandi	Late medieval temple
Barjora	Hatasuria	Late medieval mosque and temple
	Managram	Late medieval mosque
	Mandarbani	Late medieval mosque
Indas	Dibakarhati	Ancient palace
do	Krishnabati	Late medieval
do	Mirzapur	Late medieval temple
do	Shashpur	Ancient palace, temple, <i>Durga-mandapa</i>
Kotulpur	Banmukha	Late medieval temple
	Krishnanagar	Mosque
	Lallbazar	Late medieval temple

81. EXPLORATION IN DISTRICT MIDNAPORE.— In the course of village-to-village survey work Santanu Main" of the Calcutta Circle of the Survey located the following sites of archaeological interest:

<i>Police Station</i>	<i>Village/ Site</i>	<i>Nature of remains</i>
Bhagwanpur	Abasberia	Temple datable to eighteenth-nineteenth century AD
do	Bamanchak	Temple dated to nineteenth century AD
do	Baraibar	Temple dated to nineteenth century AD
do	Benudiha	Temple dated to nineteenth century AD
do	Bhagwanpur	Late medieval temples
do	Kakra	Late medieval temple
do	Kaptiabari	Late medieval temple
Bhagwanpur	Kotbar	Temple dated to nineteenth century AD
Bhupatinagar	Dakshinbayenda	Late Medieval mound, terracotta objects, etc.

EXPLORATIONS AND EXCAVATIONS

<i>Police Station</i>	<i>Village/Site</i>	<i>Nature of remains</i>
Bhupatinagar	Haripur	Temple dated to eighteenth / nineteenth century AD
do	Ichhapur	Late historic sculpture of Kali
do	Kashba	Late medieval mound
do	Porachingra	Nineteenth century temple
do	Tirokhali	Nineteenth century temple

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS

ANDHRA PRADESH

1. VIJAYANAGARA INSCRIPTION, BHIMUNIPADU, DISTRICT CUDDAPAH.— This inscription, engraved on a stone lying in front of the Anjaneyasvami temple, is in Telugu language and characters. Dated Saka 1316 (A D 1394) it belongs to the reign of Vijayanagara king Arihararaya (i.e., Harihara II) and records the consecration of god Hanumamta by Kasavana, son of Lakkinayini at Bhiminipadu in Maliki-nadu which was governed by Deyaraya-yodiyalaraju.

2. THREE EASTERN CHALUKYAN COPPER-PLATE CHARTERS, AMARAVATI, DISTRICT GUNTUR.— Of the three copper-plate charters of the Eastern Chalukya kings, now preserved in the Archaeological Museum, Amaravati in District Guntur, two sets were discovered from the villages Duddukuru and one from Chamarru, all in District Guntur. These charters in Sanskrit language are written in Telugu-Kannada characters of about the eighth-ninth century AD. The first record is dated in the second year of the reign of the Chalukya king *Sarvvalokasraya-maharaja* (Mangi-yuvaraja), son of Vishnuvardhana-maharaja and registers the gift of lands in the village Pencherukuru in Karmmarashtra to Gola-sarmma, son of Naga-sarmma of Kaundinya-gofra and resident of Indrapura and to Vinaya-sarmma of Bharadvaja-gotra of the above village.

The second record was issued by the Chalukya king *Sarvvalokasraya* Sri Vishnuvardhana-maharaja, son of Vijayaditya and registers the gift of the village Seravurabu in Palli-rashtra to Yajnamandridibhatta-sarmma, the son of Errukarmatredi-bhatta and the grandson of Vishnubhatta belonging to *Atreya-gotra* and *Apastamba-sutra* on the occasion of the solar eclipse. The donee is described as the resident of Dvedagombarru.

The third record belonging to the reign of king Jayasimha, son of Vishnuvardhana-maharaja registers the grant of *Vilasati-agrahara* in *Natavadi-vishaya* after exempting all taxes to Svami-sarmma of Kautsa-gotra.

3. KALYANA CHALUKYA INSCRIPTION, HUZURNAGAR, DISTRICT NALGONDA.— This inscription, engraved on a stone at the entrance of the Siva temple, is in Telugu language and characters. The record is dated Saka 1045 (AD 1123) and states that when the Chalukya king Tribhuvanamalladeva was staying in his camp at Kalyanapura, *mahapradhana* and *dandanayaka Potayya*. And Govindarajulu

¹Information from K.V. Ramesh, Director (Epigraphy) who was assisted by Madhav N. Katti, M.D. Sampath and S.P. Tewari, C.R. Srinivasan, S. Subramonia Iyer, Venkatesha, N. Nanjundaswamy and CAP. Sastri, and D.M. Nagaraju, S. Nagarjuna, S. Swaminathan, T.S. Ravishankar, S. Rajavelu and K. Karuppaiah of the Epigraphy Branch of the Survey, Mysore who found, examined and reported nearly 860 inscriptions of which the important ones are noticed here.

EPIGRAPHY

were administering Kondapalli-300 and made grants of lands for the worship, food-offerings and maintenance of perpetual lamp to the deity Kotisvaradeva on the occasion of Uttarayana-sankranti. The gift is stated to have been entrusted to a certain Suri-nayaka.

4. KAKATIYA INSCRIPTION, CHILUKURU, DISTRICT NALGONDA.— This inscription, engraved on a pillar set up in front of the Garuda-*stambha* of the Chennakesava temple, is in Sanskrit and Telugu languages and in Telugu characters. Dated Saka 1167 (in chronogram *giritarkka-rudra* = AD 1245), it belongs to the reign of *mahamandalesvara* Kakatiya Ganapati and registers the grant of lands in various places by the minister Manchena, for the worship and maintenance of perpetual lamp to the god Prasanna Chennakesavadeva installed by him at Chilukuru, for the merit of his brother Nuvularama (de*) va-preggada. The minister Manchena is described as the author of a work called *Raghunatharamacharita* and as a well-learned person.

5. TELUGU CHOLA INSCRIPTION, PANDIPADU, DISTRICT NELLORE.— This inscription, engraved on a stone near the sluice of a tank outside the village, is in Telugu language and characters. Dated Saka 1272 (AD 1350), it belongs to the reign of Manmasiddhayadeva-choda-maharaju. It registers the gift of lands belonging to the king (*prabhumanyam*), below the lake in village Pamdipadu by Devajiyya and Mallajiyya to a certain Komariredi. It also records the assignment of one fourth of the share of the gift to the god and the other two-thirds to the donor.

6. EASTERN CHALUKYA INSCRIPTION, VIJESVARAM, DISTRICT EAST GODAVARI.— This inscription, engraved on a pillar lying in the compound of a Siva temple outside the village, is written in Sanskrit and Telugu languages and in Telugu characters. Dated Saka 1093 (ADI 171), the record belongs to the reign of Vishnuvarddhana. It registers the grant of lands at Yodapalli for the food-offerings to the deity Vamsavarddhana Vijaisvara-mahadeva. Further, it also records the grant of lands by Vishnuvarddhana Vijayaditya to the same deity on a different occasion. The record also registers the gift of lands in the Parukarapalli village by Yarra Suryya Perggada, for the merit of Kulottungachoda-maharaju. Chamddaladevi, the queen of Vijayaditya is stated to have granted lands at Korapalli to god Vijaisvaradeva in the Saka year 1094 (AD 1172). Lokaraju, the *mahamandalesvara* is also stated to have made grant of lands in the village Nittur to the same deity.

KARNATAKA

7. RASHTRAKUTA INSCRIPTION, ANDOLA, DISTRICT GULBARGA.— This Kannada inscription, engraved on a slab kept by the side of the Atlingesvara temple, belongs to the reign of the Rashtrakuta king Kannaradeva. Dated Saka 834 (AD 912), it refers to the administration of his chief and *maneverggade* Kesari over Nareyamgal - 70 division and the *nalgamunda* Uttama, carrying on the duties of *gamunda*. The inscription registers the grant of 24 *mattars* of land by four individuals including Kubbayya, the son of *perggade* Gunugeyya for the worship of the deity Gunugesvara, the image of which was installed by them.

8. SEUNA (YADAVA) INSCRIPTION, ANDOLA, DISTRICT GULBARGA.— This Kannada inscription, engraved on a slab by the side of the Hanuman temple, belongs to the reign of the Yadava king Ramachandra. Dated Saka 1200 (AD 1278), it states that while Narayana-Naranadeva-nayaka and

Lakshmipattamahadevi-dandanayika, were governing Sagara-pattana, queen Sovala-devi got a lake excavated at Anadaleya-nagara, for the welfare of animals and *brahmanas*. It states that *mahamandalesvara* and *mandalika* Mallideva donated eight *mattars* of land, with the permission of *Unahaprad!w.niSagarasa-dandanayak&Mfotmulige,nakhara-murnmadifa* etc., to the deity Adinatha.

MADHYA PRADESH

9. SANSKRIT INSCRIPTION, RAMNAGAR, DISTRICT MANDLA.— This inscription, engraved on a stone slab built into the wall near the water tank in the Moti Mahal, is in Sanskrit language and Nagari characters. It belongs to the reign of a local chief Hridayesa who was ruling over Gunaniradhilegadh. Dated Vikrama 1724 (in numerals and chronogram *veda-netra-haya-indu*) (AD 1667), it contains an elaborate genealogy of the ruling king commencing from Yadavaraya and records the construction of a temple (*Vibhudhalaya*) as well as the installation of the images of Vishnu, Sambhu (Siva), Ganesa and Durga. The *prasasti* was composed by Jayagovinda.

TAMIL NADU

10. PALLAVA LABEL INSCRIPTIONS, MAHABALIPURAM, DISTRICT CHINGLEPUT.—The label inscriptions, engraved on the loose stones, are in Pallava-Grantha characters. They are in florid characters of seventh century AD and resemble those found engraved in the Tiruchchirappalli rock-cut cave inscriptions. The epithets like *Sri Raja-simha*, *Sri Ranajaya*, *Sri Chitrakarmukha* and *Sribhara* recorded here are identical with the *birudas* of Rajasimha II found engraved in the other Pallava monuments.

11. PALLAVA INSCRIPTION, MAHABALIPURAM, DISTRICT CHINGLEPUT.— This inscription, engraved on a semi-circular slab found on the northern side of the Shore temple, is in Sanskrit verse and written in Pallava-Grantha characters of seventh century AD. It is in praise of king Rajasimha.

12. KONGU-CHOLA INSCRIPTION, MUTTUKALLUR, DISTRICT COIMBATORE.—This Tamil inscription, engraved on a loose stone near a Siva temple, belongs to the Kongu-Chola king Virarajendra. Dated in his second regnal year (AD 1210), it refers to the provision made by Chembaril-chellan *alias* Kongalvan *alias* Narapati, a *vellala* of Mavandur *alias* Erivirapattanam in Vadaparisara-nadu for maintaining a *sandhi* lamp (twilight lamp) to the deity Isvaram-udaiyar.

13. TAMIL-BRAHMI INSCRIPTION, VIKKAMANGALAM, DISTRICT MADURAI.—This inscription, engraved on the inner face of a rocky outcrop, is in Tamil language and Tamil-Brahmi characters of first century BC. It states that the cave was caused to be made by Ara-iytan of Erayal.

14. PANDYA INSCRIPTION, KAVINATTUKKANMAI, DISTRICT PUDUKKOTTAI.—This Tamil inscription, engraved on the sluice of a lake, is in characters of eighth century AD. It belongs to the reign of Pandya king Maranjadaiyan and dated in his seventh year (AD 774). It states that the sluice was caused to be made by Uludanda Peruntinai Venkan of the place Kavirppal in Valla-nadu.

EPIGRAPHY

15. TAMIL BRAHMI INSCRIPTION, KILAPPUNGUDI, DISTRICT RAMANATHAPURAM. — This inscription, engraved on the top of entrance of the cave, is in Tamil language and Tamil-Brahmi characters of second century BC. It registers the fact that the cave (*pali*) was caused to be scooped out by one Kavitan of (the place) Ekkatu-ur.

16. PANDYA INSCRIPTION, MADAPPURAM, DISTRICT RAMANATHAPURAM. — This record, engraved on a stone built into the wall of the temple, is in Tamil language and Vatteluttu characters of ninth-tenth century AD. Though the record is damaged in the beginning, from the extant portion, it may be restored that the record belongs to the reign of the early Pandya king Maranjadayana. It registers the gift of fifty sheep for a perpetual lamp by Vilandai Siruvan *alias* Tennavan *alias* Pallavaraiyan of Mannuru. It is stated that Devar Vettikkudi Sendan-Karandan of this village undertook to supply one *ulakku* of ghee daily by the measure called *Solivan*.

17. PANDYA INSCRIPTION, MUDIGARAI, DISTRICT RAMANATHAPURAM. — This inscription, engraved on the door-jamb of the entrance into the *mandapa* of a Siva temple, is in Tamil language and characters of thirteenth century AD. Dated in the 13th + 13th year of the reign of Pandya king Kulasekhara, it states that Kanban-Uyakkon-Solakon caused the entrance (*tiruvasal*) to be made in the south of *mandapa* in the temple of Antarisaram-udaiya-nayanar at Mudikarai.

18. VIJAYANAGARA INSCRIPTION, TIRUPPATTUR, DISTRICT RAMANATHAPURAM. — The Tamil inscription, engraved on the north wall of the inner *gopura* in the temple of Tiruttalisvara, belongs to the reign of Vijayanagara king Immadi Narasimharaya. Dated Saka 1480 (mistake for 1482) (AD 1560), Raudra, it registers the sale of lands, by Timmarasar to a Vinayakasiva belonging to the lineage of Bhiksha-matha. It also states that the capital amount from the temple of Tiruttaliyanda-nayanar at Tiruppattur was endowed as *madappuram* for the *matha* established to the north of *Sivagengai* (tank) in the above temple.

19. TAMIL INSCRIPTION, ARAGALUR, DISTRICT SALEM. — This inscription, engraved on a slab built into the steps of the entrance of a Siva temple, is in Tamil language and characters of ninth-tenth century AD. It refers to a highway (*peruvalli*), probably leading to Kanchipuram. It also mentions the name Magadesin.

20. KONGU-CHOLA INSCRIPTION, DASASAMUDRAM, DISTRICT SALEM. — This Tamil inscription, engraved on a loose slab set up on the road side of the village, belongs to the Kongu-Chola king Rajarajachola. Dated in his eleventh regnal year (AD 1219), it states that Kamindan Pongil-Amandan-Kani and his brother, the residents of Kachchapalli in Puvaniya-nadu in Viracholamandalam got the repairs of the lake (of the village) carried out.

21. PANDYA INSCRIPTION, TYAGANUR, DISTRICT SALEM. — This inscription, engraved on the wall of the Perumal temple, is in Tamil language and characters of thirteenth century AD. The record belongs to the reign of Pandya king (?) Tribhuvanachchakravarti Konerinmaikondan. Dated in his second regnal year (AD 1255) it refers to the order of Vanakovaraiyar. It states that the village Karpundi, earlier given as *kani* to Malaimandalapperumal of Aragalur during the reign of Vikrama Pandya, was made over to the same person as *tiruvidaiyattam* from the month of Arpasi in the

nineteenth year of the reign of his *mamadi* (uncle) i. e., Hoysala Vira Somesvara. Further, it states that the wet and dry lands were received as *kani*, against the price-value (*karpura-vilai*) of 150 *panam* to be deposited into the temple treasury. The land dues thus received are also stated to have been remitted to the treasury.

22. PALLAVA INSCRIPTION, ENNAYIRAM, DISTRICT SOUTH ARCOT.—This Tamil inscription, engraved on a Jaina bed in one of the natural caverns of Melkudalur hill, is dated in the second year (AD 860) of the reign of Pallava king Nripatunga and registers the gift of seven hundred and fifty sheep by an officer of the king Karikudaiyar for maintaining a perpetual lamp to the deity Mulasthanattudevar at Sendamangalam in Panaiur-nadu.

23. CHOLA INSCRIPTION, ENNAYIRAM, DISTRICT SOUTH ARCOT.— This Tamil inscription engraved on a Jaina bed in one of the cavern of Melkudalur hill, is dated in the fourth regnal year (AD 875) of a Chola king Parakesarivarman (Vijayalaya ?). It registers the gift of five hundred sheep by Iliivaikundan *alias* Sembian Kadavadiyaraiyan for maintaining a perpetual lamp to the deity.

24. THREE CHOLA INSCRIPTIONS, ENNAYIRAM, DISTRICT SOUTH ARCOT.— These three Tamil inscriptions, engraved on Jaina beds in a natural cavern of the hill known as Melkudalurmali, belong to the reign period of Chola king Madiraikonda Kopparakesari (i.e., Parantaka I). Of these three records, two are dated in the twentieth year of his reign (AD 927) and the third is dated in his thirty-third year (AD 940). The first record registers the gift of six hundred sheep by Arumoli *alias* Viranaranappallavaraiyan for maintaining a lamp to the deity Tirumanikkoyirdevar of Sendamangalam in Panaiur-nadu. The second inscription registers the gift of seven hundred sheep for maintaining a lamp to the goddess Pidari of Sendamangalam in Panaiur-nadu by Pusan of Kulavalam. The third epigraph registers the gift of five-hundred sheep by Satvadevan *alias* Kilanattukkon of Kinanallur for maintaining a lamp to the deity (name not clear).

25. CHOLA INSCRIPTION, ENNAYIRAM, DISTRICT SOUTH ARCOT.—This Tamil inscription, engraved on a slab set up in front of the temple of Saptamatrikas, belongs to the reign of Chola king Rajarajadeva (I). Dated in his twenty-third year (AD 1008), it refers to the order of the king issued to the officers and to Kuvvagan Velan Aruran of Pudukkudi, while the king and the one hundred and twenty members of the annual labour welfare committee (*samvatsara-sramakaryan-tiruttuginra nurrirupadinmar*) of Rajaraja-chaturvedimangalam assembled at the *brahmasthana* known as *Rajarajan-tannirppandal*. It was decided by the members to endow sixty-eight sheep for maintaining a perpetual lamp and for a *sandhi* lamp once. The sheep endowed were left in-charge of Soman Modavi and Kadambur Nagandai and the two *manradis* Kadambur Kunavan and Malaiyar Madevan were responsible and stood as sureties (*punai*) to the endowment.

26. CHOLA INSCRIPTION, TIRUPPAINNILLI, DISTRICT TIRUCHCHIRAPPALLI.— This Tamil inscription, engraved on the east wall of the second *prakara* in the temple of Nilavanesvara, belongs to the reign of Chola king Kulottunga (III). Dated in his twenty-sixth year (AD 1204), it registers a deed recording the agreement on the authorised price of the land (*nila-vilaip-pramana-isaivu-tittu*) issued by Sirilango-bhattan and others of Punnamangalam, who had the *kani* rights at Nelveli in Melpalaru in

EPIGRAPHY

Pachchilk-kurram in Irajara-Valanadu, to the Adichandesvara-devar of the temple of Tiruppainniliudaiya-nayanar. It is further stated that thousand *kuli* of land was thus sold, after receiving the price value of five-hundred *narkkasu* and entering into an agreement.

27. Two TAMIL INSCRIPTIONS, VENGADATTAN TURAIYUR, DISTRICT TIRUCHCHIRAPPALLI.—Of the two

Tamil inscriptions in characters of thirteenth century, the first one engraved on the *adhishtana* of the porch in front of the *mahamandapa* on the *adhishtana* of the porch in front of the *mahamandapa* in the temple of Cholisvara, records an order (*Olai*) of the officer Akalankandalvan. It registers the grant of ten *ve/j* of land, made as *iraiyili* (tax-free) from the twenty-second year (the name of the ruling king is not specified), for conducting the worship and services (*tiruppani*) regularly to the deity Ulaguyyavanda-Cholisvaram-udaiya-nayanar, set up by Vellurudaiyar sembiyan Viradarayar.

The second record, engraved on the *jagati* of the *mahamandapa* of the same temple, belongs to the reign of Tribhuvanachakravarti Konerinmaikondan. Dated in his twenty-second regnal year, it records an order of Kangeyarayar issued to the *devakanmi* and *srimahesvara-kangani-cheyyar* of the temple of the deity Ulaguyyavanda-Cholisvaram-udaiar set up by Vellurudaiyan Sembiyan Viradarayan of Turaiyur in Ira (ja) ra (ja)-Valanadu, making four and a half land as *devadana* and as *iraiyili* (tax-free), after excluding half a land for the temple, *tirumadaivilagam* (land around the temple) and the sacred tank, from out of one and a half land, which was owned by him as *kani* land. The order, which was to take effect from the above regnal year, was duly signed by a number of officers.

28. LATER PANDYA INSCRIPTION, SANKARANKOYIL, DISTRICT TIRUNELVELI.— This inscription, engraved on the north wall of *ardhamandapa* in the temple of Sankaralinganathasvami, is in Tamil language and Tamil and Grantha characters. Dated Saka 1470, Kilaka (AD 1548), the record belongs to the reign period of the later Pandya king Parakrama-Pandya. It registers an order issued at the instance of king Tirunelveliperumal, to the officers in-charge of accounts, granting lands as *kanayachchai* (*kaniyatchi*), for the *tirumenikaval* services.

UTTAR PRADESH

29. BRICK INSCRIPTION, ERICH, DISTRICT JHANSI.— This inscription, engraved on a brick, is in Prakrit language and Brahmi characters of first century BC. It reads : ... *rajno Bandhukisa Damamitasa [pedarika]*.

30. PRATIHARA INSCRIPTION, SHANICHARA, DISTRICT SULTANPUR.— This inscription in three fragments, engraved on a stone found in the vicinity of Thakurbaba temple, is in Sanskrit language and Nagari characters of about the eighth-ninth century AD. The text of the inscription is in verse. The first fragment reads : *Bho° - and Maho°*. They could be restored as king Bhoja and his capital Mahodaya. The second fragment refer to an invocation to goddess Lakshmi (i. e., *Sri*), while the third mentions *Vikatakshara*, which is indicative of the characters of the record.

ARABIC AND PERSIAN INSCRIPTIONS¹

BIHAR

1. MISCELLANEOUS INSCRIPTIONS, DISTRICT GAYA.— This metrical Persian inscription from Sherghati records the death of Shah Sa'id who seems to be a saint, AH 1194 (AD 1780-81). One more inscription from the same place, composed by Saif, mentions commencement of construction of the mosque in AH 1229 (AD 1813-14) and its completion after one year by Maulvi' Abdu'r-Rahman.

2. EPITAPHS, DISTRICT PURNEA.— This epigraph from Chimni Bazar states that the grave is that of Qutbu'l Auliya, Jamal-ul-Haq Hadrat Bandagi Shaikh Mustafa Uthmani who hailed from Jaunpur and settled in Purnea. Another undated epitaph from the same place records the demise of **Hadrat** Shaikh Muhammad Siddiq who was the disciple (*murid*) and attendant (*khadim*) of the **above saint**. This epitaph from Purnea records the death of Muhammad' Ali Khan in AH 1217 (AD 1802-03). **One** more epitaph also from Purnea registers the demise of Ahmad' Ali Khan in AH 1258 (AD 1842).

3. MISCELLANEOUS INSCRIPTIONS, DISTRICT PURNEA.— This Persian **inscription from Purnea**, composed by Shahir, states that a mosque, a well, a bridge and a **Sarai were built by** Muhammad Hasan in AH 1265 (AD 1848-49). One more epigraph from the **same place** refers to the construction of another mosque by a lady whose name is **mentioned as** Jannatun-Nisa Khanam in the year AH 1286 (AD 1869-70).

GUJARAT

4. EPITAPHS, DISTRICT JAMNAGAR.— Eight epitaphs were copied from a graveyard in Jamnagar which furnish dates of the demise of some saintly persons and learned men of the Bohra community. Their names and dates are given as under: Shaikhul-Mashaikh Maulana Zakiu'd-Din **Mulla Shaikh** Abdu'l-Latif son of Mulla Ismai'l Safiullah died in AH 1101 (AD 1690); **Shaikhul Mashaikh Maulai** Shaikh Adam Safiullah, son of Shaikh Tayyab, son of Shaikh Ismai'l died in **AH 1110 (AD 1699)**; Shaikhul Mashaikh Maulana Kalimu'd-Din Musa Bhai Safiullah, died in **AH 1122 (AD 1711)**; Shaikhul Mashaikh Sayyidna Badru'd-Din Mulla Ismai'l Safiullah, son of Shaikh **Adam, son of 'Abdu'l Latif** died in AH 1150 (AD 1737); Sayyidi Maulai Musa Bhai Kalimud-Din Safiullah, son of Sayyidna Badru'd-Din died in AH 1185 (AD 1772). Maulai Shaikh Adam Safiu'd-Din died in AH 1252 (AD 1836); Shaikh Adam son of Shaikh Fazil Abd-e-Sayyidi, died in **AH 1262 (AD 1845-46)**; Hibtullah Jamalu'd-Din, son of Shaikh Adam Safiu'd-Din, son of Maulana **Zakiu'd-Din, died in AH 1275 (AD 1859)**.

5. MISCELLANEOUS INSCRIPTIONS, DISTRICT JAMNAGAR.—An inscription **from Jamnagar, composed** by Sayyid Faiz, records in two chronograms the date of death of Sayyid Miran **Muhammad alias**

¹Information from **M.F. Khan**, Superintending Epigraphist assisted by **S.S. Hussain, M.Y. Quddusi, M.I. Quddusi, G.S. Khwaja** and **MA. Siddiqi** of the Epigraphy Branch of the Survey, Nagpur. **One hundred and thirty-six inscriptions** were copied, examined and reported during the year under review, **out of which important ones are noticed here.**

EPIGRAPHY

Sayyid Mir Shah, son of Zain-ul-'Abedin, who expired in AH 1248/VS 1885 (AD 1832). Another epigraph from the same place states that a mosque, a *khanqah* and a tomb were built under the supervision of Piruz Khan, in AH 1288 AD 1871-72) by Nathi Bai.

6. INSCRIPTION OF NAWWABS OF JUNAGADH, DISTRICT JUNAGADH.— This inscription from Dhan Fuliya, of the time of Muhammad Rasul Khan, Nawwab of Junagadh, states that the tomb of Hadrat Shirazi Shah was quite old and in a ruinous condition hence it was renovated in AH 1311 (AD 1893), during the time of prime ministership of Muhammad Baha-u'd-Din Khan.

7. MISCELLANEOUS INSCRIPTIONS, DISTRICT RAJKOT.— This epitaph from Dhoraji states that Sayyidi Shaikh Miyan Sahib Ghulam Husain son of Mulla Ismai'l Ji died in AH 1011 (AD 1602). Another undated inscription from the same place points out that the three graves are those of Hadrat Fadl-i-Haq Sarhindi, Sher Muhammad and Imam-Din Naqshbandi and both the latter deceased persons were Khalifa of the former.

KERALA

8. MISCELLANEOUS INSCRIPTIONS, DISTRICT CANNANORE.— Found in Baliapatnam, this fragmentary and loose inscription in Arabic language, executed in beautiful Kufic characters, is the earliest dated record copied from this region. It throws light on the early settlement of Arabian traders in Kerala hence the information furnished by the inscription is quite valuable. The epigraph (pl. XLII A) records the demise of 'Ali son of Kasuri (?) in AH 471 (AD 1078). Another inscription records the renovation of the tomb of Sayyid Ahmad Jalal-u'd-Din al-Bukhari (i.e., from Bukhara in the USSR), son of Sayyid Muhammad Mihdar, the *Qadi* of Baliapatnam, in AH 1266 (AD .1849-50). One undated epitaph from the same place records the demise of Nasir-u'd-Din Mahmud son of Maulana Sharafu'd-Din, the Khatib.

9. MISCELLANEOUS INSCRIPTION, DISTRICT KASARAGOD.— This epigraph from Kasaragod, written on wooden plank, furnishes an important piece of information that Malik Bin Dinar came to India from Arabia along with Sharaf son of Malik, his maternal uncle, and Malik son of Habib, son of Malik, his nephew, and built this mosque in Kancharkot in the year AH 22 (AD 643). It also states that Malik, son of Ahmad, son of Malik, was appointed as *Qadi*. It further states that the said mosque was reconstructed with the monetary support of one of the residents of the town in AH 1223 (AD 1808-09).

LAKSHADWEEP ISLANDS

10. EPITAPHS, DISTRICT KAVARATTI.— A good number of inscriptions were copied for the first time from Kavaratti. These are the death records of the persons who settled here. Of these records, the first written in Malayalam in Arabic characters mentions the death of Khadija in AH 1213 (AD 1798). The second epitaph registers the demise of Abi Salih al-Husaini Rahmani in AH 1280 (AD 1864). The third inscription states that Muhammad Ahmar, son of 'Abdu'l-Qadir ar-Rifai, al-Qadiri, who performed Haj, who was a learned and pious man, died in AH 1308 (AD 1891).

11. EPITAPH, DISTRICT KAVARATTI.— This epitaph found in Minicoy records the death of a lady named Khadidh(j)a, the daughter of Musa, in AH 1234 (AD 1819).

PUNJAB

12. INSCRIPTION OF MUGHALS, DISTRICT SANGRUR.— This fragmentary and damaged metrical inscription, in Persian, executed in beautiful Thulth characters, was found lying loose in the Government High School, Sunam (originally from an old mound near the Civil Hospital). It provides us a new record of emperor Akbar which refers to the construction of a magnificent mosque in the year AH 987 (AD 1579-80), Unfortunately, other details are lost.

RAJASTHAN

13. INSCRIPTION OF MUGHALS, DISTRICT JAISALMER.— This important inscription from Bada Bagh, executed in beautiful Nasta'liq characters, is a new record inscribed by Mir Muhammad Ma'sum, a celebrated nobleman of the Mughal emperor Akbar (pi. XLII B). It states that Mir Ma'sum was called back from Qandhar where he was posted for some assignment and while passing through this place he inscribed this epigraph as a memento to his visit in AH 1008 (AD 1599-1600). This and several other records of this person who was not only the trusted nobleman of the emperor but also a historian, a poet and a good calligrapher of Nasta'liq style, provide quite valuable information indicating the route for going to Iran .where he was sent as an ambassador.

14. MISCELLANEOUS INSCRIPTION, DISTRICT JHUNJHUNU.— This epigraph from Jhunjhunu records the construction of a well and an ablution tank (*haud*) by Qamar-u'd-Din Shah, a saintly figure of the town, in AH 1258 (AD 1842). It also provides the information about the cost of the construction as one thousand and six hundred rupees. Another record from the same place states that Qamar-u'd-Din Shah (the above builder) died in AH 1274 (AD 1857).

15. MISCELLANEOUS INSCRIPTION, DISTRICT PALI.— This Persian inscription found in Pali records the demise of Hadrat Shah 'Abdullah *alias* Shah Bhina, in AH 1207 (AD 1792).

16. EPITAPH, DISTRICT PALI.— This epitaph from Sojat provides a valuable piece of information that Nawwab Muhammad 'Ali Shah of Lucknow who was locally known as Mastan Shah, was the paternal uncle of Nawwab Wajid' Ali Shah. He came to Sojat in AD 1855 and settled here and died in AD 1895 at the age of 95 years.

TAMIL NADU

17. EPITAPHS, DISTRICT CHIDAMBARNAR.— This epitaph, found in a graveyard in Kayalpattinam records the death in the year AH 1215 (AD 1800) of a pious lady, daughter of Ahmed Naina, a businessman, and wife of Sayyid Ahmad, a learned man. One more epitaph from the same place registers the demise of Sayyid Ahmad son of Nuh Wali-ullah al-Bakkari (belongs to Bakkar in Sind) al-Qahiri in AH 1216 (AD 1801). He is stated in the inscription as a very learned man.

WEST BENGAL

18. MISCELLANEOUS INSCRIPTION, DISTRICT MALDA.— This inscription found in Inayatpur states that the Jami' mosque was built by Haji Shaikh Khair-ullah and Shaikh Zangu who hailed from

EPIGRAPHY

Inayatpur and Dipu. The most striking feature of the inscription is that it mentions Bangla era 1287 (AD 1881-82) as the year of construction of the mosque.

19. EPITAPH, DISTRICT MURSHIDABAD.— This epitaph from Murshidabad records the death of a Begam (name not given, but seems to be a lady from the royal family of Nawwabs of Murshidabad) in AH 1195 (AD 1780-81).

III. NUMISMATICS AND TREASURE TROVE¹

ANDHRA PRADESH

1. LEAD COINS, AMARAVATI, DISTRICT GUNTUR.— A number of round lead coins of the Ikshvaku kings (third century AD) were found during debris clearance work at the Mahastupa.

2. LEAD COIN, TULLURU, DISTRICT GUNTUR.— More than nine thousand round lead coins of the Ikshvaku kings were found buried in an earthen pot found during the construction of a house by a local resident.

KARNATAKA

3. SILVER COINS, GULBARGA, DISTRICT GULBARGA.— Fifty-four silver coins of the period of the queen Victoria (AD 1840-1893) were received as treasure trove.

4. GOLD OBJECTS, ALUR, DISTRICT HASSAN.— One hundred and thirty-eight gold coins, one gold piece, two ear rings and a *tali* found at Wate gole channel at Alur were acquired as treasure trove.

5. GOLD COINS, KALE UPPALAHALLI, DISTRICT KOLAR.— One hundred and sixteen gold coins of the period of Tipu Sultan (AD 1750-1790) found at Kale Uppalahalli in Taluk Gauribidnur were acquired as treasure trove. Out of these, one hundred and six are *phanams* and ten are half *phanams*.

RAJASTHAN

6. ADI VARAHA TYPE COINS, SAMBHAR, DISTRICT JAIPUR.— A hoard containing one hundred and thirty-three Adi Varaha type coins belonging to the ninth-tenth century were found at Sambhar. The obverse of the coins contains the figure of the boar incarnation of Vishnu and on the reverse the title of the ruler '*Srimad-Adi Varaha*' in Nagari characters.

WEST BENGAL

7. COPPER HOARD, KHAJRAVERI, DISTRICT MIDNAPORE.— The Calcutta Circle of the Survey acquired through Keshiary Police Station seven Copper hoard objects (pls. XLIII-XLIV) found in the village Khajraveri by labourers while digging for *murum*. Out of the seven objects, six are shouldered celts, while one is a humped bull measuring 29-3 cm in length and 21 m in height and 1 -2 to 1-5 cm in thickness. This humped bull is a unique piece since it appears to be a solitary example of its kind in the entire Copper Hoard assemblage.

8. PALA COPPER PLATES, BANGARH, DISTRICT WEST DINAJPUR.— Two inscribed copper plates belonging to Madanapala Deva of the Pala dynasty were found within the protected area of Bangarh (pls. XLV-XLVI). Measuring 41 X 41 cm and 42 X 42 cm, these two plates are in the possession of the District Magistrate, West Dinajpur.

¹Information from 1,2, Hyderabad Circle, and 7,8, Calcutta Circle of the Survey; 3-5, Directorate of Archaeology and Museums, Karnataka; and 6, Directorate of Archaeology, Rajasthan.

IV. OTHER IMPORTANT DISCOVERIES

ANDHRA PRADESH

1. LABEL INSCRIPTION, AMARAVATI, DISTRICT GUNTUR.— J. Vara Prasad Rao of the Hyderabad Circle of the Survey noticed a fragmentary label inscription containing two lines, engraved on a limestone slab in Brahmi characters of second century AD (pl. XLVII A). It was found during the debris clearance at the Mahastupa, Amaravati.

2. RELIC CASKETS, AMARAVATI, DISTRICT GUNTUR.— During the conservation work near the western *ayaka* platform of the Mahastupa, a small crystal casket (pl. XLVII B), in a miniature squat carinated red ware pot covered by shallow lid, was found from a level below the *pradakshina-patha*. The contents of the casket included twelve irregular short cylindrical pendants of bone, one faceted rock crystal pendant and one flat rectangular and one hexagonal bead of beryl (aquamarine).

Another crystal casket (pl. XLVIII A) was noticed near the rear side of the eastern *ayaka* platform by D.R. Gehlot of the Hyderabad Circle of the Survey. The casket contained eight tiny pearl beads, one unfinished crystal spacer bead and a double-pearl bead. The casket is in two parts representing a slightly elongated stupa with a knobbed top. The casket, 42 mm high and 27 mm in diameter, can be dated to *circa* second century AD.

Besides, numerous broken pieces of ivory casket (pl. XLVIII B) were also found from a level below 80 cm from the surface near the northern *ayaka* platform of Mahastupa. After partial reconstruction, the casket was found to be of vase shape, similar to that found at Piprahwa.

3. DECORATED SLAB, ARUGOLANU, DISTRICT WEST GODAVARI.— A rectangular polished sand stone slab (42.5 X 17.0 X 3.4 cm) decorated with patterns like the Brahmi letter 'MA' or the *taurine* and *triratha* symbols separated by bell motif, in low relief, was found near the protected mound at Arugolanu by R.V. Siva Sarma of Hyderabad Circle of the Survey.

BIHAR

4. STONE IMAGE OF BUDDHA, SULTANGANJ, DISTRICT BHAGALPUR.— Shrikant Bhagat of Bhagalpur Museum, Bhagalpur, reported the chance discovery of an image of Buddha (39 X 21 cm) sitting in the *padmasana* and exhibiting the *vyakhyana mudra*, in black stone, while laying the railway track.

KARNATAKA

5. STRUCTURAL REMAINS, MALLIKARJUNA TEMPLE, KURUVATTI, DISTRICT BELLARY.—The Bangalore Circle of the Survey reported the discovery of a flight of steps along with balustrade showing a lion trampling warriors and elephant while levelling the area around the temple.

6. MEDIEVAL INSCRIPTIONS, HAMPI, DISTRICT BELLARY.— Several inscriptions of Vijayanagara period were noticed at Hampi by the Department of Archaeology and Museums, Government of Karnataka.

7. TIRTHANKARA IMAGE, MULLUR, DISTRICT COORG.— While desilting the well within the stepped tank in the Jaina temple complex at Mullur, a bronze image of a *tirthankara* (70 X 25 cm), slightly damaged near the nose, was discovered by the Bangalore Circle of the Survey. The crudeness of manufacture suggests its local origin and late date (*circa* seventeenth century AD).

8. REMNANTS OF BRICK STRUCTURES, SIDDHESVARA TEMPLE, HAVERI, DISTRICT DHARWAR.— While levelling the area north-west of Siddhesvara temple, the Bangalore Circle of the Survey, brought to light part of a brick (size: 35 X 27 X 9 cm) structure in the form of two walls running in north-south and east-west directions respectively. Associated with the remains were fragments of sculptures particularly of Sarasvati along with a *yonipitha*. The structure can be dated to the early medieval period (eighth-ninth century AD).

9. KANNADA INSCRIPTIONS, GANGAVADI, DISTRICT MYSORE.—The Directorate of Archaeology and Museums, Karnataka, noticed two Kannada inscriptions, assignable to the sixteenth century AD, near the Veerbhadresvara temple at Gangavadi.

MADHYA PRADESH

10. ANCIENT REMAINS AND SCULPTURES, GONDARMAU, DISTRICT BHOPAL.— Narayan Vyas and N.S. Pawar of Bhopal Circle of the Survey noticed sculptures belonging to Paramara period. Apart from that medieval pottery was also collected from the vicinity of the village.

11. TAMIL INSCRIPTION, ASIRGARH, DISTRICT EAST NIMAR.— H. Michael of Bhopal Circle of the Survey noticed a Tamil inscription fixed on a grave of a Britisher at Asirgarh.

12. STONE AGE TOOLS NEAR ISAGARH, DISTRICT GUNA.— Narayan Vyas and H. Michael of Bhopal Circle of the Survey collected Early Stone Age tools of Acheulian type from the agricultural field in between Isagarh and Kadwaha.

13. PARAMARA SCULPTURES, BHOJPUR, DISTRICT RAISEN.— S.N. Shrivastava of the Bhopal Circle the Survey, during the course of conservation work of Siva temple, noticed a few beautiful fragmentary sculptures including the head of Chamunda of Paramara period.

14. ROCK PAINTING, SANDERA, DISTRICT RAISEN.— Narayan Vyas of the Bhopal Circle of the Survey noticed mesolithic rock paintings depicting hunting scene, animal figures, human figures with harpoons, peacock, etc., painted in red colour in the vicinity of the village.

15. STONE AGE TOOLS, AMARMAU, DISTRICT SAGAR.— Narayan Vyas of the Bhopal Circle of the Survey and C.B. Trivedi discovered Early Stone Age tools in the vicinity of the village.

16. MICROLITHS, B AIJNATH, DISTRICT UJJAIN.— Narayan Vyas of the Bhopal Circle of the Survey, collected microliths near the site known as Baijnath on Jharda-Mahidpur road.

OTHER IMPORTANT DISCOVERIES

17. PARAMARA SCULPTURES, INOOKH, DISTRICT UJJAIN.— Narayan Vyas of the Bhopal Circle of the Survey, noticed a number of sculptures representing Parvati, Uma-Mahesvara, human and *makara-pranala*, etc., of Paramara period in the vicinity of the village.

18. ANCIENT MOUND KARADIA, DISTRICT UJJAIN.— Narayan Vyas of the Bhopal Circle of the Survey, collected Kushana, Gupta and medieval pottery and glazed ware from an ancient mound, between Ujjain-Sauwer road.

19. ANCIENT SCULPTURES, BADOH-PATHARI, DISTRICT VIDISHA.— R.S. Shrivastava of the Bhopal Circle of the Survey collected mutilated sculptures of Vishnu, Naga, etc., in the vicinity of the village. The sculptures belong to *circa* second-third century AD in the Indo-Sassanian style.

20. RUINED STUPA, GYARASPUR, DISTRICT VIDISHA.— H. Michael of the Bhopal Circle of the Survey noticed a small ruined stone brick stupa on a hill top near Maladevi temple.

MAHARASHTRA

21. DEVANAGARI INSCRIPTION, DHANDHARPHAL, DISTRICT AHMEDNAGAR.— Ajit Kumar of the Aurangabad Circle of the Survey noticed an inscription in Devanagari script at Dhandharphal village.

22. BRAHMI INSCRIPTION, PITALKHORA, DISTRICT AURANGABAD.— S.K. Mitra of the Aurangabad Circle of the Survey noticed Brahmi inscription over the pilaster of the Cave 4. It has six letters, reading *Bhatarabhitaya*. On palaeographical ground the inscription can be dated to second century BC

23. DEVANAGARI INSCRIPTION, TALWADA, DISTRICT BEED.— S.L. Jadhav of the Aurangabad Circle of the Survey noticed an inscription on the *dipastambha* of the temple in the village.

24. ROCK-CUT TEMPLE, KALIGHAT CHALISGAON, DISTRICT JALGAON.—P.N. Kamble of the Aurangabad Circle of the Survey, during his exploration, noticed a rock-cut temple measuring 12 X 12 X 5 cm at Kalighat in Chalisgaon.

MANIPUR

25. BRONZE VESSELS, NAMBOL, DISTRICT BISHNUPUR.— The exploration team of the Directorate of State Archaeology, Government of Manipur, noticed two bronze vessels kept on stand at Nambol.

RAJASTHAN

26. INSCRIPTIONS AND WALL PAINTINGS IN DISTRICT BANSWARA.—Prakash Bapna of the Department of Archaeology and Museums, Rajasthan, noticed two inscriptions, dated VS 1442 (AD 1364) and VS 1136 (AD 1059) at Lakshmi-Narayan temple, Banswara and the Siva temple, Panahera respectively.

In addition to these inscriptions he also noticed and documented the wall-paintings, datable to the nineteenth century, at Banswara palace and Diwan Bhavan, Banswara and at the Jaina temple, Tilwara of the District.

TAMIL NADU

27. INSCRIPTIONS, PALANAIYUR, DISTRICT CHENGLEPUT.— The Department of Archaeology, Tamil Nadu, noticed an inscription of Rajaraja I, engraved on a pillar, in front of Siva temple. Inscriptions of Kulottunga Chola I were also noticed around the *garbhagriha*. The name of individual who constructed the temple is mentioned as *Pagai Mayipalam Sattan*. The inscription also mentions the lord of the temple as *Sri Mahaladeva*.

28. INSCRIPTIONS, CHOLAMADEVU, DISTRICT TRICHY.— The Directorate of Archaeology, Tamil Nadu, found inscriptions engraved in the temple. One of the inscriptions is assignable to the period of Virarajendra.

UTTAR PRADESH

29. MISCELLANEOUS OBJECTS, SARNATH, DISTRICT VARANASI.— An earthen jar containing gold objects and earthen/metallic ritualistic objects wrapped in gold foil, was discovered accidentally from the slope of the mound towards the west of the main shrine at Sarnath. The objects recovered included the leaves and flowers made of paper thin gold leaf, beads, discoids and squarish ornaments, an ornate lid in gold and unused sheafs of gold leaf, copper replicas of pomegranate, a toy-wheel covered with gold foil and damaged clay figurines wrapped in gold leaf, some art motifs like *nandipada* or *tri-ratna* and an acanthus-leaf, besides copper bells and beads of semi-precious stones. The constituents of the collection indicated them to be either of religious significance or connected with Buddhist funerary practices.

V. RADIOCARBON DATES¹

The following radiocarbon measurements¹ were made on archaeological and quaternary samples.² All the dates are based on 5730 ± 40 years half-life value of radiocarbon. The year 1950 is the base year to convert these dates into AD/BC scale. All the dates are uncorrected for $^{14}\text{C}/^{12}\text{C}$ variation.

ARABIAN SEA

1.	OFF SAURASHTRA COAST	
	i. PRL-1315. Quaternary	4690±100
	Sediment cores from 100-110 cm depth site station no. 3952	
	ii. PRL-1310. Quaternary	8340±140
	Sediment cores from 0-5 cm depth, site station no. 3944	
	iii. PRL-1320. Quaternary	10340±150
	Sediment cores from 150 cm depth, site station no. 3958	240
	OFF AMBALAPUZHA	
	i. PRL-1464. Marine sediment	1300±150
	Shells from sediment core, depth 2-32 to 2-35 m Sender's sample no. VC 10/1	
	ii. PRL-1465. Marine sediment	500±100
	Shells from sediment core, depth 4-25 to 4-29 m Sender's sample no. VC 13/1	

¹Contributed by Sheela Kusumgar and M.G. Yadava, Physical Research Laboratory, Navrangpura, Ahmedabad 380 009. Further details of the dated samples can be obtained from excavators.

²Samples submitted by: 1, National Institute of Oceanography, Dona Paula, Goa; 2-3, Geological Survey of India, Marine Wing, Cochin; 4, Department of Anthropology, Dibrugarh University, Assam; 5, University Museum, 33rd & Spruce Streets, Philadelphia, USA, and Department of Archaeology, Ahmedabad, Gujarat; 6, Kurukshetra University, Kurukshetra, Haryana; 7, Earth Science Division, Physical Research Laboratory, Ahmedabad; 8, Archaeological Survey of India, New Delhi; 9, Vikram University, Ujjain; 10, Archaeological Survey of India, Excavation Branch-I, Nagpur; 11-12, Deccan College, Post-graduate and Research Institute, Pune; 13, Department of Ancient Indian History, Banaras Hindu University, Varanasi; 15, Directorate of Archaeology, Calcutta, West Bengal; 16, Department of Archaeology, Calcutta University, Calcutta; 17, R.S.I.C., North-Eastern Hill University, Shillong; 18, Department of Archaeology, University of Ibadan, Nigeria.

3. OFFPONNANI	
i. PRL-1383. Marine sediment Decayed wood from sediment core, depth 1-35 to 1-38 m Sender's sample no. GC 15/1	8230±210
ii. PRL-1384. Marine sediment. Decayed wood from sediment core, depth 200 to 2-10m Sender's sample no. GC 12/2	10240±580 540
iii. PRL-1385. Marine sediment. Decayed wood from sediment, core, depth 1-15 to 1-18 m Sender's sample no. GC 16/1	8360±210
iv. PRL-1386. Marine sediment Peat from sediment core, depth 0-89 to 0-95 m Sender's sample no. GC 14/c	8690±180
v. PRL-1387. Marine sediment Decayed wood from sediment core, depth 1-60 to 1-65 m Sender's sample no. GC 17/1	9530±240

ASSAM

4. KACHUANI, DISTRICT DIBRUGARH	
PRL-1233. Neolithic Culture Brownish soil, depth 2-5 m, trial trench, Sender's sample no. 1.	2210±140

GUJARAT

5. ORIYO TIMBO, DISTRICT BHAVNAGAR	
i. PRL-1411. Lustrous Red Ware Charcoal from trench S2SW, layer 5A depth 0-55 m Sender's sample no. 11262	3930±110
ii PRL 1424. Lustrous Red Ware Charcoal from trench S8, layer 5, depth 0-60 m Sender's sample no. 11847	3860±140
iii. PRL-1425. Lustrous Red Ware (?) Charcoal from trench S6, layer 6B Sender's sample no. 11689	5150±170

RADIOCARBON DATES

- | | | |
|-----|--|----------|
| iv. | PRL-1426. Lustrous Red Ware (?)
Charcoal from trench S2, layer 4,
depth 1-3 m
sender's sample no. 11297 | 4380±160 |
| v. | PRL-1427. Lustrous Red Ware
Charcoal from trench 89, layer 6,
depth 0-7 m
Sender's sample no. 11949 | 3330±110 |

HARYANA

- | | | |
|----|---|----------|
| 6. | BALU, DISTRICT JIND
PRL-1007. Harappa Culture
Charcoal from trench FXI,
Stratum 16, depth 3.5 m. | 4200±170 |
|----|---|----------|

HIMACHAL PRADESH

- | | | |
|----|---|--------|
| 7. | KUNTBHAYO, DISTRICT MANDI
PRL-1498. Lake sediment
Organic portion of lacustrine sediment,
depth 0-80 to 0-85 m Sender's sample no. 1
K3-1 and 1 K3-2. | Modern |
|----|---|--------|

JAMMU AND KASHMIR

- | | | |
|----|---|---------|
| 8. | LADAKH
PRL-1430. Old temple structure
Fragments of wood from ancient
temple structure. | 760±155 |
|----|---|---------|

MADHYA PRADESH

- | | | |
|-----|--|----------|
| 9. | Mahidpur, District Ujjain | |
| i. | PRL-1382. Chalcolithic Culture
Charcoal from trench MDP, Tr. I, layer 7,
depth 2-21 m Sender's sample no. 92 | 3600±160 |
| ii. | PRL-1318. Chalcolithic Culture
Charred grains from trench MDP, Tr. I, layer
4, depth 012 m. | 3870±100 |

MAHARASHTRA

10. ADAM, DISTRICT NAGPUR
 PRL-1369. Painted potsherds with 3230+325
 copper Charcoal from trench 55, layer -310
 17, depth 70 m
 Sender's sample no. ADM/CS-011

RAJASTHAN

11. MALAR SALT LAKE, DISTRICT JODHPUR
 i. PRL-1390. Soil sediment 16660+7590
 Organic portion of well section W4, -3890
 depth 1-30 to 1-45 m
 Sender's sample no. 8
 ii. PRL-1391. Soil sediment 9990+780
 Organic portion of well section W2, -710
 depth 1-75 to 1-95
 Sender's sample no. 7
 iii. PRL-1392. Soil sediment 10080+530
 Organic portion of well section W1 -500
 depth 0-75 to 0-85 m
 Sender's sample no. 6.
 iv. PRL-1393. Soil sediment 15920+1130
 Organic portion of well section W1 -3580
 Sender's sample no. 5
 v. PRL-1394. Soil sediment 14450+6450
 Organic portion of well section W1 -3580
 depth 3-50 to 3-70 m
 Sender's sample no. 4.
12. THOB, DISTRICT BARMER
 i. PRL-1396. Soil sediment 11540+4170
 Organic portion, depth 2-80 to 30m -2760
 Sender's sample no. 2
 ii. PRL-1397. Soil sediment 12590+6340
 Organic portion, depth 3-20 to 3-40 m -3550
 Sender's sample no. 1

RADIOCARBON DATES

TAMIL NADU

13. KODUMANAL, DISTRICT PERIYAR
PRL-1182. Megalithic Culture 1550±90
Charcoal from trench MEG-2, Cist A,
Layer 2, depth 1-8 m Sender's sample
no. TML-3

UTTAR PRADESH

14. Narhan, District Gorakhpur
PRL-1252. Black and Red Ware 930±100
Charcoal from trench R13, layer 4
Sender's sample no. 1.

WEST BENGAL

15. PANDU RAJAR DHIBI, DISTRICT BARDHAMAN
i. PRL-1185. Period II 2950±140
Charcoal from trench A, layer B,
depth 1-89 m Sender's sample no.
III
ii. PRL-1184. Period II 3130±110
Charcoal from trench A, layer 9,
depth 2-7 m Sender's sample no. II
iii. PRL-1183. Period I 2880±110
Charcoal from trench B, layer 12, depth
3-18 m Sender's sample no. I
16. MANGALKOT, DISTRICT BARDHAMAN
PRL-1358. Chalcolithic Period 1870±115
Charcoal from layer 7 and B,
depth 2-82 to 3-50 m
Sender's sample no. MGKT-2/89.

SAMPLES FROM ABROAD

IRELAND

17. OFF SEA COAST, WEST IRELAND
PRL-1255. Wood from Swampy land, 4620±110
depth 2.0 m.

NIGERIA

- | | | |
|-----|--|-----------|
| 18. | HOUSE 1 (KA4S2), DISTRICT USHONGO | |
| | i. PRL-1292. Historical levels | 1130± 160 |
| | Charcoal from trench House 1, layer 2 | |
| | Sender's sample no. 1. | |
| | ii. PRL-1293. Historical levels | 3101150 |
| | Charcoal from trench house 1, layer 7, | |
| | Sender's sample no. 2 | |
| | iii. PRL-1294. Historical levels | 5801130 |
| | Charcoal from trench test-pit-1, | |
| | layer 1, depth 01 m | |
| | Sender's sample no. 3. | |
| | iv. PRL-1295. Historical levels | Modern |
| | Charcoal from trench test-pit-1, | |
| | layer 6, depth 0.54 m | |
| | Sender's sample no. 4. | |

VI. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS¹

BIHAR

1. SENUWAR, DISTRICT ROHTAS.— Food grains recovered through excavations of Neolithic and Neolithic-Chalcolithic horizons (Pd. I and IB; *Ca.* 2,000-1,200 BC) at Senuwar (lat. 24* 56' N; long. 83* 56' E) in 1987, have already been reported (1986-87, p. 129). Further collection of seeds and fruit remains made in a renewed excavation during 1990, has also been incorporated to reconstruct the regional model of subsistence economy of Neolithic and Chalcolithic culture at this site, from 2,000 BC to 600 BC. An overall picture is given as below :

A. PERIOD IA (Neolithic; *circa* 2,000-1, 800 BC): Food grains comprise rice (*Oryza sativa*), barley (*Hordeum vulgare*), dwarf-wheat (*Triticum sphaerococcum*), jowar-millet (*Sorghum bicolor*), ragi-millet (*Eleusine coracana*), lentil (*Lens culinaris*), grasspea (*Lathyrus safivus*) and field-pea (*Pisum arvense*). In association the weeds and wild taxa are identified as *Setaria glauca*, *Vicia hirsuta*, *Vicia sativa*, *Amaranthus* sp., *Oryza rufipogon*, *Panicum* sp., *Rumex dentatus*, *Coix lachryma-jobi*, *Ipomoea pestigridis*, *Artocarpus lakoocha* and *Ziziphus nummularia*.

B. PERIOD IB (Neolithic-Chalcolithic; *circa* 1,800-1,200 BC): In addition to rice, barley Jowar-millet, dwarf-wheat, lentil, grass-pea and field-pea of the same kinds as from Period IA, bread-wheat (*Triticum aestivum*), kodon-millet (*Paspalum scrobiculatum*), chickpea (*Cicerarietinum*), green-gram (*Vigna radiata*) and horse-gram (*Dolichos biflorus*) are new finds from this period. Associated seeds and fruits of weeds and wild taxa belong to *Ziziphus oenoplea*, *Vicia sativa*, *Melilotus* sp., *Euphorbia* sp., *Lathyrus aphaca*, *Datura* sp., *Coccinia grandis*, *Trianthema* sp., *Polygonum plebejem*, *Oryza rufipogon*, *Panicum* sp., *Setaria glauca*, *Desmodium* sp., and *Rumex dentatus*.

C. PERIOD II (Chalcolithic ; *circa* 1,200-600 BC) : Evidence of almost all the food grains encountered in earlier periods, is noticed. Aconite-bean (*Vigna aconitifolia*) and the oil-seeds of sesame or *til* (*Sesamum indicum*), *safflower* (*Carthamus tinctorius*) and linseed (*Linum usitatissimum*) are the new additions", which mark further advancement in the crop economy during this period. Associated weeds and other wild taxa belong to *Cenchrus ciliaris*, *Indigofera* sp., *Mimosa* sp., *Perilla ocimoides*, *Datura* sp., *Asphodelus tenuifoliosus* and *Ziziphus nummularia*.

GUJARAT

2. SHIKARPUR (lat.23* 15' N; long. 70* 39' E), DISTRICT KUTCH. — Carbonized seeds, fruits and woods collected from the Harappan levels (*circa* 2,500-2,200 BC) during the course of excavations in 1988-89 and 1989-90, have been identified. Food grains of bread-wheat (*Triticum aestivum*), ragi-

¹Contributed by K.S. Saraswat and Chanchala, Birbal Sahni Institute of Palaeobotany, 53, University Road, Lucknow-226007.

millet (*Eleusine coracana*) and a lesser millet (*Setaria* species) have been found in association with weeds and wild taxa belonging to *Dactyloctenium aegyptium*, *Poa* sp., *Silene* sp., *Trianthema portulacastrum*, *Indigofera* sp., *Melilotus indica*, *Desmodium* sp. and *Ziziphus nummularia*.

Wood charcoals belong to *khejri* (*Prosopis spicigera*), *jujube* (*Ziziphus* sp.), *babul* (*Acacia nilotica*), *maini* or *mainphal* (*Randia dumetorum*), silk-cotton (*Salmalia malabarica*), *anjan* (*Hardwickia binata*), *sal* (*Shorea robusta*) and some taxa of families Rhizophoraceae and Sterculiaceae. Predominance of characteristically xerophytic taxa of *khejri*, *babul* and *jujube* in the charcoal remains, indicate arid conditions prevailing in the region, during Harappan times.

VII. MUSEUMS

1. TAJ MUSEUM, AGRA.—Map of the world showing the location of stones used for *pietra dura* at Taj Mahal alongwith the samples of stones were displayed. The worn-out background clothes of two showcases were replaced by new ones of suitable colour. The plaster casts of gold and silver coins of emperor Shah Jahan were prepared and displayed.

2. GOVERNMENT MUSEUM, AHAR.— The showcases of the three galleries were provided with cloth background. The walls of the galleries were also distempered.

3. ARCHAEOLOGICAL MUSEUM, AIHOLE.— Two stone sculptures (pl. XLIX) were acquired. Four sculptures alongwith the genealogical chart of the Chalukyan kings were displayed in the museum. Photo-documentation and preparation of data-sheets were completed.

Laminated colour photographs of important monuments and the sculptures of Aihole, Badami and Pattadakal were prepared and displayed in the museum.

Trilingual labels for all the exhibits were prepared and fixed.

4. GOVERNMENT MUSEUM, AJMER.— The museum collection was further enriched with the acquisition of one image of Vishnu in black stone, datable to nineteenth century and two hundred and three silver and debased silver coins, belonging to the medieval period and five silver coins of different denominations, belonging to the British period. Besides, twelve new wall showcases were provided by displaying some of the notable paintings from reserve collections. Twelve new wall showcases were provided to the painting section.

5. GOVERNMENT MUSEUM, ALMORA.— During the year under review the museum collection was further enriched by the acquisition of one stone, three paper, twenty bronze, one ivory and eleven mixed metal objects. Among the objects, one stone inscription (100 X 17 cm) from Champavat area deserves special mention.

6. GOVERNMENT MUSEUM, ALWAR.—During the year, a special violin was acquired. The flooring work of the Gallery 1 was also completed.

7. ARCHAEOLOGICAL MUSEUM, AMARAVATI.— Island showcase was provided for display of the copper plates. Louvre type of unbreakable glass was fixed into the ventilators. Historical boards, labels, charts and maps were prepared and fixed in the galleries.

8. ARCHAEOLOGICAL MUSEUM, BADAMI.— Trilingual labels for all the sculptures were prepared and fixed. Laminated colour photographs of important monuments of Aihole and Pattadakal and the genealogical table of the Chalukyan rulers were displayed.

Masonry pedestals were prepared for the sculptures exhibited in the verandah of the museum.

9. STATE MUSEUM, BHUBANESWAR.—The museum purchased seventy-two art objects, forty-five coins and four sets of copper plates during the year under review.

10. ARCHAEOLOGICAL MUSEUM, BUAPUR.— Painting of the Gallery 1, 2 and 3 with plastic emulsion paint was completed.

11. GOVERNMENT MUSEUM, BIKANER.— In order to display the antiquities of the pre-historic and proto-historic period, from Saraswati belt in District Ganganagar, a new archaeological section was set up. The organization of Jaina art gallery was completed.

12. ARCHAEOLOGICAL MUSEUM, BODHGAYA.— Track light was provided to have even light in the gallery. The damaged pedestals and showcases were restored and re-veneered.

13. PRINCE OF WALES MUSEUM, BOMBAY.— The museum collection was further enriched by the acquisition of three hundred and nine objects. Notable among the objects include bronze image of Amitabha (10 X 14 X 7 cm), assignable to sixteenth century from Tibet; female figure in stucco (9.2 X 4.8 X 13 cm), datable to eleventh century from Tsaparang (Tibet); terracotta female figure (5.2 X 6.5 cm), assignable to late Kushana period (second century AD); portrait of Shah Jahan (?), Mughal (eighteenth century AD); female figure in stone datable to tenth century AD from Deccan; image of Ganesa, Vaman and Vishnu in sandstone, assignable to twelfth century AD, from Rajasthan; fragmentary slab in limestone, assignable to second century AD from Amaravati, District Guntur (Andhra Pradesh); headless torso of a male deity (ht. 82.5 cm), datable to eleventh century AD from Gujarat; and female figure made of bone, second century AD(?) from Paithan.

During the period under review the museum also added two hundred forty-three books and one hundred and thirty periodicals to the Research Library.

In order to celebrate 25 years of Bombay-Yokohama Sister City relationship, the museum opened a new gallery for selected Japanese an objects.

In addition, the museum also arranged exhibition on "*Chehera—Portraiture in Indian Miniature Paintings*" from its collection during April-May 1990, and exhibition of Tibet's an and culture "Where the Mountains are high and the land is pure" on 29 November 1990.

14. INDIAN MUSEUM, CALCUTTA.— The museum acquired two hundred and thirty-three objects, datable from Sunga to Pala-Sena period through purchase, during the period under review. Notable among them are the images of Vishnu, *Simhavahini* Durga, a plaque, in stone; miniature figures of Ganesa, Uma-Mahesvara, Vishnu, Garuda, etc., in bronze; a large number of plaques datable to the Sunga period; seal matrix, toycarts etc., in terracotta; bone seal matrix and inscribed iron finger-ring; beads, die, pots etc., in stone.

The museum also procured two hundred and seventy-seven coins including one hundred and twenty- two coins in silver, sixty gold, eighty-six copper and nine pieces in other metals of which gold

MUSEUMS

coinage of Muhammad-bin-Tughlak, Muhammad-bin-Sam, Sikandar Shah of Bengal, Maratila Simha of Manipur and one coin belonging to Kushana-Sassanian period are noteworthy.

15. ARCHAEOLOGICAL MUSEUM, CHANDRAGIRI. — Five stucco figures and one each of sword and sculpture were acquired.

Organisation of the Gudimallam gallery was completed. Background curtains of suitable colour were provided for portraits in the portrait gallery. Two numbers of Vijayanagara insignia made out of thermocol was displayed in the portrait gallery.

Excavated materials of Rani Mahal alongwith the photographs were displayed.

16. GOVERNMENT MUSEUM, CHITTAURGARH.—Four oil paintings depicting the episodes of Mewar history were prepared and labels provided. Pedestals were given new colour paints.

17. MATTANCHERRY PALACE MUSEUM, COCHIN.— A new gallery was organised to highlight the Dutch drawings.

Colour photo-documentation of all the antiquities of the museum was completed.

18. ARCHAEOLOGICAL MUSEUM, RED FORT, DELHI.— Vinyl flooring was laid in the museum. Wooden shelves were provided for the manuscripts, *farmans*, painting, etc.

19. INDIAN WAR MEMORIAL MUSEUM, RED FORT, DELHI.— Vinyl flooring for the Gallery 1,2,3, and 4 and iron grill and steel pipe for steep stone staircases were provided. The galleries on either side of the staircases were suitably painted with due provision of printed labels for all the exhibits.

20. GOVERNMENT MUSEUM, DUNGARPUR.— New showcases and pedestals were provided for proper display of antiquities.

21. ASSAM STATE MUSEUM, GUWAHATI.— During the year under review the museum collected a rare stone image of Vishnu, datable to tenth century from Bilashipara, District Dhubri, and some silver coins belonging to the Ahoms and Aracots from Akhoi Phutia, District Sibsagar.

A new gallery for the display of art objects discovered from Ambari excavation was also opened.

In the course of the celebration of Golden Jubilee of the Museum, lectures on different aspects were organized.

22. ARCHAEOLOGICAL MUSEUM, GWALIOR.— Bilingual labels printed in silk screen were provided for one hundred and twenty sculptures exhibited in the museum. The mending work of a Vishnu image was completed.

23. ARCHAEOLOGICAL MUSEUM, HAMPI.—Three elephant balustrades, two huge granite architectural members bearing *urnakumbha* motif and a monolithic Veerabhadra sculpture were displayed in the museum. One 'L' shaped showcase was prepared for display of the antiquities in Gallery 3. The Hampi model was restored in order to get continuous water flow to its river channel.

Printed trilingual labels were provided to all the exhibits in the museum.

An exhibition was organized on the occasion of 'World Heritage day and week'.

24. ARCHAEOLOGICAL MUSEUM, HALEBID.— The museum collection has been enriched by the acquisition of forty-one antiquities from the Bangalore Circle of the Survey. The work of providing railing around the *tirthankara* statue and two gates was completed. The reserve collection of the museum was also well equipped with sufficient lighting arrangements.

25. GOVERNMENT MUSEUM, JAIPUR.— The showcases were provided with fine cloth background and steps were taken to control the light falling directly on the paintings.

26. GOVERNMENT MUSEUM, JAISALMER.— The museum was reorganized. Stone sculptures were displayed after providing wooden pedestals. The wall showcases of the pre-historic and archaeological sections were provided with lighting arrangements.

27. GOVERNMENT MUSEUM, JHALAWAR.— Archaeological Section of the museum was reorganized and safety measures taken.

State Museum, Jhansi.— The museum acquired forty-nine art objects during the year under review.

28. GOVERNMENT MUSEUM, JODHPUR.— During the year under review, the electric system was improved and showcases and pedestals in the Mahavir Gallery were varnished.

29. ARCHAEOLOGICAL MUSEUM, KHAJURAHO.— The collapsible iron shutters were fixed in the antiquity rooms of the store building.

Lower part of a jhuman figure and the chest of a female deity in sandstone, datable to the tenth-eleventh century AD were acquired from the Manager, Department of Tourism, Government of India, Khajuraho, Madhya Pradesh.

30. ARCHAEOLOGICAL MUSEUM, KONDAPUR.— Wall showcases for display of minor antiquities were prepared. The historical boards and map showing the Buddhist monuments of Andhra Pradesh and early historical sites of south India were provided.

The brochure on Kondapur Museum in English was printed for the public use.

31. ARCHAEOLOGICAL MUSEUM, KONARAK.— The preparation of an ornamental lintel at the main entrance of the museum building was completed.

32. FORT ST. GEORGE MUSEUM, MADRAS.— Painting and colour washing work of the verandah, main door and Gallery 2, 6 and 7 was completed.

A special exhibition on '*India's Ancient Culture and Trade links with East and West*' was organized in the Museum from 19.12.90 to 29.12.90 to synchronise with the Seminar on the integral study of the Silk Roads and Maritime Route arranged by the Survey and INTACH at Madras from 20.12.90 to 21.12.90 under the UNESCO project.

MUSEUMS

Printing of brochure in Tamil on Fort St. George Museum, Madras, was taken up and completed.

33. GOVERNMENT MUSEUM, MADRAS.— The Museum, during the period under review, acquired two images, one of a standing image of Vishnu and the other Sri Devi from Jerthala, District Dharmapuri; one image of Mahavishnu from Vellalagaram; some bronzes from Tennampoondi, District South Arcot and; one image of Devi from Maraiyar District Kamarajar.

One image of Buddha and one carved pillar were redisplayed in the New Extension Gallery. Three bronzes, sent earlier to the Indira Gandhi Centre for Atomic Research, Kalpakkam, were received back and redisplayed in the Gallery.

34. GOVERNMENT MUSEUM, MANDORE.— Pedestals were provided to objects and glass pane fitted in some of the showcases.

35. GOVERNMENT MUSEUM, MATHURA.— The museum collection was further enriched with the acquisition of twenty-seven stone sculptures, one anchor, thirty-five silver and nine copper coins and twenty-eight billons. Notable among them are a head of a male (in red sandstone) measuring 30 X 23 cm and assignable to Kushana period from Idgah, Mathura (pl. LA); and bust of Buddha wearing *ubhayansika sanghati*, measuring 74 X 48 cm in buff sandstone (pl. LB), assignable to Gupta period received from District Magistrate, Old Jamalpur.

The museum arranged lectures on Vartaman Bhagavat Purana by Dr. Sankar Lai Chaturvedi and Bharatiya Sangrahalaya Calcutta me Uttar Pradesh ki Kalakritiyon ka Pratinidhitva by R.C. Sharma.

To expand the museum educational scheme, programmes were also organized in the Museum Library Hall by selling photo folders and other publications.

36. GOVERNMENT MUSEUM, MT. ABU.— The pedestals of the sculptures were painted and the electric arrangements improved.

37. HAZARDUARI PALACE MUSEUM, MURSHIDABAD.— The re-organization work in the Hall of the Royal Exhibits, which included the display of a silver Tanjam being carried by two human models (pl. LI A), an ivory Ambari on the back of a striding elephant model and the silver *Kamal Howdah* on an elegant wooden pedestal, were completed.

The miniature ivories carved in lapidary intricacy were also displayed in a showcase with proper background cloth and suitable lighting arrangements (pl. LI B). Two marble statues (pl. LIIA-B), representing the fervour of European art and the two metal sculptures belonging to an Egyptian order were placed suitably on the pedestals for due appreciation of their feminine grace and rich artistic tradition in the round (pl. LIIC).

Two damaged wooden carriages in the Palace were restored completely (pl. LIII). Four decorative lamps in the front portico were fully revived for due illumination.

The damaged wooden carpet in the Durbar Hall and in the Committee Room were renewed as per the original as visualized in the background painting of each highlighting the silver throne within thick transparent perspex sheet casing and an exterior wooden railing, the posts of which resemble very closely the Corinthian columns of the Palace.

38. ARCHAEOLOGICAL MUSEUM, NAGARJUNAKONDA.— Documentation of all the architectural members, kept in the open air at the hill top at Nagarjunakonda was completed.

39. CENTRAL MUSEUM, NAGPUR.— The museum collection was further enriched by addition of seventy-eight sculptures.

The reorganization of the sculptural gallery is in progress and additional nine sculptures were provided with wooden pedestal.

Museum also arranged Oriental Numismatic Congress on 28 October 1990. Besides one hundred and sixty-four copper coins were also chemically treated.

40. ARCHAEOLOGICAL MUSEUM, PURANA QILLA, NEW DELHI.—Re-organization of the museum was in progress during the period under review.

41. GOVERNMENT MUSEUM, PALI.—The museum purchased two paintings on cloth depicting the life history of the folk deity 'Pabuji'. The galleries were improved by providing wooden coverage.

42. ARCHAEOLOGICAL MUSEUM, SANCHI.— Iron mesh was provided to the window openings in the galleries as a security measure. One damaged stone sculpture in the museum was suitably mended.

43. ARCHAEOLOGICAL MUSEUM, SARNATH.— Painting of the galleries was completed.

44. TIPU SULTAN MUSEUM, SRIRANGAPATNA.— The wooden barricades around the model of Srirangapatna and Tipu's oil portrait were replaced with iron barricades. The worn-out rolling bamboo screens were also replaced with new ones. The colour photo-documentation of the antiquities was completed.

Preparation of brochure in English giving details about the museum exhibits, was completed.

45. GOVERNMENT MUSEUM, UDAIPUR.— Two new wall showcases were added to the painting gallery.

46. BHARAT KALA BHAVAN, VARANASI — The museum acquired three gold coins and a silver bowl, decorated with ten figures on the outer surface. One of the coins acquired by the museum, belongs to the archer type coin of Chandragupta II of the Gupta dynasty. Another coin was the issue of Mughal emperor Shah Alam II, dated AH 1202 and minted at Murshidabad.

47. ARCHAEOLOGICAL MUSEUM, VELHA GOA.— Sixty portrait paintings of the Portuguese viceroys and governors were chemically treated and preserved.

VIII. ARCHITECTURAL SURVEY

TEMPLE SURVEY.— The Temple Survey Project (Northern Region), under B.L. Nagarch, continued the work of architectural survey of the temples of Paramaras. The ruins of the temples of Paramaras at Rahatgarh, District Sagar and the Udayesvara Mahadeva temple at Udaipur, District Vidisha, were surveyed. Besides, the temples of the Kalachuris located at Balod in District Durg, Devbaloda, in District Raipur and at Pali and Janjgir, in District Bilaspur, were also surveyed for comparative study.

Rahatgarh belonged to the Paramaras of Malwa in the mid-thirteenth century as is evident from a fragmentary inscription of Jai Singh Deva dated VS 1312 (AD 1256) found at the site. The Paramaras had built a Siva temple and a Vishnu temple at Rahatgarh of which only the ruins have been recovered. From the study of the ruins it is evident that, the temples were built in thirteenth century. Among the sculptural ruins of the Siva temple could be noticed head of Hanuman, four-armed Mahishamardini killing the buffalo demon, standing three-headed and four-armed Brahma, a dancing *surasundari*, bust of a *surasundari* in toilet and image of Nandi and a *Siva-linga* installed on a *yonipatta*. Among the architectural fragments of the Siva temple could be noticed a *makara-pranala*, door-jambs, niches containing images of deities, fragments of *kakshasana* and a stone slab carved with a stencilled lotus creeper design. Among the ruins of the Vishnu temple could be seen mutilated images of Vishnu and the left flank of the sanctum-doorway showing a standing Vaishnava *dvarapala* and a female attendant. The site of the Siva temple is at present occupied by a platform on which is placed a *yonipatta*, a *Siva-linga* and a *makara-pranala*.

The Kapilesvara group of temples at Balod is assignable to tenth century AD. The group comprises six temples, all built of white sandstone and located on the bank of a stepped tank. Starting from the south-east corner the temples have been numbered from 1 to 6.

Temple 1 consists on plan of a sanctum, an *antarala* and an *ardhamandapa*. The sanctum enshrines three modern images of Rama, Lakshmana and Sita. The walls of the sanctum are plain and the ceiling is supported by four plain pilasters. The ceiling is decorated on the top with a full-blown lotus shown inside two intersecting squares. The lintel of sanctum-doorway shows seated four-armed Ganesa on the *lalatabimba*. The ceiling of the *ardhamandapa* rests on two plain pillars and two pilasters. The pillars have a plain base supporting a shaft which is square in the lower portion and octagonal in the upper portion. The shaft supports a plain capital above which rests the plain architrave of the ceiling. The ceiling is decorated with a full-blown lotus shown inside two intersecting squares. In elevation, the temple shows from bottom upwards *kumbha*, *kalasa* and *kapota* decorated with *kudus*. They form the *adhishtana* mouldings above which rests the plain *jangha* divided into two compartments by a plain median band. The *jangha* is devoid of sculptures

and niches. Above the *jangha* rest the *varandika* mouldings consisting of a *plain pattika* and *kapota* and supporting plain *triratha sikhara* which is crowned by *amalaka* and a *chandrika*. The central projections of the *sikhara* project beyond *griva* and are decorated with a serpent.

Temple 2 is located on the north of Temple 1. It consists on plan of a sanctum and an *antarala*. The *ardhamandapa* is missing. The sanctum enshrines at present a modern image of Durga seated on the mount lion. Its *adhishtana* mouldings and *jangha* bear the same design as those of Temple 1. However, its *varandika* mouldings consist of a *kapota* and *karnika* and support a *triratha sikhara* which shows on the *bhadra* projections a decoration of miniature shrine-models. The *sikhara* is plain and its central *rathas* project beyond *griva*. On the top of this *ratha* is shown the figure of a *naga*. The *sikhara* is crowned by an *amalaka*. On the northern facade of the *sikhara* is shown an opening flanked on either side by two diamond designs inside a niche. The opening was meant for admitting light and air inside the sanctum. The lintel of the sanctum-doorway shows four-armed seated Ganesa on the *lalatabimba*.

Temple 3 consisted on plan of a sanctum, an *antarala* and an *ardhamandapa*. However, only the sanctum has survived. The sanctum enshrines at present a modern *Siva-linga*. This temple is known as Kapilesvara temple and has been completely restored in recent times. The sanctum-doorway shows two images on either flanks. One of the images is that of river goddess Ganga or Yamuna and the other is that of a *Saiva-dvarapala* standing in *tribhanga*. In elevation the temple shows the usual *adhishtana* mouldings consisting of *khura*, *kumbha*, *kalasa* and *kapota*. Above this rests the plain *jangha* divided into two segments by a plain median band. The *jangha* supports *varandika* mouldings consisting of a *kapota* and *karnika* above which rests the *triratha sikhara* which is decorated on the lower portion with a miniature shrine-model.

The *sikhara* is crowned by an *amalaka* and a *chandrika*. The central *rathas* of the *sikhara* project beyond the *griva* and are decorated on the top with a serpent. There are two huge images of four-armed seated Ganesa placed on either side of the sanctum-doorway at present. In front of the sanctum was an *ardhamandapa* which has completely collapsed. There is a flight of steps on the north of the temple which leads to the tank in front.

Temple 4 is located in front of Kapilesvara *asrama* and consists on plan of a sanctum alone which enshrines at present an image of four-armed seated Ganesa carrying *abhaya*, *parasu*, *padma* and *modakapatra*. The walls of the sanctum have been provided with trellis-windows for admitting light and air. The ceiling of the sanctum consists of a band of three concentric circles and is decorated on the top with a full-blown lotus. The sanctum-doorway shows on the left flank an image of four-armed dancing Chamunda carrying *damaru* and *khatvanga* in her upper two hands. In elevation the temple shows from bottom upwards three plain *pattikas* which support a plain *jangha* divided into two segments by a plain median band. The *jangha* supports a *chhadya* above which rests the *pidha sikhara* crowned by a plain *griva* and an *amalaka*.

Temple 5 is located in front of Temple 1 and faces south. It consists on plan of a sanctum, an *antarala* and an *ardhamandapa*. The walls of the sanctum are plain and white washed and its ceiling

rests on two plain pilasters and two plain brackets. The ceiling consists of two intersecting squares decorated on the top with a full-blown lotus. The sanctum enshrines at present an image of four-armed seated Santoshimata. In elevation, the temple shows from bottom upwards, two plain *pattikas* which support a *plain jangha* divided into two segments by a plain median band. The *jangha* supports a plain *chhadya* above which rests the *pidha sikhara* crowned by *griva* and *amalaka*. The lintel of the sanctum-doorway shows on the *lalatabimba* an image of four-armed seated Ganesa. The roof of the *qntarala* is of gable-end variety. The *ardhamandapa* in front of the sanctum has collapsed and is missing.

Temple 6 stands on the east of Temple No. 5 and consists on plan of a sanctum, an *antarala* and an *ardhamandapa*. The sanctum enshrines at present a modern image of Krishna standing and playing on a flute. The ceiling of the sanctum rests on two plain pilasters and consists of two intersecting squares decorated on the top with a full-blown lotus. The lintel of the sanctum-doorway shows four-armed seated Ganesa on the *lalatabimba*. In elevation the temple shows *adhishthana* mouldings comprising two *plain pattikas*, *kalasa*, *kapota* and *plain jangha* divided into two segments by a plain median band, *varandika* mouldings and the plain *triratha sikhara* carved on the lower portion of the *bhadras* with miniature shrine models. The *bhadras* of the *sikhara* project beyond *griva* and are decorated on the front side with two serpents. The *sikhara* is crowned by *griva* and *amalaka*. Among the loose sculptures found at the site may be noticed those of Ganesa, Hanuman and fragments of an image of Uma-Mahesvara seated in *lalitasana*.

The Siva temple at Devbaloda consists on plan of a sanctum, an *antarala*, a *mahamandapa* and an *ardhamandapa* approached by a flight of five steps. The sanctum enshrines a *Siva-linga* installed on a *yonipatta*. The walls of the sanctum are plain and its ceiling rests on four pilasters and three brackets. The ceiling consists of four intersecting squares arranged one above the other and has a plain top. The sanctum-doorway is decorated with four *sakhas*. The lintel of the sanctum-doorway shows on the *lalatabimba* a niche containing an image of seated four-armed Ganesa carrying *abhaya*, *parasu*, *padma* and *modakapatra*. Above the sanctum-doorway is a projecting *chhadya* which is surmounted by five niches in two rows. The niches contain images of Hanuman, dancing *surasundari*, standing two-armed Devi, a standing ascetic and a chopped image of Mahishamardini. The recess on the right contains an image of a standing female attendant while the recess on the left contains an image of a dancing female. Above the niches rests the plain architrave of the ceiling of the *antarala*, which is plain and flat. On the lower portion of the sanctum-doorway are shown three standing images including those of river-goddesses, Saiva *dvarapalas* and female attendants. The ceiling of the *antarala* rests on two ornamented pilasters. The ceiling of the *mahamandapa* is divided into nine compartments by an arrangement of pillars and pilasters. The four central pillars of the *mahamandapa* are highly ornamented and differ from the remaining ten pillars which are plain. The lower portions of the shafts of these pillars are decorated with niches containing images of Krishna playing on flute, Bhairava carrying dagger, *damaru*, *trisula* and chopped off, standing Karttikeya carrying chopped off and Sakti, standing Vishnu carrying *sankha*, *chakra*, *gada* and *padma*, dancing Ganesa carrying *parasu*, *padma* and *modakapatra*, Mahishamardini killing the buffalo demon, a chopped figure of

standing Varaha, Bhairava carrying chopped off *damaru*, *trisula* and *kapala*, Hanuman in *alidha* pose, a male drummer, an *apsaras* and an ascetic holding a chopped *padma* by his right hand. The middle portion of the shaft is decorated with four bands of foliage and *kirttimukhas*. The ceiling of the central compartment consists of three intersecting squares and is decorated on the top with a full-blown lotus. The ceilings of the remaining eight compartments are decorated each with a single square.

There is an *ardhamandapa* on the northern side of *mahamandapa* which is approached by a flight of five steps. The flat ceiling of the *ardhamandapa* rests on four pillars and is decorated with a square.

In elevation, the temple shows from bottom upwards *pitha* mouldings consisting of a *kharasila*, three plain *bhittas*, *gajathara*, *simhathara* and *narathara*, *adhishthana* mouldings comprising *kumbha*, *kalasa* and *kapota* decorated with *kudus*, *jangha* divided into two bands of sculptures by a median band carved with *hamsas*, *varandika* mouldings and roof. Among the noteworthy sculptures on the *jangha* are eight-armed dancing Siva, four-armed standing Parvati, six-armed dancing Ganesa, eight-armed Mahishamardini, four-armed standing Surya, four-armed dancing Bhairava, two-armed standing Surya, four-armed Nrisimha, four-armed Varaha, Krishna playing flute, Trivikrama and Vamana. Besides, the sculptures of a female shooting an arrow from a bow, standing Saiva ascetics, *apsarases* in different postures, amorous couples, female deities and a *kapalika* wearing a *kaupina* and holding a dagger and *kapala* are also shown on the *jangha*.

The *varandika* mouldings consist of a *karnika*, *padma* and a plain *pattika* which support a *kutachhadya*. The roof of the sanctum is flat like the roof of the *mahamandapa* and *ardhamandapa*. In front of the sanctum is a Nandi *mandapa* which enshrines an image of seated bull. There is a stepped tank on the north of the temple. The temple is a notable monument built by the Kalachuris of Ratanpur branch and is assignable to the middle of the twelfth century AD.

The Siva temple (pi. LIV) at Pali, District Bilaspur, is comparable in date to the Siva temple at Devbaloda and is ascribable to twelfth century AD. It consists on plan of a *sapta-ratha* sanctum, an *antarala* and a *mahamandapa* and stands on a spacious platform approached by a flight of three steps on the east. The temple is built of well-polished purple sandstone. On the eastern wall of the *mahamandapa* is engraved an inscription of a single line in Devanagari characters recording the name of Sriman Jajalladeva who has been identified with the Kalachuri king of Ratanpur branch belonging to twelfth century. There is another inscription of three lines in Devanagari characters carved on the *asanapatta* on the southern side. It is a pilgrim record of worship. The pilgrim was a Jogi named Makardhvaj, 700.

The sanctum is square internally and enshrines three *yonipattas*, each having a Siva-*linga* installed on it. The walls of the sanctum are plain and its ceiling consists of overlapping courses of concentric circles. The sanctum-doorway is decorated with seven *sakhas*. The lower portion of the sanctum-doorway shows the images of river-goddesses, Saiva *dvarapalas* and male attendants. The lintel of the sanctum-doorway shows four-armed seated Siva in the central portion, seated Brahma

on the right end and seated Vishnu on the left end. The interspace between the lintels is filled with seated images of Navagrahas.

The ceiling of the *antarala* rests on two pillars which are ornamented with *kirttimukhas* from which chains-and-bells are seen issuing out on the upper portion. The bases of these pillars are carved with rosettes and lotus petals. The ornamented shaft is surmounted by a capital consisting of a *karnika* and a *padma*. The capital supports the flying *bhuta* brackets which are surmounted by plain architrave of the ceiling.

The ceiling of the *mahamandapa* rests on eight ornamented pilasters. There are projecting windows on the southern and northern sides of the *mahamandapa* with *asanapattas* and *kakshasanas*. The *mahamandapa* has four central pillars and its ceiling consists of courses of concentric overlapping circles with a pendant on the top. The pilasters of the *mahamandapa* are carved with niches containing images of dancing Ganesa, Siva riding on the bull, dancing Siva, seated Parvati, seated Gaja-Lakshmi, seated Saiva ascetic worshipping *Siva-lingas*, Sarasvati playing on *vina*, two Saiva ascetics fighting and a Saiva *sadhu* performing *panchagnitapas*. The *mahamandapa* is octagonal in plan.

In elevation the temple shows from bottom upwards pitha mouldings consisting of *jadyakumbha*, *karnika*, *padmapattika* and *karnika*. Above this rest the *adhishthana* mouldings consisting of a plain *khura*, *kumbha* decorated with small niches containing diamonds, plain *kalasa*, *kapota* decorated with *kudus*, *karnika* and a plain *pattika*. Above this rests the *jangha* which is ornamented with two bands of sculptures (pl. LVA). Among the sculptures on the lower row of the *jangha* could be noted those of *apsarases* (pl. LVB), *vyalas* inside recesses, four-armed standing Agni, Durga seated in *lalitasana*, eight-armed Mahishamardini killing the buffalo-demon, Ardhanarisvara standing in *tribhanga* and four-armed dancing Siva. Among the sculptures on the upper row of the *jangha* could be seen those of four-armed Gaja-Lakshmi seated in *lalitasana*, four-armed standing Siva, six-armed Sarasvati seated in *lalitasana* and playing on *vina*, *apsarases* and *vyalas*.

Above the *jangha* rest the *varandika* mouldings which support the *saptaratha sikhara* carved with a mesh of *chaitya*-dormers. The *sikhara* is surmounted by *griva*, *amalaka*, *chandrika*, *kalasa* and *bijapuraka*.

The Vishnu temple (pl. LVI A) at Janjgir in District Bilaspur is locally known as Nakata Mandira. It is an incomplete temple and consists on plan of a *saptaratha* sanctum and an *antarala* and stands on a spacious platform. The temple faces east and the *antarala* is approached by a flight of five ascending steps on the east. The ceiling of the *antarala* is plain and rests on two pilasters which are richly carved with friezes of sculptures showing seated deities and scenes of dance and music.

The sanctum-doorway is embellished with nine *sakhas* all of which have been carried over the lintel. The *lalatabimba* shows four-armed seated Vishnu. On the lower portion of the sanctum-doorway are shown standing river goddesses and Vaishnava *dvarapalas*. The door-sill shows a projecting *mandaraka* decorated with bold lotus-scrolls in the centre and flanked on either side by two devotees, each holding a *kalasa* by his both hands and two *nagas* also holding a *kalasa* by their both hands.

The walls of the sanctum are plain. The ceiling of the sanctum is supported by four pilasters and three brackets. The pilasters are plain except for a median band decorated with stencilled lotus-scrolls. The ceiling of the sanctum consists of seven bands of concentric overlapping circles and its top is decorated with a full-blown lotus. There is no image inside the sanctum at present.

In elevation, the temple shows from bottom upwards *pitha* moulding consisting of a plain *pattika*, a frieze of half-lotuses, a frieze of diamonds, a frieze of rosettes, *karnika*, *gajathara* and a frieze of lions with riders. Above this rest the *adhishthana* mouldings consisting of *kumbha* decorated with niches each containing an image of four-armed Vishnu seated in *lalitasana*, *kirttimukhas* and a frieze of swans. The upper portion of the *kumbha* moulding is decorated with spiral lotus-scrolls and *chaitya*-arches. Above this rests the *kalasa* carved with lotus-petals, *kapota* decorated with *kudus* and *karnika*. This is surmounted by *jangha* divided into two compartments by a median band decorated with half-lotuses. There are two rows of sculptures on the *jangha* (pl. LVI B). Among the sculptures on the *jangha* may be noted those of Vishnu, Indra, Agni, *apsarases*, ascetics, Harihara, Rama, Yama, Nirriti, Siva, Surya, Parvati, Varuna, Vayu, Kubera, Isana, amorous couples and Varaha and Nrisimha forms of Vishnu.

Above the *jangha* rest the *varandika* mouldings consisting of *karnika*, *padma*, and friezes of swans. This is surmounted by an incomplete *saptaratha sikhara* decorated with a mesh of *chaitya*-arches.

The platform on which the temple stands has elaborate *pitha* mouldings and shows a row of sculptures of deities. It is approached by a flight of eleven steps on the north. Near the steps on either side are shown scenes from Ramayana. Among the sculptures carved on the platform may be noted Krishna-//a scenes. On the western side of the platform have been shown a number of niches containing images of Vishnu. Among the sculptures shown on the northern side of the platform could be noted those of Hariharapitamaha and Harihara.

To the north of Vishnu temple stands a Siva temple which consists on plan of a *pancharatha* sanctum and an *antarala*. The sanctum has a plain interior and does not enshrine an image at present. The hollow *sikhara* of the sanctum-doorway consists of five *sakhas* and shows images of river-goddesses and Saiva *dvarapalas* on the lower portion.

In elevation the temple shows *adhishthana* mouldings consisting of a plain *khura*, *kumbha*, *kalasa*, *kapota* and *karnika* surmounted by *jangha* which is divided into two compartments by a median band. There are two niches on the walls of the *antarala*, the lower one of which contains an image of standing Karttikeya. The lower niches on the southern, western and northern *bhadras* of the sanctum contain images of dancing Siva, standing Surya and dancing Siva respectively. The upper niches on the aforesaid *bhadras* of the sanctum contain images of seated Brahma, Hariharahiranyagarbha and Vinadhara Siva;

Above the *jangha* rest the *varandika* mouldings consisting of three plain *pattikas* and *karnikas*. This is surmounted by a plain *pancharatha sikhara* crowned by *griva*, *amalaka* and *chandrika*. The pilasters of the *antarala* are carved with friezes of sculptures showing dance and music scenes, flying

ARCHITECTURAL SURVEY

*vidyadhara*s carrying garlands and friezes of swans. The Vishnu temple as well as this Siva temple were built by Kalachuris in the early thirteenth century as is evident from the decadant style of their sculptures.

Besides, the Paramara sculptures found in the Central Museum, Nagpur were also studied. They include two marching elephants from the elephant frieze of Siddhanatha temple at Onkar Mandhata, District Khandwa in Madhya Pradesh.

In addition to this, the sculptures housed in the open air museum inside the fort at Balod, District Durg, were also studied. The sculptures mostly belong to Maratha period i.e., seventeenth century. Most of the images are those of male warriors holding a sword and a shield and riding on horses. Notable among the images of deities are those of seated Ganesa, Chamunda and Parvati which are assignable to thirteenth century.

IX. PRESERVATION OF MONUMENTS
MONUMENTS OF NATIONAL IMPORTANCE

AGRA CIRCLE

Uttar Pradesh

1. CHINI-KA-RAUZA, AGRA, DISTRICT AGRA.—The *dalans* were plastered and flooring attended.

2. FORT, AGRA, DISTRICT AGRA.—The portion of the fortification wall in-between the fourth and fifth bastions from Amar Singh gate towards Delhi gate was repaired by replacing and resetting the decayed stones of the outer veneering and pointing the open joints as per original design. Underpinning, wherever necessary, was also done along the walls.

The missing or damaged *dasa* stones, pillars, floor and veneering stones of the Machchi Bhawan were replaced and repaired.

The decayed *dasa* stones and worn-out stones of the verandah and courtyard of the Ratan Singh ki-Haveli were also repaired by replacing the stones.

The broken *chhajjas* and carved brackets at the corner of the Diwan-i- Am were replaced.

3. ITIMAD-UD-DAULA'S TOMB, AGRA, DISTRICT AGRA.— The compound on the river side was repaired by underpinning of *lakhauri* bricks and plastering the wall surface

4. JASWANT SINGH KI CHHATRI, AGRA, DISTRICT AGRA.— Repair works such as *lakhauri* brickwork, recessed pointing and roof concreting were attended to.

5. RAM BAGH, AGRA, DISTRICT AGRA.—The central kiosk was repaired by plastering the *lakhauri* brick facing below the platform and the base was strengthened by underpinning. The decayed stone pillars, *dasa* stones, and veneering stones were replaced with new ones above the platform level.

6. TAJ MAHAL COMPLEX, AGRA, DISTRICT AGRA.— Decayed plaster on parapet walls over *dalans* flanking the western gate, and on walls of rooms of the said gate was removed and replastered in lime-cement-sand mortar. Decayed and exfoliated stones of veneering towards south of western gate were replaced by new ones and bulged veneering stones were reset. The joints of veneering stones and *chhajja* were pointed. The eastern and western side marble stone arches of outer facade were watertightened by pointing the open joints with special lime mortar.

In continuation of previous year's work (1989-90, p. 156) the flooring with irregular hexagonal and square-shaped stones near eastern Naubat Khana were restored by replacing the decayed and broken stones, resetting the sunken ones and providing new stones at missing places. The sunken and decayed *dasa-stones* were reset and replaced by new ones. The work of restoration of broken *jali*-railing was also taken up and completed. The decayed, broken pieces and missing railings and *muttakas* of red sandstone were replaced with new ones (pl. LVII). Modern brick-paved courtyard in front of north-western side of the Saheli Burj were removed and a suitable garden was laid out.

PRESERVATION OF MONUMENTS

The stone floor was watertightened by recessed pointing. To protect the monument from the direct strike of water flow of the river Yamuna and a *nallah*, boulder-pitching with wire-meshing was done to a distance of four metres along the monument. The western side wall of Kali mosque was underpinned with *lakhauri* brick-work and plastered with fresh lime cement mortar at places where it was missing.

7. GROUP OF MONUMENTS, FATEHPUR SIKRI, DISTRICT AGRA.—The missing sandstone flooring and *dasa-slabs* were replaced. The open joints of masonry arches, ceilings and pillars of *dalans* of record office were filled up with lime mortar and some minor underpinning work was also done. The decayed red sandstone *chhajjas* were replaced with new ones (pl. LVIII). The open joints of pillars, walls and arches of mint building (*karkhana*) in stone masonry were filled up with lime mortar to check vegetation and falling of stones. The work is in progress. The excavated structures, identified as Ibadatkhana near booking counter of Jodhabai palace was provided with iron grill railings. The missing inlay work on the plinth of the tomb of Shaikh Salim Chisti was restored. The central dome of the Jama Masjid was provided with copper lightning conductor. The work of underpinning with stone masonry and pointing joints of walls of Todar Mai ki Baradari was in progress. The collapsed bastion near Agra gate was reconstructed as per original besides taking up repairs of other structural remains and pathways, viz., poor-house, *hammam* near Buland Darwaza, approach between Diwan-i-am and Badshahi gate.

8. HUMAYUN KI MASJID, KACHPURA, DISTRICT AGRA.— On the north-eastern side of the mosque a flagstone apron was laid after providing lime concrete base. The outer facade wall of main chamber on the northern and southern sides was deplastered and replastered with lime, cement, *surkhi* and Chambal sand mortar. Plaster on the roofs on northern and southern sides was dismantled and 1 cm thick plaster of lime, cement, *surkhi* and Chambal sand was laid besides providing a ledge along with parapet wall.

9. DANDESHWAR GROUP OF TEMPLES, KOTLI-CHANDAK GUNTH, DISTRICT ALMORA.— Flagstone flooring around the main shrine was provided and a retaining wall towards the southern side of the main shrine was also raised.

10. ANCIENT TEMPLE OF PANDUKESHWAR, DISTRICT CHAMOLI.— The boundary wall around the temple was restored with course-rubble stone masonry in cement mortar. The floor of the temple was laid with cement concrete mortar and encased with stone-hedge.

11. BALESHWAR TEMPLE, CHAMPAWAT, DISTRICT PITHORAGARH.— A compound wall was constructed around the temple. Above the compound wall one metre high barbed wire fencing in angle iron posts was also provided. Besides, two iron gates towards south of west side of the premises were also provided.

BANGALORE CIRCLE

Karnataka

12. PANCHALINGADEVA TEMPLE, HOOLI, DISTRICT BELGAUM.— The missing stone members of the outer veneer of the temple were provided with new ones after filling the core. Perforated stone windows (*jalandhra*) in matching design were fixed in the openings of the walls.

13. TIPU SULTAN'S UPPER FORT AND CITADEL, BELLARY, DISTRICT BELLARY.— Dry-stone masonry pitching was provided to the main gateway of the fort. The joints were recess pointed. The fallen portion of the gateway was reconstructed. Within the citadel, accretionary partitions were removed and one of the rooms was reconstructed. The roof was rendered watertight. The flight of steps was repaired and the iron gate was set right.

14. KRISHNA TEMPLE, KRISHNAPURAM, DISTRICT BELLARY.— The out-of-plumb and partially dislodged outer veneer of the kitchen was reconstructed as per the original after strengthening the foundation. The undulating paved slabs of the *mahadvara* were relaid.

15. GOPALAKRISHNA TEMPLE, TIMMALAPURAM, DISTRICT BELLARY.—The out-of-plumb veneer on the western side of the *garbha-griha*, and northern and south-eastern corner of the *navaranga* were dismantled upto ground level and reset as per the original after filling the core with cement mortar. The dismantled roof-slabs in the south-eastern corner of the *mukha-mandapa* were replaced as per the original and rendered watertight. A broken beam of the *mahadvara* was strengthened by inserting I-section girders and the broken lintel of the door-frame was mended using steel clamps (pl. LIX).

16. ACHYUTARAYA TEMPLE, VENKATAPURAM, DISTRICT BELLARY.— The broken beam of the outer *mahadvara* was replaced by a new beam. The roof-slabs removed in the process were reset as per the original and rendered watertight. In the inner *mahadvara*, the broken beams, supported by obstructive props, were either mended using non-magnetic stainless steel clamps or replaced with new ones as per requirement and the props were also removed. The roof of the bay was watertightened. The listed northern and part of the eastern inner *prakara* together with the cloister *mandapa* were dismantled after due recording and reconstructed as per the original after strengthening the foundation and filling the core with rubbles. The *mandapa* was also reconstructed as per the original by reusing the fallen original architectural members. The roof was rendered watertight. The missing stone members of the *pakasala* side of the *prakara* were provided with new ones (pl. LX).

17. VITTHALA TEMPLE, VENKATAPURAM, DISTRICT BELLARY.— The fragile brick superstructure over the eastern *mahadvara* was strengthened internally. The dislodged *prakara* wall to the east of the *mahadvara* was reconstructed with the original members. The out-of-plumb *adhishthana* of the cloister *mandapa* was dislodged and reset as per the original plan and elevation.

18. CHIKKI GUDI, AIHOLE, DISTRICT BIJAPUR.— The *adhishthana* of the sub-shrine was exposed by clearing debris to the required width and depth. The dismantled portion of the wall of the sub-shrine was reconstructed as per the original. The missing members were replaced with available stones or fresh ones. The flight of steps in the east was reset to position.

19. MONUMENTS AT AIHOLE, DISTRICT BIJAPUR.— Dressed stone slab was provided around the shrine located to the south-east of the Durga temple. The archaeological area around the major group of monuments was fenced.

20. DAKHNI IDGAH, BUAPUR, DISTRICT BIJAPUR.— The damaged compound wall was reconstructed with a coping stone course after strengthening the foundation. Underpinning the cavities below the Idgah was done with masonry in cement mortar.

PRESERVATION OF MONUMENTS

21. HYDER BURZ, BIJAPUR, DISTRICT BIJAPUR.— The railing wall of the flight of steps was raised in height as a preventive measure. The area around the bastion was re-fenced.

The height of the small parapet wall on the bastion was raised by one metre by providing crimp mesh as a safety measure.

22. IBRAHIM RAUZA, BIJAPUR, DISTRICT BIJAPUR.— Mending of damaged minarets, finials and providing new ones in missing portions and repairs to the damaged brick *jali* is in progress. Bat nuisance was stopped by closing the shaft of the dome with transparent mesh.

23. VISVESVARA TEMPLE, HALLUR, DISTRICT BIJAPUR.—The entrance to the temple was paved with stone slabs to prevent rain-water from entering into the complex besides watertightening the roof of the entrance *mandapa* and the *maha-mandapa* by providing a fresh weatherproof course. The joints between the architectural members of the *sikhara* were also pointed using epoxy resin to arrest water percolation. The side openings of the *nandi-mandapa* were closed with asbestos cement sheet set in wooden frames to prevent the entry of bats.

24. WATER PAVILION, KUMATGI, DISTRICT BIJAPUR.— The dead and loose plaster over the walls was removed and replastering was done to match with the original. The dead lime concrete flooring was stripped off and a fresh flooring was laid. The openings created by the arches on the exterior were closed with wire-mesh frames. The roof was rendered watertight by providing a fresh weatherproof course. The damaged merlons of the arched halls were repaired.

25. PAPANATHA TEMPLE, PATTADAKAL, DISTRICT BIJAPUR.— The work of fencing around the monument is in progress.

26. SANGEET MAHAL, TORVI, DISTRICT BIJAPUR.—The decayed plaster in the joints of the masonry was raked out and recess pointed in combination mortar. The edges of the original plaster were filleted. Hidden and buried structures under debris were brought to light by careful debris clearance.

27. VIDYASANKARA TEMPLE, SRINGERI, DISTRICT CHIKMAGALUR.—The joints of the roof-slabs were pointed with epoxy resin to arrest water percolation. The hood-stones were either mended or replaced as required and the joints between them and the roof slabs were pointed in combination mortar. The undulated stone apron around the temple was reset and the joints were pointed wherever required.

28. GARE BAGILU, FORT, CHITRADURGA, DISTRICT CHITRADURGA.— Dressed stone pavement was provided around the monument. A compound wall with grill work was constructed. Collapsible gates were provided to Gare Bagilu, Kasi Visvesvara and Hanuman temples.

29. FORT AND LARGE MASONRY ELEPHANTS, MERCARA, DISTRICT COORG.— Ashlar masonry retaining wall with fencing was constructed. Raking out of the decayed plaster is in progress.

30. THREE STONE-BUILT JAINA TEMPLES, MULLUR, DISTRICT COORG.— The flooring was repaved with stone slabs after levelling the ground.

31. GALAGESVARA TEMPLE, GALAGANATHA, DISTRICT DHARWAD.—The revetment on the river side was strengthened using the same material and fresh ones wherever required. The exposed foundation course of the *mandapa* on the south-west corner of the temple was underpinned.

32. OLD RUINED TEMPLE BETWEEN THE FORT AND THE TANK, HANGAL, DISTRICT DHARWAD.— The south-eastern corner of the shrine was dismantled and reconstructed by providing cut-stones in the voids. Undressed stone masonry was built over the core on either side of the entrance of *garbhagriha*. The exposed foundation was also covered with undressed masonry and flight of steps was provided (pl. LXI).

33. SIDDHESVARA TEMPLE, HAVERI, DISTRICT DHARWAD.— The out-of-plumb outer veneer of the Narasimha shrine was dismantled and reset with original materials and fresh stones wherever necessary to fill the voids. Over the shrine, a parapet wall in ashlar masonry was built and aesthetically finished. The roof was watertightened by laying a weather-proof course.

34. MANIKESVARA TEMPLE, LAKKUNDI, DISTRICT DHARWAD.— The sunken stone members of the northern and western shrines were dismantled and reset as per the original after strengthening the foundation. The core was filled with cement mortar. The roof was rendered watertight. The area around the temple was levelled to expose the *adhishthana* and given an appropriate gradient (pl. LXII). The area around the temple and the adjoining tank was fenced.

35. VIRANARAYANA TEMPLE, BELAVADI, DISTRICT HASSAN.—The dismantled south-eastern corner of the *mandapa* was reset as per original with the available members and with fresh ones wherever the original was missing.

36. KESAVA TEMPLE, BELUR, DISTRICT HASSAN.—The damaged stucco figures on the eastern and northern face of the eastern *gopura* were mended as per the original (pl. LXIII).

37. HOYSALESVARA TEMPLE, HALEBID, DISTRICT HASSAN.— The broken beams of the *navaranga* were mended by providing concealed I-section girders. The original lotus medallion carved on the bottom surface of the beam was retained by sawing a thin strip of the beam and refixing it beneath the concealed I-section girder using epoxy resin. The supporting pillars bearing inscription of Vijayanagara period provided earlier were removed and shifted to the Archaeological Museum. The roof was given a fresh layer of weatherproof course of brick jelly in lime mortar.

38. KEDARESVARA TEMPLE, HALEBID, DISTRICT HASSAN.— The dry-stone masonry wall on the northern and western sides of the temple was dismantled. Grill fencing on toe-wall was provided. Work on eastern side is in progress.

39. RAMALINGESVARA TEMPLE, AVANI, DISTRICT KOLAR.— The roof of the Parvati shrine was rendered watertight by laying a fresh course of *surkhi*.

40. ANCIENT PALACE SITE AND REMAINS, SRIRANGAPATNA, DISTRICT MANDYA.— The debris accumulated over the palace remains was scientifically removed and the remains were exposed and suitably conserved.

41. RANGANATHASVAMI TEMPLE, SRIRANGAPATNA, DISTRICT MANDYA.— The entrance of the *garbhagriha* was provided with grill door with pipe with frame.

42. SIDLU MALLIKARJUNA TEMPLE, BETTADAPURA, DISTRICT MYSORE.— The fallen parapet of the temple was reconstructed using the original and fresh material. The undulated pavement of the courtyard was repaved and joints were pointed.

PRESERVATION OF MONUMENTS

43. SRIKANTHESVARA TEMPLE, NANJANGUD, DISTRICT MYSORE.- A cracked beam was mended by inserting concealed I-section girder. A pillar in the cloister *mandapa* was replaced. The damaged stucco figures on the inner parapet were mended as per the original.

44. PARSVANATHA BASTI, KUBATTUR, DISTRICT SHIMOGA.—The dismantled architectural members were reset as per the original. The sunken floor slabs were reset. A new laterite compound wall was constructed.

45. RAMESVARA TEMPLE, KUPPAGADDE, DISTRICT SHIMOGA.— The sunken out-of-plumb southern and south-eastern portions of the *sabha-mandapa* were dismantled and reset as per the original after strengthening the foundation.

46. JAINA BASTI, MELIGE, DISTRICT SHIMOGA.— The joints were recess-pointed after raking out the dead mortar. Fallen portion of the enclosure was reconstructed using available materials.

47. SIVAPPA NAYAKA'S FORT, NAGARA, DISTRICT SHIMOGA.— The fallen and missing portions of the laterite masonry parapet was reconstructed using the salvaged stones from the debris and fresh ones.

48. JAINA TOMBS, MOODABIDRI, DISTRICT SOUTH KANARA.— The joints were recess pointed and suitably coloured to match the laterite masonry in tomb Nos. 1,2,3,16, and 17. The area around tomb 1 and 2 was levelled. Newly acquired area around the tombs was fenced.

49. JAMALABAD FORT, NADA AND LAILA, DISTRICT SOUTH KANARA.— Heavy vegetation growth like trees, shrubs, etc., were cleared from the walls, pathways and in the open area stop. The work of providing masonry steps wherever missing is in progress.

50. CHANNIGARAYA TEMPLE, ARALAGUPPE, DISTRICT TUMKUR.— The ongoing work of reconstruction as per the original of the dismantled outer veneer was completed. The foundation was strengthened by laying a concrete bed.

51. JOSHI SHANKARA NARAYAN DEVASTHAN, BHATKAL, DISTRICT UTTARA KANNADA.— The area north-east of the temple was levelled. The compound wall was dismantled for reconstruction.

52. TOMBS OF THE EUROPEANS, KUMTA, DISTRICT UTTARA KANNADA.— The compound wall was repaired using laterite stones and a barbed fencing was provided.

BHOPAL CIRCLE

Madhya Pradesh

53. CHAUSATH YOGINI TEMPLE, KHAJURAH, DISTRICT CHHATARPUR.— The old and worn-out low G.I. barbed wire fencing on stone posts was replaced with high G.I. barbed wire fencing on angle iron posts. The flight of approach steps leading, to the temple has been repaired and reconditioned. The roofs of the shrines have also been repaired and made watertight.

54. WESTERN GROUP OF TEMPLES, KHAJURAH, DISTRICT CHHATARPUR.— Replacement of the old and worn out G.I. barbed wire fencing on angle iron posts of the eastern side enclosure of western group of temples with C.R. stone masonry dwarf wall mounted with M.S. grill railing was taken up.

Sintex sheds (cabins) have been provided to three water coolers to protect from sun, rain and human vandalism. The defect in the floodlight cables was repaired and rectified through Electrical Division of Central Public Works Department, Kanpur.

55. FLAT ROOF TEMPLE, KUNDALPUR, DISTRICT DAMOH.— In continuation of last year's work (1989-90, p.162) the replacement of old damaged roof slab with fresh dressed single stone roof slab matching the original was completed. Repairs and restoration of damaged temple platform was also completed.

56. SIVA TEMPLE, NOHTA, DISTRICT DAMOH.— In continuation of the previous year's work (1989-90, p. 162) the raising of low level compound wall in R.R. stone masonry and mounted with G.I. barbed wire fencing on angle iron posts was completed. The temple was also made watertight.

57. ASOKAN ROCK EDICT, GUJJARA, DISTRICT DATIA.— In continuation of the previous year's work (1989-90, p. 162) enclosing of rock edict with dwarf wall surmounted with M.S. grill railing was completed. The area around the rock edict was enclosed with stone masonry compound wall with iron gate.

58. BUDDHIST ROCK-CUT CAVES, BAGH, DISTRICT DHAR.— In continuation of the previous year's work (1989-90, p. 162) the construction of eighteen R.C.C. pillars with beams and slab in place of old damaged and missing rock-cut pillars, beams and slab in Cave 4 was completed and finished with rock finish plaster (pl. LXIV). Construction of four R.C.C. pillars and beams in place of missing rock-cut pillars and beams in Cave 6 remained in progress.

59. BHOJASHALA, DHAR, DISTRICT DHAR.— In continuation of the previous year's work (1989-90, p. 162), replacement of old decayed and damaged stone flooring of prayer hall with fine chisel dressed limestone flooring on lime concrete base was completed.

60. LAT-KI-MASJID, DHAR, DISTRICT DHAR.— In continuation of the previous year's work (1989-90, p. 162) restoration of decayed and bulged stone wall with fresh fine chisel-dressed ashlar stone masonry was completed.

61. DHARAMSHALA, HOSHANG SHAH TOMB, MANDU, DISTRICT DHAR.— Replacement of decayed and damaged lime stone flooring of Dharamshala, Hoshangshah tomb with fine chisel-dressed stone slabs quarried departmentally from Zeerabad quarry in progress (pl. LXV).

62. JAMA MASJID, MANDU, DISTRICT DHAR.— In continuation of the previous year's work (1989-90, p. 167), restoration of damaged stone *chhajjas* with fresh fine chisel-dressed lime stone *chhajjas* is in progress (pl. LXVI).

63. TAVELI MAHAL, MANDU, DISTRICT DHAR.— In continuation of the previous year's work (1989-90, p. 167) providing of angle iron door shutters with wire mesh in arch opening of the basement remained in progress.

64. THEATRE HALL, MANDU, DISTRICT DHAR.—The cracked, damaged and bulged out arches have been restored in R.R. stone masonry with original alignment. The damaged and missing enclosure wall was restored with cut stone circular pillar with available stones.

PRESERVATION OF MONUMENTS

65. WATER PALACE, SADALPUR, DISTRICT DHAR.— Accumulated silt in the river channel near Water Palace was excavated and removed to avoid flooding of the palace area. Restoration of damaged and missing underground earthen water channels with fresh earthen pipes and overlaying with lime concrete flooring remained in progress.

66. BATTISI BAOLI, CHANDERI, DISTRICT GUNA.— In continuation of the previous year's work (1989-90, p. 163), the restoration of damaged and missing stone masonry wall was completed.

67. TOMB OF ABUL FAZAL, ANTRI, DISTRICT GWALIOR.— Replacement of old worn out and damaged G.I. barbed wire fencing with stone masonry dwarf wall mounted with G.I. barbed wire fencing on angle iron post was in progress.

68. ROCK-CUT JAINA COLOSSI (EK PATHAR KI BAODI), GWALIOR, DISTRICT GWALIOR.— In continuation of the previous year's work (1989-90, p. 163), stone pitching in the open courtyard in front of Caves 1 to 26 on cement concrete base to check the erosion of soil was taken up. The damaged enclosure wall was restored in stone masonry and M.S. grill was provided on the top of wall near Cave 26.

69. MANSINGH PALACE, GWALIOR, DISTRICT GWALIOR.— The construction of reinforced coarse rubble stone masonry retaining wall to provide support to the foundation of Bastion No. 3 remained in progress.

70. TOMBS OF MOHAMMAD GHAUS AND TANSEN, GWALIOR, DISTRICT GWALIOR.— In continuation of the previous year's work (1989-90, p. 163) the damaged and missing facing stones of parapet of Tansen's tomb were restored. The Tansen tomb and other *hujjaras* were provided with M.S. grill gates. The damaged grave platforms and compound wall were repaired. Laying of garden was in progress.

71. JAINA COLOSSI, URWAI GATE, GWALIOR, DISTRICT GWALIOR.— The damaged and missing flight of steps leading to Jaina images was restored. Stone pitching of frontage after levelling for easy run off of rain water was in progress.

72. TEMPLE REMAINS, BADGAON, DISTRICT JABALPUR.—Unearthing of buried temple remains was in progress. Enclosing of the area with G.I. barbed wire fencing on angle iron posts was also taken up.

73. RUINED PALACE INSIDE FORT, BURHANPUR, DISTRICT KHANDWA.— In continuation of the previous year's work (1989-90, p. 164) the damaged and missing stone masonry was restored and the roof terrace was made watertight by laying fresh lime concrete. The passage leading to the river was repaired and covered with stone slab.

74. EKOTARSO MAHADEO TEMPLE, MITAULI, DISTRICT MORENA.— In continuation of the previous year's work (1989-90, p. 164) the work of removing the debris of fallen portion of circular corridor and sorting out and stacking of useful stones at proper place for reuse in restoration work was in progress.

75. KAKANMATH TEMPLE, SUHANIA, DISTRICT MORENA.— In continuation of the previous year's work (1989-90, p. 164) filling of the cavities under the flooring of *mandapa* and periphery of the sanctum with cement slurry and stone flooring was relaid.

76. GATE NO. 5, AJAIGARH FORT, AJAIGARH, DISTRICT PANNA.— The cracked door lintel of Gate No. 5 was repaired. Restoration of Top-Khana near Gate No. 5 for storage of stone sculptures was in progress.

77. ROCK SHELTERS, BHIMBETKA, DISTRICT RAISEN.— In continuation of the previous year's work (1989-90, p. 164), the approach path leading to rock shelters has been provided with stone edging. Paving with lime concrete with flat boulders was in progress.

78. SIVA TEMPLE, BHOJPUR, DISTRICT RAISEN.— Restoration of damaged and missing flooring and missing steps of the temple with fresh fine chisel dressed cut stone steps was in progress.

79. BUDDHIST MONUMENTS, SANCHI, DISTRICT RAISEN.— In continuation of the previous year's work (1989-90, p. 164), the construction of road barrier with widening of road with retaining wall was completed. Restoration and watertightening of walls of the cells and stone flooring of monastery No. 46 was also completed.

80. RAJA RANI MAHAL, FORT, DHAMONI, DISTRICT SAGAR.— The restoration of damaged and missing wall of Raja Rani Mahal in R. R. stone masonry was in progress.

81. GARHPEHRA FORT, GARHPEHRA, DISTRICT SAGAR.— The damaged and missing walls of the palace were restored. The palace was made watertight by laying fresh lime concrete.

82. BADAL MAHAL, RAHATGARH FORT, RAHATGARH, DISTRICT SAGAR.— The damaged and missing walls of palace have been restored in R. R. stone masonry. Restoration of damaged arch roof with R.R. masonry arch was in progress.

83. MONASTERY, CHANDREH, DISTRICT SIDHI.— In continuation of the previous year's work (1989-90, p. 165), the walls of the cells were restored in ashlar stone masonry. The old decayed and damaged roof and terrace were made watertight. The protected area was enclosed with G.I. barbed wire fencing on angle iron posts.

84. MALADEVI TEMPLE, GYARASPUR, DISTRICT VIDISHA.— Realignment of the flight of steps leading to the temple and providing and fixing G.I. pipe railing on the side of the steps for easy access to the visitors was in progress.

85. CAVES, UDAIGIRI, DISTRICT VIDISHA.— In continuation of the previous year's work (1989-90, p. 165), the approach pathways leading to Cave 13, 19 and 20 were paved with stone pitching on cement concrete base to check soil erosion. Cracks and cavities in the caves were sealed with cement slurry to check seepage of rain water.

PRESERVATION OF MONUMENTS

BHUBANESWAR CIRCLE

Madhya Pradesh

86. CHHOTI MA-KI-MANDIR, DANTEWADA, DISTRICT BASTAR.— The damaged *mukha-mandapa* was taken up for repair. The wooden pillars were refixed over concrete base. The damaged capitals, roof beams and rafters were replaced. The tiles were dismantled and refixed.

87. MAHADEVA TEMPLE, SAMLUR, DISTRICT BASTAR.— The existing apron around the temple was dismantled and the existing platform was reset in proper plumb. Grouting inside ceiling of the sanctum and *sikhara* was also attended to.

88. KARLI MAHADEVA TEMPLE, SAMLUR, DISTRICT BASTAR.— Existing dilapidated flooring was removed and relaid in cement mortar. The *mandapa* was provided with flagstone flooring. The dislodged stones of the *amalaka* were reset.

89. SAVARI TEMPLE, KHAROD, DISTRICT BILASPUR.— A compound wall in C.R. stone masonry with barbed wire fencing was constructed around the protected area.

90. PATALESVAR TEMPLE, MALHAR, DISTRICT BILASPUR.— Excavation of earth and filling with 40 mm stone metal was completed for the foundation of compound wall. The work is in progress.

91. KANTI DEUL, RATANPUR, DISTRICT BILASPUR.— The work of dismantling of the temple, raft foundation was laid. Construction of the retaining wall on tank side was in progress. The land recently acquired was fenced with barbed wire.

92. MAHADEVA TEMPLE, NARAYANPUR, DISTRICT RAIPUR.— In continuation of previous year (1989-90, p. 166), the work of dismantling of the temple, raft foundation was laid. Construction of the retaining wall on tank side was in progress. The recently-acquired land was fenced with barbed wire.

93. LAKSHMANA TEMPLE, SIRPUR, DISTRICT RAIPUR.— The open muddy courtyard of the museum at Sirpur is replaced by providing flagstone flooring over sand bed.

94. MAHADEVA TEMPLE, GANDAI, DISTRICT RAJNANDGAON.— The *sikhara* of the temple was watertightened. The temple complex was beautified by laying an informal garden.

Orissa

95. EXCAVATED BUDDHIST SITE, LALITAGIRI, DISTRICT CUTTACK.—The north-east side of the Landa hill was fenced with barbed wire.

96. EXCAVATED BUDDHIST SITE, UDAYAGIRI, DISTRICT CUTTACK.—The missing and worn-out brick walls of the monastery were restored and the top of the brick masonry was watertightened.

Barbed wire fencing with M.S. grill gate was provided on the northern side.

97. PASCHIMA SOMANATHA TEMPLE, BOUDH, DISTRICT PHULBANI.— Replacement of the missing and worn-out architectural members on the eastern side *sikhara* was done with newly-carved sandstone blocks.

98. NILAMADHAVA AND SIDDHESVARA TEMPLE, GANDHARADI, DISTRICT PHULBANI.— Missing and damaged architectural members were renewed with newly carved stones in combination mortar with stainless steel clamps as per original (pl. LXVII).

99. BAKRESVARA TEMPLE, BHUBANESWAR, DISTRICT PURI.— The worn-out and out-of-plumb stones of the north-east portion of *jagamohana* were reset with new stones with epoxy resin.

100. BHASKARESVARA TEMPLE, BHUBANESWAR, DISTRICT PURI.— Laterite stone apron around the temple was provided to keep the surrounding clean from growth of vegetation, etc.

101. CHITRAKARINI TEMPLE, BHUBANESWAR, DISTRICT PURI.— Broken and missing portion of compound wall was reconstructed.

102. JAMBESWAR TEMPLE, BHUBANESWAR, DISTRICT PURI.— Sandstone flooring on the southern side was provided by renewing the dilapidated, worn-out and missing stones. The old dilapidated, worn-out and missing sandstone sub-shrine in front of the main temple were renewed with new as well as old sandstone in combination mortar. A retaining wall in laterite stone masonry was also built around the newly excavated sub-shrines.

103. CAVES, KHANDAGIRI AND UDAIGIRI; BHUBANESWAR, DISTRICT PURI.— Providing sandstone pavement at Hathigumpha was taken up; the work is in progress.

104. VARAHI TEMPLE, CHAURASI, DISTRICT PURI.— The inner dislodged ceiling stone slabs of the *garbhagriha* were reset by replacing the iron joist which is totally damaged and broken with the help of R.C.C. beams. Structural repairs to the outside wall of the *jagamohana* and main temple were attended to. The work is in progress.

105. CHAUSATH YOGINI TEMPLE, HIRAPUR, DISTRICT PURI.— The existing damaged barbed wire fencing was removed and transplanted over the laterite compound wall to avoid unauthorised trespassing and for development of the environment of the temple-complex.

106. SUN TEMPLE, KONARAK, DISTRICT PURI.— Restoration and core filling of left hand side wall of southern step and platform, right hand side wall of southern step, facing west and both right hand and left hand side walls of northern steps, right hand side and left hand side wall (top layer) of northern steps was carried out. Removal of dead mortar and exposing the joints, crevices of roof slab and pointing with combination mortar was also attended. The *roof of the jagamohana* was watertightened.

107. LORD JAGANNATHA TEMPLE-COMPLEX, PURI, DISTRICT PURI.— Resetting of disintegrated/broken, bulged-out structural members and sculptured panels and renewing the missing and worn-out architectural members on southern side *sikhara* of the main temple including consolidation of the inner core with combination mortar was attended to. Re-plastering was done in the *jagamohana* and *bhogamandapa* wherever damaged.

Deplastering up to *kalasa* level of Vimala temple was completed. Disintegrated stones were replaced. *Beki* was completely dismantled. Underpinning, consolidation of the inner core and recess pointing of the cracks and joints of stone structure by epoxy mortar was attended to.

PRESERVATION OF MONUMENTS

Disintegrated, broken and bulged-out architectural members and sculptured panels around outer wall of the superstructure of Siddha Ganesa temple were reset. Missing and worn-out architectural members and panels, *pidhas*, etc., were restored. The inner core was consolidated with liquid mortar. The joints and cracks were pointed/ filled up with epoxy resin. An underground drain was provided towards northern side of the complex to allow easy flow of used water of the temple.

New corbelling wall by khondalite stone was provided to support the lower belts of *amala*. The fallen *amala* piece was replaced with a newly carved stone block as per original.

Old lime terracing on southern side roof of *kurmi-beda* was dismantled and renewed. Consolidation of the inner core of the stone wall and pointing the open joints/ cracks was also attended to.

CALCUTTA CIRCLE

West Bengal

108. JORMANDIR, BISHNUPUR, DISTRICT BANKURA.—Bulged laterite stone structure was dismantled and replaced. The foundation of the basement on west side was strengthened by RCC raft. Undressed laterite stone slabs on four sides were dressed and ornamental designs were carved.

109. MADANAMOHANA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—The foundation of the basement was provided with cement concrete. Terraced floor and roof was lime concreted as per original colour and texture.

110. RADHA GOVINDA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—Bulged out and damaged laterite stone masonry of the temple was dismantled and restored in combination mortar as per original. The roof terrace was lime concreted. The brick chariot was also repaired.

111. SAILESVARA TEMPLE, DIHAR, DISTRICT BANKURA.—The damaged portions of the temple wherever necessary were repaired. The main entrance of the temple was provided with iron gate.

112. LALJI TEMPLE, KALNA, DISTRICT BARDHAMAN.—Damaged and fallen ornamental brickwork of the walls and pillars was removed and restored. Plain brickwork of the walls of the *bhoga-ghar* and Narayana temple was also restored. Old and damaged beams and *bargahs* were replaced by new ones and with it two layers of tiles are re-laid. Thick ornamental plastering of the walls of the *sabhamandapa* and Narayana Temple was renewed. Decayed and damaged wooden doors and window were replaced and two coats of paint were given.

113. COOCH BIHAR PALACE, DISTRICT COOCH BIHAR.—The outer wall on the northern, eastern and southern sides of the palace was pointed and plastered.

114. BRINDABAN CHANDRA'S MATH, GUPTIPARA, DISTRICT HOOGHLY.—Debris accumulated near the main gate was removed. Plain brick patches of the walls were restored and pointing was done. New wooden gate was provided. In order to drain out the accumulated water, drain was provided.

115. MAYER GHAT, BELUR, DISTRICT HOWRAH.—Old, damaged and worn-out bricks of the structure were dismantled. For the protection of the Ghat, wooden barricading was done with sand filling in gunny bags in-between the inner and outer rings of the wooden barricade.

116. BAISGAZI WALL, GOUR, DISTRICT MALDA.— Vegetational growth from the basement and top of the wall was removed and wall repaired as per original. The top of the wall was provided with a layer of 10 cm thick cement lime mortar.

117. ADINA MOSQUE, PANDUA, DISTRICT MALDA.— Decayed bricks of five to six layers of old Gour bricks were restored with lime *surkhi* mortar. 10 cm thick lime cement concrete was laid on the floor as well as on the roof. Joints in the stone masonry were pointed. Old barbed wire fencing was repaired or restored wherever missing; main wooden gate was also provided.

118. RESIDENCY CEMETERY, BABULBONA, DISTRICT MURSHIDABAD.—Missing brick patch works of the tombs were restored as per original. The old pulverised plaster from the tombs was removed and replastered. The old and decayed lime concrete from the domes of the tombs was removed and relaid with thick lime concrete.

119. HAZARDUARI PALACE, MURSHIDABAD, DISTRICT MURSHIDABAD.— For installing passenger lift, stone floor was dismantled and foundation trench excavated after removing the debris.

120. IMAMBARA, MURSHIDABAD, DISTRICT MURSHIDABAD.— Terraced roof of the Imambara was dismantled. The old and worn-out wooden *bdrgahs* were replaced with new ones after removing old decayed roof concrete. The walls were replastered and whitewashed. The flooring stones were reset. The window shutters of the southern wall were repaired.

121. BALLAL DHIPI, BAMANPUKUR, DISTRICT NADIA.— Missing portions of the brick wall were underpinned. In order to drain out water, cast iron pipe was provided.

122. JATAR DEUL, DISTRICT 24-PARGANAS.— Unwanted vegetational growth and deep-rooted trees on top of the temple were removed and damaged brick wall repaired and restored. The joints of the walls were pointed.

CHANDIGARH CIRCLE

Haryana

123. KOS MINARS (TWO IN NUMBER) PALWAL SIDE, DISTRICT FARIDABAD.—The area around the Kos Minars was enclosed with MS grill over a rubble wall.

124. ANCIENT MOUND, AGROHA, DISTRICT HISSAR.— In continuation of last year's work (1989-90, p. 169) the restoration of the stupa including watertightening, resetting, recess pointing and grouting was taken up. The work is in progress.

125. GUJARI MAHAL, HISSAR, DISTRICT HISSAR.— The undulated and sunken stone flooring was removed and relaid over a concrete base. The open joints were pointed.

126. GATEWAYS OF MUGHAL SARAI, GHARAUNDA, DISTRICT KARNAL.— Damaged and missing masonry patches on northern and southern gate were restored. Broken arches were rebuilt and steps were repaired as per original.

127. PATHAR MASJID, THANESAR, DISTRICT KURUKSHETRA.— The work of providing boundary wall around the monument was taken up and completed.

PRESERVATION OF MONUMENTS

128. SHAIKH CHILLI'S TOMB, THANESAR, DISTRICT KURUKSHETRA.—Fallen and missing patches of *lakhauri* brick masonry of the eastern boundary wall and main gate were restored by underpinning and pointing. The wooden lintels of the gate were also replaced. The disturbed and damaged portions of cells of the *madrassa* were also taken up for repair. The work is in progress.

Punjab

129. GATEWAY OF OLD SARAI, SARAI AMANAT KHAN, DISTRICT AMRITSAR.— The terrace of the western gate was watertightened with fresh lime concrete after removing the dead concrete.

130. RAM BAGH GATE, AMRITSAR, DISTRICT AMRITSAR.— In continuation of last year's (1989-90, p. 170) work, the dismantled red sandstone pillars, beams and veneer slabs of the *deori* were reset and broken stones were replaced. The work is in progress.

131. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA.— Fallen patches of brick masonry were restored in *lakhauri* brick in lime *surkhi* mortar.

132. SARAI INCLUDING GATEWAY, DAKHNI, DISTRICT JALANDHAR.— Fallen patches of the *lakhauri* brick masonry of the western gate were underpinned and pointed. Dead and damaged floor was renewed with fresh lime concrete and country brick.

DELHI

CIRCLE Delhi

133. CHAUBURJI MASJID, DELHI.— Structural repairs such as dismantling of old and dead lime concrete, laying fresh lime cement concrete and underpinning of stone masonry in combination mortar were carried out following the original pattern.

134. LOTHIAN CEMETERY, KASHMERE GATE, DELHI.— Underpinning of *lakhauri* brick masonry and plastering in combination mortar was done matching the original in colour and texture.

135. RED FORT, DELHI.— Missing floral bands on the western side of the Diwan-i-Am were reproduced in consonance with the original pattern.

136. SHISH MAHAL IN SHALIMAR BAGH, DELHI.— Extensive structural repairs which involve watertightening, underpinning and resetting of damaged masonry walls were carried out.

137. AFSARWALA TOMB, NEW DELHI.— Old and decayed concrete was dismantled and fresh concrete laid in combination mortar similar to the original.

138. KOTLA FIRUZ SHAH, NEW DELHI.— Missing part of the eastern side fortification wall is being restored to height of extant remains followed by watertightening and pointing.

139. PURANA QILA, NEW DELHI.— Bulged and overhanging stone masonry of the bastion existing on the south-western side of Purana Qila is being dismantled and simultaneously preserved by way of stone masonry in consonance with the original pattern.

140. QUTB MINAR, NEW DELHI.— Structural repairs to the flutings below the first balcony were carried out by scooping out decayed, damaged and crushed veneer stones including removal of

corroded iron clamps embedded in masonry and refixing with new red sandstone veneer of original texture and colour including reproducing relevant floral and geometrical designs strictly in consonance with the original pattern after stabilising the core masonry in rich mortar (pi. LXVIII).

141. SULTAN GHARI'S TOMB, NEW DELHI.—Old and buried structures were exposed and preserved in conformity with the original by way of coursed rubble masonry and pointing.

142. SAFDARJANG'S TOMB, NEW DELHI.— Underpinning of *lakhauri* brick masonry and pointing in combination mortar were executed matching the original pattern.

143. TUGHLAQABAD FORT, NEW DELHI.— The buried structure around the Bijai Mandal were exposed and the structures preserved in accordance with the original pattern.

144. BIJAI MANDAL, BEGAM PUR, NEW DELHI.—Structural repairs were carried out which include underpinning and restoration of disturbed masonry and laying terrace concrete in conformity with the original pattern.

145. ADHAM KHAN'S TOMB, MEHRAULI, NEW DELHI.— Wide and deep cracks developed on either side of the dome were stitched and grouted. A coat of plaster was also applied to render the top watertight.

146. NILA GUMBAD, NIZAMUDDIN, NEW DELHI.— Structural repairs including underpinning of stone work, plastering and pointing with combination mortar were carried out in accordance with the original pattern.

147. WAZIR PUR TOMB, R.K. PURAM, NEW DELHI.— Extensive underpinning, providing mouldings and arches with stone masonry work were carried out as per the original pattern.

GUWAHATI CIRCLE

Arunachal Pradesh

148. TAWANG MONASTERY, DISTRICT TAWANG.— In continuation of last year's (1989-90, p. 171) work at monastery, three timber floors on the west side store building were reset after replacing decayed beams and planks with new ones. In the library front side timber railing was replaced with new timber members as per original design. The collapsed portion on the east side of the stone masonry boundary wall was reset. The bulged-out retaining wall adjacent to kitchen building was taken out and stone masonry work was done in cement mortar. Pointing and whitewashing was done on the north and south side gates and in the west side store building.

Assam

149. SIBDOL, SIBSAGAR, DISTRICT SIBSAGAR.— In continuation of last year's work (1989-90, p. 172) the plastering work to the outer surface of main temple was completed with lime *surkhi* mortar. Restoration work of the ancient compound wall of the temple (phase II) was completed with special size bricks as per original.

PRESERVATION OF MONUMENTS

150. RANGHAR, JOYSAGAR, DISTRICT SIBSAGAR.— Remaining work of providing missing brick masonry with special size bricks with lime *surkhi* mortar and concreting the roof and plastering the stuccos was taken up and completed.

151. EIGHT CANONS OF AHOM PERIOD ON THE BANK OF THE SIBSAGAR TANK, DISTRICT SIBSAGAR.— A shed with tubular trusses and G.I. sheets was provided over the canons to guard against weathering agencies.

152. KARENGHAR, JOYSAGAR, DISTRICT SIBSAGAR.— The damaged concrete of the open floor, western side rooms of the first floor and domical roof were taken out and lime concreted besides attending the repair works such as plastering, etc. The work is in progress.

153. BISHNUDOL, JOYSAGAR, DISTRICT SIBSAGAR.— The decayed brick floor of the *nata-mandapa* was exposed by removing the earth and resetting partly with two layers of special size bricks in composite mortar. Temples 1 and 2 were also repaired. The dislocated arched roof of Temple 1 was reset. The roof and floor were relaid with lime concrete. The damaged plaster was taken out and replastered.

154. SIBDOL, GAURISAGAR, DISTRICT SIBSAGAR.—The remaining work of plastering in lime *surkhi* mortar was completed as per original colour, design and pattern after taking out decayed plaster.

155. AHOM RAJA'S PALACE, GARGOAN, DISTRICT SIBSAGAR.— Barbed wire fencing was provided around the protected area of the monument with angle iron posts. Some pointing and missing brickwork were also attended to in the monument.

156. GROUP OF FOUR MAIDAMS, CHARAIDEO, DISTRICT SIBSAGAR.— The brick paved outer surface of the main *maidam* was exposed by removing the earth and the surface was repaved with two layers of special size bricks in composite mortar. The work is in progress.

Manipur

157. VISHNU TEMPLE, DISTRICT BISHENPUR.— The barbed wire fencing was repaired. Vegetation, moss and lichen were removed from the monument.

Meghalaya

158. STONE MEMORIAL OF U-MAW-THAW-DUR-BRIEW, NARTIANG, DISTRICT JAINTIA HILLS.— Vegetation all around the monument was removed and moss and lichen was eradicated from stone memorials.

Nagaland

159. REMAINS OF FORT, DIMAPUR, DISTRICT KOHIMA.— In continuation of last year's work (1989-90, p. 172), the remaining work of providing brick-on-edge pathway in the fort compound around the platform I and near the water tank was completed. Earth cutting and filling works were also done. Brick wall near the gate was partly exposed by removal of overlying earth.

Tripura.

160. UNAKOTI, KAILASAHAR, DISTRICT NORTH TRIPURA.—In continuation of previous year's work (/ 989-90, pp. 172-173) cracks in the rock-cut sculptures were filled with cement concrete and cement mortar and top was finished with epoxy resin mixed with stone dust as per original. R.C.C. staircase was provided for easy approach to the rock-cut Ganesa panel. Vegetation, moss and lichen were removed from all around the rock-cut sculptures.

HYDERABAD CIRCLE

Andhra Pradesh

161. SRI SIDDHESVARASWAMI TEMPLE, HEMAVATI, DISTRICT ANANTAPUR.— The dead lime plaster on the exterior and interior walls was removed. The wide gaps in the masonry walls were filled with lime mortar and in turn coated with lime plaster. The dead lime plaster of the *sikhara* was removed and strengthened with recess pointing followed by lime plaster.

162. MALLIKARJUNA TEMPLE, KAMBADURU, DISTRICT ANANTAPUR.— The fallen *prakara* wall was reset with the available material. The lime wash on the wall portions of the temple was removed to expose original wall carvings.

163. CHANDRAGIRI FORT, CHANDRAGIRI, DISTRICT CHITTOOR.—The dead lime plaster over the roof of Raja Mahal was removed and relaid in combination mortar. The arch openings were provided with iron grills. The work of restoration of missing balconies of Raja Mahal is in progress.

164. RANGIN MAHAL, GURRAMKONDA, DISTRICT CHITTOOR.— The decayed lime plaster and broken flat-tiles over the heavy roofs and *chhajjas* was removed for laying fresh weather proof course.

165. SRI SAUMYANATHASWAMI TEMPLE, NANDALUR, DISTRICT CUDDAPAH.— The breaches to the outhern *prakara* wall were bridged and restored to the plumb by utilising the available and newly procured material. The dead lime mortar over the *sikhara* of Garuda shrine was removed and relaid with fresh combination lime mortar. The distorted casing slabs of the southern entrance *gopura* were reset with old and new ones (pl. LXIX). The roof was watertightened by brick jelly and plastered with lime after relaying the roof slabs.

166. GOLINGESVARA GROUP OF TEMPLES, BICCAVOLU, DISTRICT EAST GODAVARI.—The old and dead lime plaster over the brick *sikharas* of Chandrasekhara and Rajarajesvari temples was removed and replastered after restoring the damaged portions.

167. BUDDHIST STUPA, AMARAVATI, DISTRICT GUNTUR.— Foundation trench was dug around the *mahastupa* for the construction of drum wall.

168. GOLCONDA FORT, GOLCONDA, DISTRICT HYDERABAD.— The rampart wall abutting on either side of the main entrance (Bala Hisar) has been watertightened by way of pitching, concreting and recess pointing at the top. Floral designs on the ceiling of the clapping hall (portico) at the main entrance were restored to their original shape and colour.

PRESERVATION OF MONUMENTS

169. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD.— Patch plastering work at ground floor, clock and mosque areas and entire central dome was completed and the roof of the mosque area was watertightened in brick jelly concrete.

170. BUDDHIST SITE, CALINGAPATNAM, DISTRICT SRIKAKULAM.— The damaged spokes and drum walls of excavated brick stupa were strengthened and restored by using available old brickbats and the top portion of the stupa was watertightened.

171. KATESVARALAYAM (DEVI SHRINE), PALAMPET, DISTRICT WARANGAL.— In continuation of previous year's (1989-90, p. 174) work, the reconstruction of *adhishthana* was completed. The *mukhamandapa* was reconstructed upto the beam level including *pradakshinpatha*.

172. KIRTI TORANA, WARANGAL FORT, DISTRICT WARANGAL.— The basal mouldings of western *kirti-torana* were exposed and the foundation was strengthened by providing concrete curtain wall all around to avoid seepage from the ground. Some of the broken moulding pieces were reset by using dowels in epoxy resin.

173. BUDDHIST REMAINS, GUNTUPALLE, DISTRICT WEST GODAVARI.— The brick wall and stone votive stupas were watertightened and joints were pointed. The dislodged stones of pathways were removed and reset. The thick thorny bushes on either side of pathways were also cleared.

JAIPUR CIRCLE

Rajasthan

174. MARBLE PAVILIONS AND BALUSTRADE ON THE ANASAGAR BANDH AND THE MARBLE HAMMAM BEHIND THE ANASAGAR BANDH, AJMER, DISTRICT AJMER.— Restoration of the collapsed marble pillars of the fallen Khan-i-Khan gateway was done.

175. ANCIENT MONUMENTS, BHANGARH, DISTRICT ALWAR.— Broken/fallen stone steps of the Keshavarai temple were repaired and the open joints were pointed.

Fallen stone steps at the main entrance of the Mangala Devi temple were repaired and open joints pointed.

Exposed shops on the north side bazaar was also taken up for repair by underpinning the random rubble masonry walls and sunk pointing of wall surface and top.

Random rubble masonry gateway of the Gopinath temple was repaired and the open joints were pointed.

Underpinning the random rubble masonry and replastering of the ceiling of the dome of the *chhatra* near Gopinath temple was completed.

Loose stone steps of the Maqbara were dismantled for resetting.

Repairing of the south side fallen bastion and fortification wall was taken up for restoration in R.R. masonry and pointing the open masonry joints.

176. KOTAN-KI-DEVRI NO. 2, NEELKANTH, DISTRICT ALWAR.— Plinth of the Devri on south-east was repaired as per original and sunk pointing of the joints was also completed.

177. LAL MASJID, TIZARA, DISTRICT ALWAR.— The debris lying in the basement chambers was removed to make room for laying of the floor and underpinning the R.R. masonry of walls/pillars of the chambers was completed. Sunk pointing of the repaired portion was also done.

178. FORT WALL, BHARATPUR, DISTRICT BHARATPUR.— Restoration of the breached fort wall on Gopalgarh side is in progress.

179. DIG PALACES, DIG, DISTRICT BHARATPUR.— Repainting of the doors and windows of the palaces with enamel paint was completed.

180. FORT, JAISALMER, DISTRICT JAISALMER.— Dismantling of old bulged-out and damaged lower fortification wall, sorting out of the serviceable material and resetting the same with old and new stones as per original alignment and batter was completed.

181. FORT, RANTHAMBHOR, DISTRICT SAWAI MADHOPUR.— Construction of R.R. masonry pathway from Andheri Gate to Battis Khamba *chhatri* was completed. Structures along the pathway were also exposed.'

LUCKNOW CIRCLE

Uttar Pradesh

182. GARHWA FORT, ALLAHABAD, DISTRICT ALLAHABAD.— Bulged rubble stone masonry wall on the western side was reset in position and pointed. Flagstone apron was provided in front of sculpture shed and inner side of the fort wall, the tanks were desilted partly and the work is in progress.

183. KHUSRO BAGH, ALLAHABAD, DISTRICT ALLAHABAD.— The decayed planks and rusted nails, etc. of the wooden gate on northern side were repaired. Side walls were plastered and a cattle trap was provided to check entry of cattle.

184. EXCAVATED SITE, SRINGAVERAPURA, DISTRICT ALLAHABAD.— Top courses of circular wall of Tank-C were watertightened by providing concrete shell underneath the walls. The work is in progress.

185. ANCIENT SITE, SAHET-MAHET (SRAVASTI), DISTRICT BAHRAICH.— The stupa excavated by Indo-Japanese Team was repaired by taking out top courses and resetting them in position. Mud banding was done around the site to check entry of rain water into the sections. The walls of the cells around the stupa were underpinned and watertightened; the walls were further strengthened by providing concrete shells beneath the foundation.

Underpinning and watertightening the top courses of the Pakki-Kuti was further continued and completed.

Vegetation growth from the Kachhi-Kuti was also removed and top courses were taken out and reset in position. The structures were further strengthened by underpinning.

PRESERVATION OF MONUMENTS

186. KALINJAR FORT, KALINJAR, DISTRICT BANDA.— Lime concrete flooring was done in the courtyard and in the rooms near entrance gate of Raja Mansingh palace.

187. GULAB BARI, FAIZABAD, DISTRICT FAIZABAD.— Lime plaster having simple moulding was done on the walls of ground floor cells and in the ceiling of Imambara halls on the first floor.

188. BANNI KHANAM'S TOMB, FAIZABAD, DISTRICT FAIZABAD.— Fresh lime concrete was provided on the roof terrace. The moulding on the parapet wall was lime plastered. The work is in progress.

189. TOMB OF BAHU BEGUM, FAIZABAD, DISTRICT FAIZABAD.— Thick layer of lime wash on the walls on ground floor facade was carefully removed and thereafter colour matching was done. Lime plaster in patches was done inside ground floor cells.

190. AURANGZEB'S PAVILION AT BAGH BADSHAHI (KHAJUA), DISTRICT FATEHPUR.— The missing compound wall towards tank was rebuilt matching with original and barbed wire fencing done over it for the safety of monument besides underpinning and pointing the wall. Buttress walls were provided to support bulged compound wall towards east side. Open joints in the veneering stones of pavilion were pointed.

191. KIRAT SAGAR, MAHOBA, DISTRICT HAMIRPUR.— The *ghats* were partly repaired by resetting rubble stones and pointing the open joints. Desilting was carried out partly. The work is in progress.

192. ROCK-CUT IMAGES OF TIRTHANKARAS, MAHOBA, DISTRICT HAMIRPUR.— An iron grill was provided after dismantling rubble stone masonry wall. The pointing and plastering work was also attended. Portico which was provided in front of rock-cut sculptures was watertightened.

193. ANCIENT BRICK TEMPLE, BHITERGAON, DISTRICT KANPUR.— In order to check entry of cattles etc., and for the safety of the monument, construction of a compound wall was taken up; the work is in progress.

194. AMJAD ALI SHAH'S MAUSOLEUM, LUCKNOW, DISTRICT LUCKNOW.— Dead lime concrete of the roof terrace was removed and fresh lime concrete laid to check leakage of rain water. The work is in progress.

195. ASAFI MOSQUE, LUCKNOW, DISTRICT LUCKNOW.— The spongy and peeled off plaster of south side facade of the southern wing, north side facade and eastern facade were carefully removed and after underpinning in patches, the plaster in stucco was redone. The moulded plaster work on the southern plinth of the main mosque in the base of the minaret was reproduced. Lime concrete was laid at the southern lower terrace of mosque upto octagonal bastion.

196. IMAMBARA OF ASAFUD-DAULA, LUCKNOW, DISTRICT LUCKNOW.— The work of underpinning and lime plastering the south-eastern staircase was further continued. The mouldings and floral designs were reproduced. The first entrance passage was lime concreted. The worn-out brick floor of the second gateway was replaced.

197. BHUL BHULAIYAN, LUCKNOW, DISTRICT LUCKNOW.— The dead and decayed lime concrete of entire galleries on the second floor was replaced with fresh lime concrete. Steps and side walls of galleries were underpinned and lime plastered.

198. JAMI MASJID, LUCKNOW, DISTRICT LUCKNOW.—Dead and decayed lime concrete on the roof in the north lower portion was relaid.

199. KAISER BAGH GATES, LUCKNOW, DISTRICT LUCKNOW.— Salt affected and damaged *lakhauri* brickwork towards south-east corner of the western gateway having rich moulding was underpinned. Eastern facade and southern wing of gateway was replastered. The work is in progress.

200. KAZ-MAIN BUILDINGS, LUCKNOW, DISTRICT LUCKNOW.— Southern facade of the northern wing cells along the compound wall was repaired by reproducing the moulded and richly carved missing and decayed lime plaster including underpinning with *lakhauri* bricks. The work is in progress.

201. NASIR-UD-DIN HAIDER'S KARBALA, LUCKNOW, DISTRICT LUCKNOW.— Wide and deep cracks which had developed in the vaulted roof were filled up and the dead and decayed lime concrete of western-southern berm terrace was removed and relaid with fresh lime concrete. The missing lime plaster on the parapet wall and side walls of the raised roof was restored.

202. OLD PALACES AT DILKUSHA, LUCKNOW, DISTRICT LUCKNOW.—The damaged and salt affected portions of wall were underpinned and open joints of *lakhauri* bricks were pointed. Lime plaster having moulding was done on the outer facade towards north-east and south-west sides. The broken steps towards east side were rebuilt in brick masonry. Iron gates were provided in the two arch openings to check entry of persons during night.

203. PICTURE GALLERY, HUSAINABAD BARADARI, LUCKNOW, DISTRICT LUCKNOW.— Spongy and peeled off lime plaster of entire south facade and part of western facade upto ground floor *chhajja* was reproduced in conformity with original pattern after underpinning patches.

204. RESIDENCY BUILDINGS, LUCKNOW, DISTRICT LUCKNOW.— The salt affected and damaged portions of the main building were thoroughly underpinned to prevent further decay and open joints were pointed.

The walls of the structures on the southern side were watertightened by taking out the top courses of *lakhauri* bricks and resetting them in original position after removal of roots, etc. The work is in progress.

Badly decayed round pillars, cusped arches of the treasury building were underpinned and lime plastered. The work is in progress.

205. SIKANDAR BAGH BUILDINGS, LUCKNOW, DISTRICT LUCKNOW.— The bulged outer wall of the mosque on the east was rebuilt in *lakhauri* brick and lime plastered. Lime concrete floor was provided in the room towards south side near the mosque. Lime concrete apron was provided along the compound wall towards south-east corner.

206. TOMB OF MUSHIR ZADI, LUCKNOW, DISTRICT LUCKNOW.— Cracks developed in the ceiling of first floor room towards eastern side were grouted and missing and decayed lime-plaster was restored. The work is in progress.

PRESERVATION OF MONUMENTS

207. TOMB OF SAADAT ALI KHAN, LUCKNOW, DISTRICT LUCKNOW.— Decayed lime plaster having moulding and carving on southern facade was reproduced matching with original. The work is in progress.

MADRAS CIRCLE

Kerala

208. MATTANCHERY PALACE, COCHIN, DISTRICT ERNAKULAM.— The decayed wooden rafters on the western side roof of the Durbar Hall were replaced with new sunpaulin coated wooden rafters, matching the original in form and size. The undulating cement floor was reconditioned. The broken Mangalore-type tiles of the roof were replaced with new ones.

209. FORT, ANJENGO, DISTRICT TIRUVANANTHAPURAM.— The wooden doors and iron grills and gates were painted.

210. PARASURAMA TEMPLE, TIRUVALLAM, DISTRICT TIRUVANANTHAPURAM.—The accretionary coat of lime-wash over the front *prakara* wall containing sculptures was removed to expose the original surface.

211. ROCK-CUT CAVE, VILINJAM, DISTRICT TIRUVANANTHAPURAM.— The wire-fencing provided to the archaeological area was replaced with grill fencing over a toe-wall.

Pondicherry

212. SVAYAMBHUNATHASVAMI TEMPLE, NEDUNGADU, PONDICHERRY.— The decayed and missing _ wooden beams provided within the *gopura* structure were replaced by R.C.C. beams with matching finish simulating the original wooden members. The voids in the brick masonry of the *gopura* were filled and stitched with specially made bricks of the same size as the original. Further, whole *gopura* was consolidated by underpinning, grouting and pointing. The exposed brick surface of the *gopura* was provided with specially made lime mortar.

Tamil Nadu

213. KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT CHENGALPATTU-M.G.R.— The *prakara* with *devakulikas* on all sides were underpinned by plain cement concrete from the exterior in order to prevent the *prakara* from going further out-of-plumb. The exterior of the *prakara* was pointed. The protected area was fenced.

214. PIRAVATANESVAR TEMPLE, KANCHIPURAM, DISTRICT CHENGALPATTU-M.G.R.— Earthwork was done to expose the details of *upa-pitha* of the temple. The outer veneer members of the structure had gone out-of-plumb due to subsidence in foundation so much so that some of the members were precariously hanging. Further, the monument was covered with accretionary additions in brick masonry. In order to restore structural stability of this small sandstone structure, it was necessary to provide a strong foundation. After proper documentation, the entire shrine was dismantled. The exposed foundation was made of sandstone and granite boulders in three distinct layers, with the

smaller boulders forming the bottom layer. The boulders were spread to cover the plan area of the shrine. The boulders became undulated as the interstitial earth has sunk. The boulder foundation was documented and removed. After providing a raft foundation in cement concrete the boulders were set in cement as per original. The dismantled superstructure was also reconstructed as per original. The accretionary brick additions were removed. The weathered portions of the sandstone members were moulded in special mortar matching the original in colour and texture. A flight of steps was provided to the front door. A temple-model door was also provided.

215. FIVE RATHAS, MAHABALIPURAM, DISTRICT CHENGALPATTU-M.G.R.— A stone revetment was constructed along the archaeological area to contain the spread of sand. A grill-gate was provided to the complex with a flight of steps.

216. SHORE TEMPLE, MAHABALIPURAM, DISTRICT CHENGALPATTU- M.G.R.— The original flight of steps leading into the complex from the west alongwith a portion of the western outer *prakara* were exposed while dismantling the retaining wall for its reconstruction. The exposed structures were conserved by resetting the original members and providing new members for the missing ones. The joints were recess pointed. Several accretionary structures like walls, steps etc., were removed. In order to facilitate easy movement of visitors within the complex, steps were provided at places.

217. DHARMESVARA TEMPLE, MANIMANGALAM, DISTRICT CHENGALPATTU-M.G.R.— Proper drainage was provided to the inner *prakara* by removing the accumulated earth. Masonry joints of the *prakara* were pointed. Fencing was repaired. An approach pathway to the monument was laid.

218. MUNKUDUMISVARA TEMPLE, P. V. KALATHUR, DISTRICT CHENGALPATTU-M.G.R.—The decayed plaster over the *sikhara* was removed and replastered in combination mortar over which a coat of fine ground lime mortar was applied. The stucco figures were also mended in similar way and as per original.

219. VENKATESAPERUMAL TEMPLE, TIRUMUKKUDAL, DISTRICT CHENGALPATTU-M.G.R.— The brick masonry *kapota* was restored wherever it was broken or missing. The leaky *mandapa* and the *sikhara* were watertightened. Accretionary coat of lime-wash over the main shrine and *prakara* was removed to expose the inscriptions. Sky-lights were provided in the *mandapa* roof.

220. TIRUPULISVARA TEMPLE, VAYALUR, DISTRICT CHENGALPATTU-M.G.R.— In continuation of last year's (1989-90, p. 179) work, the Vishnu shrine in the complex was taken up for conservation. The entire structure was in a dilapidated condition with the outer veneer members of the *garbhagriha* and the entire *pada* portion of the *maha-mandapa* missing. After proper documentation of the existing structural members, the structure was dismantled. A raft foundation with random rubble masonry footing was provided. The structure was reconstructed as per original with the stone members available and new members matching the original in form and size. The roof was rendered watertight by providing new weathering course.

221. MURUGANATHA TEMPLE, TIRUMRUGANPOONDI, DISTRICT COIMBATORE.— The accretionary Dakshinamurti shrine abutting the main shrine was shifted towards south after dismantling and

PRESERVATION OF MONUMENTS

reconstructing the same as per original, in order to facilitate easy and better access to the inscriptions engraved on the wall of the main shrine. The dilapidated *madapalli* was also reconstructed as per original.

222. PARTHASARATHI AND KRISHNA TEMPLE, PARTHIVAPURAM, DISTRICT KANYAKUMARI.— The decayed weathering course over the roof of the *mukha-mandapa* was removed and a fresh course was laid. The leaky brick masonry *sikhara* was rendered watertight by grouting the cracks with liquid mortar. The voids in the brick masonry were filled with suitable masonry. The decayed plaster over the masonry was removed and the *sikhara* was replastered with combination mortar with a layer of fine lime mortar applied over it. Wood preservative was applied to the wooden members of the *namaskara-mandapa*.

223. FORT, VATTAKOTTAI, DISTRICT KANYAKUMARI.— The heavy growth of rank vegetation over the fortification was removed.

224. CLIVE'S BUILDING, FORT ST. GEORGE, MADRAS, DISTRICT MADRAS.— In the middle bay of the western wing, the walls were replastered with combination mortar after raking out the dead plaster. The undulating Cuddapah-stone flooring was reconditioned.

225. MASJID AND TWO PONDS, ARCOT, DISTRICT NORTH ARCOT-AMBEDKAR.— Colour-washing was >done to the buildings. Approach pathway was reconditioned.

226. SVAYAMBHUNATHASVAMI TEMPLE, KILPUTTUR, DISTRICT NORTH ARCOT-AMBEDKAR.— The leaky roof of the *maha-mandapa* was rendered watertight. The loose sculptures were given a masonry pedestal. An approach pathway was laid.

227. SUBRAHMANYASVAMI TEMPLE, VALLIMALAI, DISTRICT NORTH ARCOT- AMBEDKAR.—The decayed plaster over the brick *sikhara* was removed and replastered with a layer of fine lime mortar over a layer of combination mortar. Suitable colouring was given.

228. OLD COLLECTORATE BUILDING, FORT, VELLORE, DISTRICT NORTH ARCOT-AMBEDKAR.—The decayed plaster on the walls of the main hall in the ground floor was removed and the walls were replastered.

229. JALAKANTHESVARA TEMPLE, VELLORE, DISTRICT NORTH ARCOT-AMBEDKAR.— In continuation of last year's (1989-90, p.180) work, mending of a broken beam and the composite pillar located in the north-east of the central bay of the *kalyana-mandapa* was taken up. The broken pieces of the pillar was mended using epoxy resins and a 6 mm thick stainless steel plate was introduced in-between the shaft and the capital and between the capital and the corbel in order to facilitate even distribution of the load so that mended portion will remain intact. To accommodate the stainless steel plate, a groove of even thickness was cut in the lower member. The broken beam that was running over the corbels of north-eastern and south-eastern pillars of the main bay was also mended using epoxy resins. Two I-section girders welded together with a plate at the top and bottom respectively were introduced into the beam by cutting a channel on the top of the beam as the sides has carvings. After mending of the beam and the pillar was over, they were positioned in their original positions. The ceiling slabs were

positioned and the roof was watertightened. An apron of stones was provided to the *kalyana-mandapa*. Besides, the outer and inner *mahadvaras* were paved with stone slabs.

230. JAINA TEMPLE, METTUPUDUR, DISTRICT PERIYAR.— The sunken and out-of-plumb wall connecting the *ardha-mandapa* and the *maha-mandapa* was dismantled after due documentation for reconstruction. Work is in progress.

231. SOUNDARARAJAPERUMAL TEMPLE, IRUMBANADU, DISTRICT PUDUKKOTTAI.— In continuation of last year's work, wherein the southern *prakara* with the cloister *mandapa* was conserved, the northern *prakara* wall was taken up. An accretionary brick wall had been added along the outer veneer of the wall as an earlier conservation measure. This brick were was removed, which also exposed the remains of the outer veneer at places. The outer veneer was provided to a length of about 18 m with available stone recovered from debris after providing a suitable foundation.

232. BHUMISVARA TEMPLE, SEVALUR, DISTRICT PUDUKKOTTAI.—The dilapidated *kalyana-mandapa* essentially due to growth of vegetation and long neglect was taken up for conservations (pl. LXX). The outer veneer on the northern and eastern side had been dislodged and the walls had gone out-of-plumb. The outer veneer was dismantled after documentation and reconstructed over a new foundation. The *kapota* members were collected and refixed in their position. The flooring was reconditioned over a layer of concrete. The voids of the inner veneer were pointed.

233. PALACE STRUCTURE, RAJAGIRI FORT, GINGEE, DISTRICT SOUTH ARCOT.— Earthwork was done to expose the original features of the structures. The exposed features were consolidated by bringing them to plan level. The southern wing of the 'Horse stables' was dismantled after proper documentation and reconstructed as per original.

234. PATTABHIRAMA TEMPLE, NARASINGARAYANPETTAI, DISTRICT SOUTH ARCOT.—The leaky *sikhara* of the main, Amman, Andal shrines and another sub-shrine were watertightened by replastering the *sikhara* after removing the decayed plaster over them.

235. BRIHADISVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR.— The missing portions of the staircase inside the *Rajarajantiruvusal* were provided with old available stones. The brick pavement to the east of the *nandi-mandapa*, which was worn out, was repaved. The drain on the rear side of *nartana-medai* was reconditioned. In order to siphon out the storm water from the *prakara* more efficiently, the recent drain connected to Chappanavari was closed. A new drain of R.C.C. pipes was laid as per the available original scheme and connected to the nearby Sivaganga tank.

236. BRIHADISVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT TIRUCHCHIRAPALLI.—The upper portion of the *maha-dvara* on the eastern side of the temple was found missing even before the monument was declared protected. However, blocks of stones, architectural members etc., are found lying in heaps in front of the *maha-dvara*. With a view to utilizing the architectural members of the *maha-dvara* in the reconstruction to the extent possible, debris was cleared and the architectural members were identified and stacked neatly. Thereafter the out-of-plumb portion of the southern part of the *maha-dvara* was dismantled after documenting properly, and reconstructed as per original

PRESERVATION OF MONUMENTS

(pl. LXXI). Subsequently, all the stone members collected and identified were fixed in their proper position in the structure. Even then, it cannot be reconstructed to its original height.

237. FORT, RANJANGUDI, DISTRICT TIRUCHCHIRAPALLI.—The fallen portion of the northern bastion was reconstructed with available stones as per original after suitably strengthening the foundation. The walls of the mosque located on the top of the hillock were given a new layer of plaster after removing decayed layer. The roof was watertightened. Rank vegetation grown along the steps to the summit was removed and the gaps were pointed.

238. BHAKTAVATSALA TEMPLE, CHERANMADEVI, DISTRICT TIRUNELVELI-KATTABOMMAN.— Due to sinking of the foundation, the cloister *mandapa* alongwith the inner veneer of the *prakara* had gone out-of-plumb. The same was dismantled and reconstructed as per original. The roof was watertightened. The accretionary coat of lime-wash applied over the inner *prakara* was removed.

239. VALISVARA TEMPLE, TIRUVALISVARAM, DISTRICT TIRUNELVELI-KATTABOMMAN.— The lichen and moss spread over the *sikhara* of the main shrine was removed. The Amman shrine was given a false wooden ceiling. The wooden members were painted.

MINI CIRCLE, GOA

Goa

240. FORT, AGUADA, CANDOLIM, DISTRICT NORTH GOA.— Water tank of the fort Aguada was repaired and grills were provided around it for safety. Gates were also fixed at the main entrance.

241. BASILICA OF BOM JESUS, OLD GOA, DISTRICT NORTH GOA.— Decayed wooden beams and planks of the first floor verandah were replaced with new ones. The doors and windows were repaired by removing decayed portion of wood. Necessary new fixtures were added. The remaining portion of the dilapidated laterite rubble compound wall was built with seasoned laterite stones in combination mortar. The laterite drainage was repaired by providing R.C.C. drain.

242. LADY ROSARY CHURCH, OLD GOA, DISTRICT NORTH GOA.— Two coats of whitewash were applied on the internal wall of the church.

243. ARCHAEOLOGICAL MUSEUM, CONVENT OF ST. FRANCIS OF ASSISI, OLD GOA, DISTRICT NORTH GOA.— Repair works of doors and windows were attended to by removing decayed wooden portion. Patch plastering of the Gallery 2, 3,4, 5, was also attended to.

244. SE' CATHEDRAL CHURCH, OLD GOA, DISTRICT NORTH GOA.— The fallen northern bell tower of the church was repaired by using laterite stone. Doors and windows made of teakwood were fixed to the ancillary structure in the residential complex of the church. Replastering of decorated pillar base mouldings in the church was also carried out.

245. ST. ASSISI CHURCH, OLD GOA, DISTRICT NORTH GOA.— Decayed planks and packs of the wooden altars in the church were repaired by using fevicol and nails. Necessary repairs to the wooden frames in the Art Gallery were completed. Two coats of Super snowcem were applied on the external walls of the church and doors and windows were painted.

246. ST. CAJETAN CHURCH, OLD GOA, DISTRICT NORTH GOA.— Wooden pedestal of the altar on the northern side of the church was dismantled and refixed by providing new packs and planks. Decorated mouldings of the pillars were replastered. Doors and windows were repaired after removing decayed wooden portions.

247. MAHADEVA TEMPLE, CURDI, DISTRICT SOUTH GOA.— The reconstruction of the temple was taken up and completed upto plinth level.

248. SAFA MASJID, PONDA, DISTRICT SOUTH GOA.— Exterior walls of the Masjid were white washed.

249. MAHADEVA TEMPLE, TAMDISURLA, DISTRICT SOUTH GOA.— Watertightening of the basaltic stone roof of the temple was attended to by using waterproofing compound. Old plaster over the apron around the temple was removed. The entrance to the *garbhagriha* of the temple was provided with wooden door.

MINI CIRCLE,

SHIMLA *Himachal*

Pradesh

250. TEMPLE OF BASHESHAR MAHADEVA AT HAT, BAJAURA, DISTRICT KULLU.—Protected area was enclosed with stone masonry wall.

251. BUDDHIST MONASTERIES, TABO, DISTRICT LAHAUL AND SPITI.—In order to check the dampness the foundation of the Kyil Khang was stabilized. The floor inside was concreted. The work of laying pathway around Serkhang and stabilizing the foundation was taken up and completed. Watertightening of the roof and repair to the walls of the Byam-ba Khang was also taken up and completed.

252. PHOO GUMPHA, TABO, DISTRICT LAHAUL AND SPITI.—The damaged and sunken flooring was removed and repaired. The outer walls were replastered as per original.

253. TRILOKINATHA TEMPLE, MANDI, DISTRICT MANDI.—Fallen portions of the retaining wall were reconstructed as per original.

SRINAGAR CIRCLE

Jammu and Kashmir

254. FORT, AKHNOOR, DISTRICT JAMMU.—The fallen buttress wall of the fort on the southern side was reconstructed partly in stone masonry and partly in brick masonry to match with the original.

Besides, cracks in the tower of the bastion were stitched. The fallen fortification wall on the northern side was also reconstructed to its original height.

255. MONASTERY AT ALCHI, DISTRICT LEH.— The leaking roofs of the Lotsava Lhakang, Manjusri Lhakang and Dukhang were watertightened. Wooden flooring in rooms of Lotsava Lhakang and Manjusri Lhakang was provided to match with the original. The facade of the Dukhang was also restored in mud brick work.

PRESERVATION OF MONUMENTS

256. PALACE AT LEH, DISTRICT LEH.— The decayed and fallen roofs of the rooms lying at level 6 and 12 on the south side and south-east corner of the palace were taken up for repairs. Round wooden poles were provided with twigs at the top to match the original arrangements. The roof was given waterproofing treatment by providing mud concrete over alkathene sheets and hessian cloth. The missing doors and windows were also replaced.

257. DERA TEMPLE AT BABORE, DISTRICT UDHAMPUR.— The missing and fallen portions of the superstructure of the *mandapa* on the west side were restored to conform to the original. Both plain and ornamental work was done.

258. KALA DERA TEMPLE II, BABORE, DISTRICT UDHAMPUR.— The fallen walls of subsidiary shrine were restored. Besides, the main temple received attention by way of providing dressed stone masonry in missing portions on the southern side.

259. TEMPLE, KIRAMCHI, DISTRICT UDHAMPUR.— The sunken flooring between the temple was dismantled and reset with proper slope with replacement of worn-out and broken stones.

260. FORT, RAMNAGAR, DISTRICT UDHAMPUR.— Missing fallen and cracked portions of the fortification wall on the northern side were reconstructed. Battlements at top were restored in conformity with the original. The flooring in the cells which had weathered was redone.

261. OLD PALACE, RAMNAGAR, DISTRICT UDHAMPUR.— The missing portions of the fortification wall on the northern side were restored in stone masonry. Its top was also redone in country brick masonry.

262. SHEESH MAHAL, RAMNAGAR, DISTRICT UDHAMPUR.— The fallen compound wall on the rear side of Sheesh Mahal was restored. Fallen buttress wall supporting the terrace was also repaired to arrest soil erosion.

VADODARA CIRCLE

Gujarat

263. SMALL STONE MOSQUE, ISANPUR, DISTRICT AHMEDABAD.— Bulged and out-of-plumb ashlar stone masonry was dismantled and reconstructed. Decayed lime concrete was removed and provided with lime cement matching the original.

264. MONUMENTS AT SARKHEJ (PAVILION AND MAIN GATEWAY), DISTRICT AHMEDABAD.— Decayed wooden beams were replaced with new ones. The sunken marble stone steps were dismantled and provided with new ones as per the original pattern.

265. JAMI MASJID, DHOLKA, DISTRICT AHMEDABAD.— The decayed lime concrete and damaged ashlar stone masonry was dismantled and relaid with new stones and lime concrete as per the original.

266. DARBARGADH, SIHOR, DISTRICT BHAVNAGAR.— The bulged wall was dismantled and reconstructed with cement mortar as per original by providing RCC framework. Damaged Kota stone flooring of the ground floor of the main room was replaced with new ones matching the original.

267. SAHASRALINGA TANK (RUDRAKUPA), PATAN, DISTRICT MEHSANA.— Dismantling and reconstruction out-of-plumb ashlar stone masonry in cement mortar, and providing missing stone masonry as per original was carried out.

268. JAMI MASJID, CHAMPANER (PAVAGADH), DISTRICT PANCHMAHALS.— The out-of-plumb and bulged ashlar RR masonry was dismantled and reconstructed in lime concrete as per original. The missing stone grill was replaced with newly carved and moulded grill as per original pattern.

MONUMENTS MAINTAINED BY THE STATES

ANDHRA PRADESH

The Department of Archaeology and Museums, Andhra Pradesh, carried out conservation work at the following monuments :

1. GAJASHALA AT KONDAPALLI, DISTRICT KRISHNA.
2. RESIDENCE OF LATE SRI VEERASALINGAUR PANTULUGARU AT RAJAHMUNDRY.
3. CHHAYA SOMESVARASWAMI TEMPLE. AT PANGAL.
4. MOSQUE AT HAYATNAGAR.

DELHI

The Department of Archaeology, Delhi Administration, carried out conservation work at the following monuments:

1. CHAUMCHI TOMB, MEHRAULI, NEW DELHI.—The accumulated debris around the monument was cleared and plinth level exposed. One of the existing corner *chhatris* was repaired and grouted.

2. BURI KHAN TOMB, R.K. PURAM, NEW DELHI.— The jungle growth around the monument was cleared and all the openings were fixed with grills.

GUJARAT

The Department of Archaeology, Government of Gujarat, carried out conservation works at the following monuments:

1. GANGVO KUND, DEDADARA, DISTRICT SURENDRANAGAR.— The dilapidated and disturbed eastern parapet wall and steps of the *kund* were taken out and reset as per original. The missing stones of the steps were also provided with new stones.

A compound wall was also provided around the *kund* for development of garden.

KARNATAKA

Conservation works at the following monuments were carried out by the Department of Archaeology and Museums, Government of Karnataka.

1. PARASAGAD PORT, SOUNDATTI, DISTRICT BELGAUM.— The dilapidated front portion of the fort wall was repaired by resetting stones

PRESERVATION OF MONUMENTS

2. MALLIKARJUNA TEMPLE, SOODI, DISTRICT DHARWAD.— Conservation work of the two *gopuras* and pitching work around the temple was completed.

3. NALAKANADU PALACE, YARAKAPADI, DISTRICT KODAGU.— The dilapidated portions of the main entrance were removed and repaired by providing burnt brick masonry and plastering. The damaged tiles and reapers were replaced with new Mangalore tiles and reapers in the main building.

4. SRI NARASIMHASWAMI TEMPLE, MELUKOTE, DISTRICT MANDYA.—The main *gopura* of the temple was watertightened. The badly damaged portion of the Madras terrace was dismantled and replaced. The doors and windows were repaired.

5. CHENNIGARAYA TEMPLE, TURUVEKERE, DISTRICT TUMKUR.—The out-of-plumb veneered wall to the right of the temple was removed and reset. The pavement was reset around the temple.

MANIPUR

The following monuments were conserved by the Manipur State during the year under review:

SAMADHI OF MAHARAJA GAMBHIR SINGH; SRI SRI GOVINDAJI TEMPLE, BEITHAB; BRINAMCHANDRA TEMPLE; SAMADHI OF MAHARAJA KHABA; LEIMAPOKPA KEIRUNGBA TEMPLE; THANGAL GENERAL TEMPLE; and ROYAL GATEWAY, all in DISTRICT IMPHAL

NAGALAND

The Government of Nagaland undertook repairs at the following monuments :

1. WOODEN SCULPTURE IN SHANGYU, DISTRICT MON.
2. SECOND WORLD WAR TANK, KOHIMA TOWN.
3. HISTORICAL SITES AT CHUNGBYIMTI, DISTRICT TUENSANG.
4. DISPLAY OF HUMAN SKULLS AT CHUI, DISTRICT MON.
5. JLNA AND EDIBEN MEMORIAL AT MONGCHEN, DISTRICT MOKOKCHUNG.
6. SOPFUNUO MEMORIAL, RUKHROMA, DISTRICT KOHIMA.

RAJASTHAN

The Department of Archaeology and Museums, Government of Rajasthan, carried out conservation work at the following monuments :

1. ASTRONOMICAL OBSERVATORY, JAIPUR; 2. MAJ'S CHHATRI, JAIPUR; 3. HAWA MAHAL, JAIPUR; 4. CENOTAPHS, GAITOR, JAIPUR; 5. AMBER, DISTRICT JAIPUR; 6. NARSINGH'S TEMPLE, AMBER, DISTRICT JAIPUR; 7. DALARAM GARDEN, JAIPUR; 8. CENOTAPHS OF BHARMAL, AMBER, DISTRICT JAIPUR; 9. AKBAR'S FORT, AIMER; 10. FORT, BHARATPUR; 11. TEMPLE AT ISWAL, UDAIPUR; 12. HUCHKUND, DHOLPUR; 13. GANGODBHEDA, AHAR, UDAIPUR; 14. KAMLESHWAR TEMPLE, INDERGARH, BUNDI; 15. FATEH JUNG'S GUMBAJ, ALWAR; 16. BAKHTAWAR SINGH'S CHHATRI, ALWAR.

X. EXPEDITION OUTSIDE INDIA

PRESERVATION OF ANGKOR VAT TEMPLE, SIEM REAP, CAMBODIA

In continuation of the previous year's work (1989-90, pp. 194-197), the Survey resumed the work of structural conservation and chemical preservation of the Angkor Vat temple-complex at Siem Reap, Cambodia under the bilateral agreement between the Governments of Cambodia and India under the direction of B. Narasimhaiah assisted by R.C. Mishra, P. V. Dongre, H. Mangiraj, K. Chaturvedi, Y.P. Thakkar, S. Dandapani, S. Rajendiran, Raghuraj Kishore, A.D. Jaiswal, P.C. Mittal, A.K. Bandyopadhaya, S.N. Dubey, M.I. Shaikh, Chanderpal, Bheru Lai Kumavat and M.R. Sharma. During the season the reconstruction of Samudramanthan Gallery, Entrance Pavilions north and south of Samudramanthan Gallery, the Central Entrance Porch on the east, the Stepped Embankment of the moat and south-east corner railing between Third and Fourth Enclosure were taken up. Besides, chemical cleaning and preservation of exterior walls of First Enclosure, four towers including the central one in the first enclosure, all the four interior galleries of the First Enclosure, northern and eastern corridors and four axial verandahs of the First Enclosure and eastern and western exterior of the Samudramanthan Gallery were executed.

STRUCTURAL CONSERVATION.— The Samudramanthan Gallery, which had been dismantled by the French in the 1960s and reconstructed upto the roof-level by the Indian teams in the previous years, was completely reconstructed (pl. LXXII) after properly identifying the original dismantled architectural members. In all, four hundred and seventy-two architectural members were reset in their proper position. The roof of the gallery was rendered watertight (pl. LXXIII) by pointing and grouting. The cornice portion was also similarly watertightened so as to prevent the entry of water into the gallery and run over the Samudramanthan panel. The masonry joints of the rear wall were also pointed to prevent the penetration of splashing rain-water. It was found that the level of the massive plinth of the gallery had been inadvertently raised by 5 cm when it was reconstructed by the French. After considering several alternatives like raising the floor level to that of the plinth, maintaining the original floor level but with a covered drain, to chisel off the plinth level to that of floor level, etc., it was decided to retain the original floor level. But instead of providing a closed channel, the rain-water could be taken to the inlets of the underground drain provided in the gallery by the French by lowering the level of the paved slabs wherever necessary. The flooring was reconditioned similarly and the level difference was camouflaged and a look similar to ancient sunken flooring was obtained. In all eighty-one slabs were reset and their joints were pointed.

The reconstruction of the superstructure of the Entrance Pavilion south of the Samudramanthan Gallery was taken up and-completed. The work involved rectification of some errors which had crept in the reconstruction in the earlier years. The work was also challenging in lifting the heavy

architectural members as the cranes could not reach the height. In all, three hundred and two architectural members were hoisted and reset in eight layers above a height of 10 m. The flooring had been dismantled by the French to provide concealed drain. However, the same was relaid at the original level, in all, relaying eighteen slabs. Some of the slabs had to be trimmed due to error in the reconstruction of the plinth.

The porch on the east of this entrance had been reconstructed upto the plinth level by the French. After reconditioning of the floor, the superstructure was reconstructed as per the original (pl. LXXIV).

Similarly, the porch on the south was also conserved upto plinth level and the floor was reconditioned. The joints in the floor between the slabs were pointed to prevent percolation of water.

The Entrance Pavilion north of the Samudramanathan Gallery had been dismantled and reconstructed to certain level. Here again, the agency that had executed the work had failed to maintain the plumb of the door-frame and the diagonal distances of the pavilion properly. As a result, some portions of the reconstructed structure were out of plumb and there were wide gaps. Therefore, in the first instance, it was required to dismantle the out of plumb portions and reconstruct the same to plumb. Further reconstruction was undertaken after executing the above work and then the whole structure was reconstructed as per the original, in all, resetting three hundred and forty-two architectural members (pl. LXXV).

The superstructure of the western porch of the entrance had been dismantled many years ago. Only one original pillar and an RCC pillar with a beam hoisted over the latter were standing. It was found that even the original pillar was disintegrating and had developed vertical cracks. There was severe disturbance in flooring. The out of plumb plinth, flooring and beams were dismantled for reconstruction. However, it was found that the core of the plinth made up of laterite blocks was intact and the dislodgment was only due to heavy growth of vegetation in the past. The plinth was reconstructed by resetting forty-eight architectural members. The floor was also reconditioned. Further work of reconstructing the porch is reserved for next season as the missing pillar had to be recast in RCC.

The main central entrance on the east of the third enclosure has two porches of different heights. The smaller porch, standing on a double plinth, had been dismantled upto the first plinth level in the previous season. In this season, after strengthening the laterite core with cement mortar and concrete, the dismantled members were reset as per the original. The flooring was reconditioned. The front pair of pillars were weak, particularly between the base and the capital, for any reuse. Therefore, the shaft portion was removed and the same was recast in RCC as per the original. Of the rear pair of pillars, one had to be strengthened by inserting I-section girder. After these strengthening measures, the vaulted roof was reconstructed by resetting seventy architectural members. In addition, the members of the plinth identified for dismantling in the previous season were pushed back to their original positions by lifting the superincumbent load and using horizontal jacks to the maximum possible extent because the dismantling of the members would have disturbed the existing intact portions of the

higher porch and also it was observed that the gaps formed in the masonry were not due to sinking of foundation, but because of masonry defects and growth of vegetation in the past.

In continuation of previous year's work, the stepped embankment of the moat on the west was taken up for conservation. Initially, 8.50 m long portion, dismantled during previous year, was reconstructed. Further, the embankment to a length of 18.20 m was taken up for conservation. After dismantling the steps, it was found that the steps were resting freely over a bed of sandstone jelly and clay, which in turn is laid over a laterite core. The earthen substratum is also fashioned in steps. The dry masonry of the laterite core had encouraged free growth of vegetation and had made way for rain-water to play havoc. After removing all loose earth over the stepped earthen stratum, a bed of cement concrete was laid over the hard earth. Then the laterite core was reconstructed with due care taken not to leave any gaps between. If any gap occurred, the same was filled with cement concrete so much so that the core will function as a whole mass. The steps were reconstructed as per the original (pl. LXXVI). A total length of 120.70 m of the embankment was thus conserved so far. In addition, functional drains were also provided all along the embankment as a preventive measure.

This part of the railing had been dismantled by the French team before 1970. It is not known why this was dismantled. Possibly, the whole railing was in dilapidated condition. Therefore, with a view to reconstructing it, the whole railing must have been dismantled. Then the reconstruction work must have been started from different points with the intention of completing it quickly. But, unfortunately, errors crept in and the ends of the two opposite works could not meet. This situation can be seen even today at several places all around. This was one such place and they had to abandon the work. The dismantled portion was reconstructed by using eight architectural members after rectifying the error committed earlier and after consolidating the core made up of laterite blocks.

CHEMICAL PRESERVATION.—The chemists of the team had to execute their work with constraints like non-availability of chemicals in time, keeping constant supply of water at a height of 50 m from the ground level, and above all inexperienced labour force. However, in spite of all these difficulties faced by them, they could chemically clean and preserve more than 25,000 sq. m. The area covered include : exterior walls of the first enclosure, four towers including the central one in the first enclosure, all the four interior galleries of the first enclosure, northern and eastern corridors and four axial verandahs, and eastern and western exterior of the Samudra-manthan Gallery. In addition, the western facade (pl. LXXVII), of the fourth enclosure on the west was also chemically cleaned and preserved.

The method adopted in chemical cleaning and preservation is as follows. In the first instance, the surface was moistened with water spraying. Then the area was cleaned with 1% to 2% solution of liquid ammonia, used only to neutralize the acids secreted by the hyphae of the micro-vegetation, mixed with teepol, a non-ionic detergent and by brushing gently with nylon brushes or soft coir brushes as the situation demanded. The surface was thereafter cleaned thoroughly with water. The area thus cleaned was treated with 2% solution of polycide, bioxide and zincsilicofluoride separately. Finally, after complete drying of the area, it was preserved by applying a coat of 2% solution of polymethyl methacrylate in toluene.

XI. ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS¹

ANDHRA PRADESH

1. VIRABHADRASVAMI TEMPLE, LEPAKSHI, DISTRICT ANANTAPUR.— Paintings on the north ceiling of the *ardhamandapa* and the west wall of the Virabhadra shrine were subjected to chemical treatment for the removal of old yellowish and translucent preservative coating, oil and sooty matter. For this purpose, methyl alcohol, cellosolve and toluene were used either individually or in combination with turpentine as restrainer. 1% solution of polyvinyl acetate in toluene was finally applied as a preservative coating.

2. RAMESVARASVAMI TEMPLE, TADIPATRI, DISTRICT ANANTAPUR.— Chemical treatment work was continued for the eradication of vegetational growth, oily and sooty accretions using an aqueous mixture of ammonia and teepol in 3:1 ratio. Lime wash accretions were also removed with the help of 10% acetic acid solution and after thorough washing with water and drying, a coat of 2% fungicide was given to the surface. The chemically cleaned area was finally preserved with 2% polyvinyl acetate solution in toluene thus completing the work.

3. THOUSAND-PILLARED TEMPLE, HANAMKONDA, DISTRICT WARANGAL.— Chemical treatment work by chemico-mechanical means was continued for the removal of thick accretions of lime wash, calcareous accretions and other deposits. Dilute solution of acetic acid, oxalic acid, sodium hexametaphosphate, followed by general cleaning with ammonia teepol mixture were used for the purpose. The chemically cleaned and dried surface was subjected to fungicidal treatment followed by a coat of 3% solution of Acrypol-P in toluene as preservative. The work was completed.

BIHAR

4. SHERSHAH SURI'S TOMB, SASARAM, DISTRICT ROHTAS.— Chemical treatment for the removal of dust, dirt, moss, lichen and other vegetational growth was continued by using 5% solution of ammonia and 3% non-ionic detergent. At some places 5% aqueous solution of oxalic acid was applied to bleach dark patches over stone surfaces. To check further growth of moss and lichen, two coats of 2% aqueous solution of sodium pentachlorophenate were sprayed on the cleaned surface which was followed by application of a preservative coat of 3% solution of Acrypol-P in toluene.

DELHI

5. DIWAN-I-KHAS, RED FORT, DELHI.— The chemical treatment and preservation of the golden paintings, inlay work and plain marble surface was continued in the Diwan-i-Khas. Work was also

¹Information from : 1-1J, 14-16, 19-58, Chemical Branch of the Survey; 12-13, 17-18, Department of Archaeology, Government of Gujarat.

carried out in the eastern corridor and northern side of the central hall for the removal of dust, dirt, greasy matter and soot. These accretionary deposits were removed by stepwise treatment in different stages, viz., treatment with liquor ammonia, teepol and hydrogen peroxide; treatment with triethanolamine and methyl alcohol in 1:2 proportion and finally application of a paste of aluminium silicate and magnesium trisilicate in 4:1 ratio. The treated area was finally washed with water. The work is in progress.

6. ROSHANARA BARADARI, ROSHANARA BAGH, DELHI.— The paintings on the arched walls of the verandah encircling the grave were in bad condition due to detachment of plaster and bulging at several places, flaking of pigments, etc. Detached plaster and bulgings were fixed and cracks were filled using plaster of Paris, fevicol, etc., followed by colour matching to give uniformity to the surface. Chemical cleaning was thereafter carried out for the removal of mortar splashes, dust and dirt using organic solvents and aqueous solution of glacial acetic and employing chemico-mechanical methods. The treated area was finally preserved with the help of 2% solution of polyvinyl acetate in toluene.

7. ARAB-KI-SARAI, NEW DELHI.— The beautiful paintings and stucco work on the central dome and northern arched portion which were covered with thick deposits of dust, dirt and soot were treated with suitable organic solvents, viz., acetone, methanol, toluene and triethanolamine, either individually or in combination, for the removal of above accretions. Loose and fragile pigments were fixed by the application of 5% solution of poly vinyl acetate and the entire treated area was finally preserved with 2% solution of polyvinyl acetate in toluene. The work has been completed.

8. HUMAYUN'S TOMB, NEW DELHI.—The marble and red sandstone surface of north-west side was subjected to chemical treatment for the removal of vegetational growth, dust and dirt using 1-2% mixture of teepol and ammonia with gentle brushing followed by thorough washing. The area was then given fungicidal treatment with 1% solution of sodium pentachlorophenate and finally preserved with 2% solution of polyvinyl acetate in toluene. The work was completed.

9. QUTB MINAR, MEHRAULI, NEW DELHI.— The interior side of the walls and staircase were covered with thick deposits of dust and dirt, bats' excreta, greasy matter and wasp nests. Chemical treatment was commenced from the fifth floor downwards using dilute solution of liquor ammonia and teepol in the ratio 3:1. The calcareous material was removed by treatment with 5% solution of glacial acetic acid. The chemically cleaned area was given a preservative coat of 2% solution of methyl methacrylate polymer in toluene.

10. SAFDARJUNG TOMB, NEW DELHI.—The paintings on the under surface of the arched portion of the entrance gate of the tomb were affected by fine deposits of soot and oily matter released by vehicles passing close by to the tomb alongwith dust and din. The superficial accretions of dust and dirt were removed by gentle brushing while soot and oil accretions were removed by application of organic solvents like N-butanol, diacetone alcohol, methanol, toluene and triethanolamine. The treated area was finally preserved with 2% solution of polyvinyl acetate in toluene. The work was completed.

GOA

11. ST. CAJETAN'S CHURCH, VELHA GOA.— Chemical treatment and preservation of a big canvas painting was carried out after complete removal of butter paper and cloth facing from the painting for the removal of dust, dirt and bat's excreta before final fixing of loose painting.

Chemical treatment of two wooden panel paintings was also carried out.

GUJARAT

12. PALIYA AT BHUCHARMORI DERI, NEAR DHROL, DISTRICT JAMNAGAR.— The coat of vermilion applied over the memorial stone was cleaned by applying kerosene oil and 1 to 2 per cent dilute solution of sodium hydroxide plus water.

13. JAMI MASJID, UPERKOT, JUNAGADH, DISTRICT JUNAGADH.— The three marble *mihrabs* of the mosque had been disfigured by visitors who had scribbled their names in ink. These were removed using liquid ammonia and teepol in water solution and various other organic solvents such as acetone, toluene, benzene and xylene.

14. RANI-KI-VAV, PATAN, DISTRICT MAHESANA.— The chemical treatment work (II Phase) of outer sculptures and carvings of Rani-ki-Vav was carried out for the removal of hard accretions of moss, lichen, etc., with the help of 3% solution of liquor ammonia. Fungicidal treatment was given to the treated area using 2% suspension of zinc silicofluoride and then preserved. The work is in progress.

15. JAMI MASJID, PAVAGARH MONUMENTS, CHAMPANER, DISTRICT PANCHMAHALS.— The chemical treatment work for the removal of lime accretion and vegetation growth from the outer portion of Jami Masjid, Pavagarh, was continued using dilute acetic acid and a mixture of 3% solution of non-ionic detergent and aqueous ammonia respectively. The cleaned surface was given fungicidal treatment and then preserved with 3% solution of polyvinyl acetate in toluene. The work is in progress.

16. KEVDA MASJID, PAVAGARH MONUMENTS, CHAMPANER, DISTRICT PANCHMAHALS.— The outer portion of this monument, thickly covered with dried black vegetational deposits was treated with a mixture of ammonia and non-ionic detergent. Entire treated area was then given fungicidal treatment using 2% suspension of zinc silicofluoride and preserved. The work is in progress.

17. EXCAVATED REMAINS, KUNTASI, DISTRICT RAJKOT.— The silo and the mud brick structure, which had been exposed in the course of excavation were in a fragile condition. In order to consolidate these, loose soil was removed using smooth brush. Thereafter, 4% polyvinyl acetate in toluene (sulphur free) solution was applied on the silo and the mud brick structure. Finally, these were covered with plastic sheets and sand to- protect from rain and effect of weathering.

18. SIVA TEMPLE, SUPEDI, DISTRICT RAJKOT.— The sculptures and carvings in the temple were subjected to chemical cleaning, treatment and preservation (pl. LXXVIII). These were first cleaned with dry coir brush to remove micro-organism algae; the remaining micro-organism algae were

removed with mixed solution of 3% liquid ammonia, teepol and water. Paper pulp treatment was given to porous portions of sculptures to remove soluble salts. Finally, 3% polyvinyl acetate in toluene was applied with smooth brush as a preservative coating.

HIMACHAL PRADESH

19. BUDDHIST MONASTERIES, TABO, DISTRICT LAHUL AND SPITI.— The mural paintings on the western and southern walls of inner sanctum (periphery) of the Duwang Gumpa were covered with thick layers of dust, dirt and soot alongwith mud streaks at some places.

The superficial deposits of dust and dirt were first removed by gentle brushing and then chemical treatment was carried out for the removal of other accretions using suitable organic solvents viz., ethylene glycol, petroleum ether, dibutyl phthalate, methanol, toluene, triethanolamine, etc., either individually or in different proportions. The cleaned portions were finally preserved with a thin coat of 2% solution of PVA in toluene (pls. LXXIX-LXXX).

20. ARDHANARISVARA TEMPLE, MANDI, DISTRICT MANDI.— The exterior sandstone structure of *vimana*, embellished with carvings of floral designs, geometrical patterns and miniature figures of gods, was chemically treated for the eradication of moss and lichen using 1-2% ammonical solution and teepol with soft nylon brushing. The lime accretions which did not yield to the above treatment were removed chemico-mechanically using 2-5% aqueous solution of glacial acetic acid. The entire treated area was then given an application of 1% suspension of zinc silicofluoride as fungicide and subsequently preserved with 2% solution of polyvinyl acetate in toluene.

21. TRILOKINATH TEMPLE, MANDI, DISTRICT MANDI.— The thick and hard lime plaster accretions deposited in the crevices of carvings of the highly porous grey coloured soft sandstone were removed by chemico-mechanical means using dilute acetic acid and brushing the softened accretions.

The superficial accretions of dust, dirt and vegetation growth on the outer sandstone structure were removed chemically using ammonical solution mixed with teepol. After thorough washing and drying 1% suspension of zinc silico-fluoride was sprayed all over the cleaned area as a fungicide followed by a coat of preservative. The work is in progress.

KARNATAKA

22. TIPU SULTAN PALACE, BANGALORE, DISTRICT BANGALORE.—Paintings in the palace have been treated with suitable chemicals for the removal of layers of lime wash coatings using chemico-mechanical method. The fragile and powdery pigments were consolidated. Paintings thus exposed have been cleaned and preserved. About 58% work has been completed.

23. ASAR MAHAL, BIJAPUR, DISTRICT BIJAPUR.— Old translucent preservative, wax, sooty matter and other superficial accretions were removed from the paintings using suitable organic solvents. In addition to above cleaning work, reintegration work was also attended to. Wood carvings and pillars were also treated and preserved suitably. About 70% work has been completed.

24. DARYA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA.—The panel and canvas paintings which were fixed to the joints of wooden planks and exhibited on the ceiling of the eastern and

western verandah were taken up for treatment, restoration and modelling work. Loose hanging and torn canvas were consolidated with emulsion of PVA after blowing out the accumulated dust and dirt between the canvas and the carrier and making the stiff and fragile canvas more pliable with the use of alcohol. The chemical treatment involved removal of superficial accretions of dust and dirt with the help of methyl alcohol, cellosolve and toluene. Paintings were finally preserved with 1 % solution of PVA in toluene. About 50% work has been completed.

25. KIRTINARAYANA VAIDYESVARA TEMPLE, TALKAD, DISTRICT MYSORE.— Lime wash and thick calcareous accretions were removed by chemico-mechanical means using dilute acetic acid. Entire cleaned area was given a fungicidal treatment with sodium pentachlorophenate and preserved with 1% solution of PVA in toluene. About 64% work has been completed.

26. RAMESVARA TEMPLE, KELADI, DISTRICT SHIMOGA.— Parvati, Ramesvara and Veerabhadra shrines were chemically treated for the removal of biological growth, accretions of black paint, lime, oil and soot using suitable chemicals. The cleaned area was given fungicidal treatment and finally preserved with 2% solution of PVA in toluene. The work has almost been completed.

KERALA

27. VADAKKUNATHAN TEMPLE, TRICHUR, DISTRICT TRICHUR.— Accretions of smoke, dust and mud were removed from the wooden bracket figures and carvings using 3:1 aqueous solution of ammonia and teepol. After complete drying of the wooden structures, Flytox a pyrethrum product was sprayed as insecticide and finally preserved with 2% PVA in toluene.

The paintings in the temple were also treated chemically for the removal of similar accretions using triethanolamine, diacetone alcohol, butyl acetate, toluene and turpentine as restrainer. Some paintings covered with thick lime wash were exposed by chemico-mechanical means and finally preserved with 2% PVA in toluene. Stone sculptures at the entrance of Sri Rama shrine were also attended for the removal of oily, greasy and sooty accretions chemico-mechanically using ammonia and teepol and preserved with 3% Acrypol-P in toluene. The work has been completed.

MADHYA PRADESH

28. VAMANA TEMPLE, KHAJURAHO, DISTRICT CHATTARPUR.— Chemical treatment for the removal of moss and lichen was continued using a solution of teepol and ammonia (3-5%) with soft nylon brushes. The work is in progress.

29. SIDDHESVARA TEMPLE, NEMAWAR, DISTRICT DEWAS.— Chemical treatment and preservation work was continued on this monument for the removal of moss and lichen using 3-5% ammoniacal water mixed with teepol and gentle scrubbing with soft nylon brushes. Lime accretions were also removed using 1% solution of acetic acid followed by application of 1-2% solution of sodium pentachlorophenate as a fungicide and 2% solution of perspex in toluene as a preservative. The work has been completed.

30. BAGH CAVES, BAGH, DISTRICT DHAR — Eleven stripped panels of painting of Cave 4 were remounted on a new support of fibre glass using epoxy resin. After removal of facing, mounted

paintings have been cleaned and colour matched. In addition to this, in Cave 2 and 4, old preservative coating has been removed from the painted surface and a new preservative coat was applied after general cleaning.

Fumigation and insecticidal treatment were also carried out in Cave 2, 3, 4, to arrest bat and insect activity using alluminium phosphide mixed with ethylene dibromide and formaline respectively.

31. EK PATHAR KI BAODI, GWALIOR, DISTRICT GWALIOR.— The work of chemical cleaning of Ek Pathar ki Baodi was taken up for the removal of moss and lichen alongwith lime accretions from the images of Jaina sculptures. The work is in progress.

32. SAS TEMPLE, GWALIOR FORT, GWALIOR, DISTRICT GWALIOR.— The chemical treatment and preservation work was continued for the removal of vegetational growth like moss and lichen, etc., using a mixture of liquid ammonia and teepol with soft nylon brushing. At some places, 1% solution of acetic acid and pyridine were also used for the removal of lime and coal-tar accretions respectively. The cleaned surface was given fungicidal treatment with 1% aqueous solution of sodium pentachlorophenate followed by preservative coating with 2% solution of polymethyl methacrylate. The work has completed.

33. JOGIMARA CAVE, DISTRICT SURGUJA.—The paintings executed on the ceilings of the cave were covered with dust, dirt and wasp nests and were faintly visible. Besides, due to leaching, lime had deposited on the surface of the paintings thereby obliterating some of the figures. The paintings had also been disfigured by vandals who had written their names in acrylic paint. By using a mixture of various organic solvents the names written in acrylic paint and dust and dirt were removed. The chemically cleaned area was finally given a preservative coat with 2% polyvinyl acetate solution in toluene.

MAHARASHTRA

34. ROCK-CUT CAVES, ELLORA, DISTRICT AURANGABAD.— Paintings in the *garbha-griha* of Cave 12 were treated chemically for the removal of dust, hard accretions of soot, shellac and varnish using organic solvents with cotton swabs and sable hair brushes. Bulgings in the above paintings and paintings of Nandi *mandapa* (Cave 16) were fixed to the wall and preservative coat of 2% PVA was applied on some area.

Some stone sculptures of Buddha in *Teental* of this cave were also treated for the cleaning of dust and dirt accretions and excreta of bats and birds using ammonia-teepol mixture. Sculptures were preserved after thorough washing and complete drying.

35. AURANGAZEB'S TOMB, KHULDABAD, DISTRICT AURANGABAD.— Marble platform of Aurangzeb's tomb alongwith plaster work, covered with thick accretions of dust and dirt were treated chemically using a mixture of dilute ammonia and teepol for the removal of above accretions. Hydrogen peroxide and some other chemicals were also used and entire treated structure was finally preserved. The work has been completed.

36. TRIMBAKESHWAR TEMPLE, TRIMBAKESHWAR, DISTRICT NASIK.— The chemical treatment of main temple, Nandi *mandapa* compound wall and thirty *lingas* was carried out for the removal of thick growth of moss and lichen using 3% aqueous solution of ammonia-teepol mixture. On the cleaned surface, 2% zincsilicofluoride suspension was sprayed as fungicide and 3% solution of Acrypol-P in toluene was applied on dried surface as preservative. The work has been completed.

ORISSA

37. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT PURI.— The *jagamohana* of this temple was chemically treated for the removal of thick deposits of dust, dirt and extensive vegetational growth using mixture of 2 to 3% aqueous solution of ammonia and teepol with gentle brushing. Cotton wads soaked in liquid ammonia were also used to cover certain areas for softening and easy removal of hard incrustations of lichen. All over the cleaned surface, 1% solution of sodium pentachlorophenate was sprayed as fungicide and finally preserved with 1 to 1.5% solution of PVA in toluene. 58% work has been completed.

38. SUN TEMPLE COMPLEX, KONARAK, DISTRICT PURI.— The *pidhas of jagamohana* covered with thick vegetational growth were cleaned chemically using 2% aqueous solution of ammonia mixed with 1% teepol. After cleaning, thorough washing and subsequent drying of the surface, 1% suspension of zinc silicofluoride was sprayed as fungicide and three coats of 1% methyl methacrylate solution in toluene were applied for preservation and surface consolidation. The work is in progress.

39. JAGANNATHA TEMPLE COMPLEX, PURI, DISTRICT PURI.— The deplastered surface of the *vimana* of the Jagannatha temple, 16 metres and 19 metres above the spring level was taken up for the removal of remanent hard layer of lime plaster by chemico-mechanical process, using dilute acetic acid. The chemically cleaned area after thorough washing was given a fungicide coat followed by application of 1-2% acrypol solution in toluene as preservative.

The deplastered area of Siddha-Ganesa temple located on the south side of the main temple was taken up for the removal of tenacious lime plaster accretions by chemico-mechanical means using dilute acetic acid. The treated surface was thoroughly washed and 2% suspension of zinc silicofluoride in water was sprayed as fungicide followed by a preservative coat of 2% solution of Acrypol in toluene. The work has been completed.

The deplastered surface of the Surya-Narayana temple was chemically treated for the removal of lime plaster accretions and preserved adopting same conservation measures as already discussed.

PONDICHERRY

40. PANCHANANDEESVARA TEMPLE, THIRUVANDUR KOIL.— The vegetational growth and sooty accretions were removed from the exterior wall using 3 : 1 solution of ammonia and teepol. The patches of lime wash and yellow ochre were also removed from interior carved pillars and the row of Ganga figures using dilute acetic acid solution. After thorough washing and drying of the surface, 1% solution of sodium pentachlorophenate was sprayed as fungicide followed by 3% solution of acrypol-P in toluene as preservative. The work has been completed.

TAMIL NADU

41. ARJUNA'S PENANCE, MAHABALIPURAM, DISTRICT CHENGAI ANNA.— Hard calcareous accretions, vegetational growth, dirt and dust have been removed from the bas-relief panel by chemical treatment. The calcareous accretions were first softened with dilute acetic acid and then scrubbed mechanically whereas the other accretionary deposits were removed using dilute aqueous ammonia-teepol mixture. After thorough washing of the treated surface, 1% solution of sodium pentachlorophenate was sprayed as fungicide and finally preserved with 3% solution of Acrypol-P in toluene. Filleting and filling of cracks and fissures over the panel have also been attended.

42. BAS-RELIEF OF KRISHNA MANDAPA, MAHABALIPURAM, DISTRICT CHENGAI ANNA.— The chemical treatment work was carried out on the front *chhajjas* for eradication of vegetational growth using aqueous solution of ammonia and teepol. Dust, dirt, lime wash and calcareous accretions were removed from the pillars and Govardhana panel using aqueous solution of acetic acid and sodium hexametaphosphate. General cracks and fissures were also filled up using stone powder and epoxy resin. The chemically treated areas were given fungicidal treatment and finally preserved with 3% Acrypol-P solution in toluene.

43. SHORE TEMPLE, MAHABALIPURAM, DISTRICT CHENGAI ANNA.— Six to eight repeated applications of paper pulp soaked in distilled water were given to the remaining portions of Jalasayana Perumal shrine and southern *prakara* wall in order to remove soluble salts thus making an area of 204.8 sq. mt. free of soluble salts. After a final wash with distilled water, 1% aqueous solution of sodium pentachlorophenate was applied as fungicide followed by preservative treatment to the dried area with 2-3 coats of 3% polyvinyl acetate in toluene.

44. SIKHAGIRISVARA TEMPLE, KUDUMIAMALAI, DISTRICT PUDUKKOTTAL.— Chemical treatment was carried out in order to remove sooty and greasy accretions using ammonia-teepol mixture (3 : 1) and to expose the paintings of Nataraja *mandapa* by removing lime layer chemico-mechanically using dilute acetic acid solution. Entire treated area was finally preserved with 3% PVA solution in toluene. About 80% work has been completed.

45. ROCK-CUT VISHNU-SIVA TEMPLE, MALAYADIPATTI, DISTRICT PUDUKKOTTAL.— The paintings on the ceiling of inner verandah and painted stucco figures in Vishnu temple and sculptures in Siva temple were subjected to chemical conservation for the removal of dust, dirt, soot and other accretions using triethanolamine, diacetone alcohol, morpholine and toluene. Two painted human figures were exposed on the ceiling of outer verandah by removing the overlying insignificant pigments of first layer. Their clue of this exposition could be ascertained from the partially visible female head. The restoration work like filleting and edging was also attended and treated paintings were finally preserved with 2% solution of PVA in toluene.

Sculptures in Siva temple affected by greasy and sooty accretions were treated using dilute ammonia and teepol in 3 : 1 ratio. The cracks were filled up with epoxy resin mixed with stone powder and finally preserved with 3% acrypol in toluene. About 43% work has been completed.

UTTAR PRADESH

46. ITMAD-UD-DAULA, AGRA, DISTRICT AGRA.— The paintings of northern verandah and north west corner were treated chemically for the removal of dirt, dust, smoke and other superficial accretions, using organic solvents, viz., cellosolve, benzene and methanol. The marble surface was cleaned using aqueous mixture of ammonia and teepol, hydrogen peroxide and triethanolamine in different proportions. Old preservative coat was also removed from the paintings with toluene mixed with a few drops of butyl lactate and then cleaned. The cleaned paintings and marble surface were finally preserved with 1% solution of PVA in toluene. The work is in progress.

47. SHEIKH SALIM CHISTI'S TOMB, FATEHPUR SIKRI, DISTRICT AGRA.—To clean the marble surface of Sheikh Salim Chisti's tomb, bearing a yellowish-brown deposit of dust, dirt, soot and oily accretions, it was treated with 1-2% aqueous solution of ammonia mixed with teepol. Triethanolamine and hydrogen peroxide were also used for the removal of smoke and other stains. The work is in progress.

48. TAJ MAHAL, AGRA, DISTRICT AGRA.— The marble surface of eastern big arch of Taj Mahal bearing yellowish brown accretions due to accumulation of dust, dirt, smoke and soot was treated chemically using liquor ammonia, teepol, hydrogen peroxide, methanol and triethanolamine in suitable proportions to remove these accretions. A paste of magnesium trisilicate and aluminium silicate in 1:3 ratio was applied as a clay pack for the removal of sticky matter and surface was finally washed with distilled water. The work is in progress.

49. GROUP OF TEMPLES, DWARAHAT, DISTRICT ALMORA.— The exterior sandstone surface of the temple was treated with 1-2% solution of ammonia and teepol for the removal of dirt, dust, vegetational growth and superficial accretions. After chemical cleaning, fungicidal treatment was carried out with 2% suspension of zinc silicofluoride followed by preservation with 2% solution of polyvinyl acetate in toluene.

50. JAGANNATHA TEMPLE, JAGESHWAR, DISTRICT ALMORA.— The interior sandstone surface of Jagannatha temple, covered with dirt, dust, smoke accretions was cleaned with 1-2% solution of ammonia, teepol, hydrogen peroxide, triethanolamine and acetic acid in different proportions were also used. The cleaned surface was finally preserved with polyvinyl acetate in toluene. The work is in progress.

51. GOPINATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI— The exterior lime washed walls of *sabha-mandapa*, covered with dirt, dust, thick vegetational growth, were treated with 1-2% aqueous solution of ammonia and teepol. The lime was later on removed by using 1% solution of glacial acetic acid. Fungicidal treatment was carried out by using 2% suspension of zinc silicofluoride followed by preservation with polyvinyl acetate in toluene. The work was completed.

52. FORT, JHANSI, DISTRICT JHANSI— Slogans and advertising writings were removed by using different organic solvents, viz., dioxane, acetone, benzene, etc. The cleaned surface was subjected to fungicidal treatment with zinc silicofluoride followed by 2-3% solution of polyvinyl acetate in toluene as preservative.

53. ASAFI MOSQUE, BARA IMAMBARA, LUCKNOW, DISTRICT LUCKNOW.— The plastered exterior wall of the main arched gate of Asafi mosque was treated with teepol-ammonia solution for the removal of dried moss, dust, dirt, accretionary deposits. The cleaned surface was subjected to fungicidal treatment with zinc silicofluoride followed by its preservation with PVA in toluene. The work has been completed.

54. BARA IMAMBARA, LUCKNOW, DISTRICT LUCKNOW.—The lime plastered walls of main building of Bara Imambara, covered with dust, dirt, and vegetational growth were chemically treated using 1-2% solution of liquid ammonia and teepol for the removal of these accretions. Fungicidal treatment was given with 2% aqueous suspension of zinc silicofluoride on accretion free surface followed by preservation with 3% solution of PVA in toluene. The work has been completed.

55. OLD GOVIND DEO TEMPLE, VRINDAVAN, DISTRICT MATHURA.— The interior surface of central hall and inner part of the *ranga mandapa* of old Govind Deo temple, covered with dust, dirt, soot and bat's excreta were cleaned using 1-2% solution of PVA in toluene. The work is in progress.

56. VOTIVE STUPA, SARNATH, DISTRICT VARANASI.— Thick vegetational growth of moss and lichen, covering the brick structure of the Monastery 1 was removed with 2% solution of ammonia and teepol using mild nylon brushes. Dark patches of deep rooted microphytes on the stone structure were also removed by treatment with aqueous solution of oxalic acid. After cleaning, fungicidal treatment was carried out with 2% solution of copper naphthanate in kerosene oil followed by preservation with 3% solution of PVA in toluene. The work is in progress.

WEST BENGAL

57. RAMACHANDRA TEMPLE, GUPTIPARA, DISTRICT HOOGHLY.— Chemical cleaning and preservation work was taken up for the removal of thick layer of moss, lichen and other microphytes by using 2% aqueous solution of ammonia and teepol. After cleaning, fungicidal treatment was given with 2% aqueous solution of sodium pentachlorophenate to check further growth of vegetation and was finally preserved with 4% solution of polyvinyl acetate. The work has been completed.

58. KALI TEMPLE, PALPARA, DISTRICT NADIA.— Chemical cleaning was carried out for the removal of thick layer of vegetational growth using 2% solution of ammonia and teepol with soft scrubbing with nylon brushes. Some bricks and terracotta work badly damaged due to salt action was subjected to paper pulp treatment for extraction of soluble salts. It was then followed by cleaning with aqueous teepol solution. The chemically cleaned surface was then given fungicidal treatment with 2% solution of Santobrite in water followed by preservation with 4% solution of polyvinyl acetate in toluene. The work has been completed.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS¹

1. Two thousand and two hundred coins from Kasindra (Jodhpur) hoard were chemically treated and preserved.

¹Information from: 1-2, Department of Archaeology and Museums, Government of Rajasthan; 3, National Research Laboratory for conservation, Lucknow; 4-6, and 8-11, Chemical Branch of the Survey; 7, Director of Research, Government of Arunachal Pradesh; and 12, Department of Archaeology and Museum, Government of Andhra Pradesh.

2. One hundred stone sculptures and inscriptions belonging to the Government Museum at Ajmer, Mount Abu and Amber were chemically treated and preserved.
3. Sixteen miniature paintings from the G.B. Pant Government Museum, Almora; two hundred pages of "Krishna-Lila" from the State Museum, Lucknow; manuscripts from Dogra Regiment, Suratgarh, Rajasthan; wall paintings of Saint Monica Church, Goa and Raja Mahal, Orchha (Madhya Pradesh); and twenty-three *thankas* from Tawang monastery, Tawang (Arunachal Pradesh) were chemically treated and preserved.
4. Stone sculptures displayed in the Archaeological Museum, Bodhgaya, were subjected to chemical treatment for removal of dust, dirt and oily accretions using dilute aqueous ammonia, nonionic detergent and other suitable organic solvents. After thorough washing and subsequent drying a coat of fungicide followed by a preservative coat of 1-2% solution of polyvinyl acetate in toluene was given.
5. A variety of museum objects, viz., stone sculptures, coins, polychrome sculptures, inscriptions on stone, mural paintings, cannon balls and some excavated miscellaneous objects of the Archaeological Museum, Velha Goa, were chemically treated,
6. Fourteen canvas and some paper paintings, one silver *palki*, fifteen guns, ten swords, some ivory objects, one hundred eighty-three books, two *dhals* and four *kalasas* of Ambari of Hazarduari Palace Museum, Murshidabad were chemically treated and preserved.
7. Five sculptures found from Malinithan (Arunachal Pradesh) were chemically treated.
8. Sixty-five copper antiquities, forty-eight copper objects, sixty iron antiquities and fifteen iron objects and two hundred and five copper coins received from excavation at Sanghol (Punjab) were chemically treated and preserved.
9. Eighteen copper antiquities and sixty-two iron objects received from Jakhera excavation were chemically treated, cleaned and preserved.
10. Twenty pages of the *Quran* were treated and encapsulated in tissue paper.
11. One manuscript was also fumigated in a closed chamber to check insect activity.
12. Chemical treatment and preservation of floral designs in stucco figures of Rajagopuram of Sri Nageswara Vasavi Kanyaka Paramesvari temple at Penugonda in district West Godavari, preservation of marble stone tombs, stucco *jalis* and ornamental parapet wall at Paigah tombs, Hyderabad, were taken up. Chemical cleaning and preservation of stone sculptures at State Museum, Hyderabad, besides chemical conservation of a *mandapa*, a *gopuram* and *mukha mandapa* of Sri Narasimhasvami temple at Ahobilam was completed. The chemical treatment and preservation of bracket figures of wooden chariot brought from Kothapatnam of Ongole district, bronzes of Kali, Chandrasekharamurti, Buddha, Ganapati, Deepalakshmi, iron objects, etc., were chemically cleaned and preserved.

RESEARCH AND ANALYSIS¹

1. AIR POLLUTION STUDY IN RELATION TO AGRA MONUMENTS.— In order to study the effects of various gaseous pollutants and particulate matter on the monuments of Agra, the Air Monitoring Laboratory of the Survey at Agra has been monitoring level of sulphur dioxide, dust fall, suspended particulate matter and other meteorological parameters for the comparative evaluation of physical and chemical damage to the monuments in different meteorological conditions. This study is significant and important to have a close and careful watch on the state of soundness of stone and other building material to protect the monuments of Agra region from pollution by adopting the protective measures on the basis of observations made through the studies.

(a) *Measurement of Sulphur Dioxide* : This measurement was carried out at the Taj Mahal and Sikandara with the help of automatic analyser in order to evaluate the pattern of SO_2 dispersement in the atmosphere with wind direction and speed. On the basis of monthly average concentration of SO_2 ($\mu\text{g}/\text{m}^3$) it has been observed that average concentration of SO_2 was higher (49-27 $\mu\text{g}/\text{m}^3$ in January 1991) than the prescribed limit for sensitive zone during winter season.

(b) *Measurement of dust fall*: This measurement has been taken at three monitoring sites, viz., Taj Mahal, Red Fort and Sikandara throughout the year. Remarkable difference has been noticed in the nearby atmosphere of three monitoring stations. Dust samples thus collected have been analyzed qualitatively and quantitatively for the presence of deleterious salts and acidic radicals.

(c) *Measurement of Sulphation Rate* : This important parameter which determine the rate of oxidation of sulphur dioxide to sulphur trioxide was measured at Taj Mahal and Sikandara and it was found that this rate was maximum in January, i.e., during winter season.

(d) *Measurement of SPM in ambient air*: This parameter was important to measure as SPM is responsible for blackening of the surface due to its striking power on the surface and due to presence of organic/inorganic acids which is harmful to stones.

In addition to above measurements, rain water analysis and measurement of meteorological parameters was also carried out.

2. ANALYTICAL STUDIES AT SCIENCE LABORATORY, DEHRA DUN.— (a) Twelve stone samples received from Cambodia were analysed for the study of physical and chemical characteristics with the help of different analytical instruments and conventional methods of analysis. Similar studies have been done for the stone samples received from Jagannatha temple, Puri.

(b) eight metallic and iron samples received from Bhagwanpura excavated site and from some other sources were analysed qualitatively and quantitatively with the help of Atomic Absorption Spectrometer and Gravimetric analysis.

(c) Two copper samples with preservative coatings received from National Museum, New Delhi were studied with the help of Infra-red Spectrometer.

¹Information from: 1-2, Chemical Branch of the Survey; 3, National Research Laboratory for conservation of Chmical Proputy, Lucknow; 4-10, Department of Archaeology, Government of Gujarat.

ARCHAEOLOGICAL CHEMISTRY

(d) Five glaze samples were also analysed with the help of flame photometer for quantitative estimation. For some studies TGA and DTA methods have also been put into use.

(e) Soil samples received from Lakshmi Narayana temple, Hosaholoka, District Bangalore, were also analysed.

3. RESEARCH AND CONSERVATION WORK UNDERTAKEN BY NATIONAL RESEARCH LABORATORY FOR CONSERVATION OF CULTURAL PROPERTY, LUCKNOW.— (a) Metallographic studies with metallurgical microscope were done of coins collected from the Government Museum, Mathura.

(b) Metallographic work of iron artifacts from Naduvil megalithic site and Atholi Kudikhal, Monanthody from Kerala was completed.

(c) Survey, documentation and conservation work of bronzes were completed. Experiments were done with zinc powder to control bronze disease satisfactorily.

(d) Studies on the methods of lamination of birch-bark manuscripts were done and some adhesive and materials like methyl cellulose, carboxyl methyl cellulose, *maida* paste and paper were recommended.

(e) Extracts of deoiled *neem*, kernal and *kharanja* seed were tested and found effective against insects like silverfish and furniture carpet beetle.

(f) Biodeterioration studies of paper material and wooden samples collected from Maldives were done. Fungi were isolated in both the cases.

(g) Four biocides, namely orthophenyl phenol-2%, sodium pentachlorophenol 1 %, zinc DDC-5% and menthol 1, 2, & 5% were tested against fungi on replicas of Ajanta wall paintings.

(h) Polymers like silane, tegovakan V, polymethyl methacrylate etc., were used for treatment of stone samples and the treated samples were artificially weathered and physical properties such as water absorption capacity, rate of water evaporation etc., were studied.

(i) Analytical studies on the plant gums, their artistic application were carried out by TLC and which was most successful in the analysis of plant gums after hydrolysis.

4. REMOVAL OF YELLOWISH EFFECT FROM MARBLE STONE DUE TO WATER.—(i) China clay + Thyoglycolic acid (add liquid ammonia to neutralize) and made paste and then applied on effected area.

(ii) Chloramine T + liquid ammonia + Teepol solution used to remove yellowish effect on marble due to water.

(iii) Use of "Mora and Mora" reagent.

In the laboratory experiment work was done for removal of yellowish effect on marble stone due to water.

(i) Water 1000 ml.

- (ii) Sodium Carbonate - 25 gm.
- (iii) Ammonium Bicarbonate - 50 gms.
- (iv) Ethylene diamene tetraacetate - 10 gms.
- (v) CMC - 30 gms.
- (vi) Detergent (Teepol) non-ionic - 10 ml.

5. CHEMICAL TREATMENT GIVEN TO SCULPTURES AND CARVINGS.— First of all dust, dirt and birds excreta was removed from sculptures and carvings, thereafter effect of micro-organism algae was removed with dry coir brush. The remaining micro-organism algae were removed with dry coir brush. The remaining micro-organism algae were removed with mixed solution of 3% liquor ammonia + teepol + water. The solution was applied with smooth brush and remained on sculptures for 10 minutes for reaction. The sculptures and carvings were thereafter rubbed with coir brush and water. On the porous parts of the sculptures and carvings paper pulp method was applied to remove the soluble salts, thereafter these were washed with water. After completely drying the surface of sculptures and carvings finally 3% polyvinyl acetate in toluene was applied as a preservative coating with smooth brush.

6. CONSOLIDATION OF SILO AND MUD-BRICK STRUCTURES.— In the year 1989-90 during excavation of Bibi la's mound at Kuntasi Taluka Maliya, District Rajkot from trench No. F-G/4 silo and mud-brick structure were found in fragile condition. It was necessary to give these structures strength with chemicals.

First of all loose soil particles were removed by smooth brush. Then 4% polyvinyl acetate in toluene (sulphur free) solution coating was applied on all parts of the structure and silo. Finally the structure and silo were covered with plastic and over it sand, so that structure and silo were preserved from rain and weathering effect.

7. REMOVAL OF RED, BLUE AND BLACK-INK FROM MARBLE STONE.— Jumma Masjid at Upperkot, Junagadh having three *mihrabs* made of marble stone which were disfigured by visitors with red, blue and black ink and also by writing names with pencil were cleaned with following solution and solvents.

- (i) Liquid ammonia + teepol + water solution
- (ii) Acetone
- (iii) Toluene
- (iv) Benzene
- (v) Xylene

8. REMOVAL OF VERMILION EFFECT FROM PALIYA, BHUCHARMORI DERI NEAR DHROL, DISTRICT JAMNAGAR.— Vermilion applied over Paliya by local people was cleaned with following chemicals:

ARCHAEOLOGICAL CHEMISTRY

- (i) Kerosene oil
- (ii) 1% to 2% dilute solution of sodium hydroxide plus water

Both chemicals were applied one by one. Kerosene oil was found very effective and there is no possibility of any side effect.

9. CONSERVATION OF HARAPPAN POT.— In the year 1990-91 Babarkot mound (village Babarkot, near Paliyad) Taluka Botad, District Bhavnagar, excavation were carried out. One Harappan pot was found from trench No. 36 M which had soil cementing effect. For removal of soil effect 1% to 2% dilute solution of hydrochloric acid + water was used with smooth brush very carefully so that colour of the pot was not affected, and finally washed with water. Finally, 3% polyvinyl acetate in toluene was applied as a preservative coating.

10. CONSOLIDATION OF MEDIEVAL STORAGE PIT.— In the year 1990-91 during Babarkot excavation one medieval storage pit was found from trench No. 40 p. The pit was in very fragile condition was consolidated with 3% polyvinyl acetate in toluene for giving strength.

XII. ARCHAEOLOGICAL GARDENS¹

ANDHRA PRADESH

1. ANCIENT- SITE, NAGARJUNAKONDA, DISTRICT GUNTUR.— Attempts were made to augment the irrigation water.

2. GOLKONDA FORT, GOLKONDA, DISTRICT HYDERABAD.— Attempts were made to augment the irrigation water.

3. RAMAPPA TEMPLE, PALAMPET, DISTRICT WARANGAL.— Landscaping and environmental development work was taken up and is in progress.

DELHI

4. KOTLA FIROZ SHAH, DELHI.— The garden was maintained nicely.

5. RED FORT, DELHI.— The garden was maintained properly.

6. HAUZ KHAS COMPLEX, NEW DELHI.—The garden around was maintained nicely throughout the year.

7. HUMAYUN'S TOMB, NEW DELHI.— During the year under review the garden was kept presentable.

8. JANTAR MANTAR, NEW DELHI.— The garden was well maintained throughout the year.

9. KHAIRUL MANAZIL, NEW DELHI.— The garden was properly maintained.

10. LODI TOMBS, NEW DELHI.— The garden was maintained nicely during the year under review.

11. NAZAF KHAN TOMB, NEW DELHI.— During the year under review, the garden was well maintained.

12. Purana Qila, New Delhi.— The garden was maintained properly.

13. Qutb Minar, New Delhi.— The garden was kept presentable throughout the year.

14. Safdarjung tomb, New Delhi.— The garden was kept presentable during the year.

15. Vijayamandal, New Delhi.— For proper irrigation of newly laid out garden, a borewell was dug through the Central Ground Water Board. The area around was taken up for plantation.

¹ Information from. 29, Government of Manipur, 35, Director of Archaeology and Museums, Government of Rajasthan; and the rest from the Horticulture Branch of the Survey.

ARCHAEOLOGICAL GARDENS

GUJARAT

16. STEP WELL, ADALAJ, DISTRICT GANDHINAGAR.—The garden was kept presentable throughout the year.

17. JAMI MASJID, PAVAGADH, DISTRICT PANCH MAHALS.— The garden was kept presentable throughout the year.

18. SHAHAR-KI-MASJID, PAVAGADH, DISTRICT PANCH MAHALS.— The garden was nicely maintained throughout the year.

19. SUN TEMPLE, MODHERA, DISTRICT MAHESANA.— The garden around the temple was maintained nicely.

20. HAZIRA TOMB, VADODARA, DISTRICT VADODARA.— The garden was well maintained.

HIMACHAL PRADESH

21. BAIJNATH TEMPLE, BAUNATH, DISTRICT KANGRA.— Garden was well maintained throughout the year.

JAMMU AND KASHMIR

22. SUN TEMPLE, MARTAND, DISTRICT ANANTNAG.— the garden around the temple was maintained nicely.

23. ANCIENT SITE, PARIHASAPURA, DISTRICT BARAMULA.— The garden around the structures was well maintained.

24. GAURI-SANKARA TEMPLE, PATTAN, DISTRICT BARAMULA.—The garden was maintained nicely.

25. AVANTIPUR TEMPLE, AVANTIPURA, DISTRICT PULWAMA.— The gardens were kept presentable throughout the year

26. PATHAR MASJID, SRINAGAR, DISTRICT SRINAGAR.— The garden around the masjid was well maintained.

27. DEVI BHAGWATI TEMPLE, BABORE (MANWAL), DISTRICT UDHAMPUR.—Garden was laid out on either side of the pathway leading to the temple.

MADHYA PRADESH

28. TEMPLES, KHAJURAHO, DISTRICT CHHATTARPUR.— In order to meet the requirements, the nursery on the eastern temple group was further extended by adding more plants.

MANIPUR

29. THANGAL GENERAL TEMPLE, WANGKHEI, DISTRICT IMPHAL.— A small garden was developed around the monument.

PUNJAB

30. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA.— The garden inside the fort was well maintained throughout the year.

RAJASTHAN

31. ANASAGAR BARADARI, AIMER, DISTRICT AJMER.— Few more plants such as *canna*, *acalypha*, *pedlanthus*, *motia* and rose were added.

32. BHARATPUR FORT, BHARATPUR, DISTRICT BHARATPUR.— The landscaping and laying out of garden around the fort was taken up and is in progress. Diesel pumping set was also installed at the bank of the ditch around the fort.

33. DEEG PALACES, DEEG, DISTRICT BHARATPUR.— A nursery was laid out and fifty citrus fruit plants were planted in the Kaccha Bagh.

34. CHITTAURGARH FORT, CHITTAURGARH, DISTRICT CHITTAURGARH.— More plants like *dakelia*, tuberose, gladiolus, foot ball lily, amanellis, etc., were introduced in the garden at Padmini palace, Bhama Shah palace, Vijayastambha and Kirtistambha and Kumbha palace.

35. PALACE, AMBER, DISTRICT JAIPUR.— The garden was maintained properly.

- UTTAR PRADESH

36. ITIMAD-UD-DAULA'S TOMB, AGRA, DISTRICT AGRA.— The work of boring well is in progress.

37. RAMBAGH GATE, AGRA, DISTRICT AGRA.— In order to meet the scarcity of water, steps were taken to bore deep wells and the work is in progress.

38. AKBAR'S TOMB, SIKANDARA, DISTRICT AGRA.— To economise and regulate the irrigation water on the western side of the tomb, new pipelines were laid.

39. MARIAM'S TOMB, SIKANDARA, DISTRICT AGRA.— Steps were taken to bore deep wells so as to meet the scarcity of water in the garden.

WEST BENGAL

40. KALACHAND TEMPLE, BISHNUPUR, DISTRICT BANKURA.— The development of garden around the temple is in progress.

41. HAZARDUARI PALACE, MURSHIDABAD, DISTRICT MURSHIDABAD.— Development of garden is nearing completion.

XIII. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. INDIAN ARCHAEOLOGY— A REVIEW.— The issue for the year 1986-87 was in advanced stage of printing and the issue for the year 1987-88 was made press ready.

2. MEMOIRS OF THE ARCHAEOLOGICAL SURVEY OF INDIA.— Number 87, *Excavations at Surkotada and Exploration in Kutch* by Jagat Pati Joshi was published.

3. ARCHITECTURAL SURVEY.—Numbers 4 and 5, *Temples of the Pratihara period in Central India* by R.D. Trivedi and *Temples of Khajuraho* by K. Deva (in two volumes) respectively were brought out.

4. SOUTH INDIAN INSCRIPTIONS.— Two numbers, Tamil and Sanskrit Inscriptions chiefly collected in 1886-87, Vol. I and Tamil Inscriptions, Vol. II, Part I & II, were reprinted.

5. CORPUS INSCRIPTIONUM INDICARUM.— Three Volumes, I, *Inscriptions of Asoka* and II, Pan I, *Kharoshthi Inscriptions*, and VII, Part I, *Inscriptions of the Paramaras, Chandellas, Kachchhapaghatas and two minor dynasties* were reprinted.

6. ANNUAL REPORT ON INDIAN EPIGRAPHY.— The issues for the year 1974-75 and 1981 -82 were in advanced stage of printing.

7. MISCELLANEOUS PUBLICATIONS.— *A Copper plate Hoard of the Gupta period from Bagh, Madhya Pradesh* edited by K.V. Ramesh and S.P. Tiwari was published.

8. GUIDE BOOKS.— *Delhi and its Neighbourhood*, both in Hindi and English was reprinted.

9. PICTURE POSTCARDS.— Thirty different coloured picture postcards were printed.

OTHER PUBLICATIONS

ANDHRA PRADESH.— The Department of Archaeology and Museums, Government of Andhra Pradesh published *Kakatiya Sanchika* in Telugu and *Island shrines-Elephanta*.

RAJASTHAN.— The Department of Archaeology and Museums, Rajasthan has taken up the printing of *The Researcher*, a departmental bulletin.



Kolhua: exposed votive stupas. See p. 3



Kolhua: exposed votive stupas around Asokan pillar. See p. 3

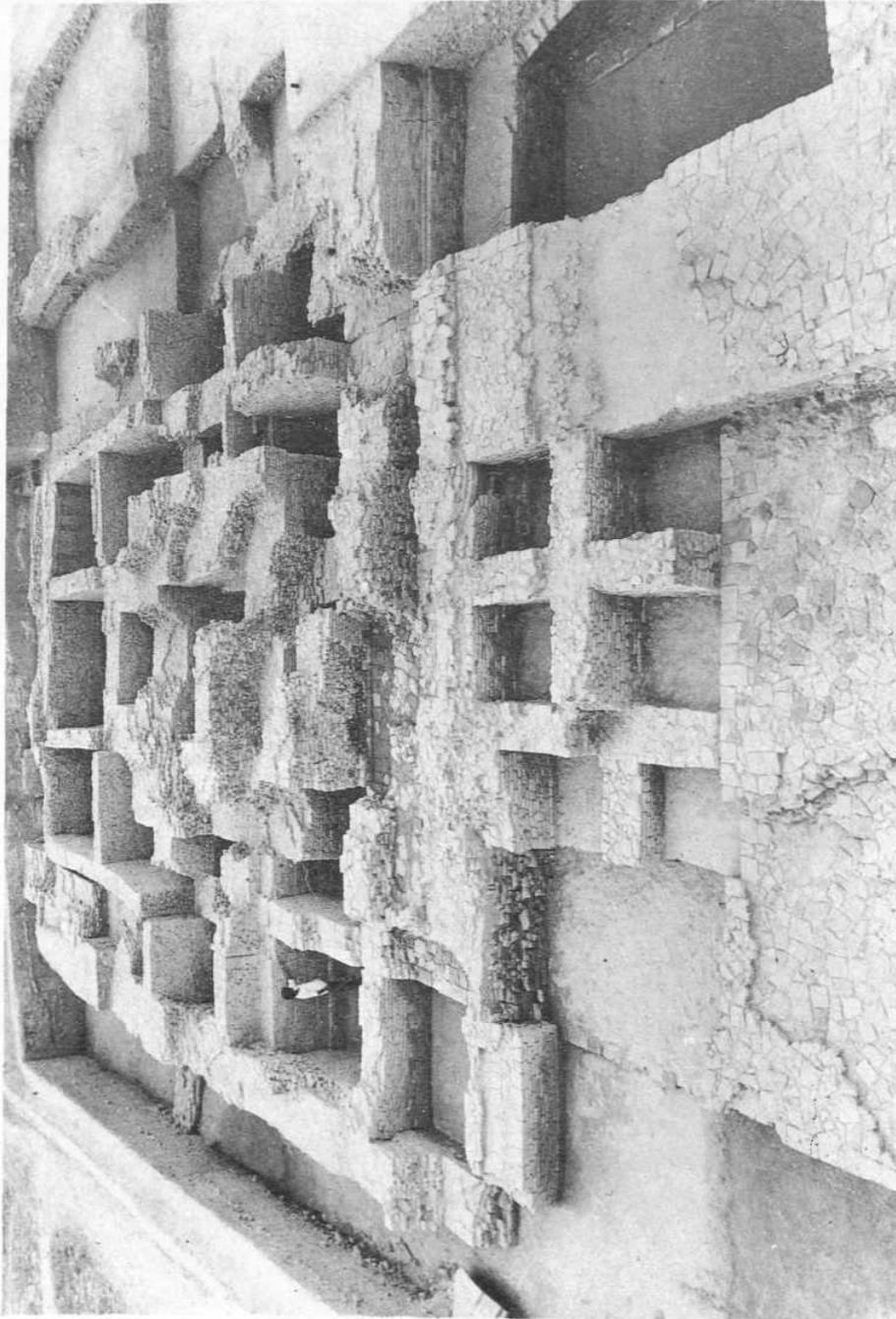


A

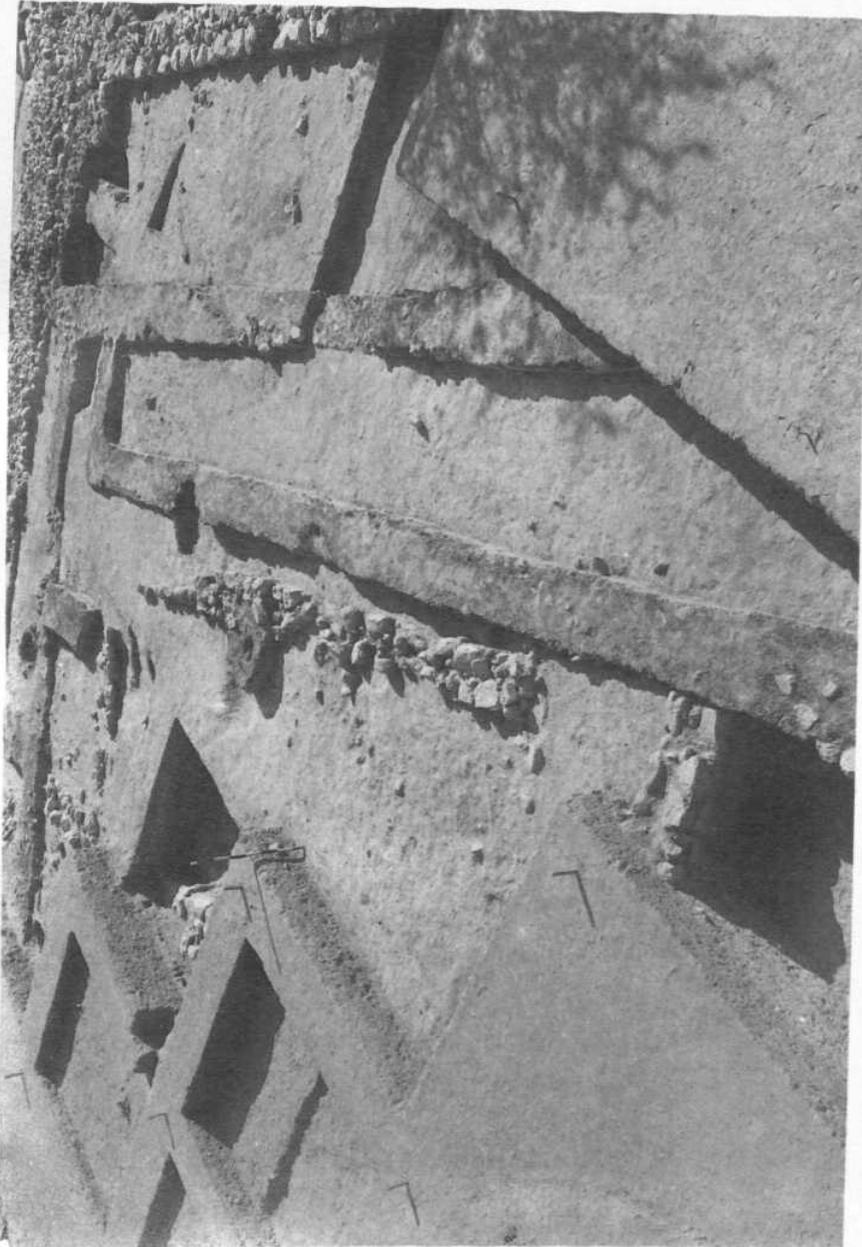


B

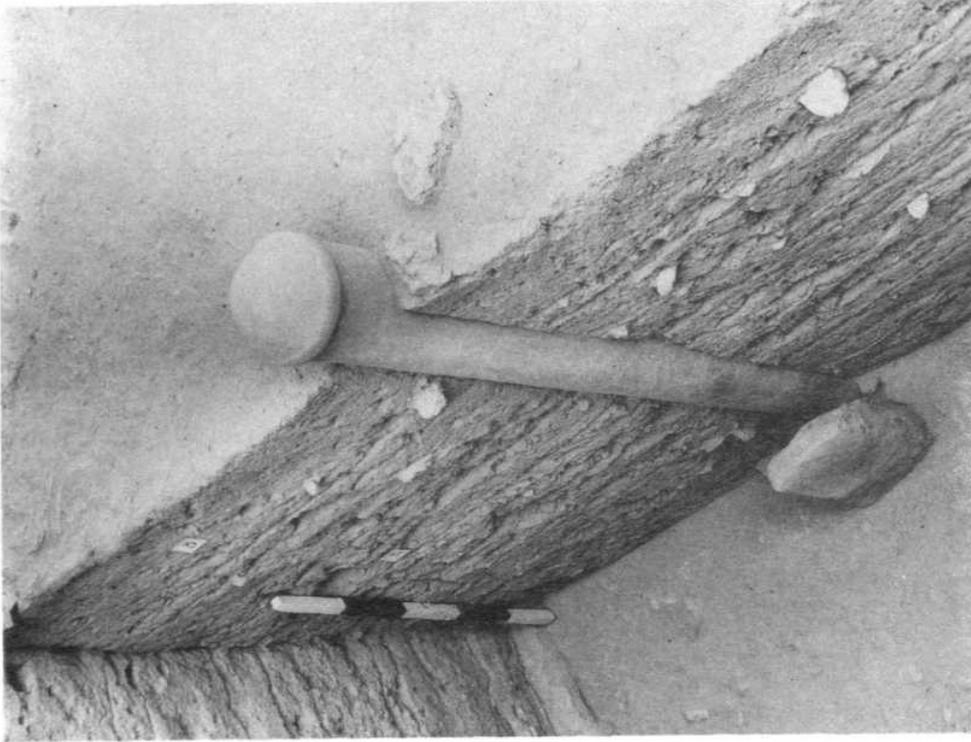
Kolhua: A, brick-lined tank and B, burnt brick drain. See pp. 3-4



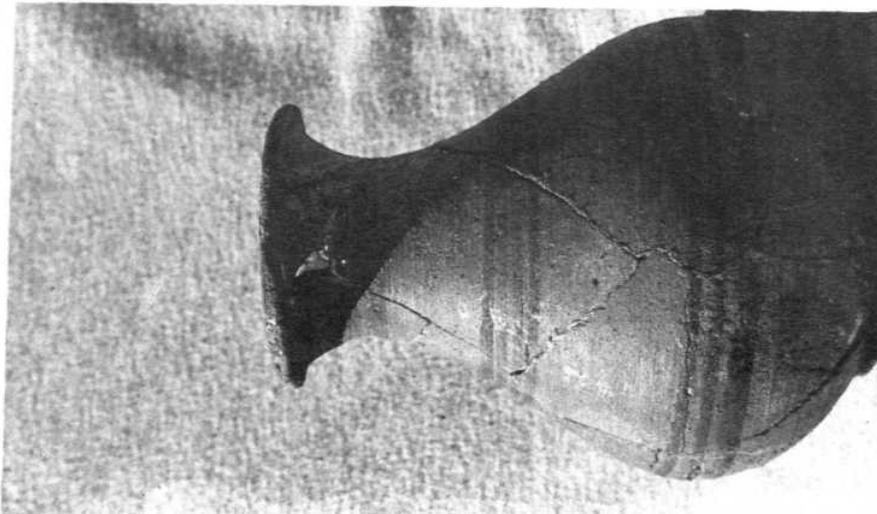
Kolhua: exposed structures. See p. 4



Babarkoi: general view, facing south-east. See p. 6

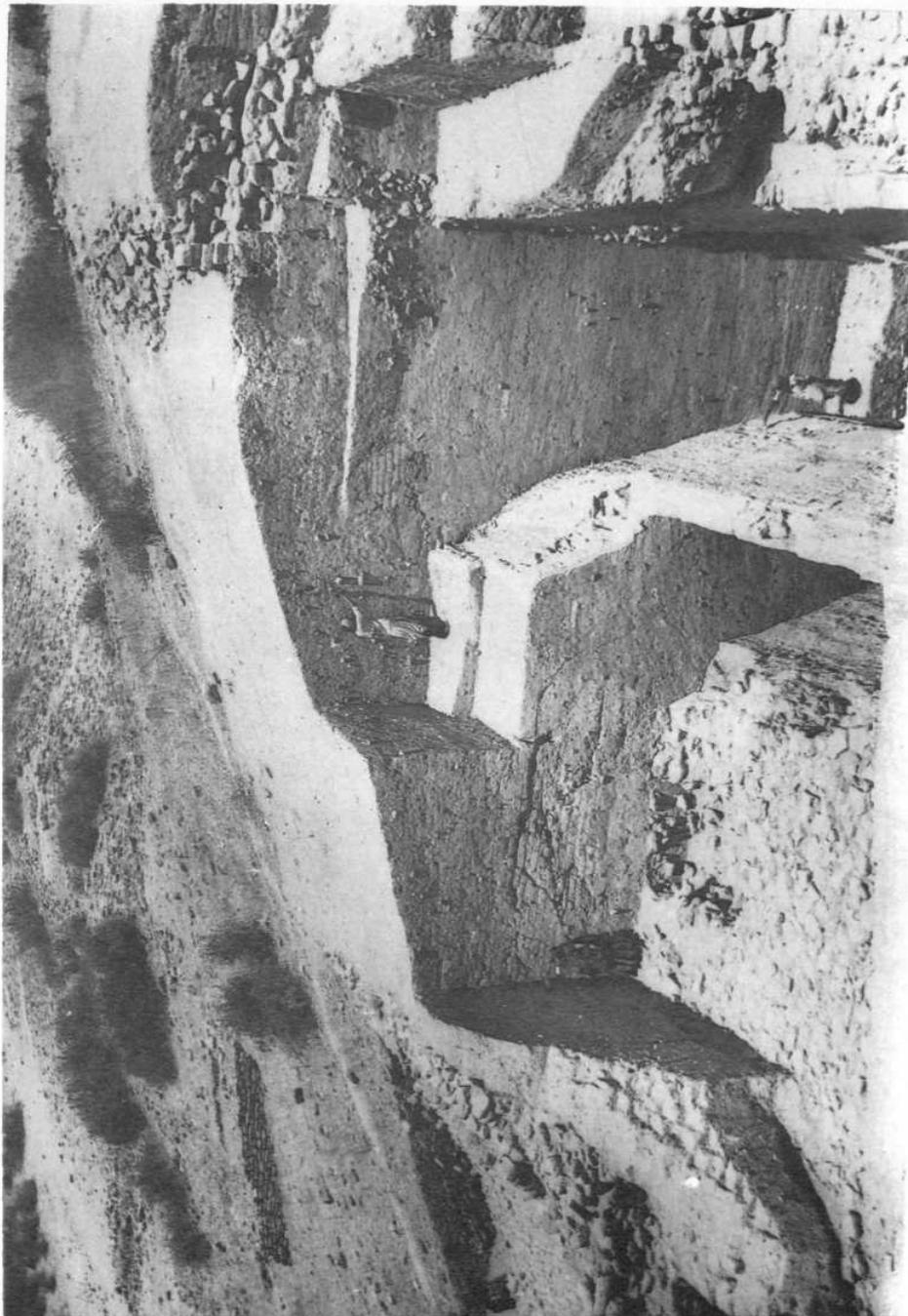


B

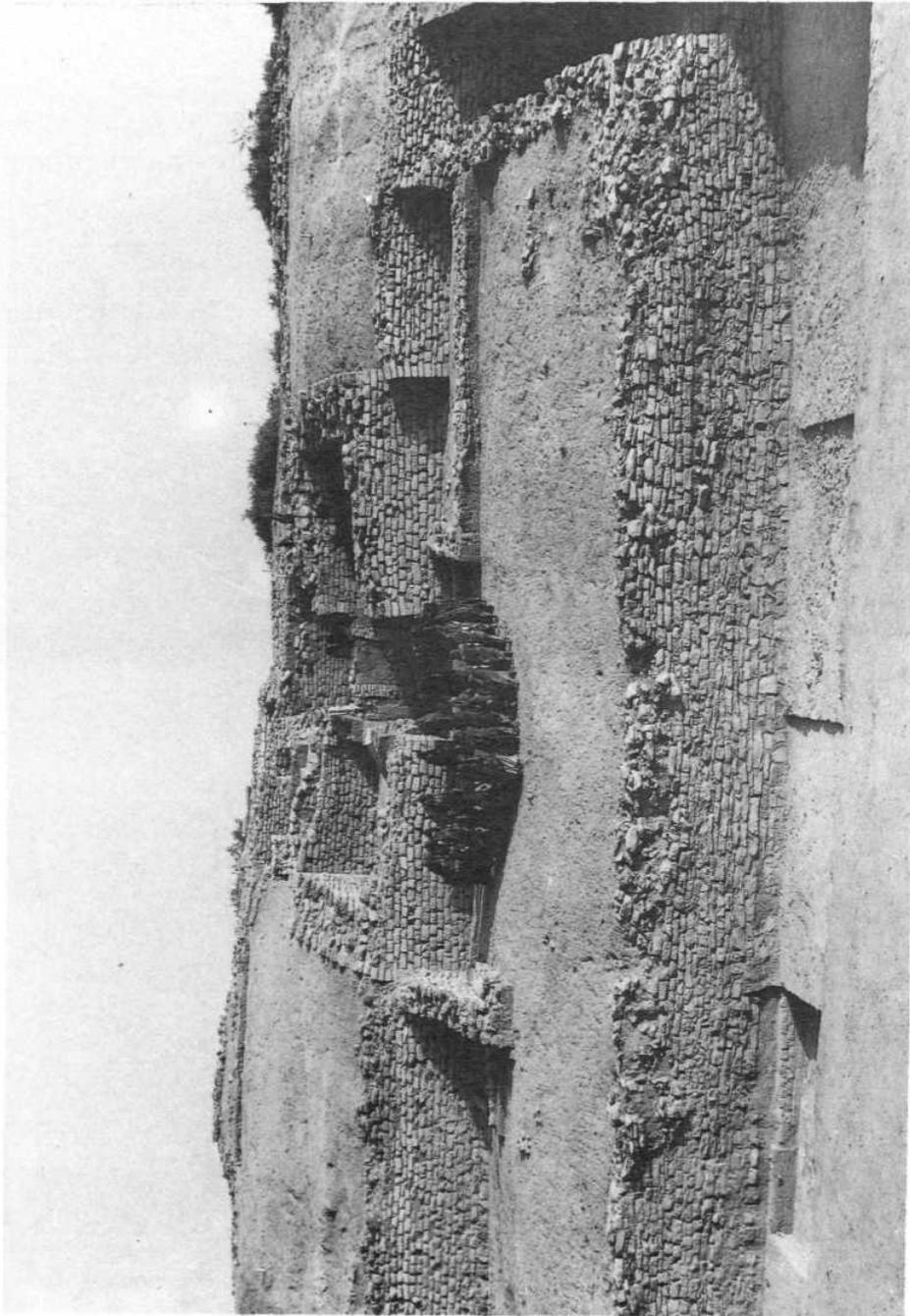


A

A, Babar Kot: pot, Phase II; B, Dholavira: polished monolithic pillar with hemispherical top. See pp. 7 and 11



Dholavira: successive phases of fortification wall. See p. 10



Dholavira: exposed north gate with sloping terrace. See p. 11



Dholavira: reel-shaped pillar base insitu. See p. 11



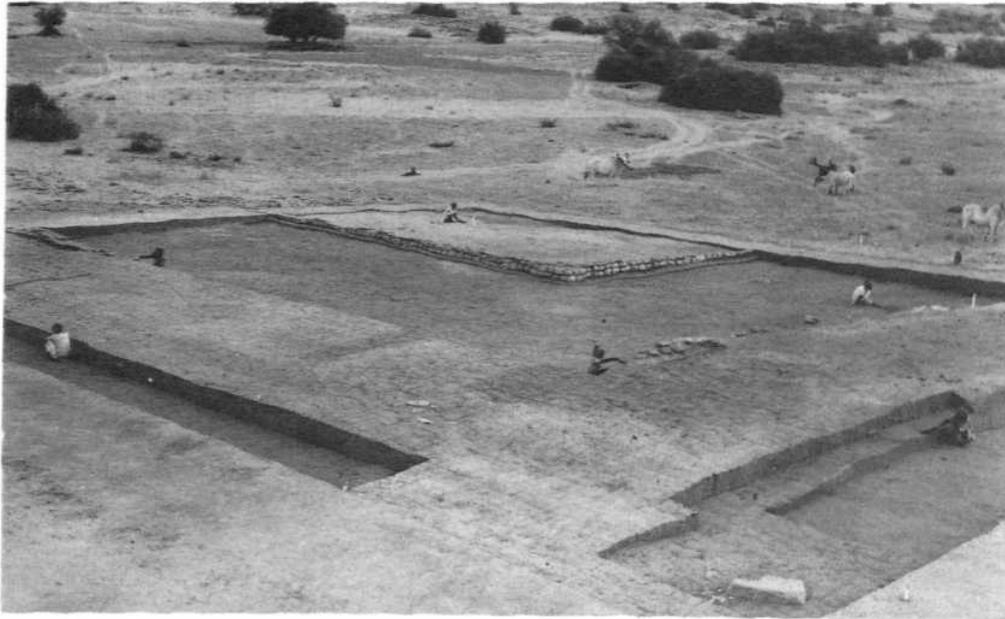
Dholavira: exposed structures. See p. 11



Dholavira: exposed structures. See p. 11

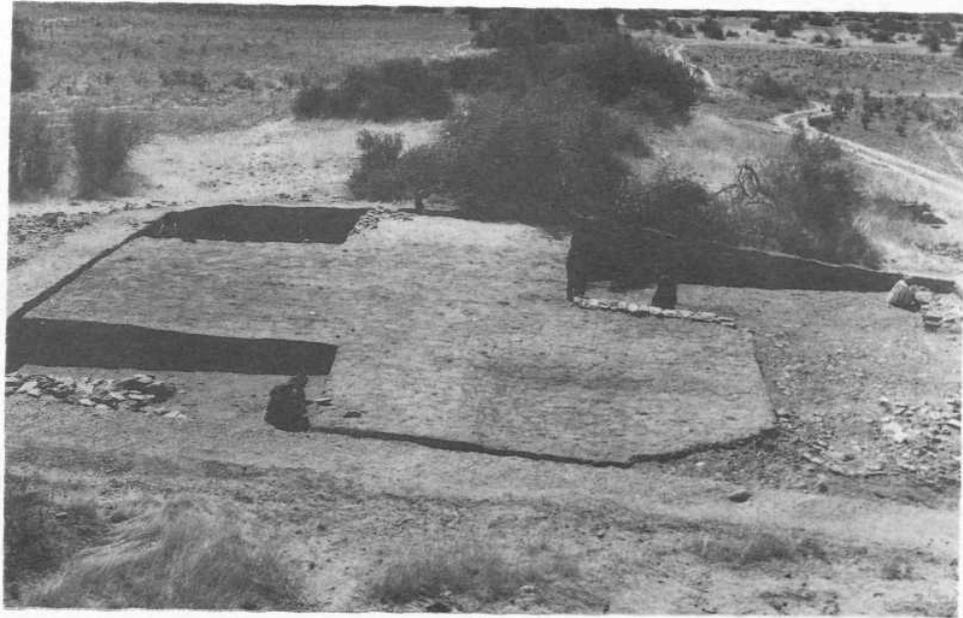


A

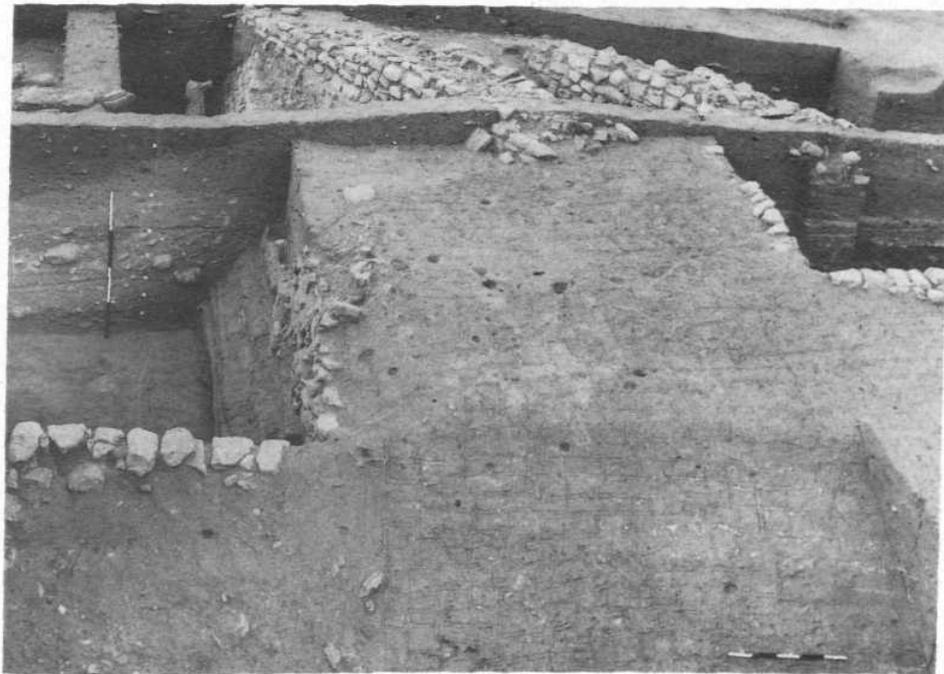


B

Dholavira: A, north-east corner outer wall of citadel; B, north-eastern outer fortification. See p. 12



A

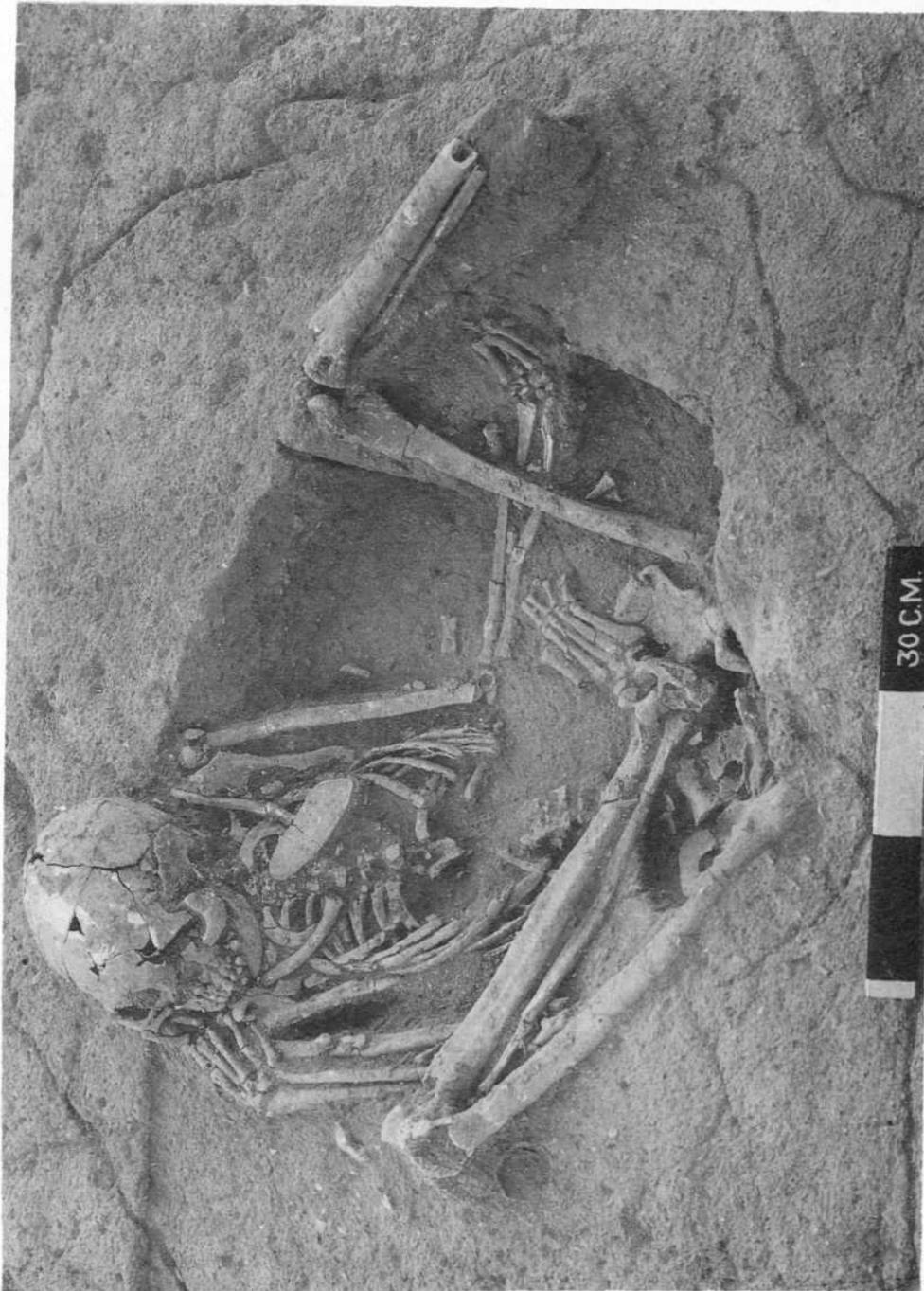


B

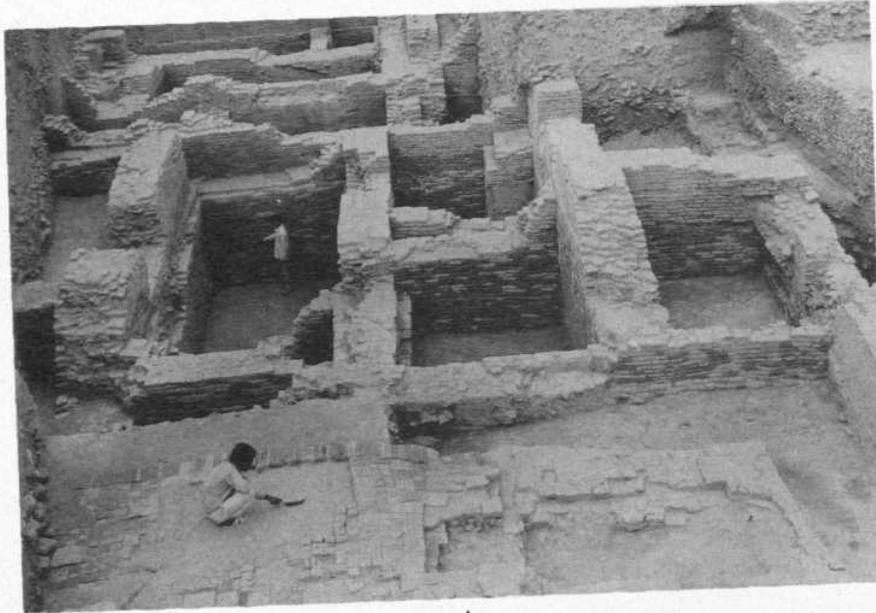
Dholavira: A, north-western and B, south-western city wall. See p. 12



*Dholavira: multi-roomed rectangular houses inside citadel,
Late Harappan. See p. 12*



Loteshwar : exposed burial, western slope of mound, Period I. See p. 16

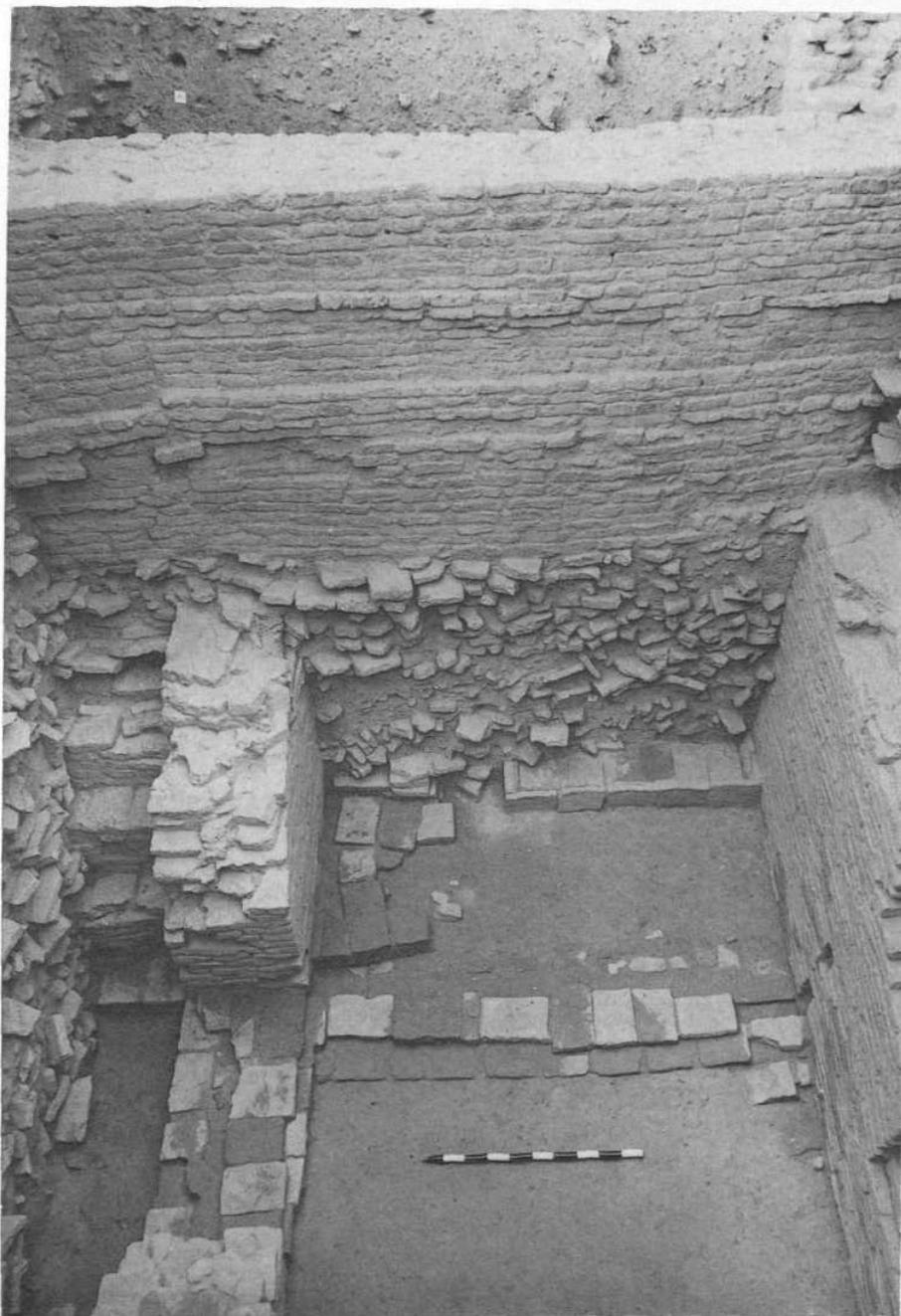


A

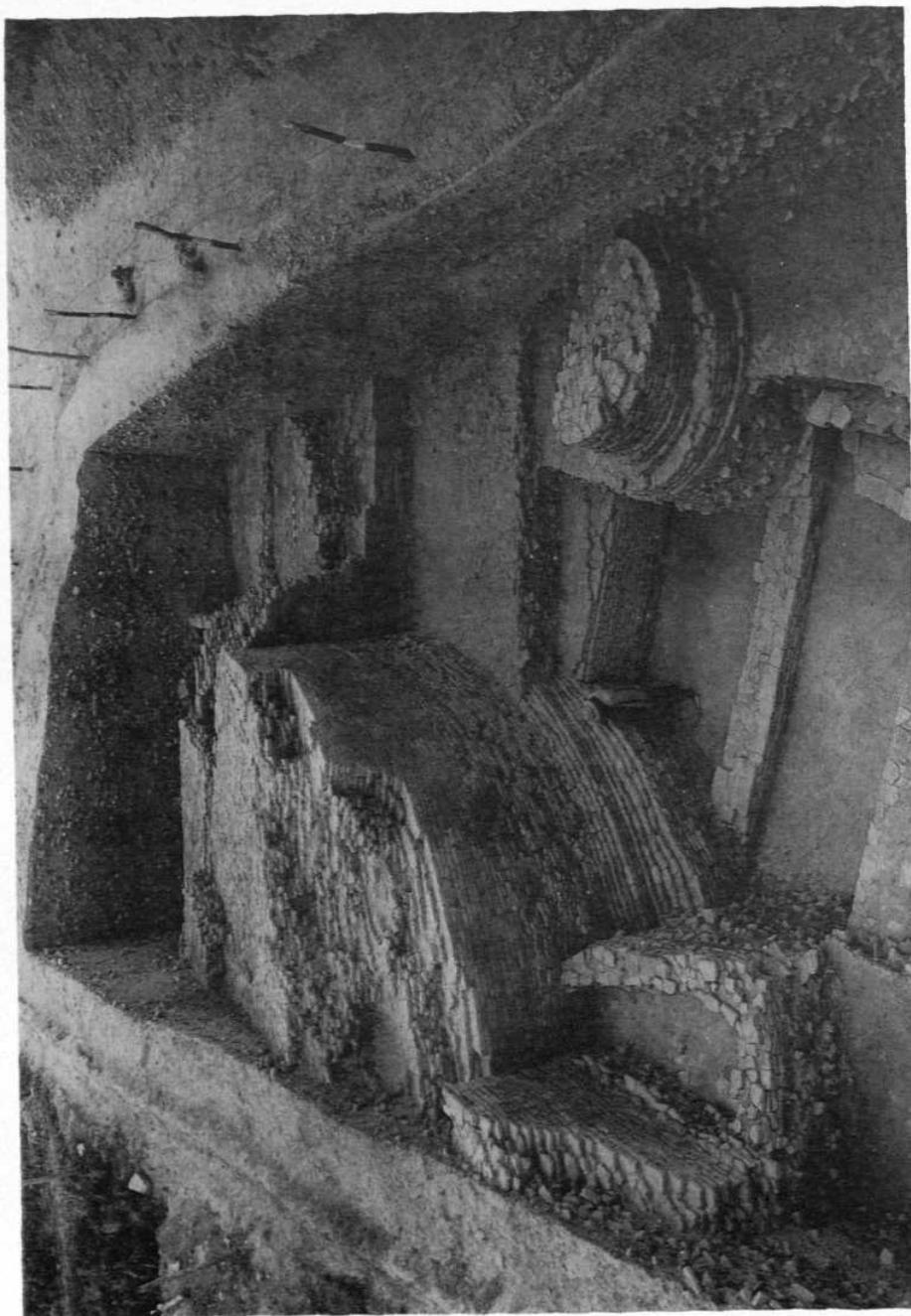


B

Harsh-ka-Tila: exposed structures, Rajput period. See p. 19



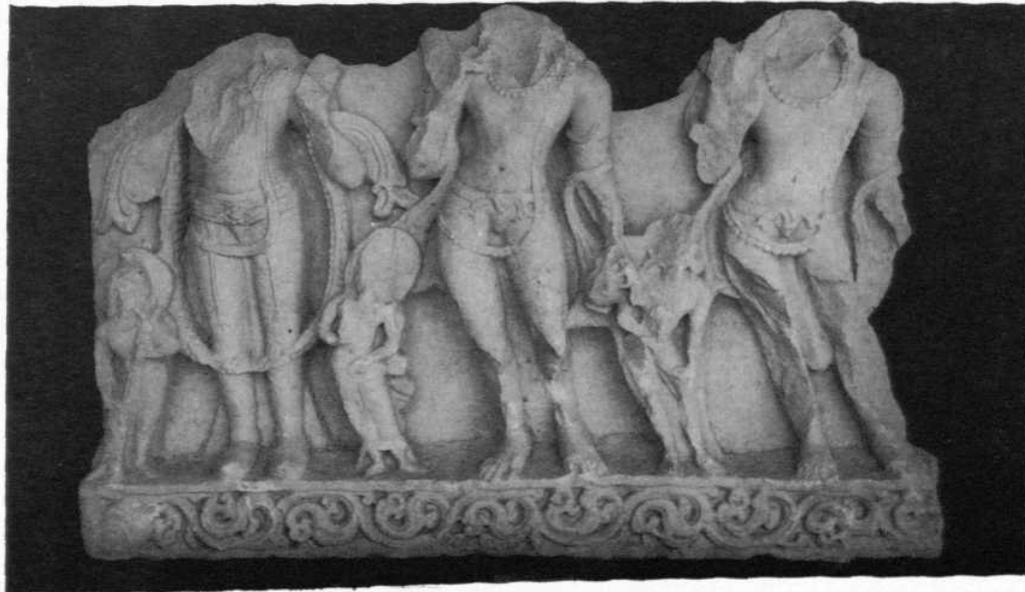
Harsh-ka-Tila: exposed structures, Rajput period. See p. 20



*Harsh-ka-Tila: northern bastion flanking western entrance and earlier structures,
Rajput period. See p. 20*

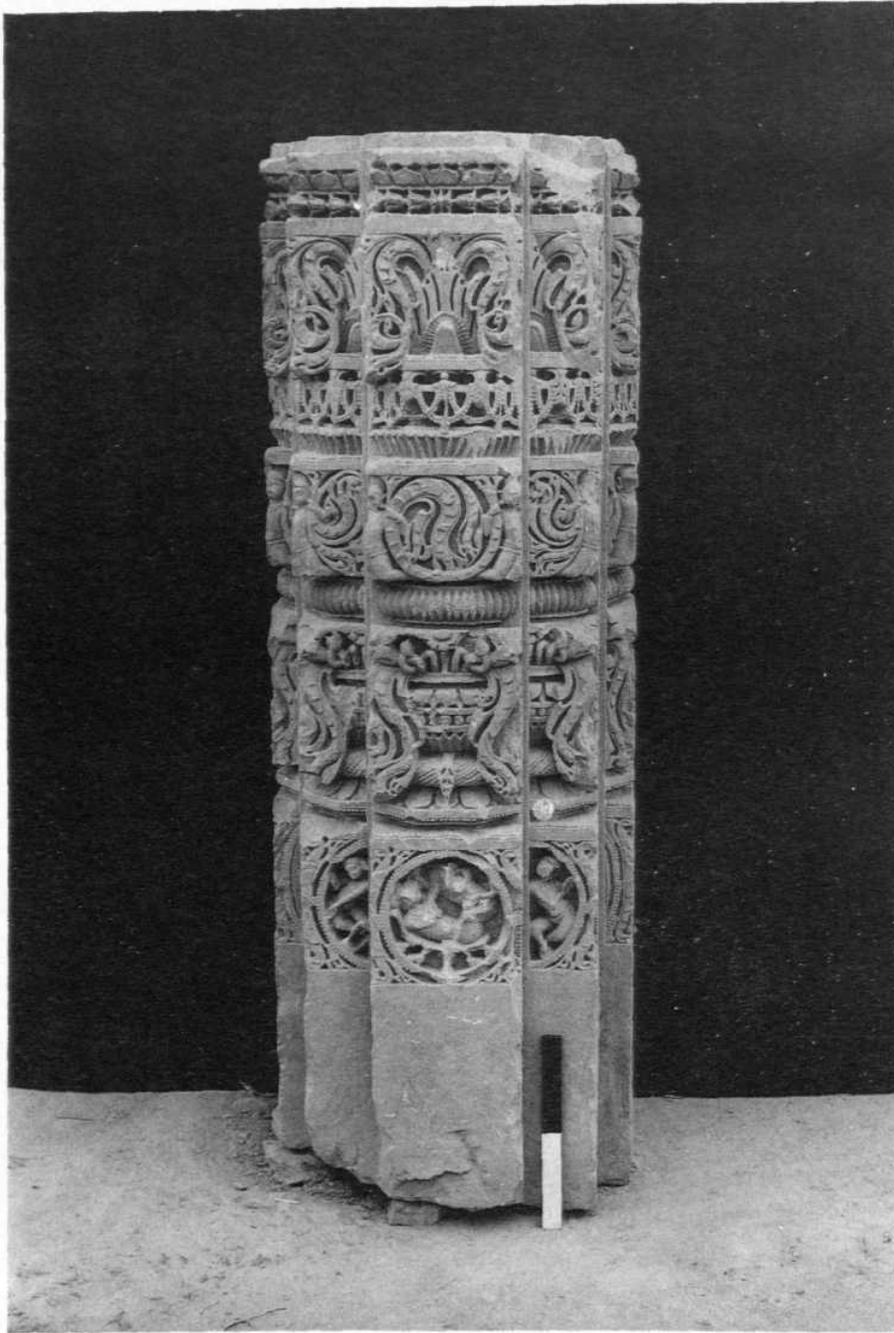


A



B

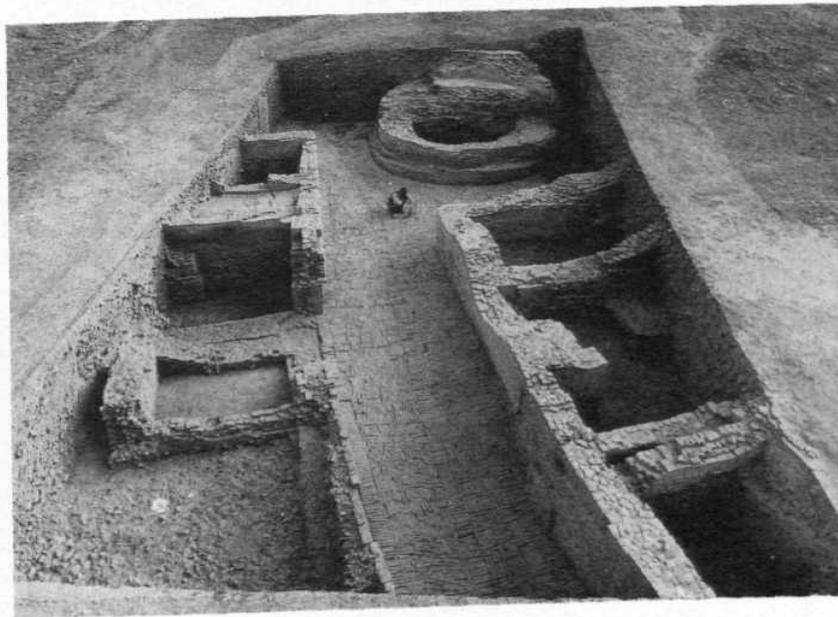
Harsh-ka-Tila: A, mutilated figure of Ganesa; B, damaged navagraha panel. See p. 20



Harsh-ka-Tila: beautifully carved bhadraka pillar. See p. 21

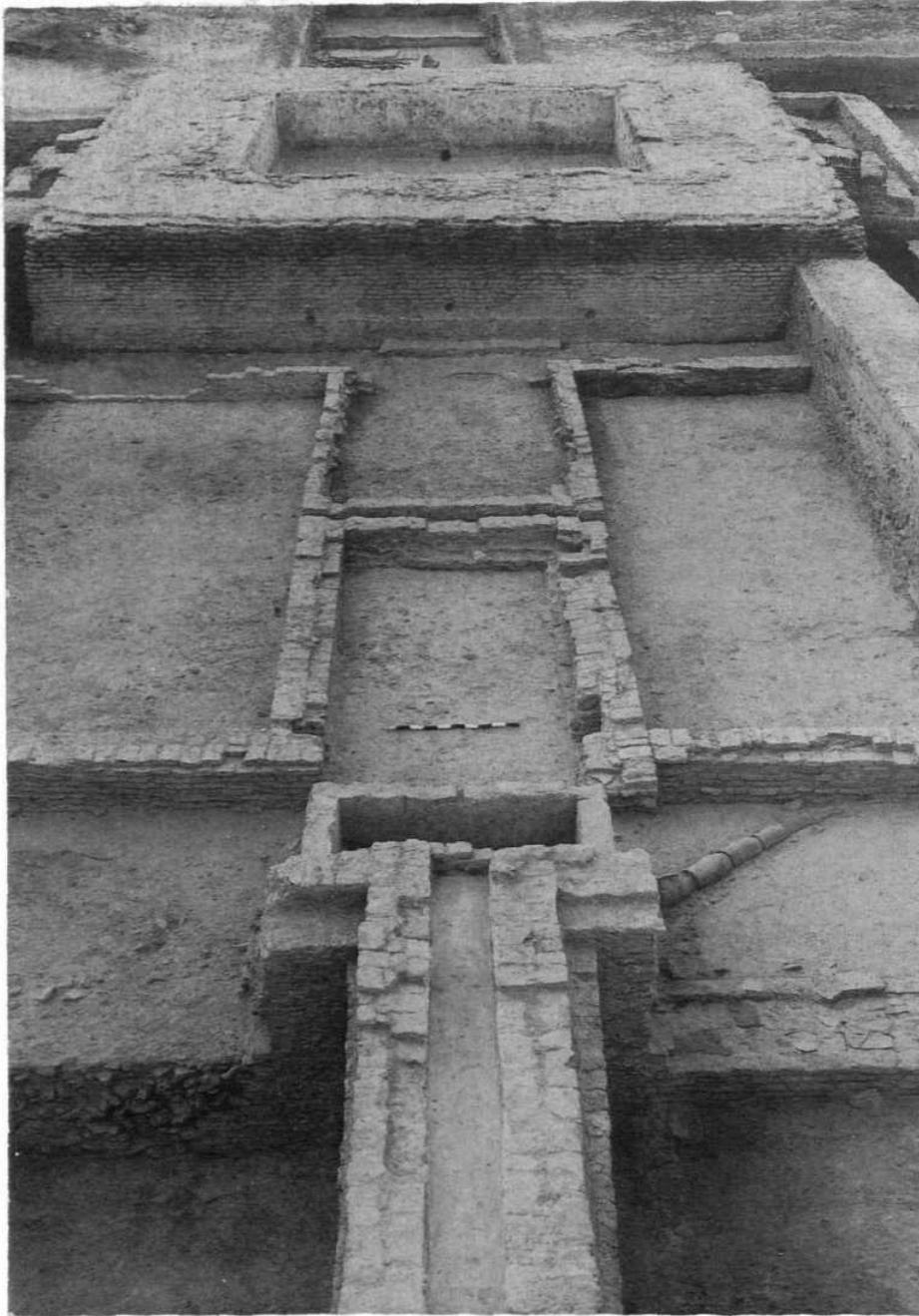


A

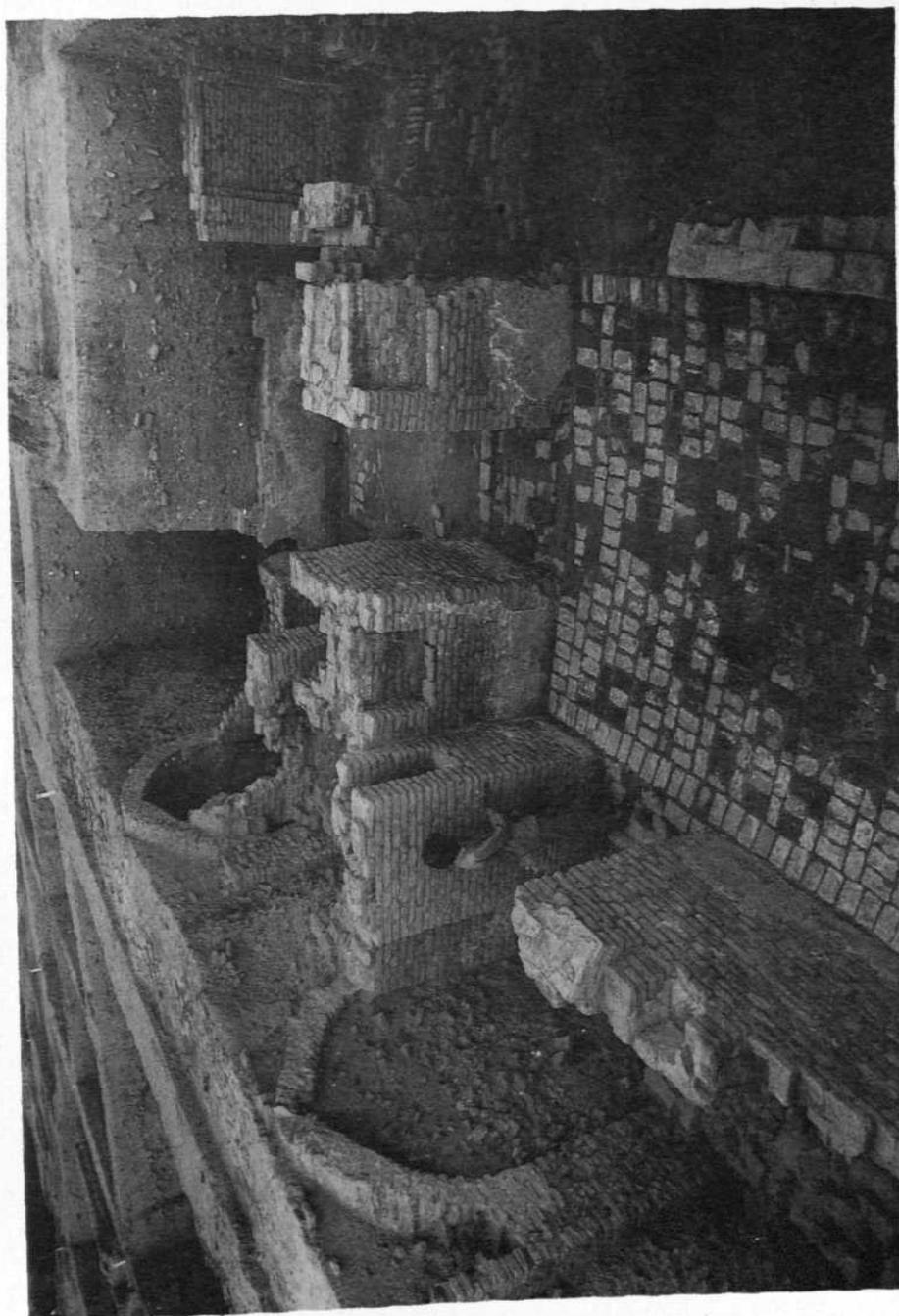


B

Harsh-ka-Tila: A, brick-paved platform, Sultanate period; B, brick-paved street and a well, Mughal period. See p. 21



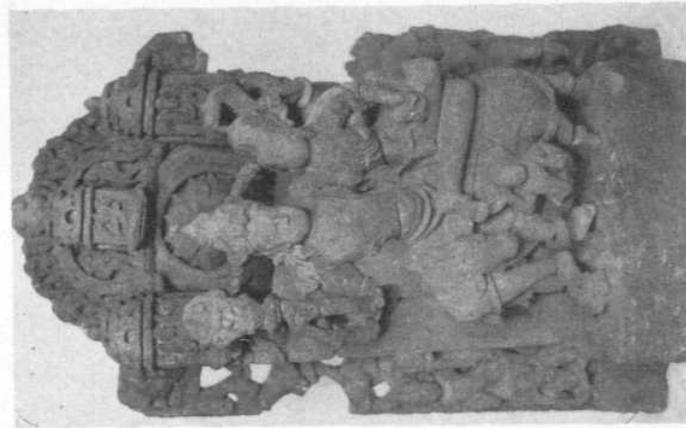
*Harsh-ka-Tila: exposed structures, garden complex with central hauz,
Mughal period. See p. 21*



Harsh-ka-Tila: paved passage connecting different residential chambers in garden complex, Mughal period. See p.21



C



B



A

A, Chari: sandstone Lakshmi; B, Maudhalghat: image of Uma-Maheshwar;
C, Hampi: inscribed slab. See pp. 23 and 29

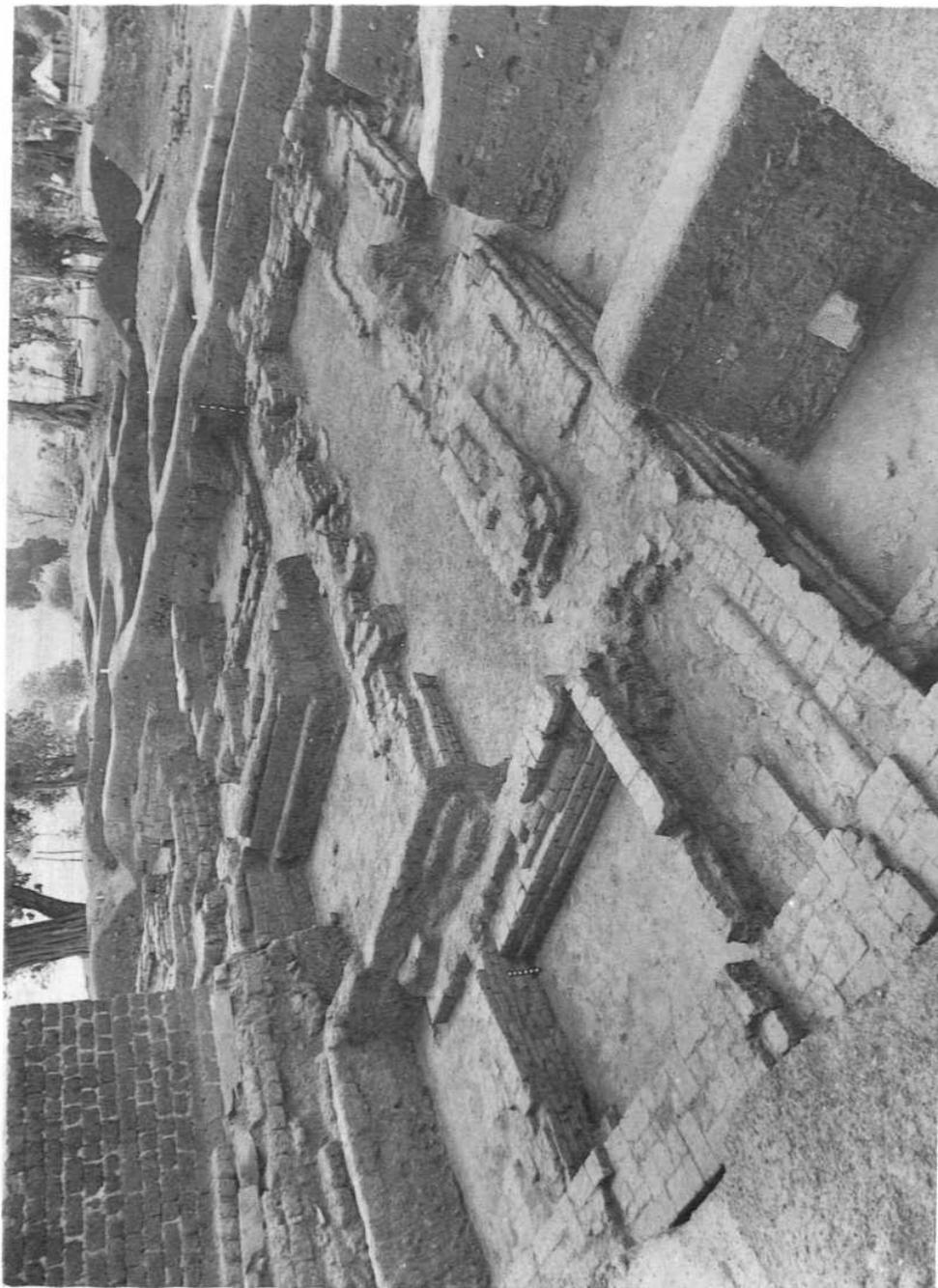


A



B

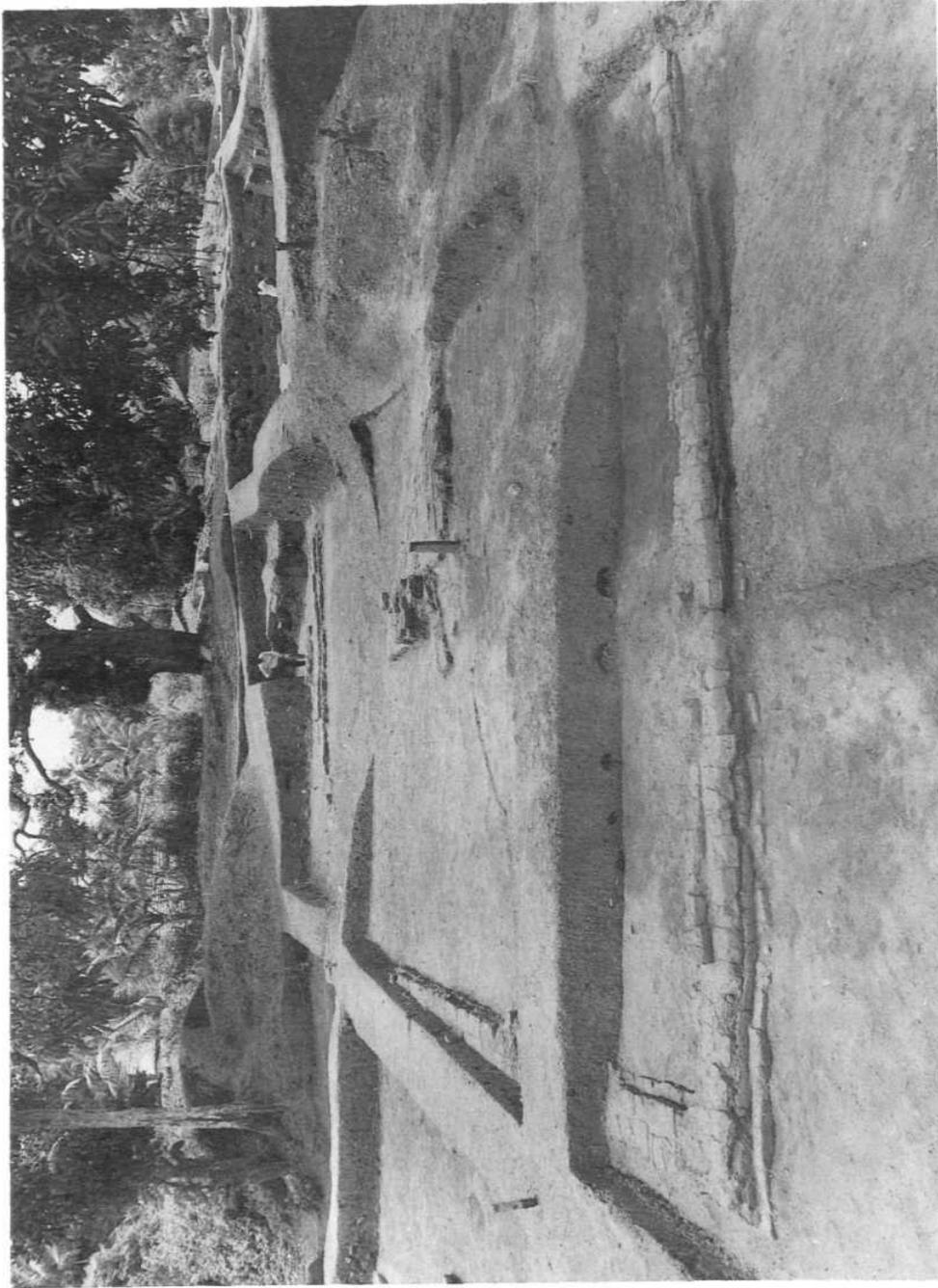
A, exposed area between STR-2 and main entrance; B, network of aqueducts. See p. 29



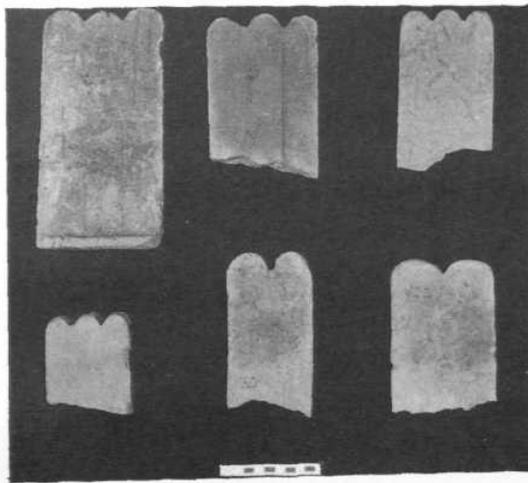
Gudhapur: exposed rectangular structures, eastern part of mound, STR-2. See p. 31



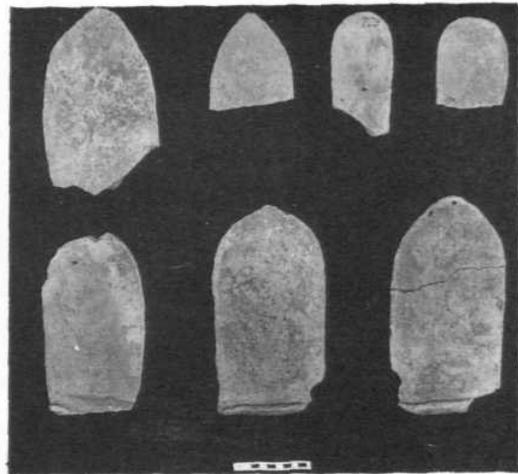
Gudnapur: STR-2, general view from east. See p. 31



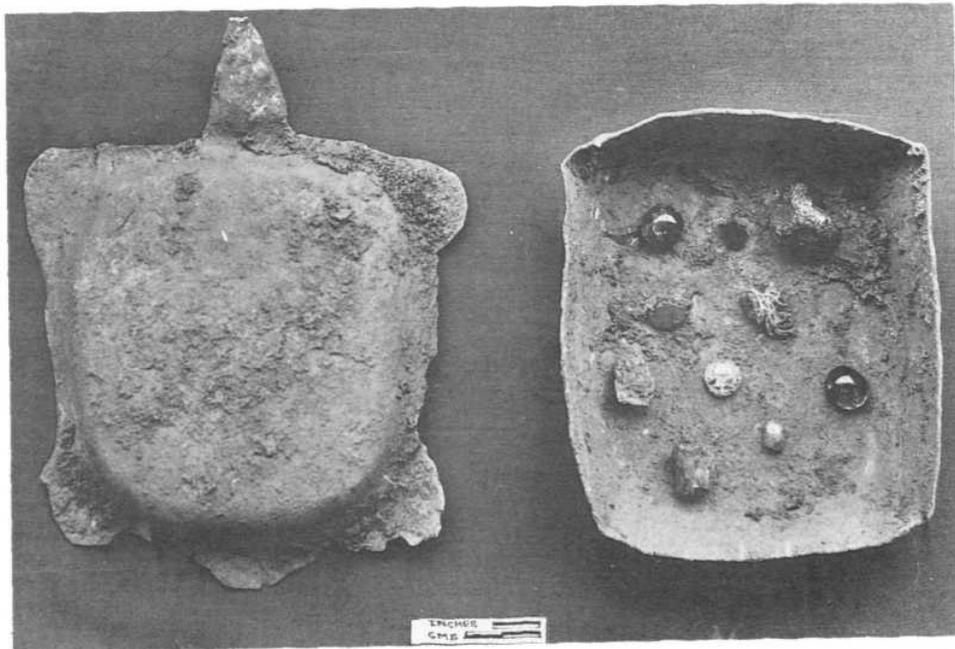
Gudnapur: STR-3, general view from south. See p. 32



A

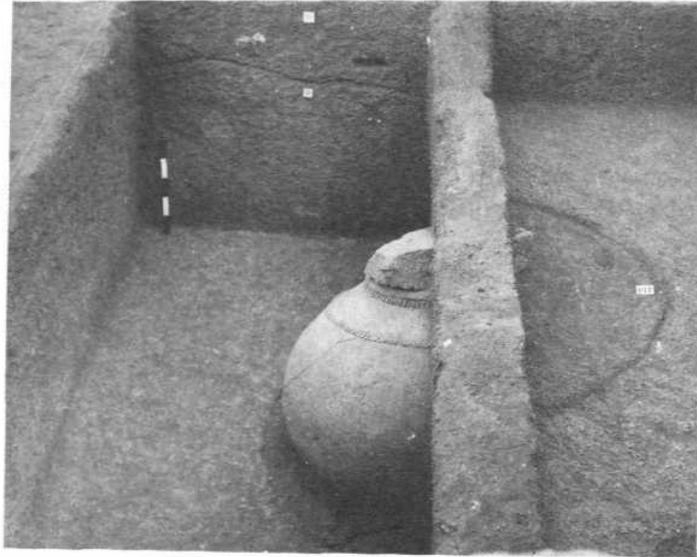


B



C

Gudnapur : A-B, roof tiles and C, tortoise shaped casket with semiprecious stones. See p. 32

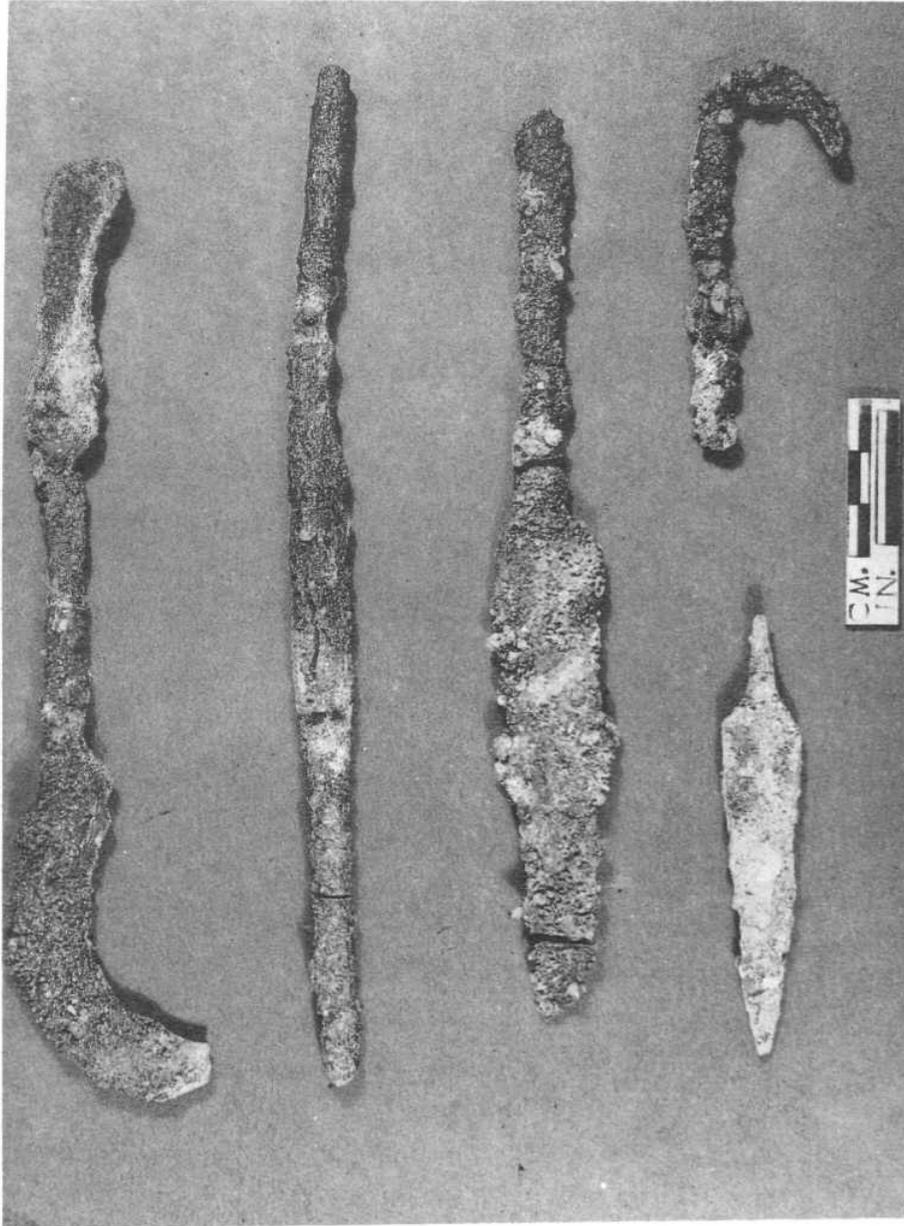


A

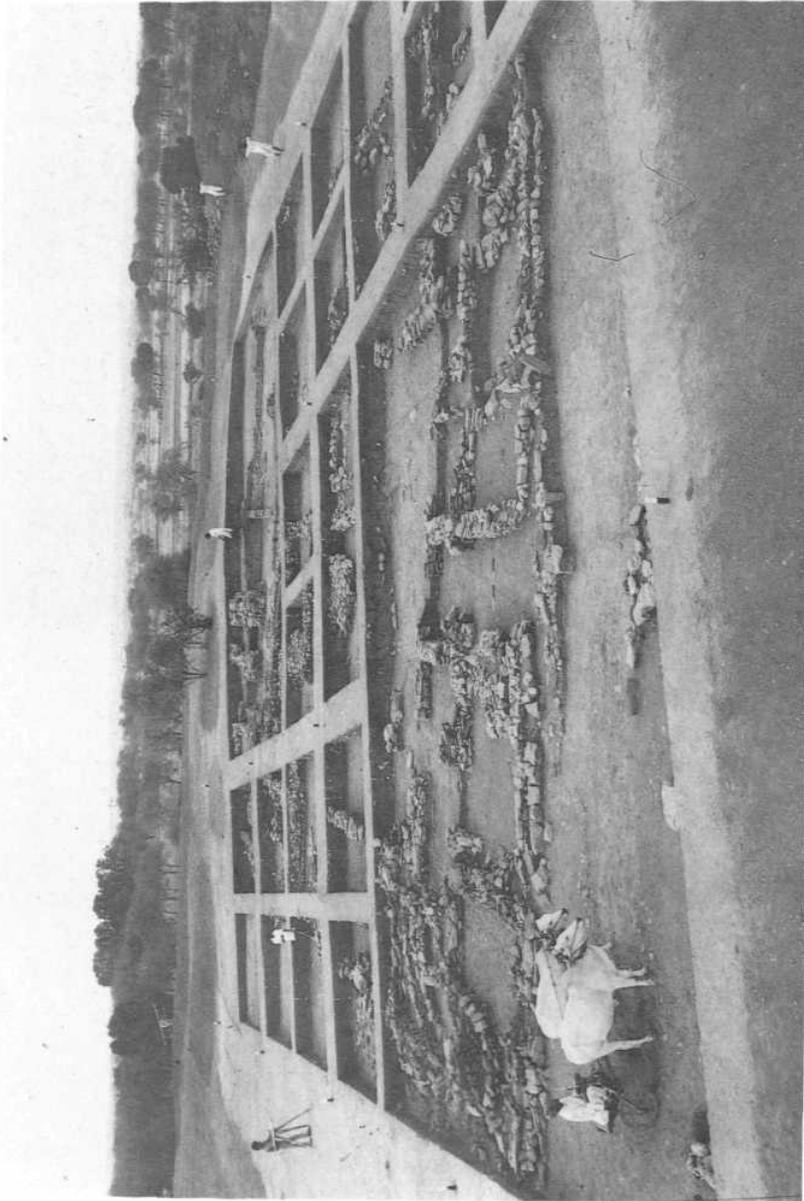


B

Cheramangad : A, Red ware urn, pyriform in shape, Megalith I; and B, Red ware pots, Megalith IV. See pp. 33-34



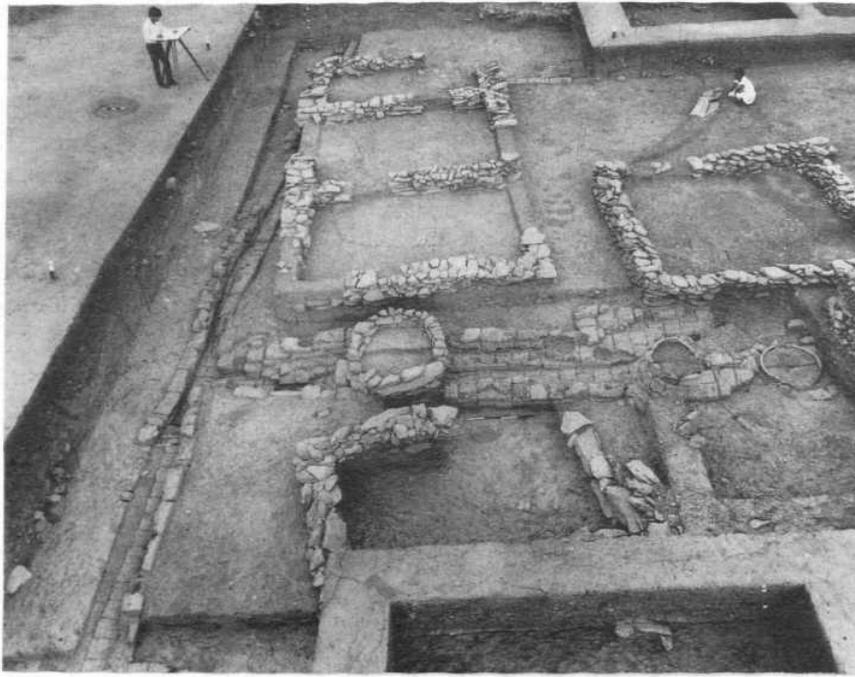
Cheramangad : Iron implements, Megalith V. See p. 34



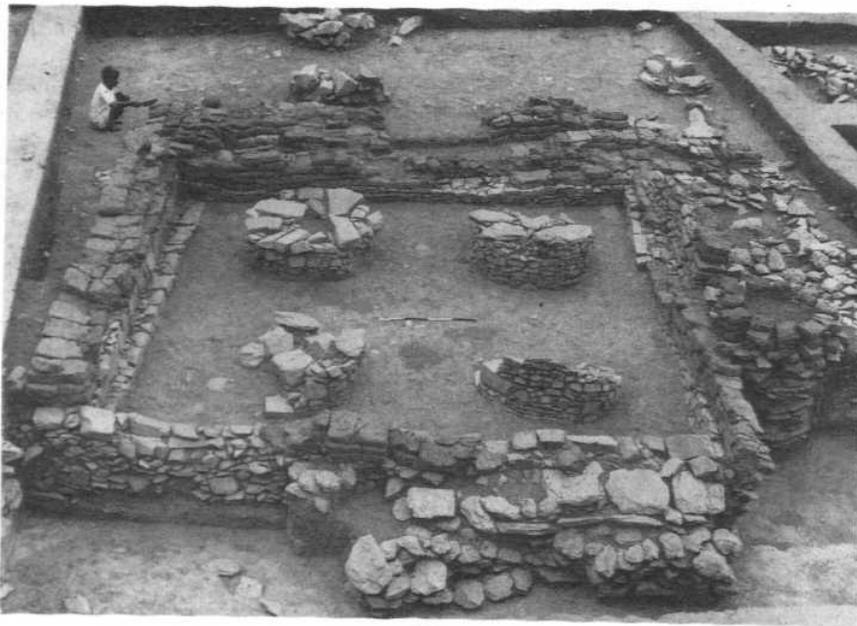
Adam : general view of trenches on the northern flank of the rampart. See p. 45



Adam : post-holes and platforms, Period I. See p. 45



A



B

Adam : A, public drains, Period IV and stone structures, Period V; B, circular stone platforms, Period V. See pp. 46 and 49



Adam : well with foot-hold, Period V. See p. 49

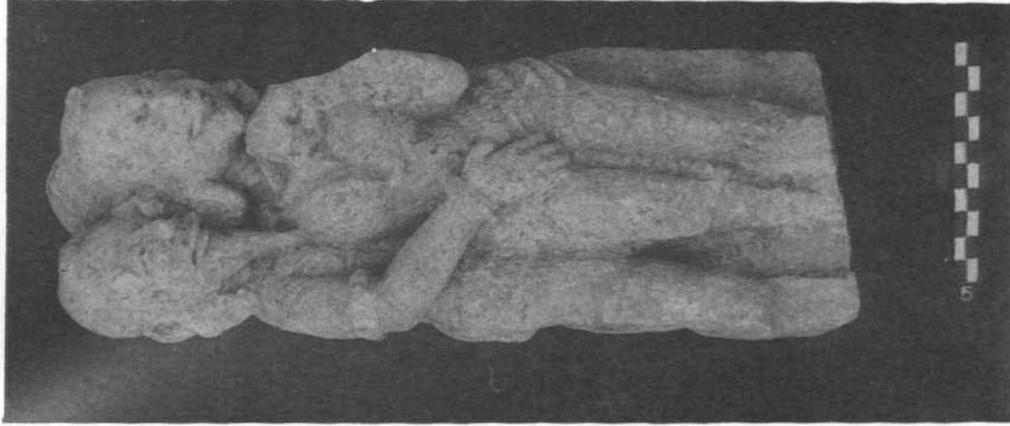


A

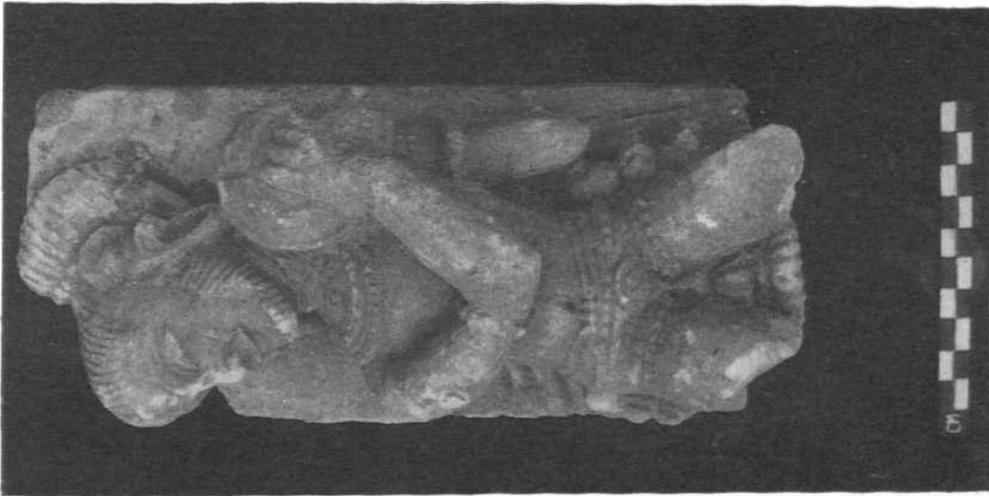


B

A, Adam : stone mould, Period V; B, Barabati fort: silver coin of Shah Jahan,
minted at Surat. See pp. 50 and 54

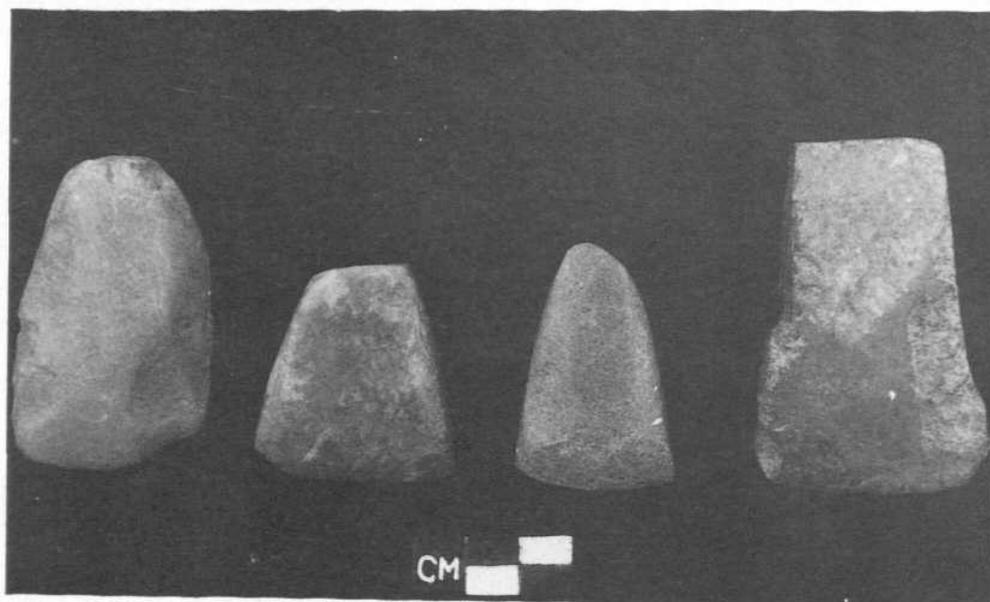


B

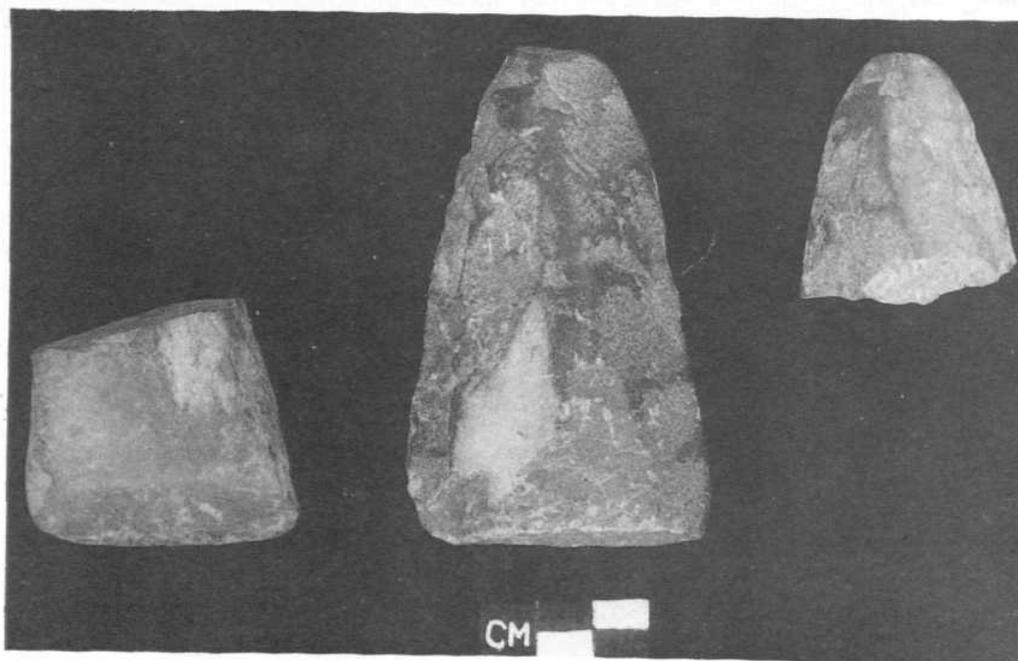


A

Barabati fort : A, male musician and B, mihuna couples. See p. 54

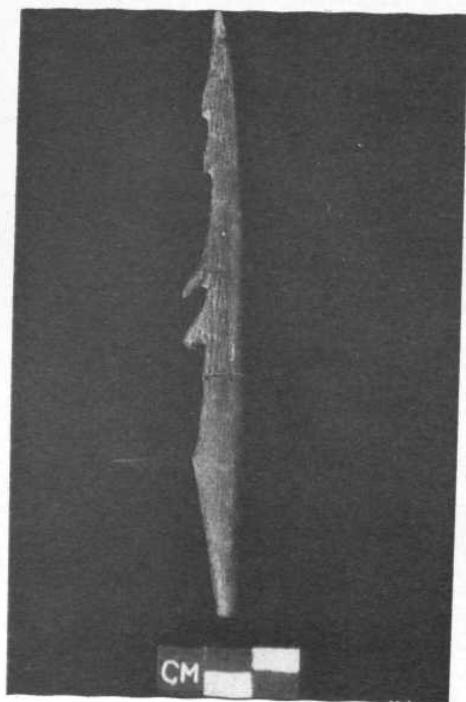


A.

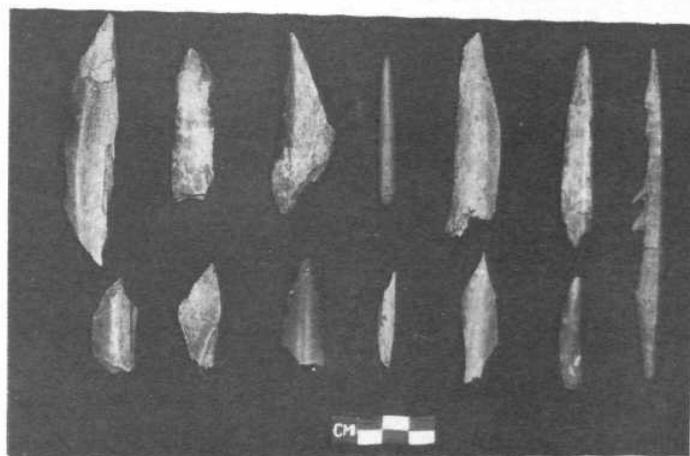


B

Golbai Sasan : stone tools. See p. 57

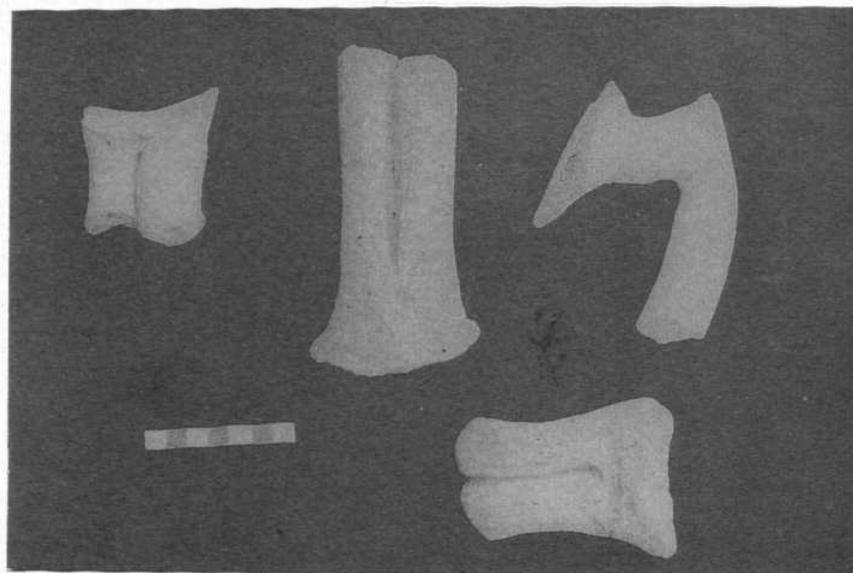


A

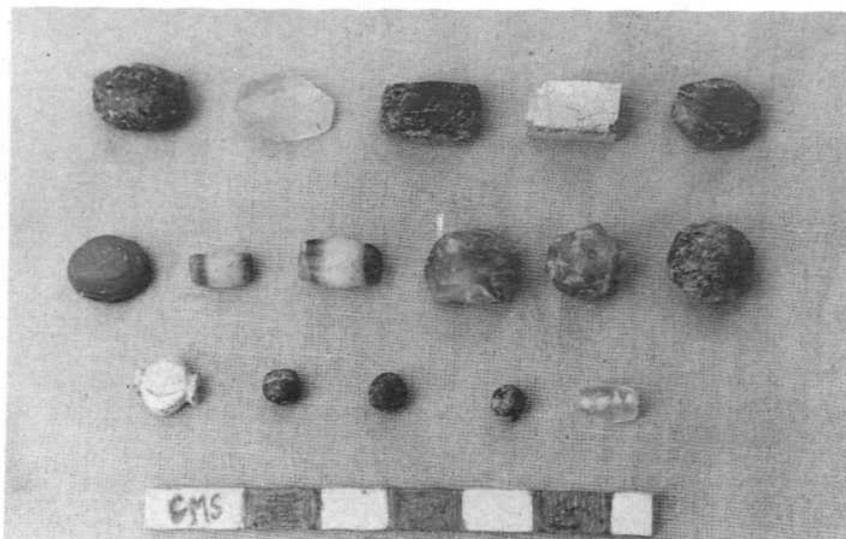


B

Golbai Sasan : bone, A, harpoon and B, tools. See p. 57



A



B

Arikamedu : A, pieces of Mediterranean amphoras and B, semiprecious stone beads. See pp. 57-58

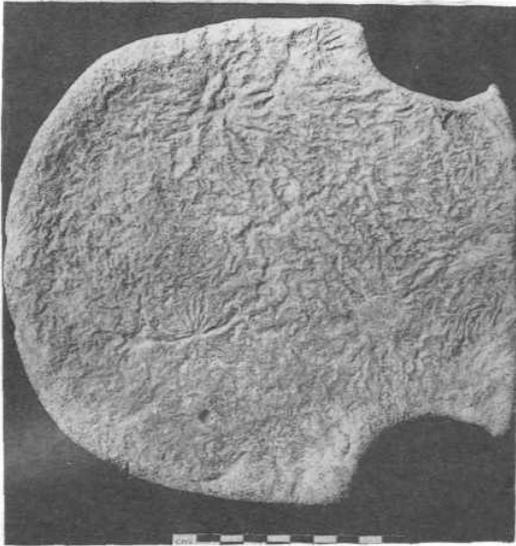


A

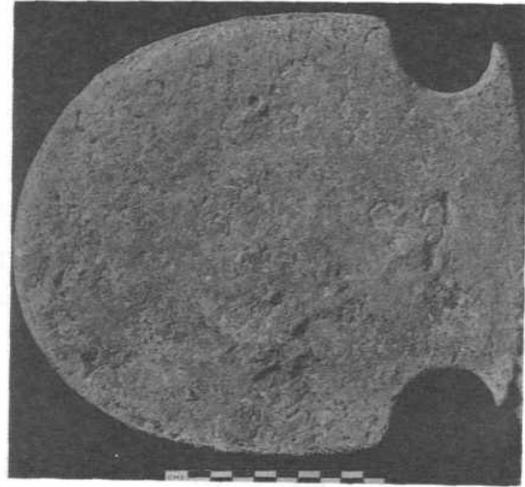


B

Mamallapuram : exposed structures on northern side of the Shore temple. See p. 62



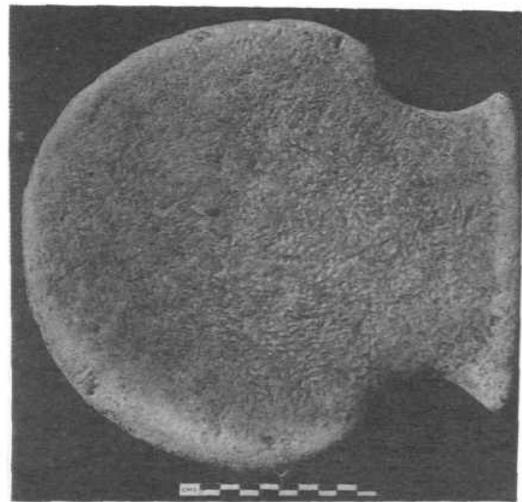
A



B

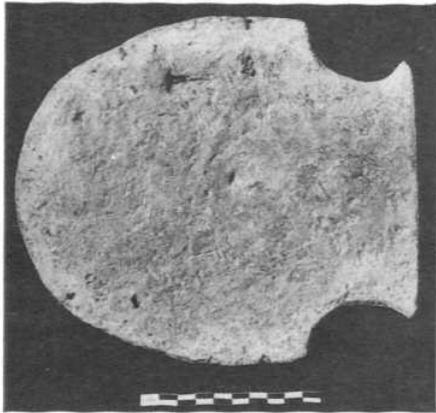


C



D

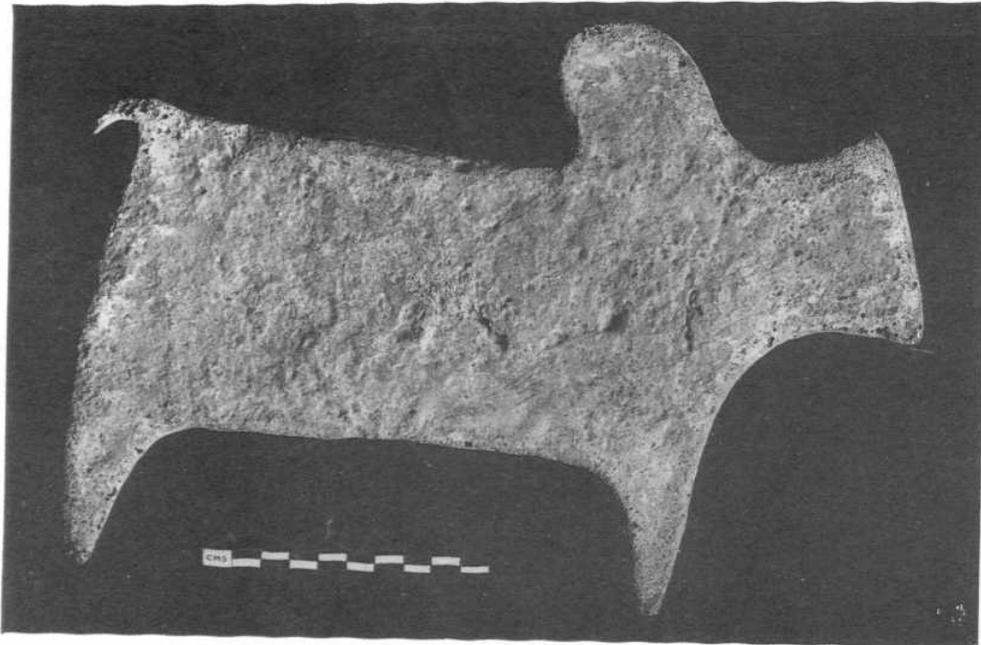
Khajravari : copper hoard objects. See p. 92



A

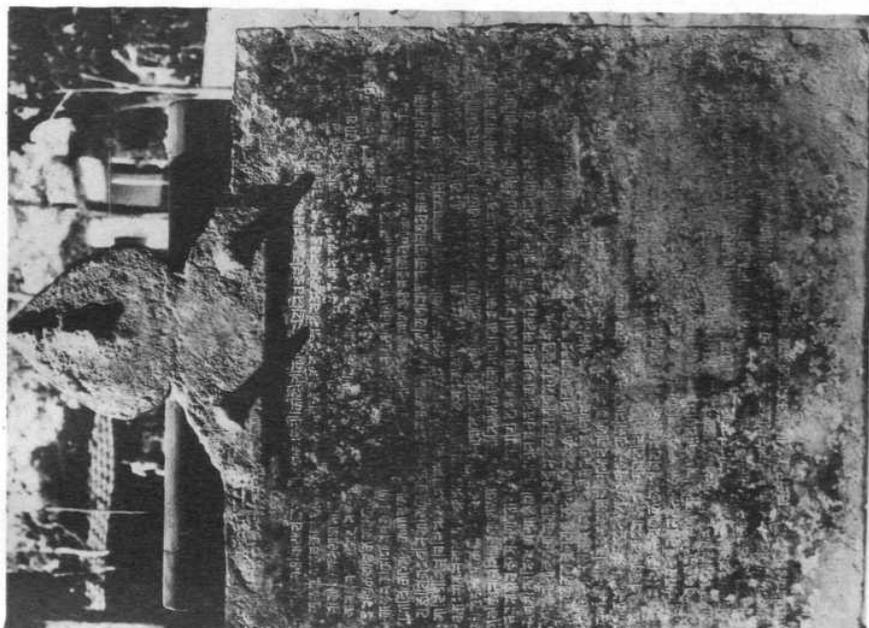


B

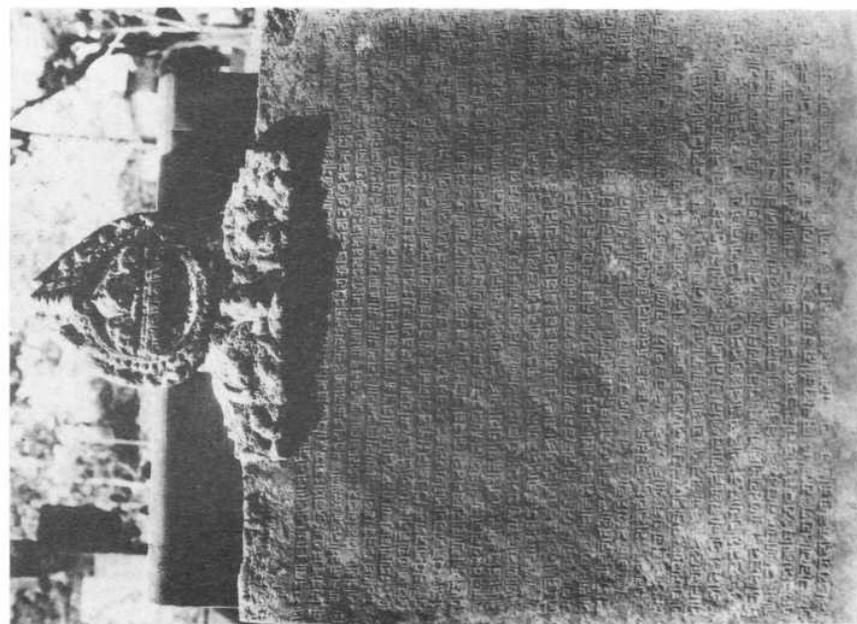


C

Khajraveri : copper hoard objects. See p.92

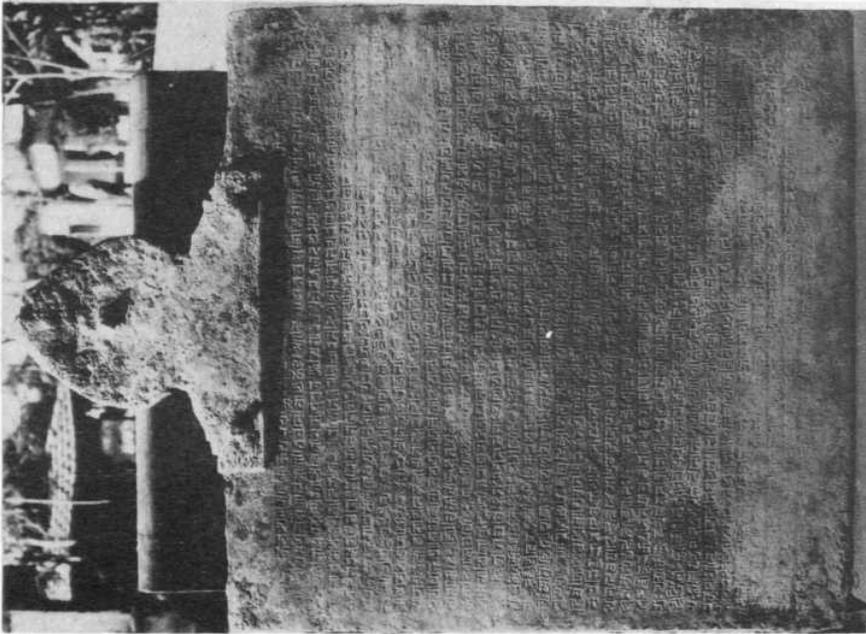


B

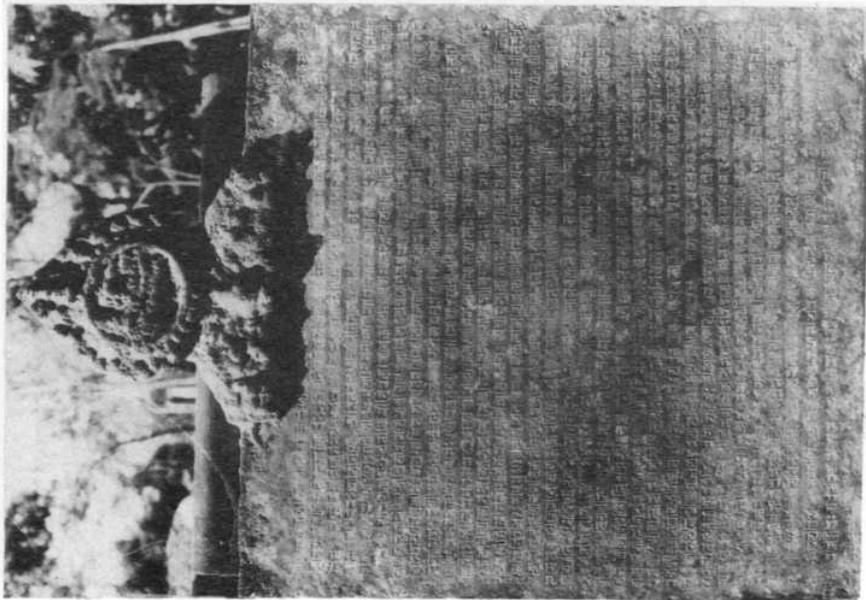


A

Bangarh : inscribed copper-plates of Madanapala Deva. See p.92

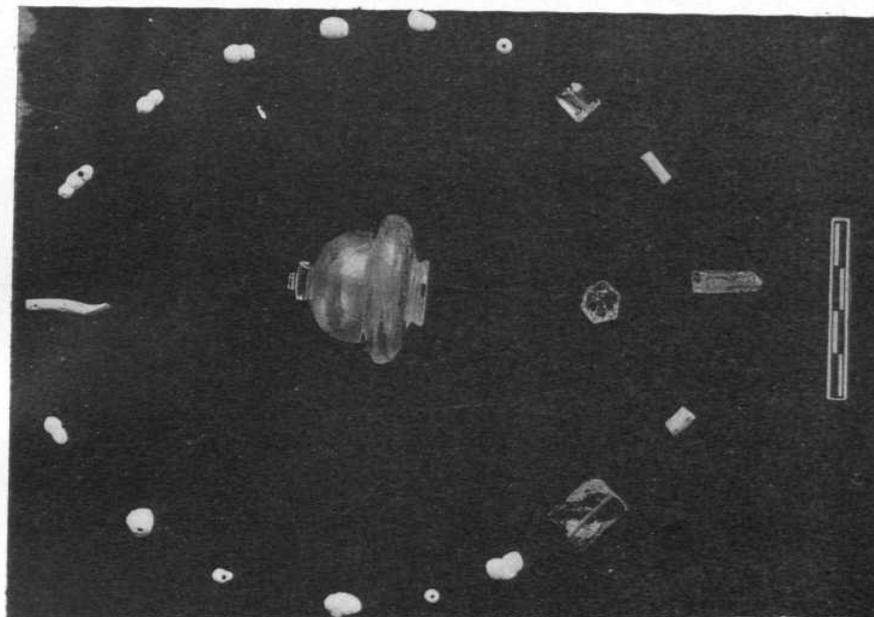


B



A

Bangarh : inscribed copper-plates of Madanapala Deva. See p.92

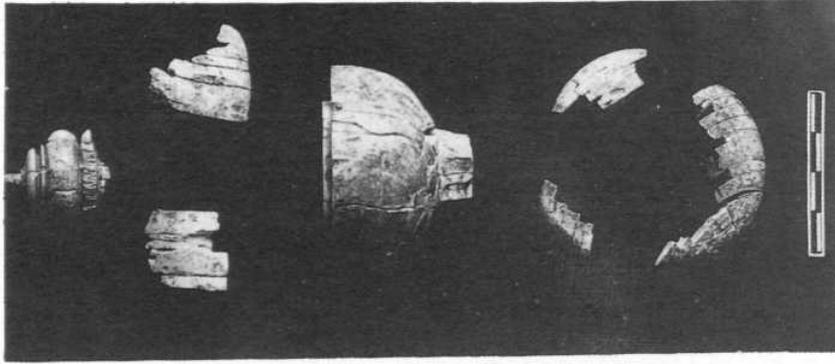


B

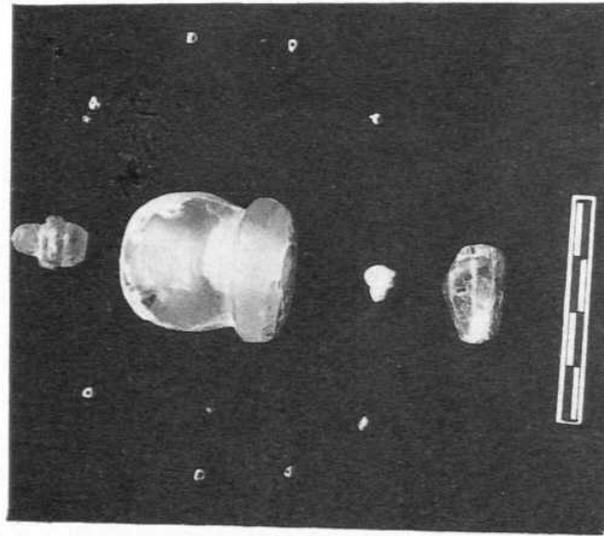


A

Amaravati : A, fragmentary label inscription and B, relic casket. See p.93



B



A

Amaravati : A, crystal and B, ivory caskets. See p. 93

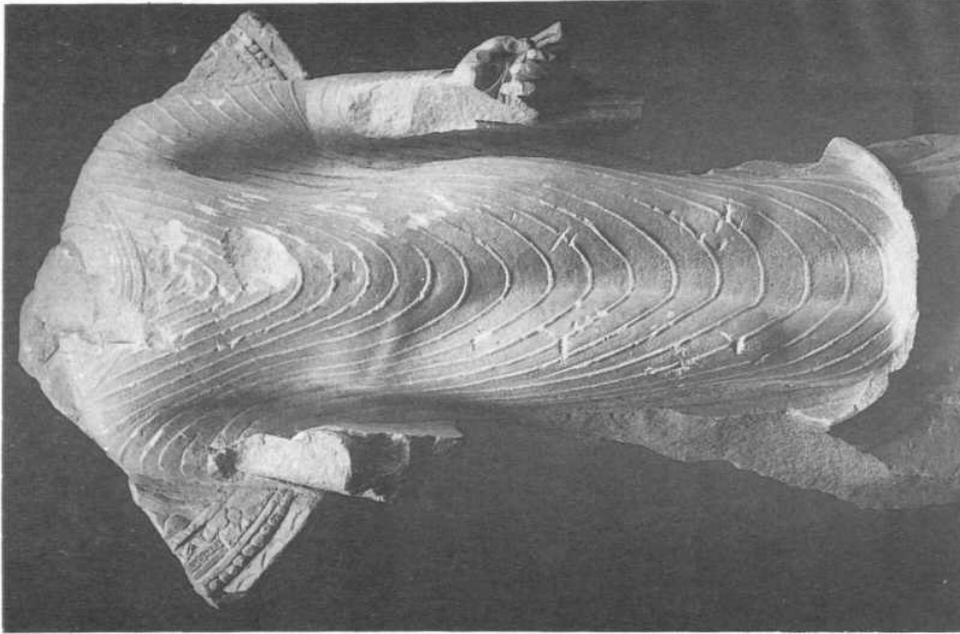


B



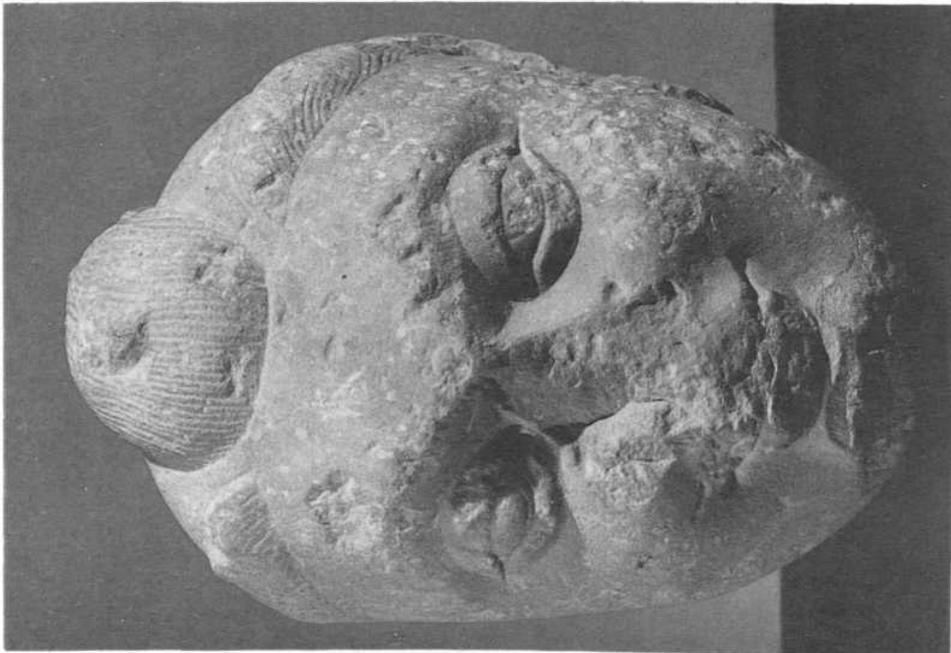
A

Archaeological Museum, Aihole : stone sculptures of Ganesha and warrior. See p. 105

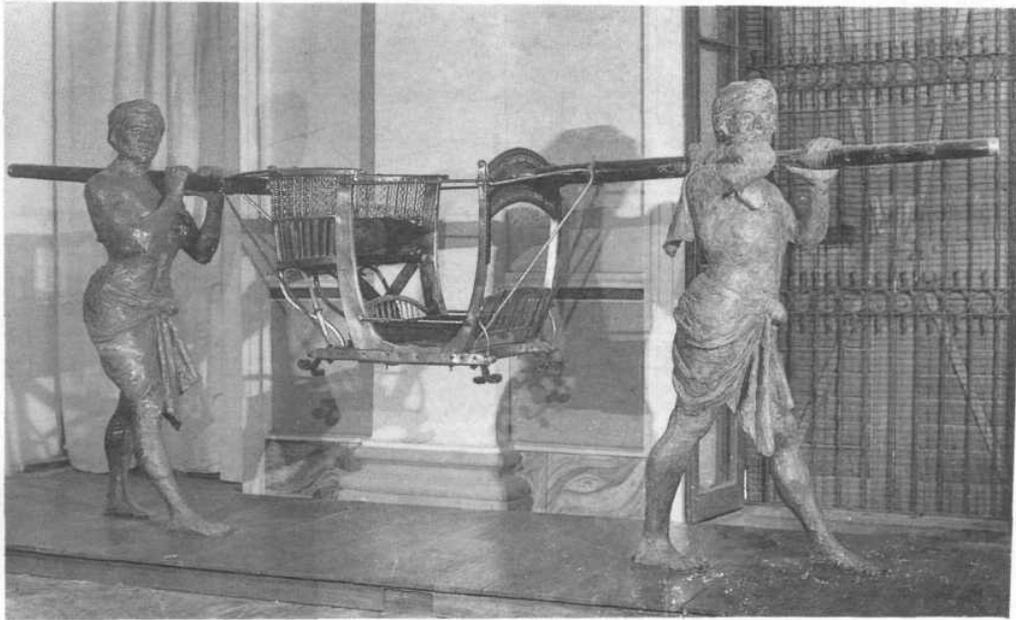


B

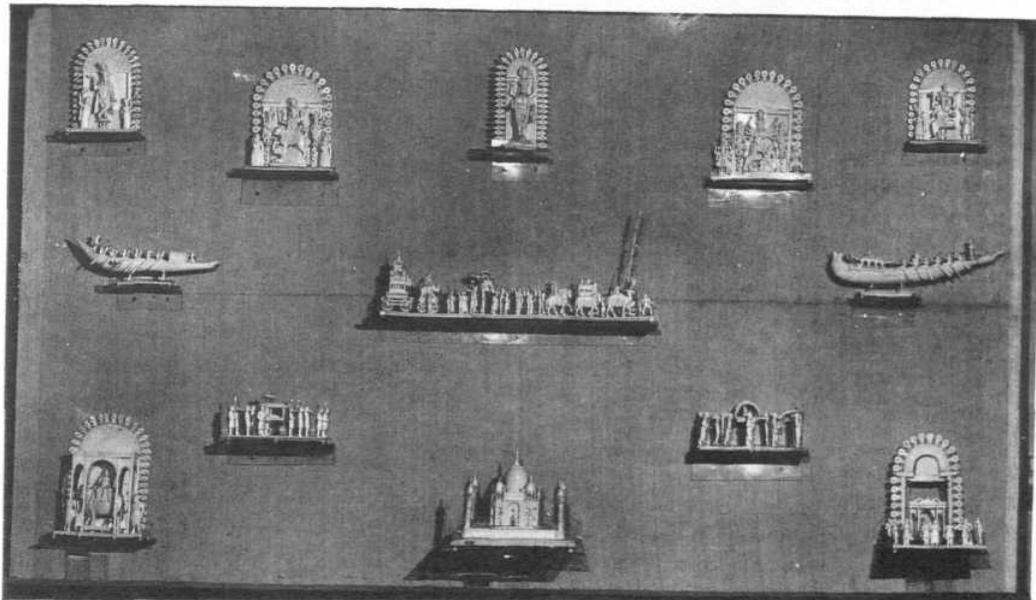
Government Museum, Mathura : A, a head of male figure in red sandstone, Kushana and B, bust of Buddha in buff stone, Gupta periods. See p. 109



A



A

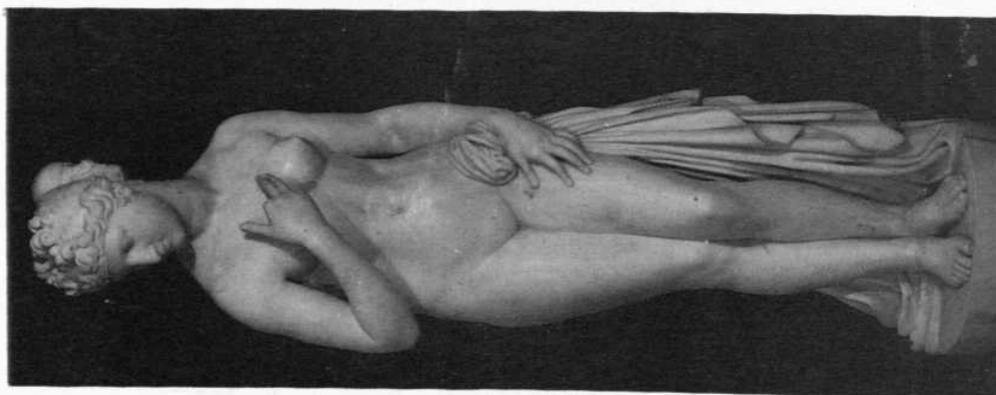


B

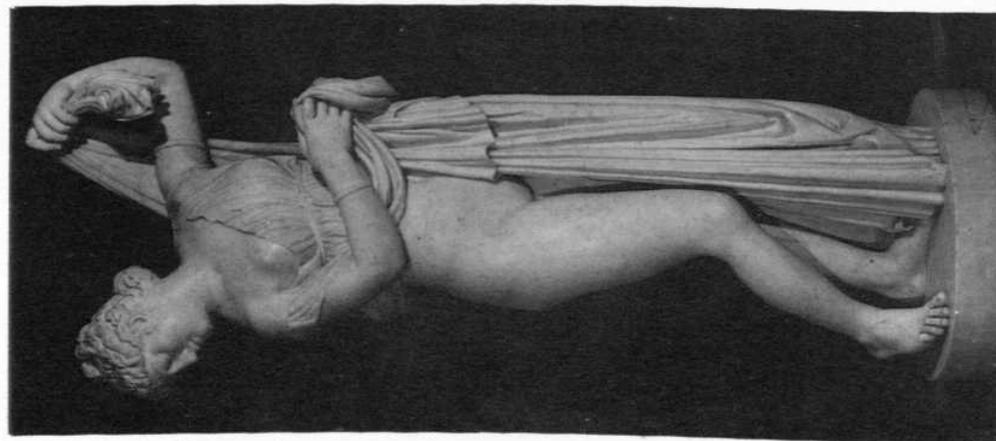
Hazarduari Palace Museum, Murshidabad : A, silver Tanjam and B, view of display of ivory objects. See p. 109



C



B

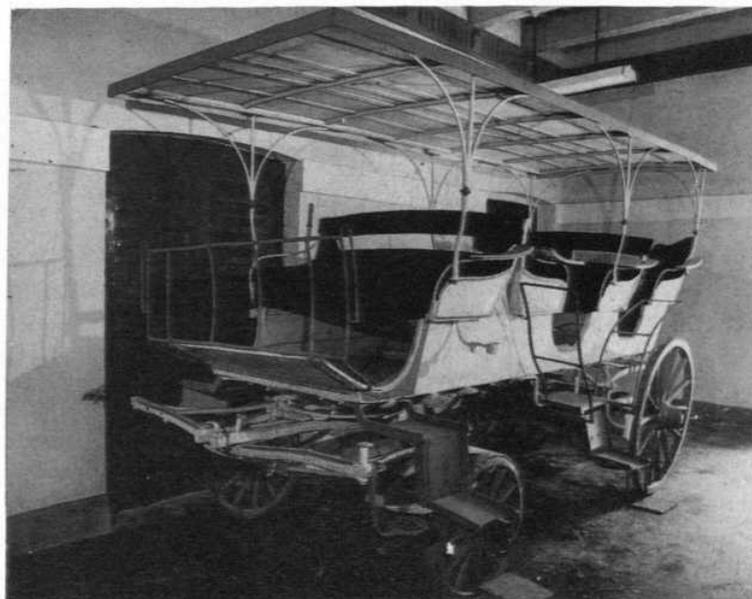


A

Hazarduari Palace Museum, Murshidabad : A-B, marble statues and C, metal image. See p. 109

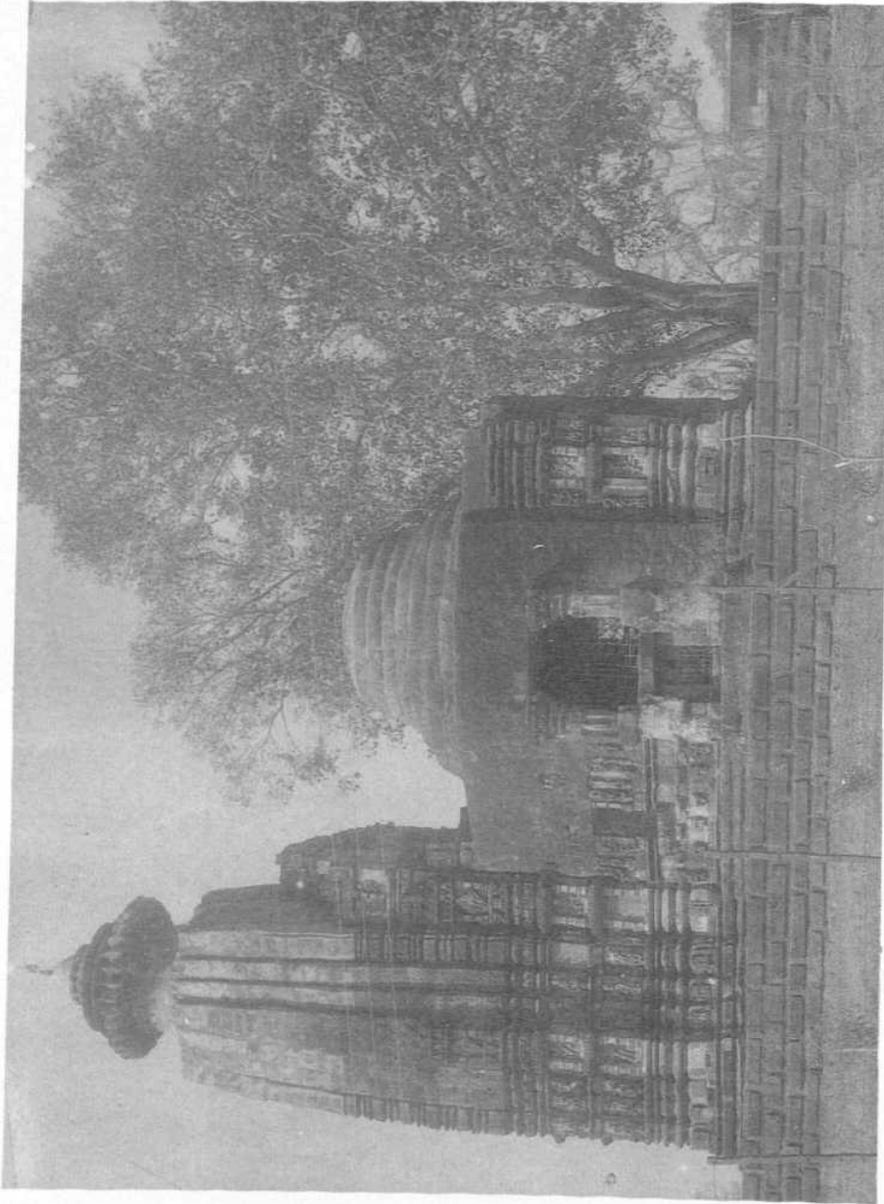


A

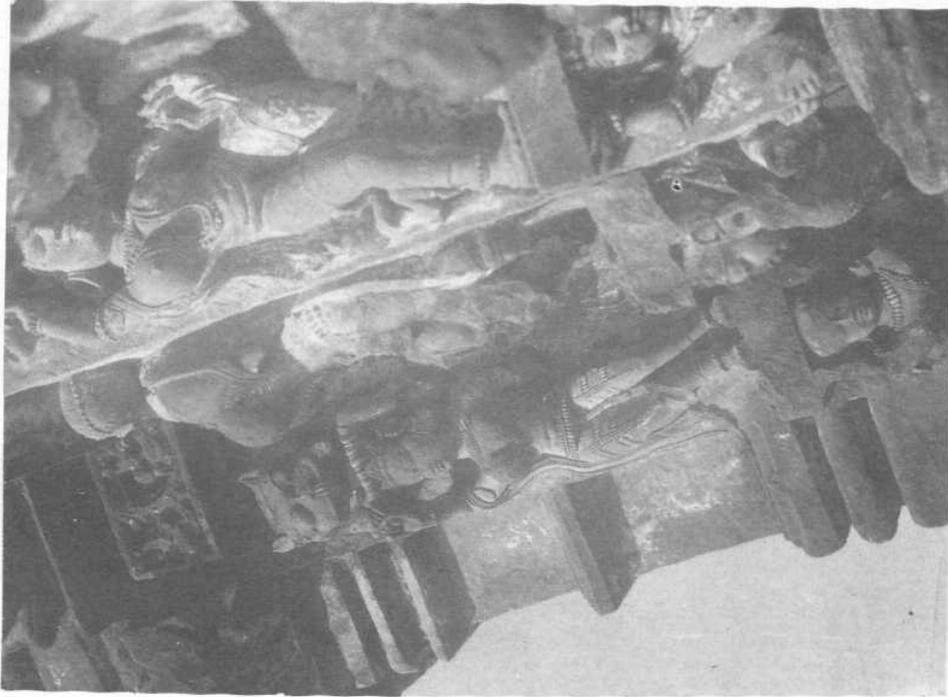


B

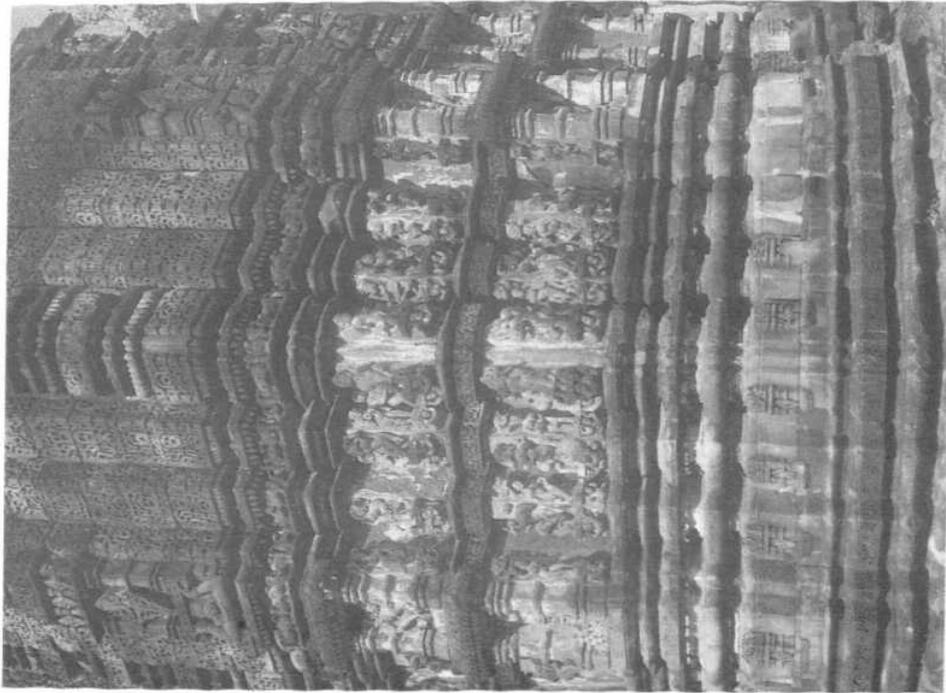
Hazarduari Palace Museum, Murshidabad : wooden carriages. See p. 109



Pali : Siva temple, view from south. See p. 114

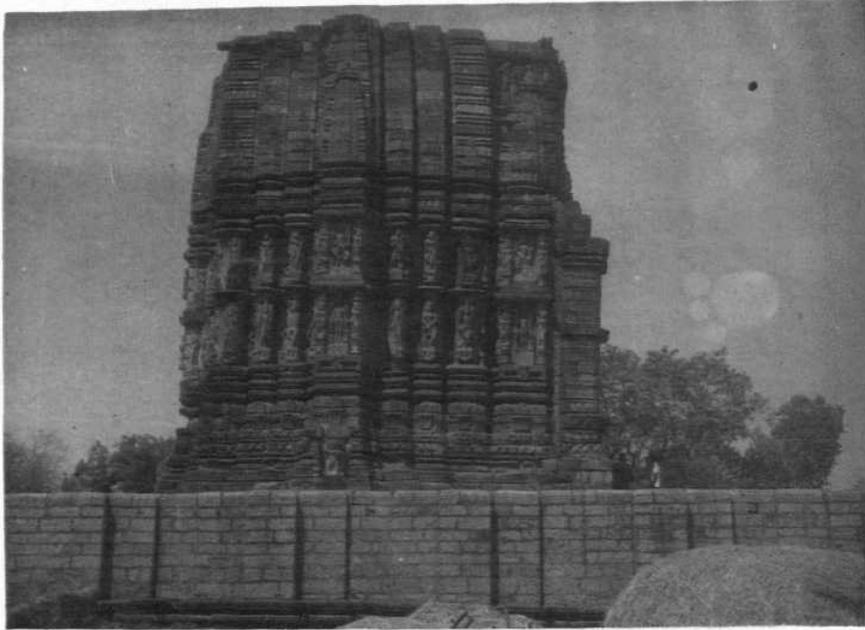


B



A

Siva temple, Pali : A, view of adishthana mouldings and jangha on south-west corner and B, apsaras on the lower row of sculptures. See p. 115

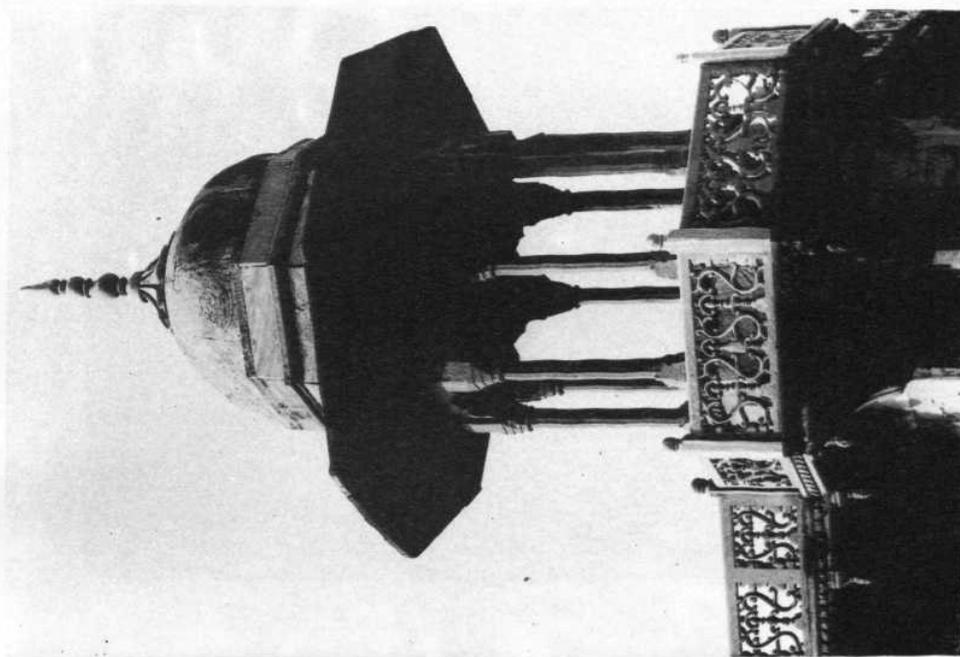


A

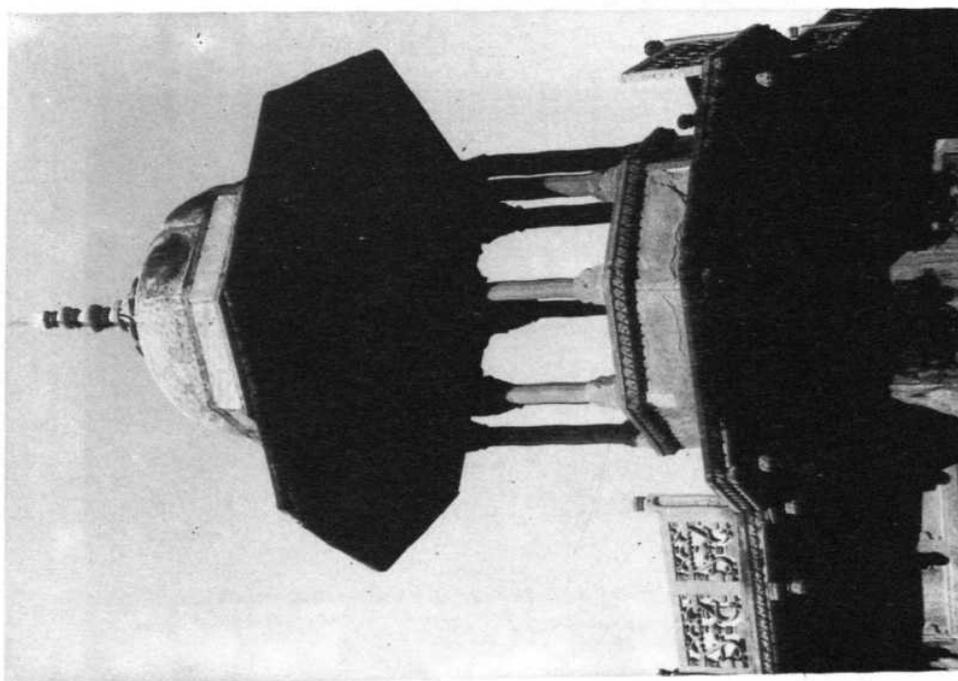


B

Vishnu temple, Janjgir : A, view from south and B, sculptures on the southern jangha. See pp. 115-116



B

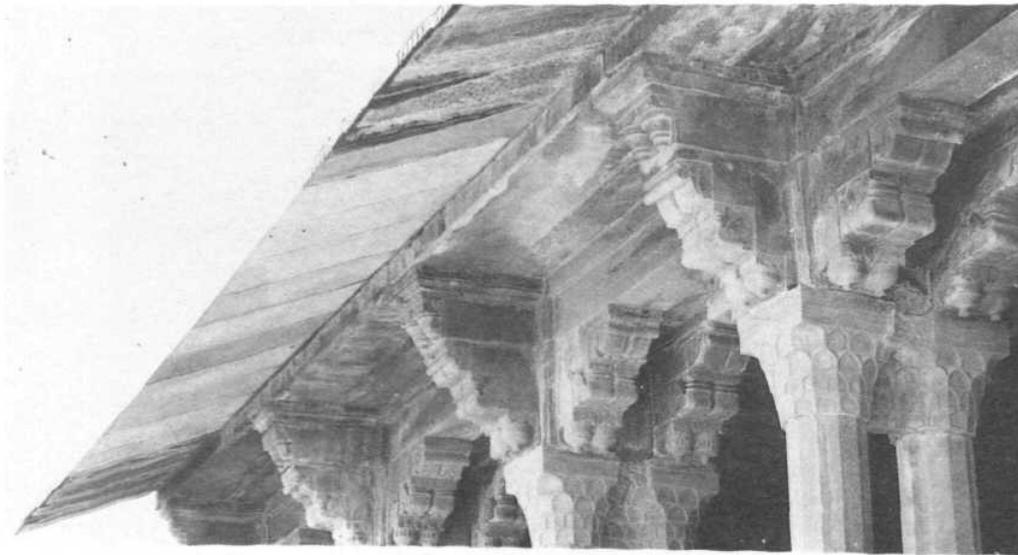


A

Saheli Burj, Taj Mahal, Agra : A, before B, after replacement of missing railings and mutakas. See p. 118

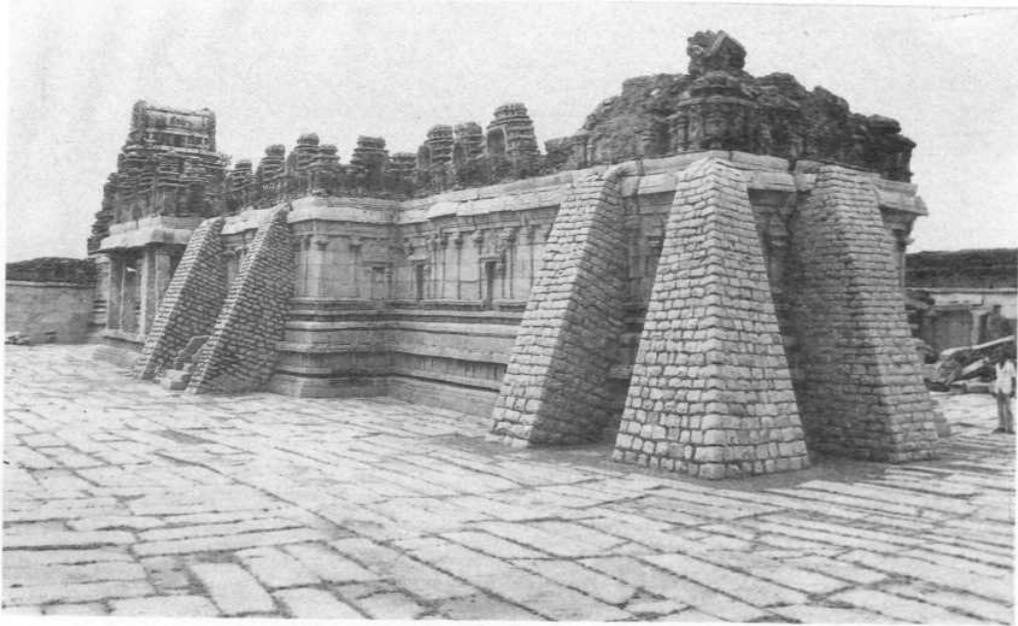


A

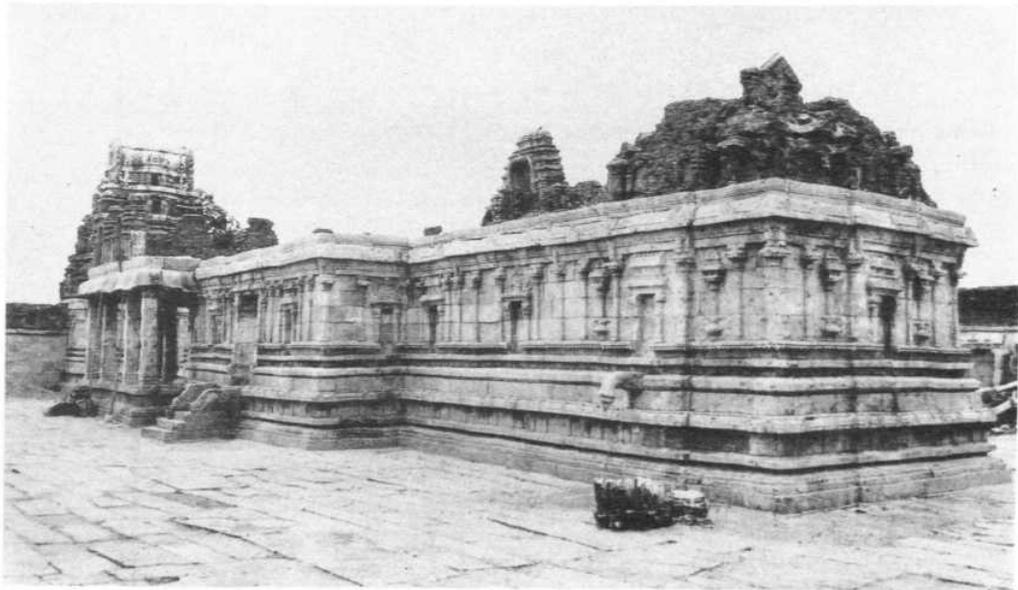


B

Record Office, Fatehpur Sikri, Agra : A, before and B, after replacement of red sandstone chhajjas. See p. 119



A



B

Gopalakrishna temple, Timmalapuram : A, before and B, after conservation. See p. 120

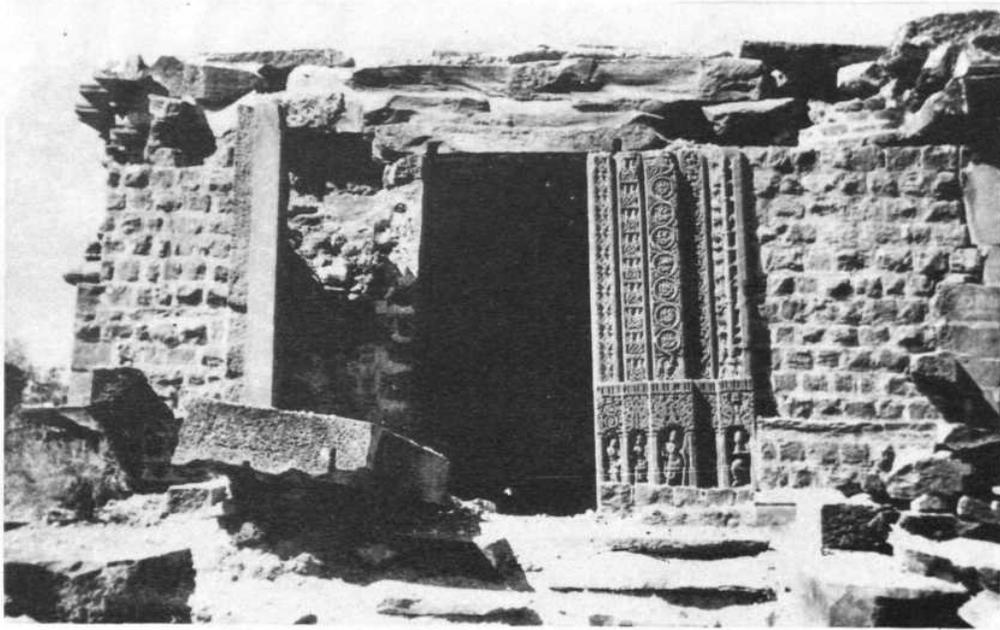


A



B

Achyutaraya temple, Venkatapuram : A, before and B, after conservation of gopuram and prakara. See p. 120

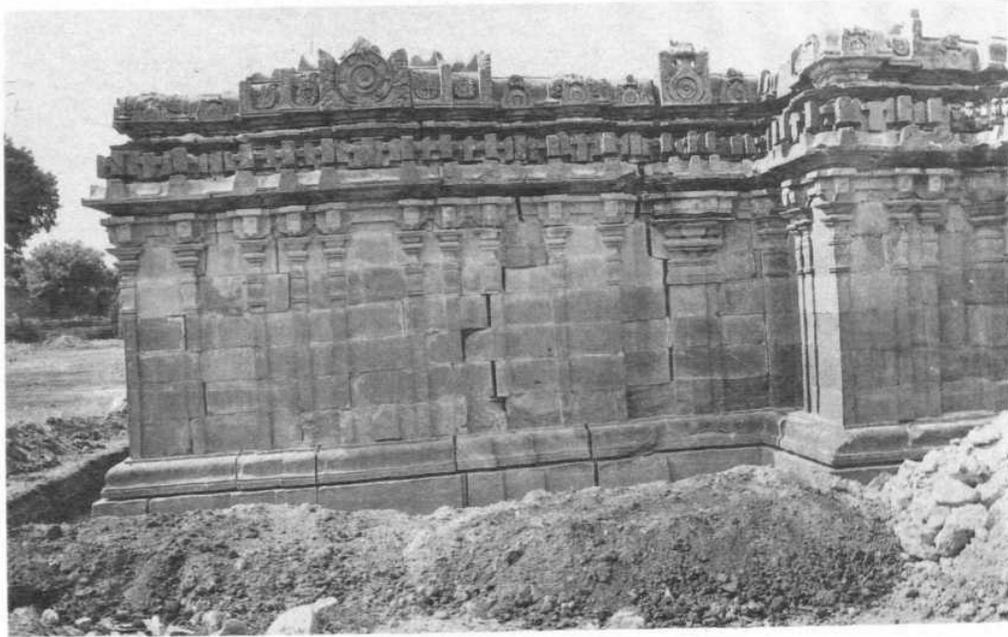


A

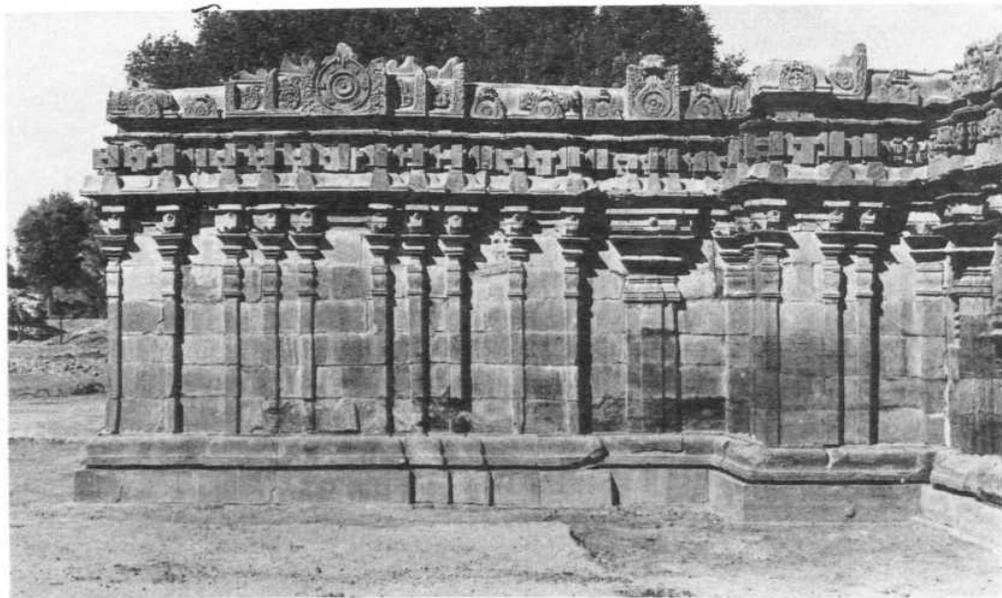


B

*Old ruined temple between fort and tank, Hanganal : A, before
and B, after conservation. See p. 122*



A



B

Manikesvara temple, Lakkundi : A, before and B, after conservation. See p. 122

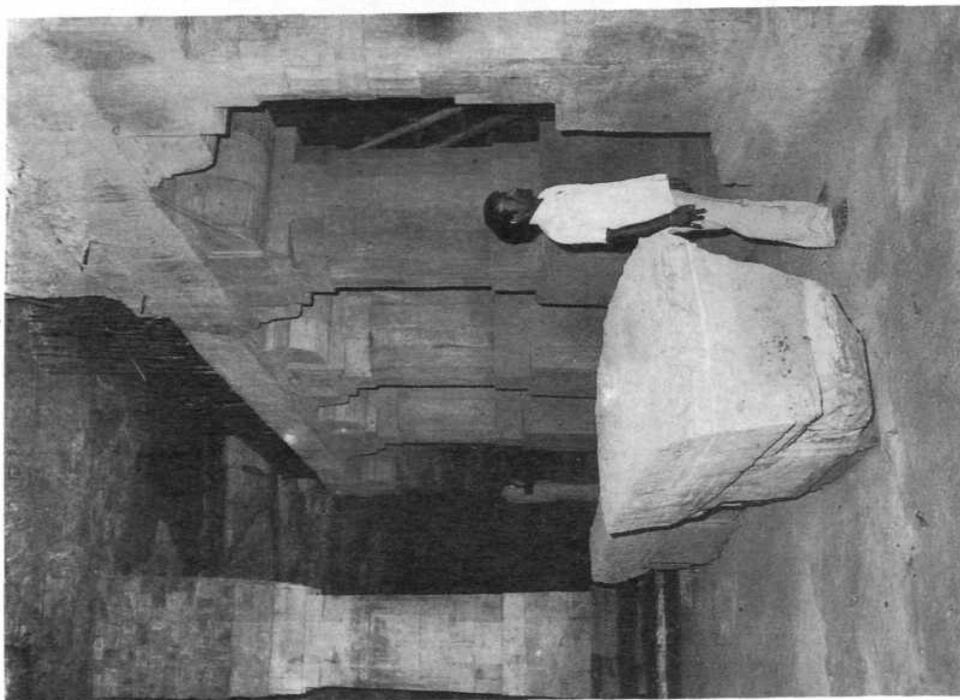


B



A

Kesava temple, Belur : A, before and B, after mending of stucco figures. See p. 122



B



A

Cave 4, Bagh : A, before and B, after conservation. See p. 124

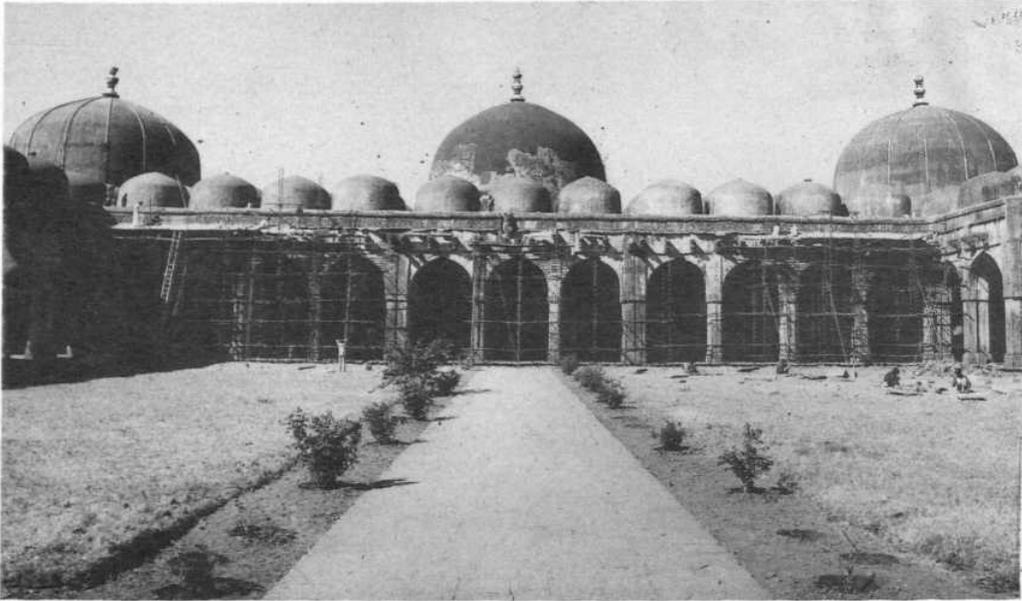


B

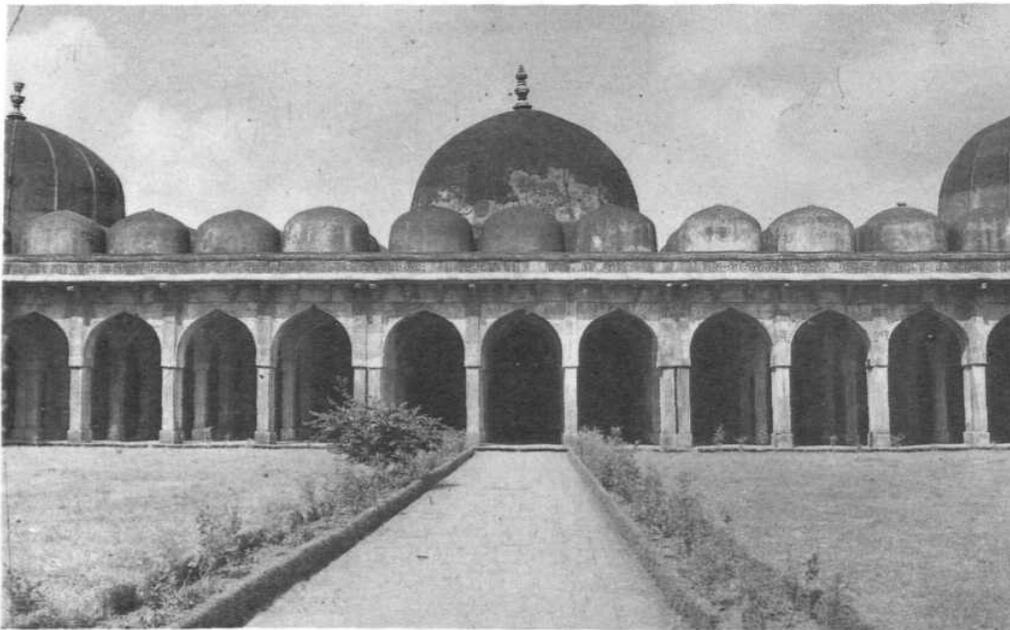


A

Hoshang Shah tomb, Mandu : A, before and B, after conservation of flooring of Dharamsala. See p. 124

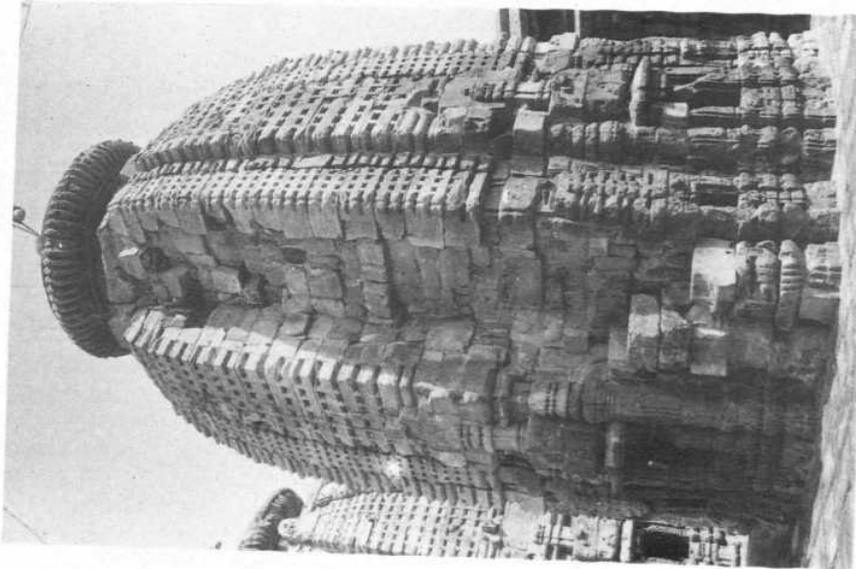


A

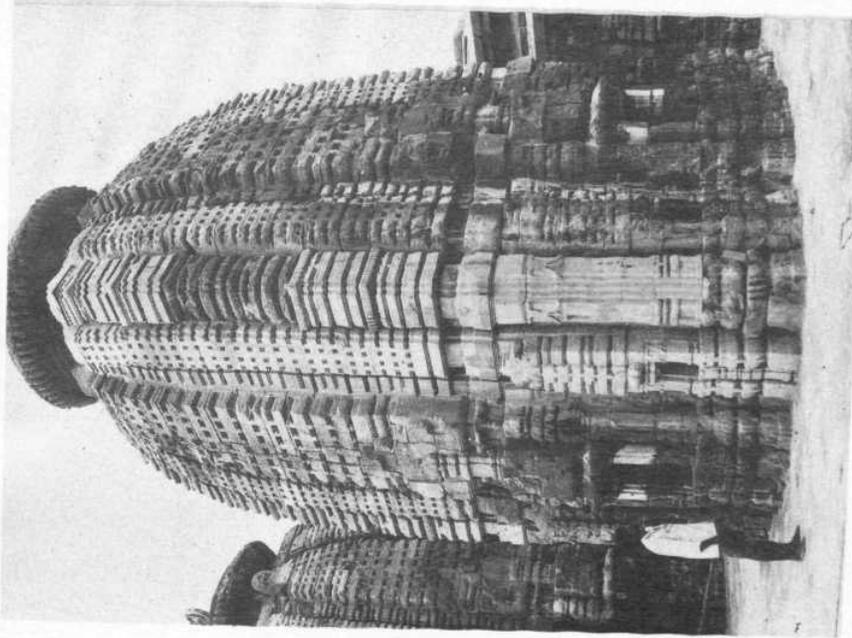


B

Jama Masjid, Mandu : A, before and B, during conservation of chhajjas. See p. 124

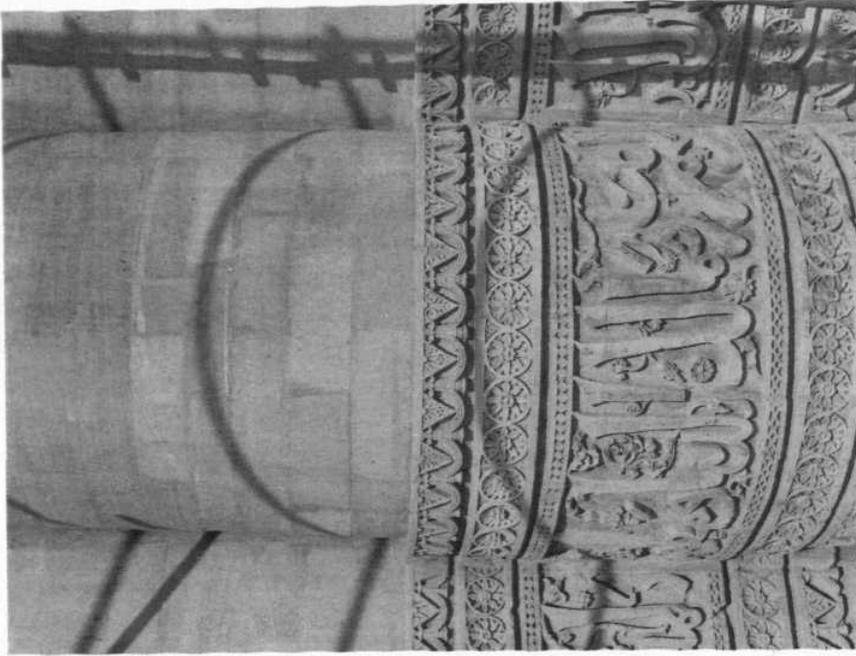


A



B

Siddhesvara temple, Gandharadi : A, before and B, after conservation. See p. 128.



B

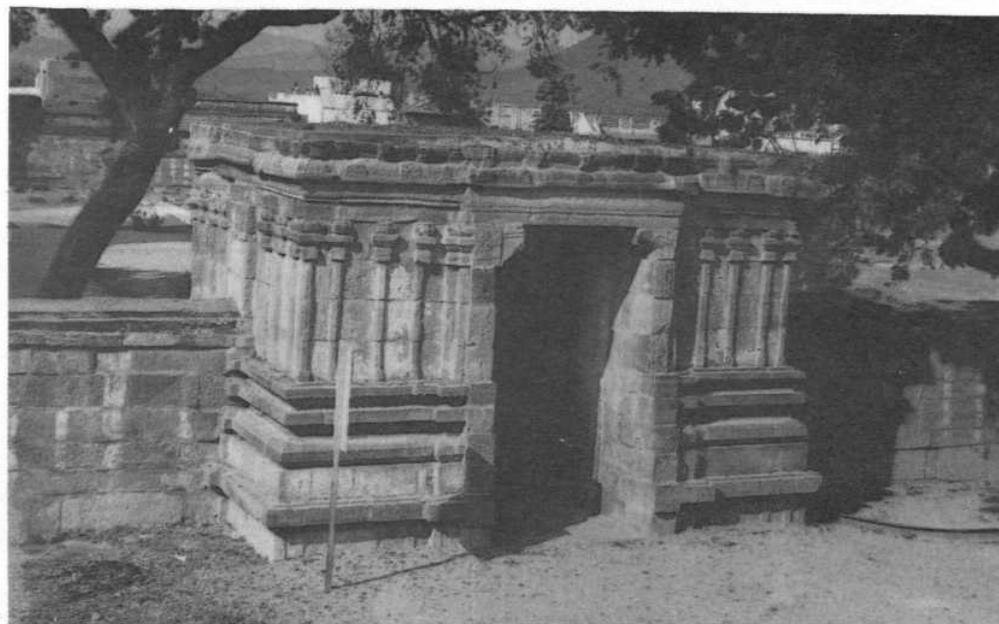


A

Qutb Minar, Delhi : A, before and B, after replacement of veneer. See p. 132



A

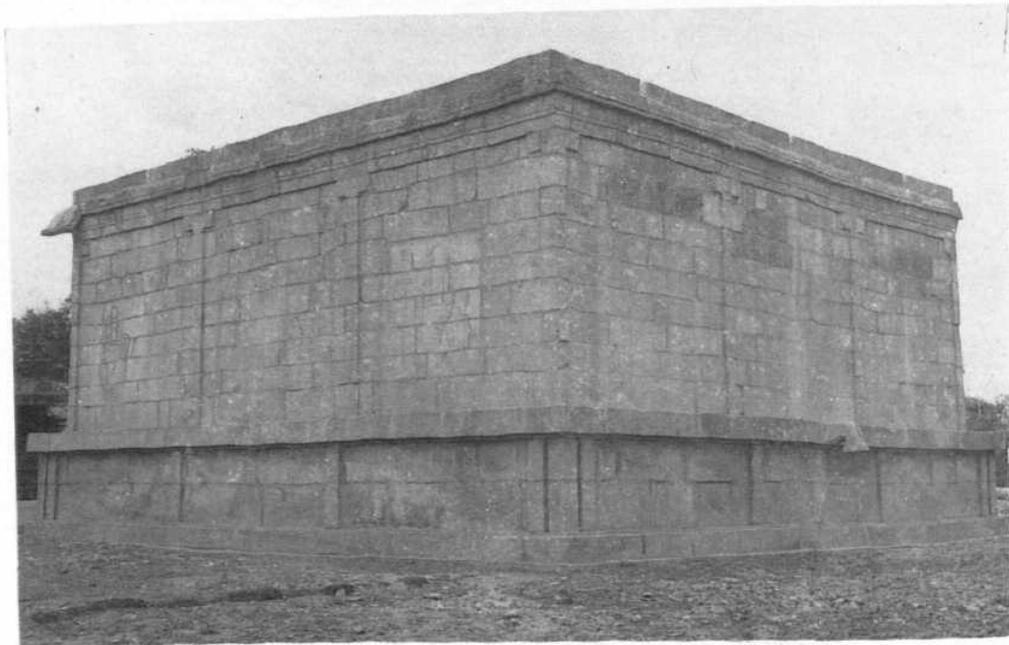


B

Sri Saumyanāthasvami temple, Nandalur : A, before and B, after conservation. See p. 134



A

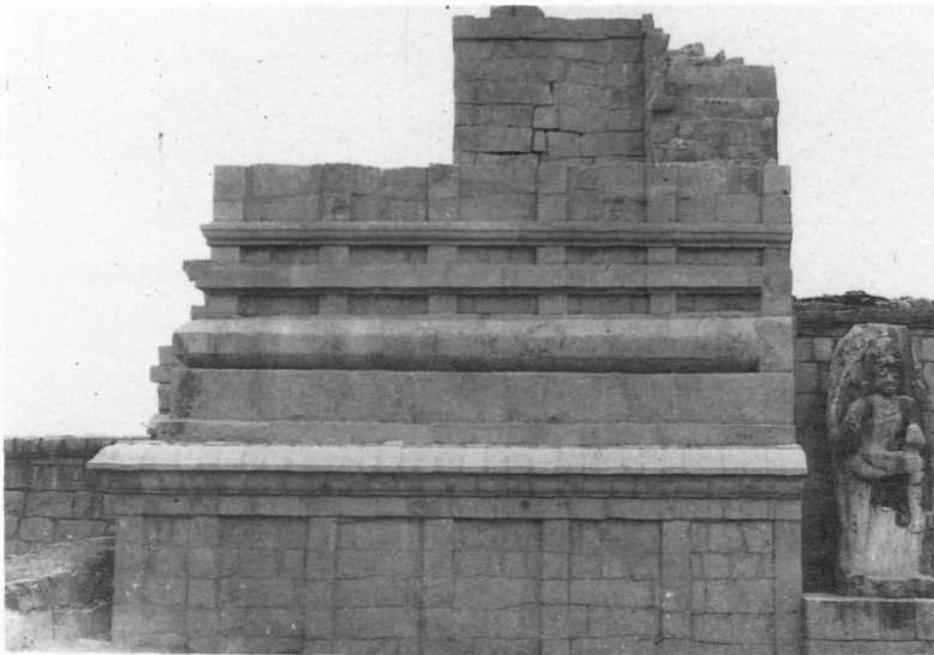


B

Bhumisvara temple, Sevalur : A, before and B, after conservation of kalyana mandapa. See p. 142



A



B

Brihadisvara temple, Gangaikondacholapuram : A, before and B, after conservation of mahadvara. See p. 142

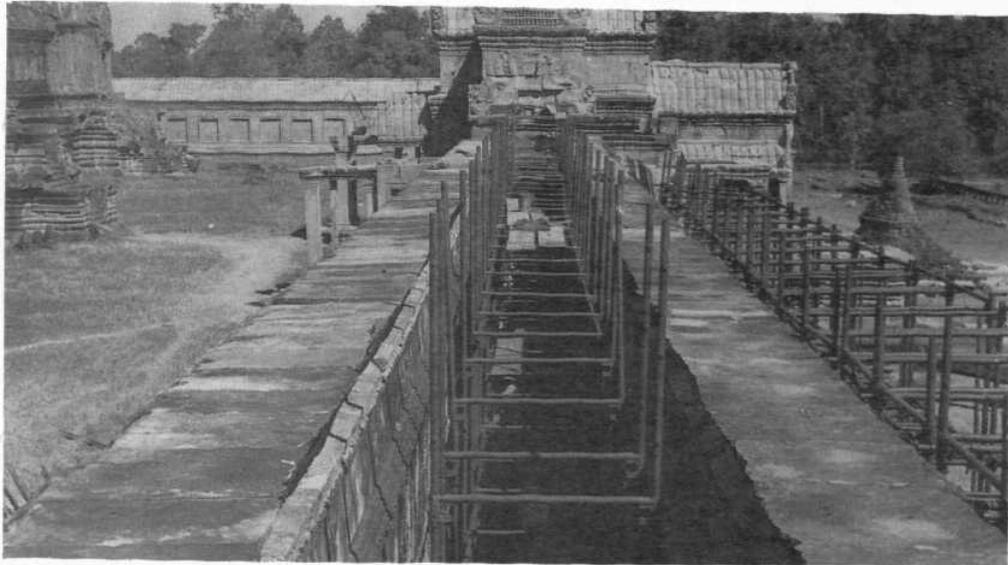


A

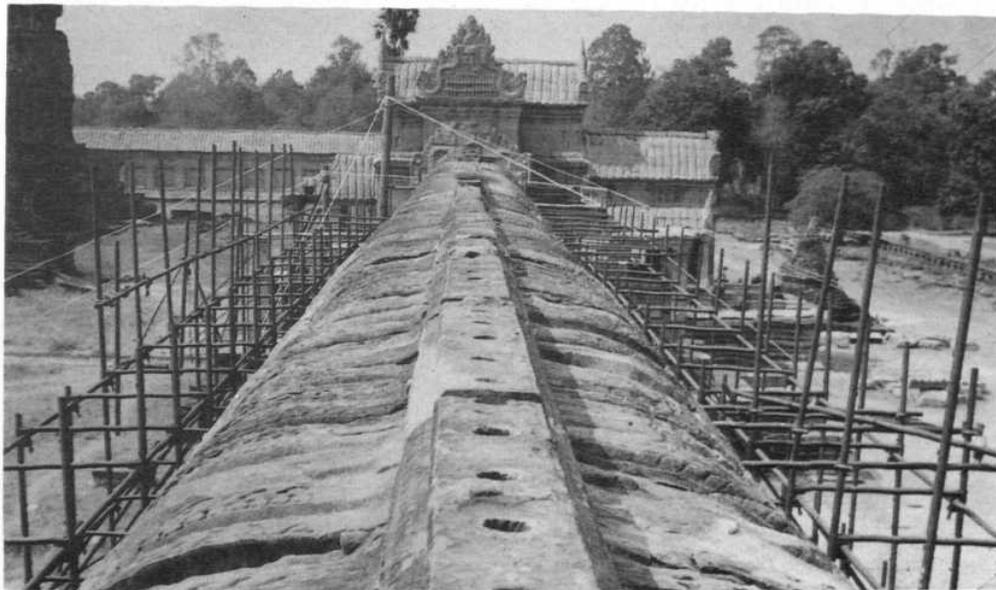


B

Angkor Vat : Samudramanathan Gallery, A, before and B, after reconstruction. See p. 148



A



B

*Angkor Vat : Samudramantran Gallery, A, before and B, after
watertightening. See p. 148*



A

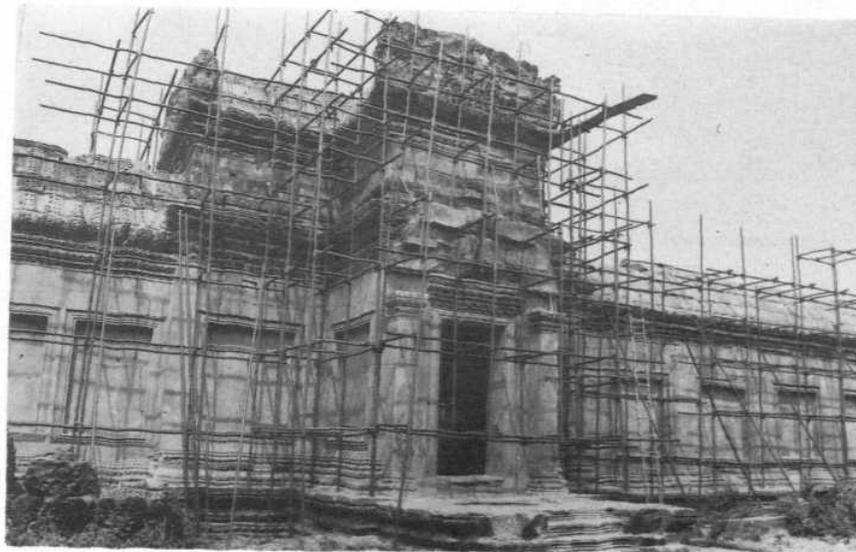


B

*Angkor Vat: entrance pavilion, south of Samudramanthen Gallery.
A, before and B, after conservation. See p. 149*



A



B

*Angkor Vat : western porch of entrance pavilion, north of Samudramanthen Gallery.
A, before and B, during conservation. See p. 149*

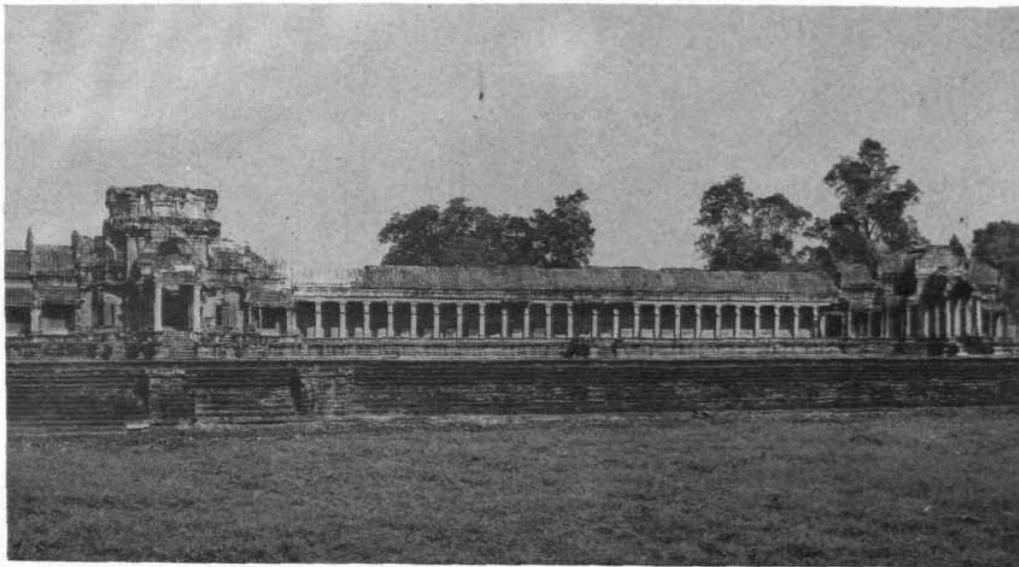


A

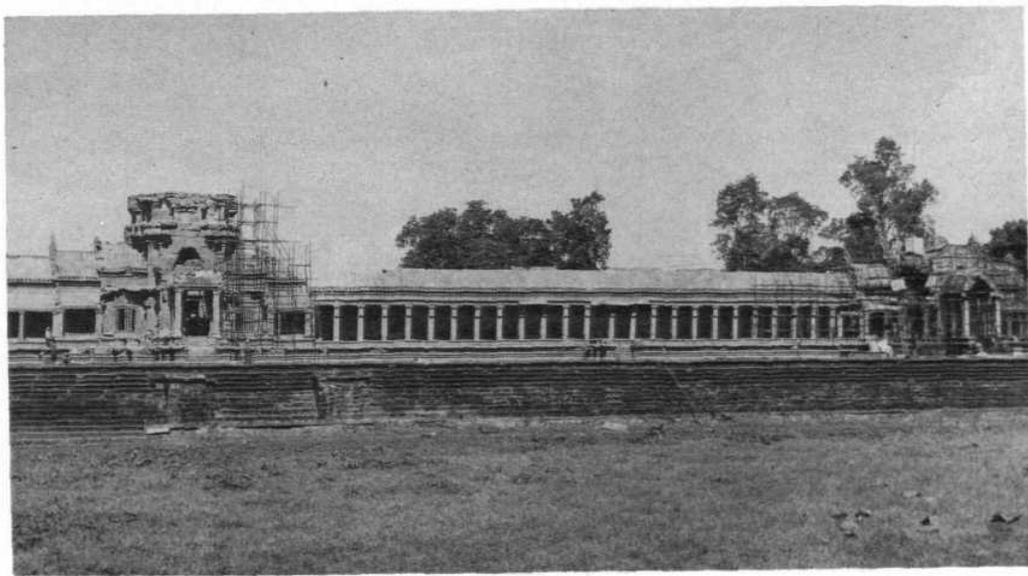


B

Angkor Vat : stepped embankment of moat, A, before and B, after conservation. See p. 150

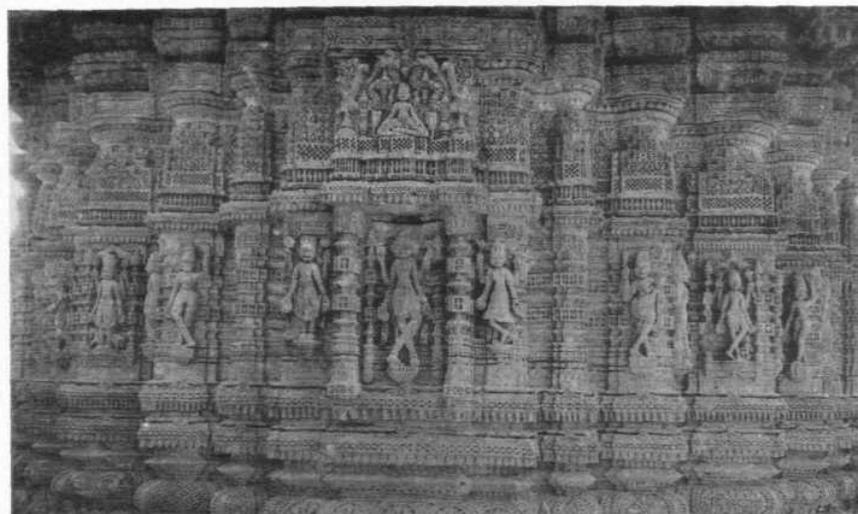


A

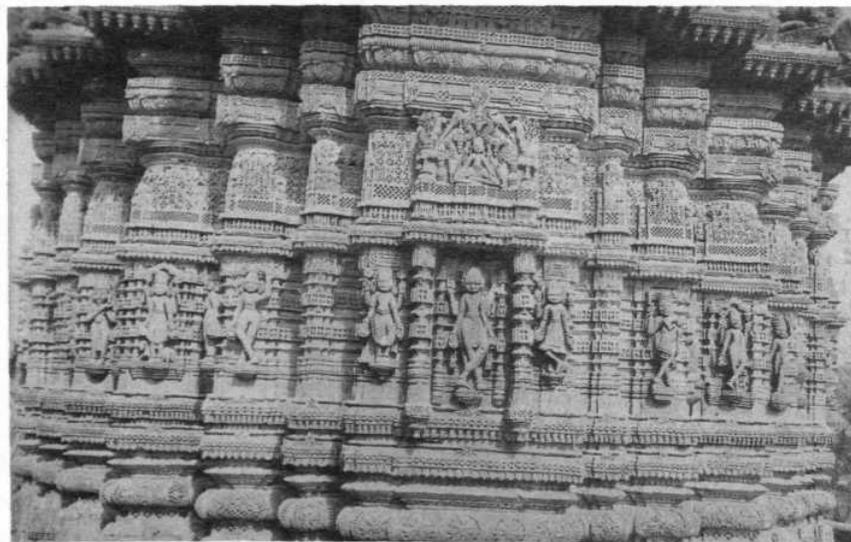


B

Angkor Wat: western façade of the fourth enclosure, A, before and B, after chemical treatment. See p. 150



A



B

Siva temple, Supedi: A, before and B, after chemical treatment of sculptures and carvings. See p. 153



A

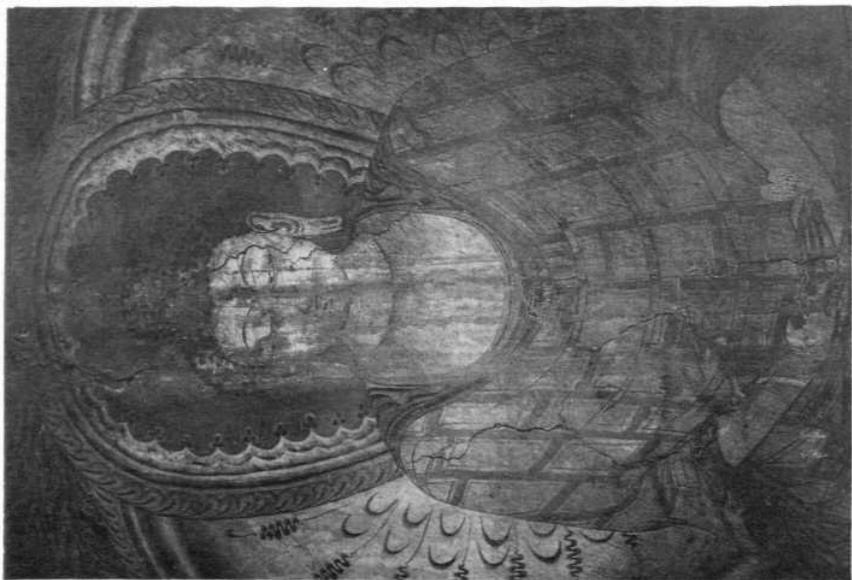


B

Duwang Gumpa, Tabo: A, before and B, after chemical treatment. See p. 154

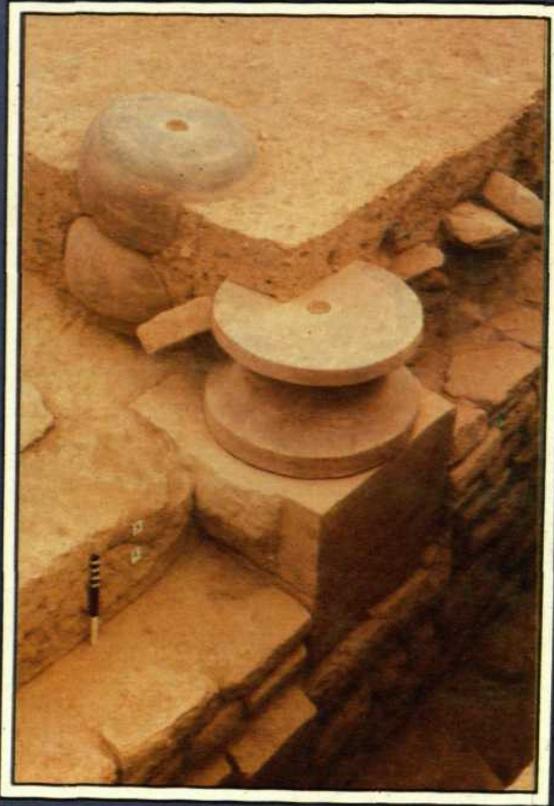


B



A

Duwang Gumpa, Tabo: A, before and B, after chemical treatment. See p. 154



ARCHAEOLOGICAL SURVEY OF INDIA



