

GOVERNMENT OF INDIA

Central Archaeological Library
Archaeological Survey of India

JANPATH, NEW DELHI.

Accession No. 84102

Call No. R 913.03

RIDALIA J.



MEMOIRS OF THE
ARCHAEOLOGICAL SURVEY OF INDIA
NO.92

EXCAVATIONS AT MALVAN

(REPORT OF THE COLLABORATION OF THE ARCHAEOLOGICAL SURVEY OF INDIA
AND CAMBRIDGE UNIVERSITY IN 1970, ON THE GUJARAT PLAIN)

F. R. ALLCHIN & JAGAT PATI JOSHI

WITH CONTRIBUTIONS FROM

A. K. SHARMA, K. R. ALUR,
J. P. SRIVASTAVA, K. T. M. HEGDE,
VISHNU MITTRE AND D. SHAH

84102



R913.03
IDA/A.J.



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

Cover :
(Front) Malvan: general view of the site on bank (Explorations)

Accession No. 84102 229-2000
Call No. R 913.05
RIDAJA-J.

©

1995

ARCHAEOLOGICAL SURVEY OF INDIA
GOVERNMENT OF INDIA

Price : Rs. 250.00

PRINTED AT M/S BENGAL OFFSET WORKS, KAROL BAGH, NEW DELHI-110005

PREFACE

With a view to exploring the estuaries of the Gujarat coastal plain and if possible defining the southern limits of the Harappa culture; exploring Stone Age sites; collecting extensive geomorphological data particularly of the lower courses of the Narmada and Tapti rivers and estuaries to the south; locating ancient ports and harbours, a joint expedition in the autumn of 1967 consisting of the present authors representing Cambridge University and Archaeological Survey of India respectively and Dr. B. Allchin worked in coastal plains of south Gujarat. The expedition besides discovering many sites ranging from Stone age to Medieval period also had a joint excavation at Malvan in 1970, thus successfully achieving the active participation of both parties. It is worthy to note that this expedition represented a new development in Indo-British collaboration in the field of archaeology.

Results of exploration and excavation were published in brief by the authors in the *Journal of the Royal Asiatic Society* in 1970 followed by notes in the *Indian Archaeology—A Review* (1966-67 and 1970-71); a paper was also read on "Excavation at Malvan" in 1971 at the Conference of Indian Archaeological Society at Nagpur.

The report on Malvan Excavations was prepared in 1971. At first the authors thought of publishing it in England, but due to several reasons it could not be published there. Thereafter one of the authors (FRA) became heavily engaged in several archaeological and conservation projects in various countries of South Asia, and was unable to complete this work. At last, in March 1994, the authors were able to meet at New Delhi exclusively for this purpose and decided to publish the report in its original shape (as prepared in 1971). They requested the Archaeological Survey of India for its publication as a Memoir which was subsequently agreed upon.

After this report was prepared two important excavation reports have come out i.e. S. A. Sali's *Excavation at Daimabad* and R. N. Mehta's *Excavations at Jokha* which may be referred to by scholars. The situation has not changed. At this stage we may recall our own observation in 1971, "The late Harappan Culture might have penetrated through Surat to Dhulia via Sonagarh pass linking the estuarine culture with those of Prakash, Bahal and Daimabad". This holds good even to-day in the light of other subsequent reports.

We hope that more Indo-British joint ventures in future in the field of archaeology will be most useful and valuable.

Jagat Pati Joshi

F. R. Allchin

CONTENTS

					PAGE
<i>List of Plates</i>					vii
<i>List of Figures</i>					viii
CHAPTER I	Introduction	...	...	F. R. Allchin and Jagat Pati Joshi	3
	A. The problem	...	...	...	3
	B. Previous work	...	...	...	3
	C. Acknowledgements	...	...	...	3
	D. Summary of results	...	...	...	5
CHAPTER II	The Site and its Environs	...	...	F. R. Allchin and Jagat Pati Joshi	11
	A. Location of site	...	...	...	11
	B. Interpretation of geomorphological evidence	...	...	...	13
	C. Cultural Data	...	...	...	14
	D. Comparisons and chronology	...	...	...	18
CHAPTER III	The Cuttings	...	...	F. R. Allchin and Jagat Pati Joshi	25
	A. Layout	...	...	...	25
	B. Stratigraphy	...	...	...	25
	C. Structures	...	...	...	33
CHAPTER IV	The Pottery	...	...	F. R. Allchin and Jagat Pati Joshi	39
	A. Period I	...	...	...	39
	1. Red Ware	...	...	...	39
	2. Black-and-red Ware	...	...	...	47
	3. Buff Ware	...	...	...	47
	4. Coarse Ware	...	...	...	47
	5. Black Ware, Grey Ware and Lustrous red ware	...	...	...	53
	6. Painted Pottery	...	...	...	55
	7. Graffiti	...	...	...	67

B.	Period II	...	...	...	...	68
CHAPTER V	Other finds	...	...	...	...	73
A.	Blade industry	...	...	F. R. Allchin and Jagat Pati Joshi	...	73
B.	Copper objects	...	...	J. P. Srivastava	...	76
C.	Terracotta objects	...	...	-do-	...	76
D.	Shell objects	...	...	-do-	...	79
E.	Glass object	...	...	-do-	...	79
F.	Beads	...	...	-do-	...	81
G.	Other Miscellaneous stone objects	...	...	-do-	...	81
H.	Miscellaneous stone objects	...	...	-do-	...	82
CHAPTER VI	Scientific Reports	...	...	...	...	85
A.	Animal skeletal remains	...	...	K. R. Alur and A. K. Sharma	...	85
B.	Study of basin floor sediment Samples	...	...	K. T. M. Hegde	...	99
C.	Pollen analysis of samples	...	...	Vishnu Mittre	...	103
D.	Shell remains	...	...	D. Shah	...	107
Appendix	A. Pottery from Ghor	...	...	F. R. Allchin and Jagat Pati Joshi	...	115
	B. List of sites explored by joint expedition	...	...	-do-	...	116

LIST OF PLATES

- I Malvan : general view of site on bank (exploration)
- II A, Malvan : view of Tapti bank, looking towards sea
B, Malvan : view of Tapti bank, looking east
- III A, Malvan : general view of site
B, Malvan : general view of site
- IV Malvan : general view of trench MVN 2
- V Malvan : Section of MVN 4 showing alluvial and sand deposit.
- VI Malvan I : view of ditch with cattle bones
- VII Malvan I B : remains of mud brick structure
- VIII Malvan I B : extension of section showing brick structure
- IX Malvan I D : ditch and embankment
- X Malvan II : showing hearths of different levels
- XI A, Malvan : terracotta cake
B, Malvan : copper objects
- XII Malvan : terracotta objects
- XIII Malvan : animal remains
- XIV Malvan : animal remains
- XV Malvan : animal remains
- XVI Malvan : animal remains
- XVII Malvan : animal remains
- XVIII Malvan : animal remains
- XIX Malvan : lumbar vertebra of horse
- XX Malvan : shell objects

LIST OF FIGURES

1. Map : sites on the coastal plain of Gujarat
2. Malvan : culture sequence
3. Sketch map of site and creek
4. Malvan : Survey plan
5. Malvan : profile of trenches
6. Malvan : profile of trenches
7. Malvan : section
8. Malvan : plan
9. Malvan : red ware, Period I
10. Malvan : red ware , Period I
11. Malvan : red, black and red wares, Period I
12. Malvan : coarse ware, Period I
13. Malvan : black, grey and lustrous red wares
14. Malvan : painted sherds
15. Malvan : painted sherds
16. Malvan : graffiti
17. Malvan : pottery of Period II
18. Malvan : stone blade industry
19. Malvan : glass objects and beads
20. Malvan : miscellaneous objects of stone and terracotta
21. Malvan : animal remains
22. Malvan : animal remains
23. Malvan : pollen diagram
24. Pottery from Ghor

CHAPTER I
INTRODUCTION

- A. The Problem
- B. Previous work
- C. Acknowledgements
- D. Summary of results

F.R. Allchin & Jagat Pati Joshi



1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900

84102



CHAPTER I INTRODUCTION

A. THE PROBLEM

The main problem which was taken in hand right from the time of the initial exploration was to investigate the southern limit of the Indus Civilization in south Gujarat, to find out what if any links might have survived the withering Indus influence and how far these influences may have penetrated in a diffused form to the northern Deccan. The problem had already been posed by the excavation of sites like Bhagatrav on the Kim, a tributary of the Narmada, Mehgam on the Narmada itself, and Hasanpura which are according to S. R. Rao, Harappan and Late Harappan sites in Gujarat, and secondly by the excavated sites of the Deccan, such as Prakash, Bahal and Daimabad, wherein Lustrous Red Ware of Post Harappan period was found. Moreover the discovery and excavation of Jokha by R.N. Mehta of the M.S. University, Baroda, had shown a cultural equipment of mixed traits of the post Harappan of Gujarat, Saurashtra on the one hand, and the chalcolithic cultures of the northern Deccan on the other (fig. 1). What exactly was the nature of the withering Indus influence in this region and how far did it contribute to the make up of other chalcolithic cultures of the adjoining areas? Malvan, situated in the estuary of the Tapti, seemed likely to provide the answer due to its location of an estuary which could receive Harappan influences, merchandise and people and transmit the same to the interior of northern Deccan through the Sonegadh pass. A third major consideration was to examine the viability of Malvan as a port and to see what if any evidence excavation of the floor of the basin might yield relating to the sea level in Harappan or Post-Harappan times.

B. PREVIOUS WORK

It was during the autumn of 1967 when the present authors in a joint expedition were exploring the estuaries of the Gujarat coastal plain and trying to define the southern limits of the Harappan culture, the site of Malvan¹ was discovered (pl. I).

C. ACKNOWLEDGEMENTS

The expenses of the excavations were borne jointly by the Archaeological Survey of India

¹A list of the sites visited is given in Appendix B.

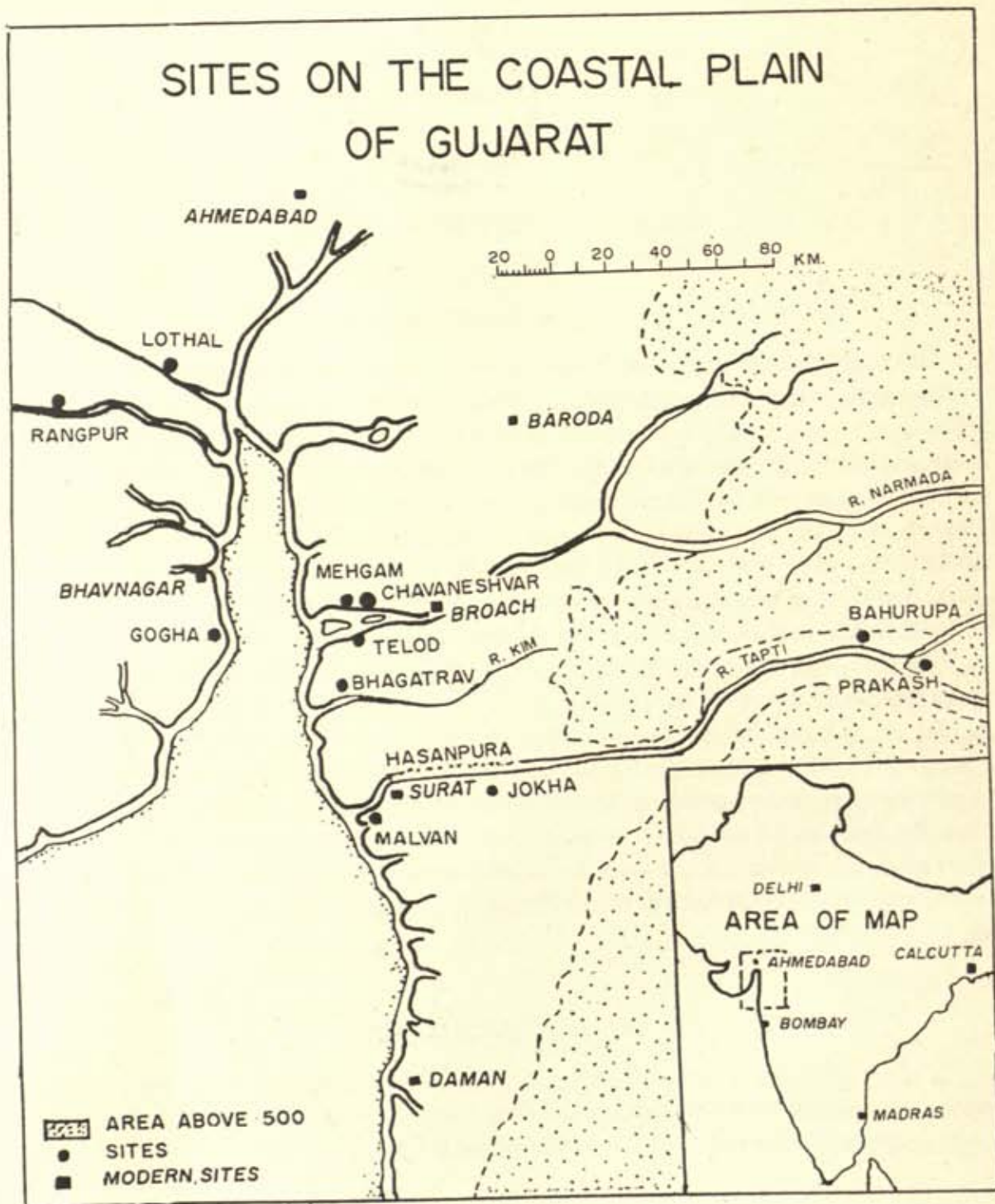


FIG. 1

INTRODUCTION

and the British participant, who wishes to acknowledge grants for the work from the British Academy. The authors are indebted to Sarvashri B.B. Lal, former Director General of the Archaeological Survey of India and B.K. Thapar, then Director (Exploration), Archaeological Survey of India for their encouragement of this joint venture; and also to K.R. Alur, Drs.(Mrs.) D. Shah, K.T.M. Hegde, Vishnu Mittre, and D.P. Agrawal and Sarvashri J.P. Shrivastava and A.K. Sharma for their valuable assistance in the report; and to Dr. Arun Kumar for the detailed comparative material appended to the description of the painted pottery. The authors owe a special debt to Dr. R.N. Mehta, the then Dean of the Faculty of Arts, M.S. University of Baroda, for his continued and generous support; they also wish to express their gratitude to the following for assistance and advice on various parts of the work Dr. R. V. Joshi, Dr. (Mrs.) B. Allchin, Mr. C. Guzder, Ms Statira Guzder and Mrs. Heera Joshi.

We have to record our indebtedness to the following members of the Excavations Branch of the Archaeological Survey of India for their assistance in excavation and the preparation of the report: Sarvashri A.K. Roy and Ranjit Roy (Survey and map); M.B. Limaye and Pyare Singh (Photography); L.K. Jain, N.G. Banerjee, J.S. Dubey, Mohinder Singh, S.V. Sutaone, M.D. Puranik, P.M. Bhope and S.R. Nikhar (Drawings); and N.K.S. Sharma for typing the report; D. Tewari, Mohamad Azam, G.M. Bodele Shyam Lal, Ranju Ram, Bhag Singh, A.U. Ganar, V.S. Armarkar, Dhan Bahadur, Jeet Bahadur, Shamrao of the Excavations Branch and M.G. Vyas, K.S. Krishnan, S.K. Padhiyar, N.C. Shah and A.V. Vadnerkar of the Western Circle of the Archaeological Survey of India.

Finally our thanks are due to Shri Hirabhai Patel of Khadi Phaliyu for his continued kindness and assistance during the course of the excavation, and to the people of Dumas and Gaviyar who worked on the excavation.

We take this opportunity to record our sincere thanks to the Director General, Archaeological Survey of India for the publication of the report in the Memoirs Series and to all those associated with the production of the Volume in the Publication Branch specially Sarvashri B.M. Pande, Director (Publication), Chhering Dorje, Superintending Archaeologist, and A. Jha, Assistant Archaeologist. Our thanks are also due to Sarvashri Vijay Kumar, Chief Artist for making some of the drawings for publication and B.R. Rajput, Senior Photographer, for preparing some final photographs.

M/s. Bengal Offset Works, deserves thanks for printing the report nicely

D. SUMMARY OF RESULTS (fig. 2)

Malvan lies on the south bank of the Tapti river near Dumas in District Surat. The excavations yielded evidence of two periods of cultural activity within a deposit of 1.30 m in the area of 15×30m, the site having been greatly eroded and a large part of the original habitation disappeared. Period I was essentially a post-Harappan, Chalcolithic occupation, and Period II consisted of a group of pits

MALVAN 1970

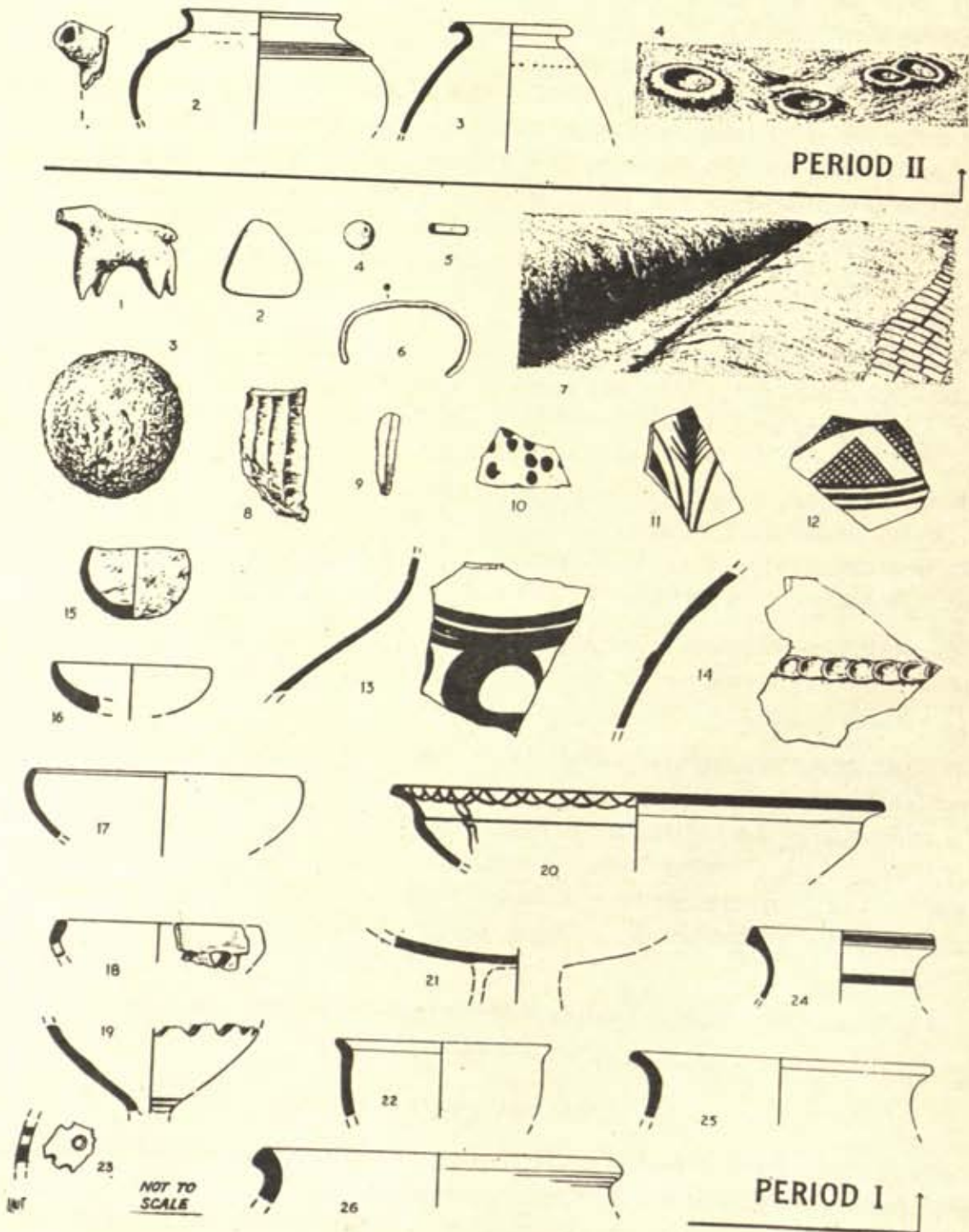


FIG. 2 : Cultural sequence

INTRODUCTION

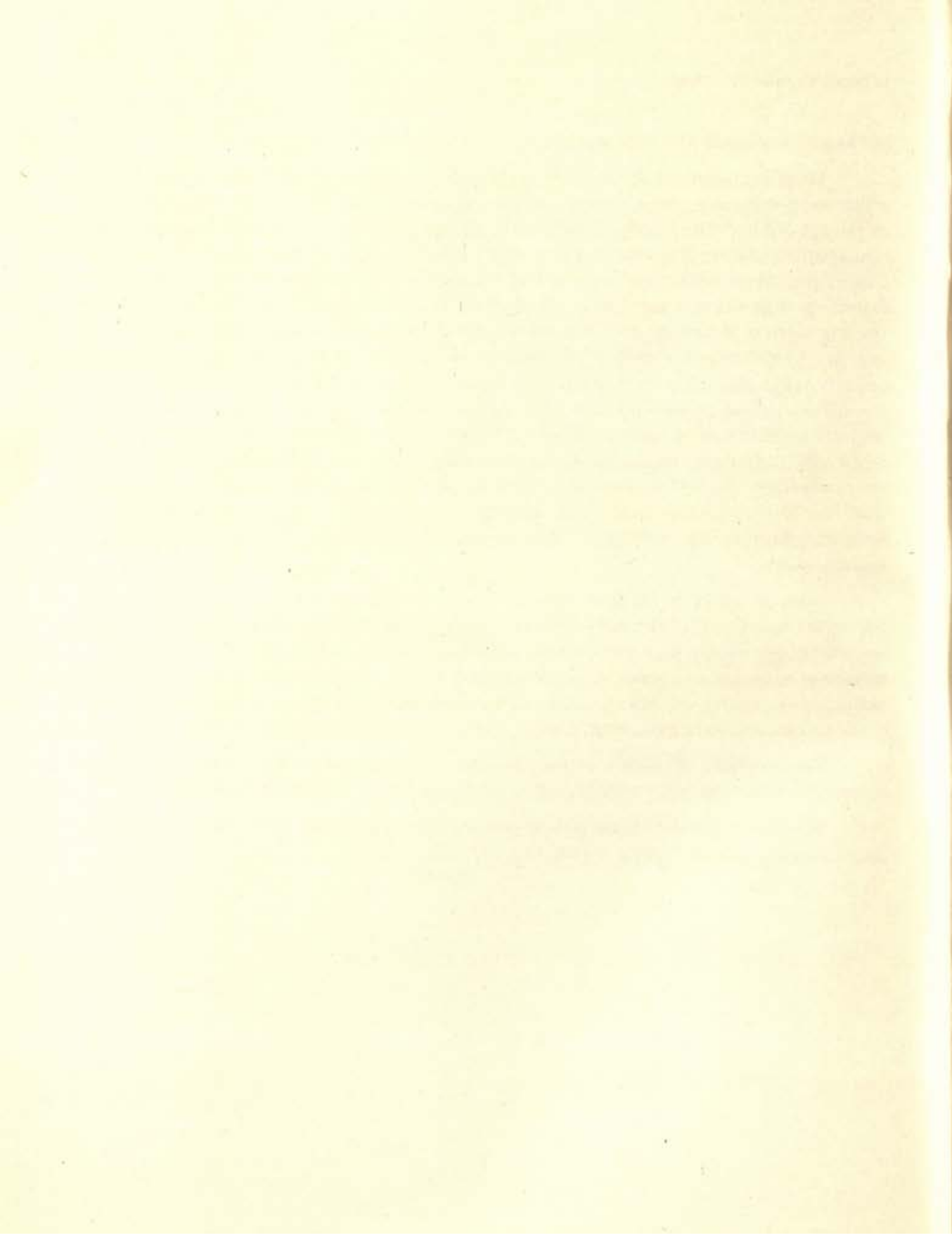
and hearths associated with some sort of a temporary occupation of later times.

The principal structural feature of Period I was a ditch (first identified during the exploration) which was running in an east-west direction and was traced to a length of 18.30 m. The ditch had an average depth of 1.10 m and width of 1.50 m cut into the natural soil. The ditch was not quite regular either in cutting or in alignment. Generally its sides were inclined to an angle of 30°. The spoil from its original excavation was spread on both sides, and particularly the north side was banked up to form the basis of a substantial mud brick structure which was traced to a considerable distance. The original form of the structure was not clear as it had been considerably eroded and damaged by later pits. Its maximum width was 3.0 m and six to seven courses of mud bricks (size 27 × 17 × 9 cm) survived in places. The ditch appears to be widening towards the eastern side and taking a turn towards the north where there is a natural fall of the present ground level. It is even possible that the original habitation lay principally to the north of this structure and has therefore entirely disappeared. To the south of the ditch a number of post-holes were dug into the heaped spoil apparently to provide some sort of fence. Beyond the ditch the occupation deposits rapidly decreased towards the south and west. The filling of the ditch yielded a good quantity of cultural debris including many cattle bones. Even after the ditch was completely filled, the occupation of this period continued without any apparent change.

Other aspects of the material culture of Period I were a large amount of pottery of the Post Harappan Chalcolithic culture, and a diminutive blade industry made on tiny cores of jasper, agate and chalcedony with an unexpectedly high ratio of cores to flakes or blades and an almost total absence of retouched specimens. A number of small objects of copper were recovered, notably a bangle. Amongst terracotta objects a small humped bull, and a number of circular or bun shaped terracotta cakes are to be mentioned. A small number of beads of paste and carnelian were found.

The occupation of period II was of a temporary or squatter character, and the grey to black pottery which characterises it probably dates from the end of the first millennium A.D.

Separate studies are included of animal remains, geomorphological considerations and pollen samples, and these greatly augment the archaeological data.

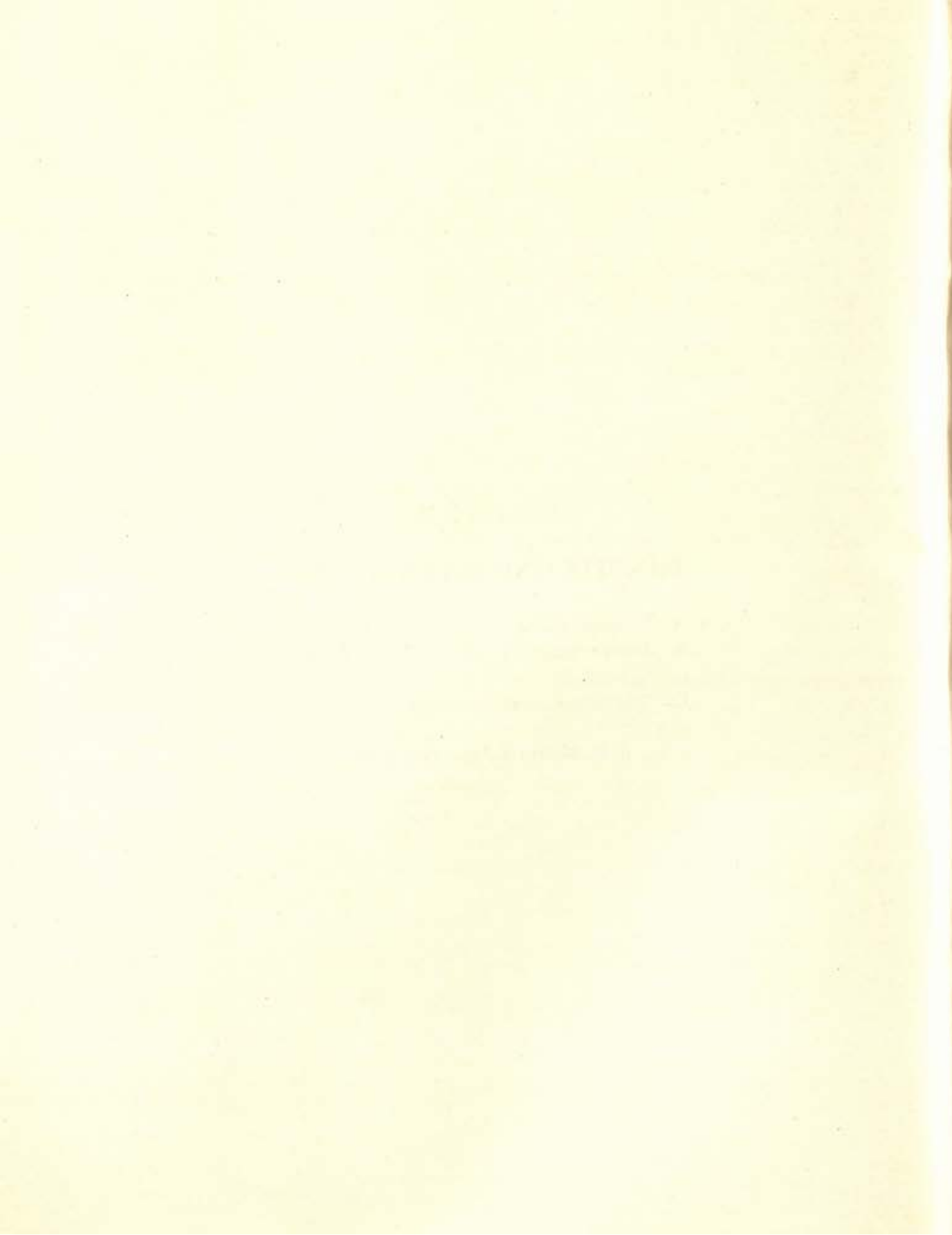


CHAPTER II

THE SITE AND ITS ENVIRONS

- A. Location of Site
- B. Interpretation of Geomorphological evidence
- C. Cultural data
- D. Comparisons and chronology

F. R. Allchin & Jagat Pati Joshi



CHAPTER II

THE SITE AND ITS ENVIRONS

A. LOCATION OF SITE

The south bank of the Tapti river (pl. II) in the last eight km before it reaches the sea at Dumas comprises two main sections, to the east the river flows more or less due westwards, while finally it turns sharply south, west of Magdala, to flow in a south-south-western direction. This last section witnesses a division of the waters, one channel flowing to the north round the extensive island or *bet*, and the smaller but deep Dumas channel flowing south of the *bet* and close to the bank.

The south bank west of Magdala consists of two main alluvial deposits : above is loose, light brown alluvium with traces of an old weathered surface at its centre, and having a depth of about 3-4 m and underneath, and at this point partly cut by the river is darker brown, hard and compact alluvium (henceforth referred to as the upper and lower alluvia respectively). The upper alluvium being softer than the lower is more liable to erosion of all sorts and this plays a significant part in the configuration of the land in the neighbourhood of Malvan. At the change in the direction of flow, west of Magdala, the two alluvia coincide and both are cut by the river. West of this point, however, the upper alluvium gradually retreats from the river, leaving the hard surface of the lower exposed as an inclined shelf reaching out to below the high tide line. About a kilometre from this point, the upper alluvium, which is marked by a clear and prominent bank, has been entirely eroded by two small *nalas* which flow in from the east, and the high bank turns inward to leave the kidney shaped basin which is the subject of our present enquiry.

At this point, at which recently an earth and stone *bund* has been made across the opening of the basin, the floor of the basin, is marked by a deposit of black sticky mud, but from beneath the mud the inclined plain of the lower alluvium forms a continuum towards the river until the high bank begins again as a narrow spit of land running south-south-westwards between the Dumas channel and the enclosed basin. This spit gradually increases in both height and breadth, reaching a maximum of about 5 m above the high tide line. This area is locally known as Ghor, having the meaning of high ground, and thus this name has been given to the small site discovered nearby, and to be described below. It is, however, completely masked by a mantle of sand and the extent to which the upper alluvium survives is difficult to determine. The sand has itself the appearance of stability and has formed a considerable humus.

The site locally known as Malvan¹ is thus situated on the lower estuary of Tapti river east of Dumas in district Surat, Gujarat (Lat. 21° 71' N; Long. 72° 42' E, Survey Sheet no. 46 C/12 (1). The

¹The name Malvan, more correctly *Malavana* means a raised area or plain. It is therefore appropriate for this area. Other local name for the site is *Kakariyo Vago*, the place of *Kankar* nodules.

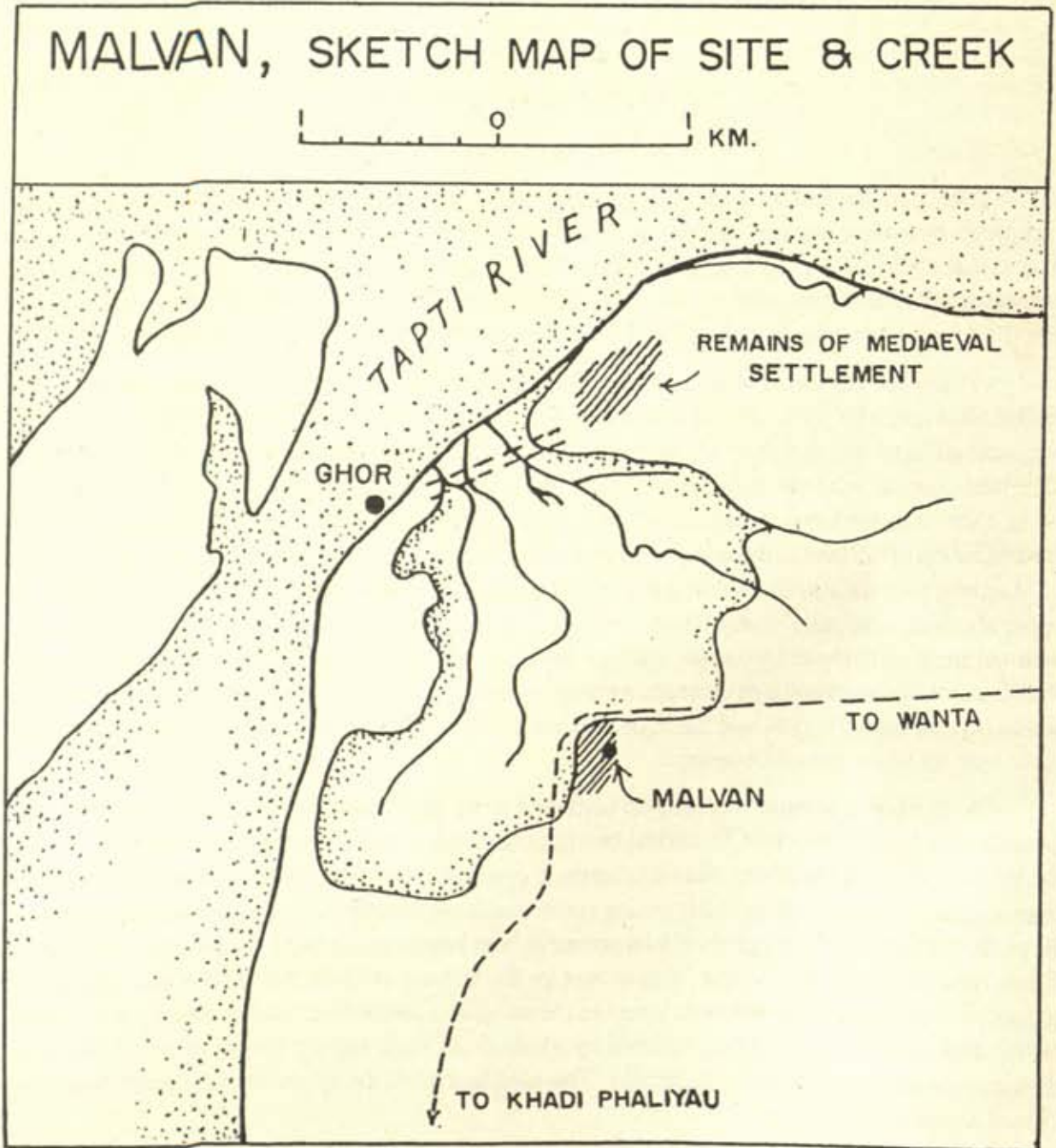


FIG. 3

mound (pl. III A) lies on the inner side of the basin we have just described. The basin covers more than six square kilometre and is roughly kidney shaped. Today, its floor is a salt flat dissected by meandering channels. The site stands on a bank some two metres in height. Recently a cause way has been built across the mouth of the basin in an attempt to reclaim the land and restrict the entry of the tide. This has also reduced the depths of the channels. Some times in the past the creek must have been tidal to within forty five metres of the Post-Harappan settlement (fig. 3). Our observation of other creeks in the area indicates that at such times it would have been possible to bring boats in on the high tide and beach them at this point as the fishermen do in the neighbouring villages at the present day. Thus, the inlet could have afforded a safe and sheltered harbour, barely visible from the main estuary and capable of receiving boats.

The mound, commanding the present harbour, lies on the top of the bank and has been considerably eroded on its outer side (pl. III B). Indeed, local information suggests that it was formerly much larger than at present. The occupation deposit exposed at the edge suggests a cultural deposit of about two metres thickness, but the rising ground behind it shows that there is a greater depth behind. The spread of the pottery in the basin area and on the rising ground bears testimony to the fact that the area had an appreciable habitation.

Two other archaeological sites were discovered in the immediate vicinity. On the upper alluvial bank some 300 m North-east of the *bund* a scatter of pottery and some slight irregularities in the surface indicate the site of a small settlement. The pottery comprised plain, dark green glazed ware and sherds of coarse red ware. Among the forms, the hollowed bowls were distinctive. No other glazed or decorated pottery was discovered. The whole assemblage indicates a settlement of mediaeval times, most probably datable to the Mughal period.

The second site, though smaller, is in some ways the more interesting. It lies about 91 m south-west of the point at which the bank reappears south-west of the opening of the basin, and is located on the surface of the hard alluvial layer about 23m out from the modern bank, and about 2.5m below the edge of the bank. It therefore lies well below high water mark. We named it after the adjacent land as Ghor. The remains comprised a single exposed ring of a terracotta ringwell, within which fragments of three pots were discovered (Appendix A; fig. 24). This group belongs, without doubt to the early historic period most probably to the second-third century B.C. or a little latter. It indicates that the river has been cutting back into the bank at this point, and that probably whatever remains there were originally at higher level have now disappeared. The ring well, being dug to a considerable depth alone survives. This find also raises doubts as to the relative levels of land and sea at that date.

B. INTERPRETATION OF GEOMORPHOLOGICAL EVIDENCE

At the outset we hoped to investigate the viability of Malvan as a port. Our work seems to have produced a fairly definite result. The picture which emerges from our excavations and from Dr.

Hegde's helpful study is that in ancient times and probably still during the occupation of the site in Period I, the basin was shut off from direct contact with the sea or river and its bed would have been several metres below the modern high water mark. In this basin there formed a lake fed by small streams from the south-east (whether technically an Ox bow lake or otherwise we are not in a position to decide), and this lake was for a considerable period permanent. On the lake bed were formed the alluvial deposits from which Vishnu Mittre has obtained so rich a pollen series, and in or into which must have 'grown, flown or blown' as Hegde puts it in the form of plant and animal life a variety of organic matter. Thus, the bank of this lake would form a naturally attractive habitat for early man, as a rich supply of natural foods, would have been locally available. The presence of a very small number of finds of cultural debris principally fragments of imported worked stone attributable to Period I or even earlier, in the clay indicates that this state persisted even during the occupation. But by far, the longer quantity of cultural debris is present in the upper parts of the sections, in the laminated sand deposits. These indicate that at a certain date the sea broke through the former barrier, most probably in the vicinity of the modern *bund*, and that thereafter a regular deposition of silt took place with the high tide. The cultural materials found in these sandy deposits are not easy to interpret. They belong without exception to Period I, but whether they represent washout from the site on the bank after its abandonment, or whether they represent detritus from the actual settlement is not easy to determine. But, for whatever reason, the scouring of the older lake deposits, by whatever agency it may have been accomplished, is at its deepest in pits MVN 3 and 7, that is to say within some 50 m of the old site on the bank. This observation seems to make it unlikely that the erosion of the site could have destroyed a major part, as at first seemed probable.

B. CULTURAL DATA

The early period at Malvan represents an occupation prior to the arrival of iron. The size of the settlement cannot even now be at all accurately determined, but there is no reason to think that it was ever large. It cannot moreover have survived for than one or two centuries, as the depth of deposits is nowhere great. No permanent houses or even permanent occupation floors were discovered in the portion where we excavated. But quantities of burnt wattle and daub were found at one point in the ditch, and these suggest the materials of which houses would have been constructed. The principal structural remains were in the form of a ditch of more than 1.5 m in width and more than 1.0 m in depth, traced for over 30 m along the crest of the bank above the basin, and curving gently in line with the bank. The ditch however passes suddenly and without any explanation through the edge of the bank and is thereafter totally lost. Traces of the spoil from the ditch were found on both the inner and outer sides, those on the outer being reinforced and partly surmounted by a mud brick platform, perhaps originally the base of rampart running along the west of the bank. This structure was heavily eroded and very little trace of it survived. The presence of this rampart if it be accepted as such, or whatever else it may have been, whether it was intended as a defence against

floods, or more likely against human or animal intruders, is a point which demands comparison with the tradition of surrounding a settlement by a wall in pre-Harappan and Harappan times. That a ditch should be formed *inside* the structure is not easy to understand, and led us at first to wonder whether the entire settlement had once lain outside the rampart and hence been now eroded away. Attractive as this suggestion is, it scarcely seems to be borne out by the evidence obtained from the bed of the basin. Inside the area enclosed by the ditch the only traces of activity were in the form of hearths and shallow pits. These occurred at three different levels, within Period I, testifying to occupation of some duration.

Of the culture of these early occupants at Malvan we know quite little. No food grains were discovered at the site, but several fragments of saddle-querns and rubbing stones were suggestive of some cereal consumption. The diet of the inhabitants was evidently enriched by meat; and apart from cattle and buffalo, sheep and goat were kept. Wild pigs were hunted, but there is no evidence that the pig was domesticated. The dog was also kept and bones of a horse were discovered. Wild animals were hunted, probably to augment the supply of food, which included the *barasingha* and the spotted deer. There is a suggestion that wild cattle still roamed the forests, and some specimens of usual size were encountered. A striking feature of Alur and Sharma's study of the bones is the evidence of a bone condition among the cattle, indicating that some of them suffered from some dietary deficiency, probably on account of the adverse effects of salinity upon local grazing. Fish were also probably used as a source of food.

The majority of the cattle bones belong to a domestic stock of average size and probably little different in appearance from the modern cattle of the region. But Alur and Sharma has shown that there is considerable variation in the form of the medullary cavities in some of the bones, and this, as Alur has shown in other studies of cattle from archaeological contexts, indicates that the Malvan cattle in some respects were closer to their wild ancestors than are modern cattle.

The technology of the Malvan settlement gives little cause for comment. No iron was discovered, and only a few small objects of copper. While these are enough to show that copper was a dominant material for making larger tools, it is not enough to suggest that it was particularly common. Other tools were made of stone. Varieties of chalcedony derived from the intertrappeans, were brought from farther up the Tapti valley and from the pieces cores were formed from which blades and even retouched tools were made. But the quantity of small number of artifacts discovered is poor, and the number of cores is proportionately high; indicating no doubt that while Malvan was a factory site, the finished products were used or employed elsewhere. The small number of broken rubbing stones and grindstones were made on trap, doleritic rock, or Vindhyan sandstone, all more or less locally available (from the western ghats). The many pieces of these rocks found in the excavations indicate that they were carefully collected and brought to the site for manufacture. Alur and Sharma have noted a small number of bone tools, simply made by grinding and sharpening suitable bones.

By far the most common finds were of pottery. Here three main traditions are in evidence. A red and buff ware, including a small but significant element of lustrous red ware, having much in common with the fine potting and firing traditions of Saurashtra and doubtless inherited ultimately from the Harappans, a black and red ware tradition, of typical forms and fabric but present in comparatively smaller quantities, and a coarse red, grey or brown ware tradition. Of the first ware we originally had some doubts that it might be imported from across the Gulf of Cambay, but in the excavations ample evidence has been obtained in the form of over-fired sherds, slag, etc. of local manufacture so that we are now certain of its local provenance. We shall discuss its relationship to that of other sites below. Of the place of origin of the second, whether local or outside, we have no evidence; but we assume that the third, being a dominant element in the whole group, must be of local manufacture. The coarse ware strikes a contrast to the red and buff. While the latter employ fine levigated clay, the former uses unlevigated gritty clay, perhaps even with a gritty admixture; while the latter is generally thrown on a wheel, the former is in all cases hand-made or built on a turntable. While the latter is usually well fired, in a kiln which must have had the fire separated from the kiln chamber, the former has been fired in an open kiln closer to those used by the average village potters of today. The significance of this contrast is not easy to determine, but in our view it is likely to reflect an older women's potting tradition, as against a newer men's tradition. If the latter were to be derived ultimately for the demands of Harappan craft specialisation, and hence implied division of labour between the sexes, it would form a model from which the widespread division of labour of the modern village potters derives; the men usually having exclusive control of the wheels, the women largely relying on turntable and hand techniques. A number of the terracotta tablets with ground sides appear to be potters' tools.

A few other categories of objects deserve attention. A unique and tiny terracotta figurine of a bull is mainly of interest because of the relationship it suggests to the similar objects widely known elsewhere in sites of this period. The presence of bangles of shell and terracotta are both suggestive of craft traditions whose roots go back to Harappan times, and which were no doubt imported, perhaps along with the Malvan colonists, from the direction of Saurashtra. The beads of carnelian, paste and terracotta are perhaps the only objects of actual importation discovered at the site. The small stone balls which resemble marbles and the pottery discs or hoppers may best be interpreted as pieces for games. The stone marbles, being of sandstone, must have been imported from a considerable distance. The pottery wheels with hole through centre are probably spindle whorls and provide an indication of the spinning of wool or cotton.

Such then were the main features of the life of the inhabitants of Malvan during Period I. This settlement was not alone on the Gujarat plain, and must be seen in comparison with the others which have been discovered. Nearest in point of space is Jokha, excavated by R.N. Mehta of the M.S. University, Baroda in 1960-67. There is a very close correspondence of some of the pottery between the two sites, but it seems that the fine painted wares of Malvan are less prominent at the other site, while the coarse wares are relatively more common. Whether or not the Malvan basin served as a

means for ships to come right up to the bank in early times, there can be no question of the proximity of the site to a sheltered port of the bank of the Tapti, where ships could have safely been beached and unloaded. In this respect, Malvan occupies a position similar to Bhagatrav, Mehgam and Chavanesvar, all of which are situated on or near the bank of an estuary. At present each of these sites, with the exception of Bhagatrav, appears to be seriously attenuated by erosion. None of them as far as our surface observations go, can claim to have been established in Harappan times, but all are of post-Harappan date. Therefore we have suggested that they belong to a post-Harappan estuarine culture of Gujarat. It must be expected that during Harappan times traders or prospectors from the Indus delta would have reached a mainland of Gujarat. But up to this time we have found no evidence of their establishing settlements or trading posts there. The claim has been made that the early period at Bhagatrav belongs to this period, but until the excavations of 1957 are properly published we must reserve our judgement. Certainly our visit to the site produced nothing to support the claim.

We had hoped, when we began work at Malvan, that our excavations might have provided evidence of external trade or contacts, perhaps even with the coasts of the Persian Gulf. This hope has not been fulfilled, and as we have seen such evidence of imports as we found were suggestive of more local trade, around the gulf of Cambay itself. But while this somewhat remote expectation was not forthcoming, more solid evidence, of a different kind has been available for no less significant trade and contacts nearer home. This is in the shape of the comparisons of form and painted design of our pottery with that of Saurashtra and even Sind on the one hand, and with Prakash in the interior of the Deccan plateau on the other. In our earlier note we expressed the opinion that the open Tapti valley provided a natural land route to the interior. This our excavations have well substantiated. The closest comparisons for our fine red and buff painted wares are with Rangpur. This is perhaps to be expected, since it is from the direction of the Indus Valley that the tradition came, and Rangpur is site which lies midway between the Indus and Gujarat. But the less numerous comparisons for both the fine red and buff wares and the coarse wares with Prakash appear in some ways even more significant, for they suggest a route by which these influences penetrated the interior of the peninsula. We may also comment here in passing upon the almost complete absence of characteristic forms or motifs of the Malwa and even more strangely of the Jorwe wares at Malvan.

Little can or need be said regarding Period II at Malvan. The occupation of this period serves chiefly as a disruptive element for the deposits of the earlier period, exposed and near the surface as they are. The high bank of Malvan served, during the closing centuries of the first millennium, as the scene for some sort of fugitive occupation, probably by agriculturalists, whose hearths and ash pits and black-grey pottery are dug at random into the earlier remains. We stress this because it is probable that all the deposits of this period are more or less mixed and the stratigraphical assignment of a piece to this period is therefore of little ultimate significance. In the case of recognizable materials, such as pottery, the division has probably meaning, but in the case of the animal remains it is likely that many of the pieces, assigned to Period II, are ultimately derived from Period I.

C. COMPARISONS AND CHRONOLOGY

Before the start of our work, we posed as our main problems the investigation of the southern limits of the Indus Civilization, and to find out what links may have survived in coastal Gujarat of the withering Indus influence in post-Harappan times. Our explorations between the Narmada and Daman rivers and the excavation at Malvan have failed to reveal any evidence of the mature Harappan culture in coastal Gujarat, and it is apparent that our concern should be to concentrate upon the second problem. During the life of the Indus Civilization a settlement, perhaps trading station, was established on the Gulf of Cambay at Lothal, having all the elements associated with the Indus Civilization came to an end in Saurashtra, as is evident by the change found in Lothal in Period II B. At this point we must also take into account the sequence at Rangpur where Rao's excavations have revealed a continuing process of diminution of the culture traits of the mature Harappan.

During his exploration of the Gujarat plain in 1957, S.R. Rao discovered four late Harappan sites, Mehgam on the north bank of Narmada, Telod close to the south bank, Bhagatrav on the Kim estuary and Hasanpur a few miles further south. He carried out trial excavations at Mehgam and Bhagatrav but these are still unpublished and the most authentic account of his work is that published as an appendix to his Rangpur report, and in a shorter form in *Indian Archaeology—A Review*.

A second excavation was carried out in 1966-67 by R.N. Mehta of the M.S. University, Vadodara, at Jokha in the Kamrej Taluka of District Surat, some 64 km east of Malvan. The site raised formidable difficulties for the excavator, because of its disturbed character, but it in every way demands comparison with Malvan. Of the pottery there are three main traditions, as at Malvan; a red and buff ware with strong post-Harappan affinities, including a painted element showing many identical forms and motifs; a black-and-red ware; and a hand-made pottery, in almost all respects comparable with that of Malvan. In our own collections from the site we detected an element which we identified as Lustrous Red ware and some of the illustrated forms support this view. The stone industry, as we note below is also strictly comparable to Malvan, although much richer and more prolific.

We were able to discover two further sites belonging to this complex. The first is at Chavaneshwara on the north bank of Narmada and 2 km east of Mehgam and the second is Malvan. At Chavaneshwara there are remains of fairly extensive settlement dating to the opening centuries of the Christian era. Section scraping in a rain gully brought to light a pit which yielded Lustrous red ware, painted at times with black pigment and included dishes, dishes-on-stand and high necked jars, all having clear affinities with Rangpur IIC and III. It shows considerable affinity with the Lustrous red ware from Hasanpur both in designs and shapes. Along with this pottery was a coarse gritty ware, mainly hand made and ill-fired, represented by jars. The picture presented by our work is that all these sites with the possible exception on Jokha are essentially estuarine in character. In particular Bhagatrav and Malvan share many features in their situation. All present a strong late Harappan element comparable to Rangpur IIB, IIC and III, and the nature of the fine pottery leaves little doubt

that it might have reached Gujarat from across the Gulf of Cambay. Another point is that an element of Lustrous Red Ware is found at Mehgam, Bhagatrav and Malvan and is a major ware at Hasanpura and Chavaneshwar, while at Jokha there is a small quantity indicating perhaps a decreasing late Harappan influence from Saurashtra and Kathiawad. In the light of these observations, there appears to be a certain amount of confusion in the terms to be used to describe this culture, e.g. Rao has referred to the early phase (IA) of Bhagatrav as Harappan but as far as we have been able to observe no definite Harappan objects have been found at any of these sites and we are led to doubt whether during the mature Harappan phase any Harappan settlement existed to the east of the Gulf of Cambay. We suppose, that as the culture developed contemporarily with Rangpur IIB it should rather be referred to as post-Harappan than as late harappan, as the latter term clearly denotes a late phase of the 'classic Indus Civilization' and its use here bears quite misleading implications.

The culture represented by the various sites referred to above may well be described as estuarine, since neither previous exploration nor our own to the east and inland of Chavaneshwar and Malvan has revealed any further sites beyond those of the Narmada or Tapti estuaries. Our exploration and excavation suggests that the lines of communication of the culture were primarily by sea towards the coast Saurashtra which is hardly 40 km across the Gulf of Cambay and correspondingly little or no extension of the culture in to the interior of the coast line has been found. Further our exploration on six estuaries to the south indicates that the Tapti marks its southern limit. In this light it is reasonable to suppose that these estuarine settlements were established in the first place by people coming across from Saurashtra during the centuries which followed the collapse of the Harappan Civilization there. It is not inherently improbable that the first settlement may have appeared during the Harappan period, as Rao has suggested, but evidence of this is still wanting.

But if the main comparisons for the pottery of Malvan are to be found in Saurashtra, there are also a number of suggestive elements which demand comparison with sites to the east. The coarse hand-made pottery shares many features with that of sites in the interior of the Deccan, while at Prakash a series of elements of painted pottery appear to compare more closely with that of Gujarat than with either the Malva or Jokha wares. This leads us to consider the interesting problem of the relationship of our sites to those of the Deccan plateau. The Narmada valley presents a solid barrier of hills and forests through which the river runs in an un-navigable gorge for many kilometres. It is perhaps for this reason no riverine sites are to be found even as far as the head of navigation at Tilakwada east of Chandod and we also did not find any sites between Chavaneshwar and Tilakwada. The south bank of Narmada appears to have offered better prospects for settlement and it is probable that between Ankleshwar and the Sea further sites may be discovered but east of Ankleshwar there might be no sites. In the case of the Tapti, the situation is rather different. The north bank above Mandvi offers equally dense hills and forests but the southern bank gives rise to more open country somewhat broken by small hills and covered by more scanty open forests. It is along this line that the rail and road routes from Surat to Dhulia have developed. This line probably provides one of the easiest routes into the interior of the Deccan and it is plausible that trade contact was established along

it via the Sonegadh pass linking the estuarine culture with those of Prakash, Bahal, Daimabad, etc. In this context the discovery of Jokha which lies some 40 km east of Malvan in the open country is an interesting pointer to a meeting of influences from both directions that is to say from the coast and the northern Deccan. It is quite possible that some of the contacts were also by way of the pass on the route going from Dharampur to Nasik, and indeed by some other passes in the western ghats. Having made a broad and somewhat rapid survey of the evidence available on the Gujarat plains, we wish to consider in rather more detail the relations of the Malvan culture with that of Rangpur on the one hand and Prakash on the other, since the former is regarded as a type site for Saurashtra it will serve as an indicator for the whole region.

At Rangpur the dominant pottery is a fine, well fired red ware with a metallic resonance, which is in many ways characteristic of the mature Harappan period. This pottery is found at Malvan, but in a limited quantity, and rather as the continuance of an earlier tradition than as a main characteristic. In the subsequent period, Rangpur IIB, C and III, this pottery continues, but at the same time black-and-red ware and Lustrous red ware increase until they are present as major elements in period III. The white painted black-and-red ware of Rangpur does not occur at all in Malvan. In our comparison of forms in the red ware from Malvan we found that a fair number could be compared with those of Rangpur IIA. This does not mean that any part of our occupation may be contemporary with that phase, but rather than this tradition continued thereafter at Rangpur itself no less than elsewhere. The majority of our comparisons are however with Rangpur IIC and III, comprising dishes, bowls and jars. In black-and-red ware and Lustrous red ware the comparisons are also mainly for IIC and III, and so too with the graffiti. A comparative study of the painted motifs (which are noted in detail in the footnotes) gives a similar picture. Almost equal numbers of motifs for Malvan can be found at Rangpur IIA, B, C and III. However, certain important elements, such as the stylisation of animals, are particularly reminiscent of IIC and III. In general the style of the painting is more reminiscent of that of the chalcolithic cultures than it is of the true Harappan. On the other hand our pottery has neither the fussiness of the Malva style, nor the extreme panache and deftness of the Jorwe. Our conclusion is that the pottery of Malvan suggests a cross-dating with Rangpur IIC and III, and this is probably the nearest cross dating we can achieve.

At Prakash, Thapar has distinguished in Period I five main pottery fabrics, a painted red ware of 'Malva' tradition, a painted red ware of 'Jorwe' tradition, a pale grey or black-and-grey ware, a coarse burnished ware, and a Lustrous red ware. Of these the first, third and fourth occur throughout the period, while the second and fifth occur only in the upper third, which may thus be designated as a separate sub-period. Of these five the Jorwe ware and the black-and-grey ware are significantly absent at Malvan. There is a small number of common forms within the red ware tradition, though it is doubtful whether they should properly be termed as 'Malwa' ware, and a few in the Lustrous red ware. More significant are the very large resemblances within the coarse ware particularly of the jar forms. Among painted motifs there are also a number of parallels, but they are less numerous than at Rangpur. The upshot of this comparison is that the Malvan pottery shows most common features

with that of the upper third of Period I at Prakash.

On the basis of these broad comparisons we may conclude that we would expect the occupation of Period I at Malvan to date from between *circa* 1400 and 1000 B.C.

In the hope of obtaining a more accurate date for the early occupation we submitted to the Tata Institute of Fundamental Research a small charcoal sample obtained from the rim of the ditch, in what appeared to be an early filling. The sample (TF-1084) has produced a date of 2675 ± 90 (2750 ± 95 B.P. which with calibration suggests a date of 905 - 780 B.C., and may reasonably be seen as indicating the date at which the filling of the trench has more or less complete.

The centuries with which we are concerned were ones of profound importance for the Indian sub-continent. The vacuum created by the breakdown of the unified Harappan culture zone, left different regional cultures in Saurashtra, Punjab and Rajasthan, all more or less bearing elements which they had inherited from the Indus Civilization. It was a period of considerable uncertainty and upheaval, and some regions certainly witness the arrival of new people from far beyond their regional frontiers. As a result, in such regions new syntheses of cultures took place and in many cases, it appears that long lived regional characters begin to emerge. The declining traces of Harappan influence on the material culture may or may not coincide, with a similar decline in the influence of less tangible character.

The Gujarat coastal plain, at this time, seems to have remained in considerable isolation. We may even hazard the guess that tribal people still living by the produce of their bows and arrows, and still employing Late Stone Age techniques to manufacture their arrow-heads, survived in north Gujarat and many places. The spread of settled life from Saurashtra into the mainland is still somewhat hard to explain and the settlements seems to have been only small, but what is remarkable is the way in which the Tapti valley seems to have developed as a channel through which influence could flow into the interior. In this way our tiny port of Malvan anticipates by many centuries a role that Surat has more recently played.

CHAPTER III
THE CUTTINGS
A. Layout
B. Stratigraphy
C. Structures

F.R. Allchin & Jagat Pati Joshi

CHAPTER III THE CUTTINGS

A. LAYOUT (FIGS. 4-6)

The lay out of the trenches was mainly determined by the peculiar and restricted nature of the site. The trenches comprised two series : Those on the crest of the old alluvial bank, to the south-east and those on the surface of the dried up inlet to the north-west. Of the first a further division may be made between those outside the Cactus hedge and on the very edge of the bank, and those inside the field which the Cactus hedge surrounds. In the earlier Series the orientation of the trenches was entirely dictated by the availability of the intact deposit as it was from the first evident that a major portion of the original site had been eroded away.

Excavation was undertaken in the following trenches : MVN-1 (6×4m), MVN-1A (4×4m), MVN 1B (an 'L' shaped extension 6×1m with extension 1.50 m). The first two were separated by baulk of 1.50 m and third by a baulk of 75 cm. Together these trenches comprised the entire northern bank outside the hedge. MVN 1C was a trench of 8×2.50 m running along the north-eastern of the hedge and forming an extension of MVN 1B, MVN 1D was a trench of 4 m square oriented and aligned so as to provide maximum opportunity of encountering any related structures to the east of MVN 1C. In the same alignment as MVN 1 but inside the hedge and after an interval, trench MVN2 (pl. IV) comprised sectors separated by 1 m baulks admeasuring 14×4 m MVN 2A and 2B were 4m square extensions to the south-west inside the Cactus hedge.

MVN 3, 4, 5, 6, 7 and 8 were trenches measuring 2×2m placed roughly in alignment between the main site and the modern embankment which now separates the inlet from the Tapti river. These trenches were located so as to provide a series of approximately equidistant stages between the base of the bank below the site and the sluice gate, and they were locally adjusted so as to provide different relationships to the modern drainage channels, some being nearer and some being farther away.

B. STRATIGRAPHY (FIGS. 7-8)

In MVN 1, 1A, 1B, 1C and 1D a generally similar pattern of stratigraphy is found with little or no variation. In MVN 2, 2A and 2B a related but slightly different stratification is found, the depth of the soil above the 'natural' being considerably greater. It is perhaps useful to describe this area first.

It appears that the area inside the thorn hedge has been less subject to erosion and more constantly used for agricultural purposes with the result that the soil formation has been comparatively richer and better maintained. Further if we ignore for a moment the complex of hearths, post holes, pits and scattered pottery throughout this part of the site, the stratification appears to be a natural product closely related to the classical black cotton soil of Gujarat. Layers (1) and (1A) together form the modern agricultural soil, having a loose yellowish character and containing an

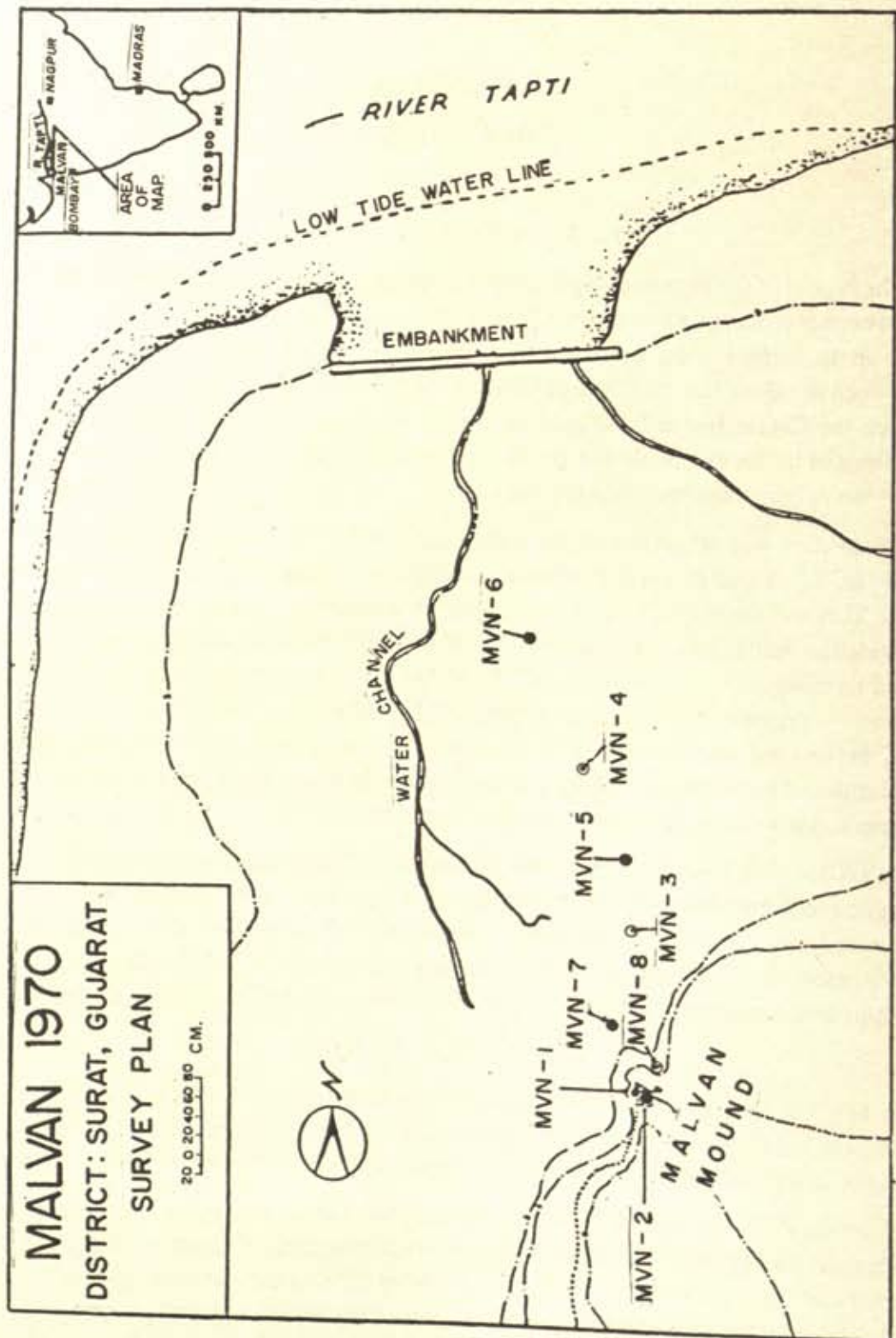
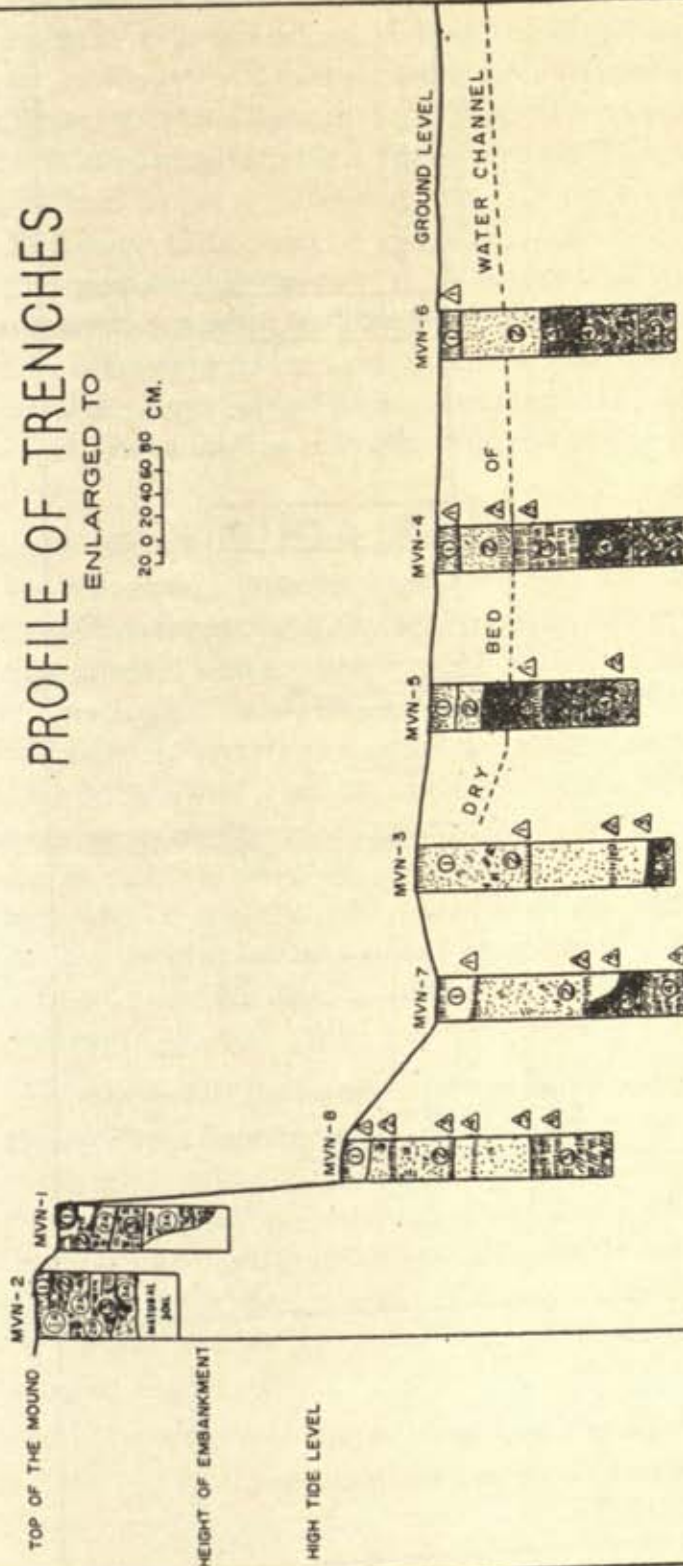


FIG. 4

PROFILE OF TRENCHES

ENLARGED TO

20 0 20 40 60 80 CM.



REFERENCES

- LAYER ① TOP SOIL
 " ② IN MVN 8, 7, 3, 5, 4, 6 - SAND
 " ③ " " 8, 3 - BROWN CLAY
 " ④ " " 7, 5 - BLACKISH CLAY
 " ⑤ " " 4, 6 - BROWN CLAY
 " ⑥ " " 6 - MOTTLED YELLOWISH CLAY
- △△ ETC. ARE FIND SPOTS OF OBJECTS DESCRIBED IN THE TEXT

FIG. 5

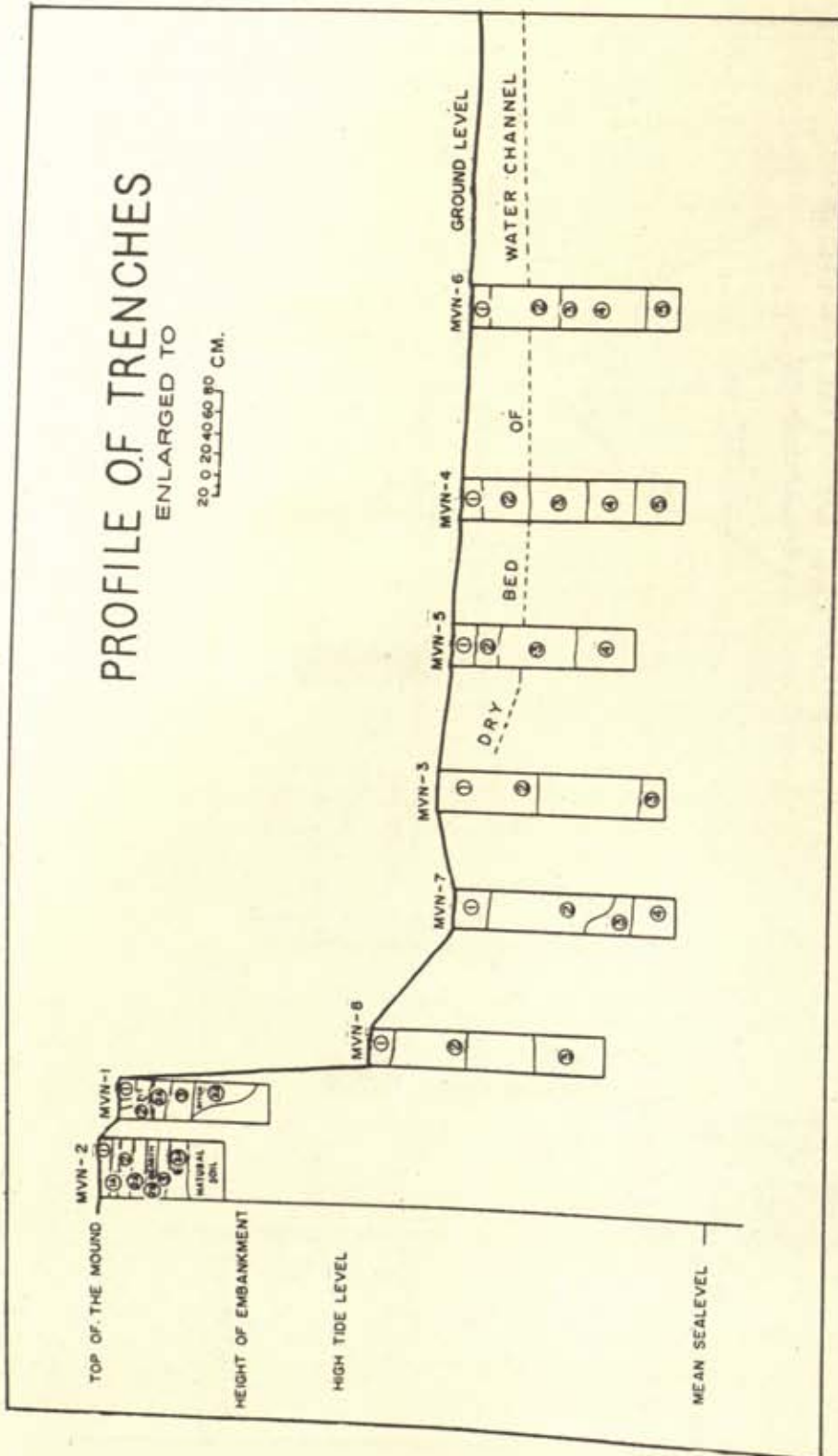


Fig. 6

THE CUTTINGS

admixture of small and worn sherds. These two layers extended to a depth of 30 cm. Layers (2), (2A) and (2B) comprise the principal occupation deposit of this area. In these layers, the soil is notably darker in colour, somewhat more compact and towards the bottom, at a depth of 70 cm. showing the first traces of kankar nodules. Layers (3) and (3A) show a marked reduction in the number and size of sherds and a corresponding increase in Kankar nodules. It seems probable that the surface of (3A) 82 cm marks the land surface at the time of the earliest occupation of the site. Layer (4) extending from 1.5 to 1.33 m comprised a brownish compact soil with calcarious nodules of increasing size and frequency. This layer contained also a very small number of sherds. bearing in mind the fissile nature of the black cotton soil, it seems reasonable to infer that the sherds found in (3A) layer and (4) found their way into these layers by the medium of such fissures. In the section of the cutting examples of fissures extending to a metre below the surface were noticed. Layer (5) from 1.33 to 1.80m was still more compact soil with a marked yellowish tinge and a maximum frequency and size of Kankar nodules.

Passing to MVN 1, 1A, 1B, 1C, the most striking difference is the absence of the thick agricultural soil encountered in the trenches inside the hedge. Here the effect of wind and water erosion has resulted in the removal of almost all the equivalent of layers (1) and (1A) of MVN-2 and has left a surface layer (1) with a maximum depth of 10 cm. Under this, except where disturbed by pits and rain gullies, layers (2) and (2A) extending to a depth of 40 cm in the outer side of the trench and 50 cm on the inner side, comprise the main occupational deposits. Layers (3) and (3A) comprise the filling of the ditch which forms the major structural feature of the area. Layer (2A) further provides the sealing for all the structural activities found below it. Layer (4) includes the loose material heaped up on either side of the ditch, and having close affinity with the natural soil which lies immediately below it. It is also to be noted that the occupational deposit of the early period lies within as little as 10 cm of the modern ground surface in this part of the site, and that due no doubt in part to its exposed position the stratification of the whole area has been seriously interfered with by more recent hearths pits, rain gullies and even graves.

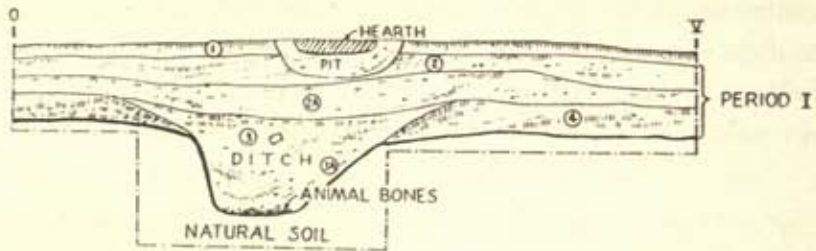
The stratigraphy of all these squares (MVN- 8, 7, 3, 5, 4, and 6) has many things in common. First, all of them contain essentially natural deposits, either alluvial or aerial, or both. None has any deposit which has resulted directly from human agency. On the other hand, all of the pits contained deposits of potsherds, slag and worked stone, as well as of a variety of shells. It must be once again emphasised that the strata encountered are essentially the result of natural agencies, and that in some cases one stratum merges into the next without any clear cut division. We describe the pits in the order of nearness to the site, MVN-8 being closest, and MVN-6 being nearest to the sluice gate and therefore the Tapti estuary.

In this square (MVN-8) we discern three strata. Layer (1) is a dusty soil with mixed sand and same humus. This layer is common to all the trenches of this series. It extends for a depth of about 20 cm and shows small fissures running down to about the same depth layer. Layer (2) is a deep

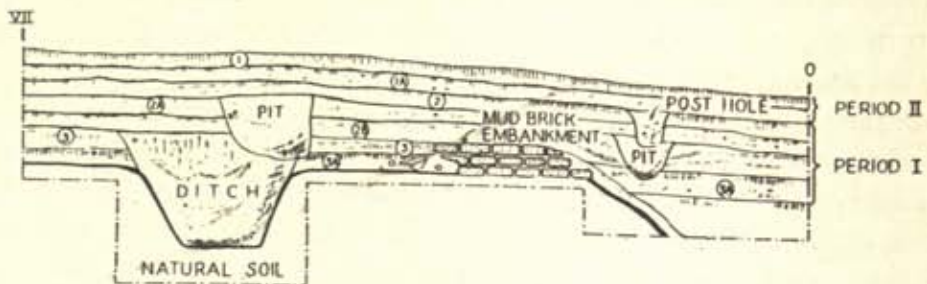
MALVAN 1970

METRES 0 1 2

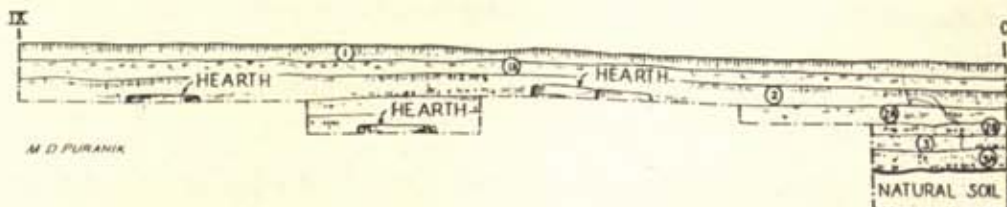
MVN. 1A
SECTION LOOKING NORTH
SECTION ON A-B



MVN. 1D
SECTION LOOKING WEST
SECTION ON C-D



MVN. 2
SECTION LOOKING SOUTH
SECTION ON E-F



M. D. PURANIK

FIG. 7

THE CUTTINGS

compact layer of sandy soil, without any clear substrata. It extends to about 160 cm below surface, developing slight irregularities of colour and texture in the lowest quarter of its depth. It contained three distinct zones of objects : at 20 cm a collection of non-descript potsherds of mixed age, some belonging to Period I, but some being probably of more recent date, a piece of slag, 2 shells; at 75 cm 10 sherds of indeterminate pottery, probably assignable to the Period I, fragments of charcoal and a jasper flake; at 95 cm 10 shells. Layer (3) occurred beneath a clear dividing line, and was excavated down to 230 cm. It comprised a patchy brown soil, more clayey and softer than Layer (2), and perhaps indicative of submarine conditions. This layer produced crystals of quartz at depth of 170 cm of charcoal at depth below 175 cm fragments of laterite or red - earthy haematite at 180 cm and a small fish tooth at around the same level.

In this trench (MVN-7), Layer (2) was again a sandy soil, similar in colour and content to the corresponding layer of the preceding trench, but distinguished from it by its laminated structure which extended through out its whole depth, i.e. to c. 160 cm. These laminations were undulating over much of the area and often as thick as 1cm. The layer contained two main zones from which shells or objects were recovered. At a depth of 30 cm 10 shells, and at 125 cm fragments of charcoal, 8 shells, 3 sherds of dark grey pottery, probably overfired and with traces of sand burnish on one.

Layer (3) was a nearly black sticky soil which had evidently a rich organic content and which shrank rapidly upon exposure to the air. Its upper surface was irregular and in one face dipped by about 30 cms. The layer continued to around 165 cm depth. It produced a quantity of lumps of laterite, fragments of charcoal, a piece of slag, 4 sherds, three of black-grey wind-and sand-worn pottery, and one over-fired, and 12 shells.

Layer (4) extended down to the lowest level reached in this trench (220 cm). It consisted of a brown sticky soil, superficially at least resembling Layer (3) of MVN 8. It produced a number of finds from the depth of 205 cm including a piece of laterite, 1 blade core of chalcedony, 3 flakes of chalcedony, one banded agate pebble, 1 piece of quartz and 10 shells.

Layer (2) of MVN-3 consisted of a sandy soil in almost all respects similar to that of the corresponding layer of MVN-7, but with much more regular wave line laminations in the sand. These on average occurred at a frequency of around 10 to every 6 cm. The layer extended down to a depth of 2 m and produced finds at three levels; at around 96 cm, 3 sherds of black grey pottery, one overfired, a piece of slag, another fragment of fused pottery, a piece of stone and a *sankh* shell. At 170 cm, occurred 4 fragments of slag, 3 sherds of dark grey pottery, 1 piece of granite, 3 pieces of chalcedony and 3 shells. At about 200 cm were found 3 pieces of banded agate and 4 shells. At 2 m the soil became extremely wet, although the water table had not yet been reached.

The strata enumerated in this trench (MVN-5) were markedly different from those we have so far discussed. Beneath the modern top soil, layer (2) was a light brown sandy soil resembling layer (2) of MVN-7 and 3, it showed, however, only slight evidence of the wave like laminations noticed

MALVAN 1970
DISTRICT: SURAT, GUJARAT

PLAN

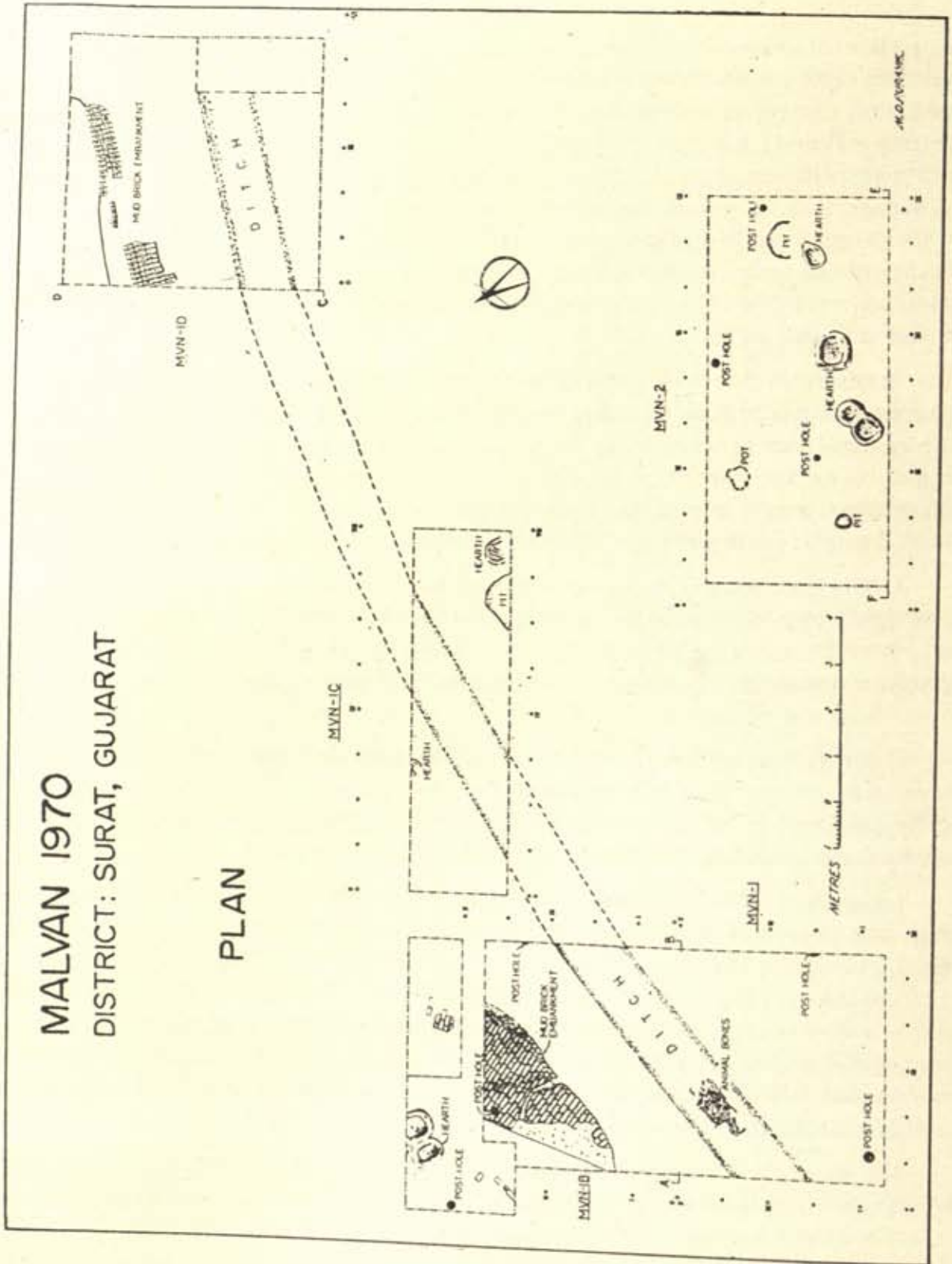


FIG. 8

in these trenches. The layer extended down to 45-50 cm, and its lower margin was undulating. Beneath it was a dark, nearly black, sticky deposit which dried out with considerable cracks and much salt efflorescence. This layer resembled (3) of MVN 7. Beneath it at a depth of around 120 cm was a light brown sandy deposit extending down to the bottom of the trench (180 cm). Only two zones of finds occurred: in layer (3), at a depth of 85 cm, 2 pieces of slag, together with 6 shells; and in layer (4) at a depth of 160 cm, 7 shells.

This trench (MVN-4) also shows certain distinctive features (pl. V). Layer (2) consists of a sandy clay, pale at the top but gradually darkening towards its base (at 65 cm). Two groups of finds occurred, on the top of the layer (at 20 cm) a blade core of a cream coloured chert, 2 prepared stones (chalcedony), 2 used pebbles, 1 piece of slag, 2 sherds of red ware, 2 stones, one probably haematite; and at 55 cm a typical hand-made rim of Period I, 1 red sherd, 1 chalcedony flake, 1 agate pebble, 1 agate flake, 1 tiny core and 3 flakes of agate, 1 core of jasper, 1 fragment of bone, 1 nodule of laterite or haematite and 8 shells. Layer (3) consisted of a light brown sand, recalling layer (2) of MVN 3, and extending down to 120 cm it contained a zone of finds at around 75 cm including fragments of earthy haematite and several dozen shells.

Layer (4) was of very dark sticky material flecked in places with tiny nodules of rust coloured iron. It extended down to 170 cm and no finds were recorded. Beneath it layer (5) gradually gave way to a lighter brown with occasional areas of pale yellow colour. This layer also produced no finds.

The sequence in this trench (MVN-6) combined features which are found in several of the others. At 20 cm at the base of the topsoil were found 1 rounded pebble, 5 pieces of slag, 1 red sherd, 2 black overfired sherds, 1 tiny core and 1 core showing evidence of exposure to fire. No other finds occurred in the trench. Layer (2) was a brown alluvial clay with a tendency to laminate into thin striations. Below it layer (3) was a thin deposit of a light yellowish clay, extending from 85-95 cm, and into layer (4) in the form of elongated tubes. Layer (4) consisted of a black sticky alluvial deposit with patches of reddish colour, its base was markedly uneven, ranging between 150-170 cm. Under it lay 5 cm a brown sandy clay, drier and less sticky than its predecessor, and in general resembling layer (3) of MVN-4.

C. STRUCTURES

The latest structural activities in MVN-1 are visible from the surface of the ground although probably they were several centuries anterior to the excavation. In so far as all the hearths and pits in this area produced a uniform pottery we have assigned them to Period II. These activities evidently took place after a long interval during which there is no trace of any occupation of the mound. The earlier Period I produced all the remaining evidences of structural activity.

STRUCTURES OF PERIOD I

The principal feature of Period I was the Ditch which ran approximately due east-west across the northernmost part of the site and which was traced for 40 m in length. The ditch was not quite regular in either cutting or in alignment. It has an average width of 1.50 to 1.60 m at the top and 50 cm at the bottom. The average depth is 1.10 m. The cutting of the ditch is surprisingly uniform although from time to time the sides have been somewhat undercut. The bottom sometimes concave and sometimes flat (pl. VI). At a number of places the loose spoil from the digging is visible, particularly in the southern side, to an extent of 1.50 m and having a height of 60 cm. A special feature on the northern side of the ditch is a spoil heap placed at a distance of some 2.50 - 3 m from the edge. This area has been subjected to later pit activity and it is not clear whether the original spoil heap may have extended further towards the ditch on this side. However, certain patches in the section looking south-west in MVN-1B seem to indicate that the heap had been cut back at some stage at this point in order to make way for the brick structures which covered it.

BRICK STRUCTURE

Over the heaped up spoil in MVN-1B and 1A a mud-brick structure was encountered following the contour of the heap and measuring 4 m \times 3.90 m east-to-west along the line of the ditch. The structure has been eaten away on almost every side by erosion, pits and a rain gully. It appears that this structure, whatever its original form and purpose may have been, lying on the north of the ditch is all that now remains of the structural complex of Period I at Malvan. The bricks used in the construction measure 9 \times 27 \times 17 cm. This structure, along with the ditch, was sealed by layer (2A). The original form cannot have been insignificant as no less than 6 to 7 courses of brickwork were traced (pls. VII-VIII).

In MVN-1D a similar and obviously related mud brick structure was discovered (pl. IX). Once again running parallel to the ditch. The ditch at this point appears to be widening towards the eastern end of the trench. There is a suggestion which unfortunately time did not allow us to investigate that it was about to take a fairly sharp turn towards the north. The present ground level falls away rapidly in this direction and excavation revealed that this decline was followed anciently by the similar brick structure. The ditch appears to have been dug from the surface of layer (3A) and layer (3) represents a spread of spoil on the south side of the ditch, and on the north side at a distance of 1.25 m from the lip of the ditch this spoil has been cut into to provide the backing for the brick embankment which was traced to a depth of 65 cm and 5-6 courses. The size of the bricks is similar to those of 1A or 1B. The width of the embankment on this side was 3.30 m, it must be presumed that this embankment was intended to provide protection against floods, although mud-brick cannot have been a very effective means for such protection.

In 1D, northern extension, no habitational activity was in evidence, apart from a large pit of

the mediaeval times cut from the surface.

The northern side of the mound, as must have already become evident from what has been described so far, has been the subject of intense erosion and there is no surviving evidence that habitation ever existed to the north of the ditch-embankment complex. Thus it seems the scanty evidence of hearths and post-holes on the southern side and the scatter of pottery which continues to several hundred metres in the adjoining field provide evidence for the principal area of occupation.

It was also observed that generally the smaller pits were associated with hearths.

POSTHOLES, HEARTHES AND PITS

Over much of the site the only traces of human occupation were in the form of post-holes, hearths and pits, those of the earlier period being situated almost exclusively on the south of the main ditch.

Post-hole no. 1, 2, 3, 4 and 5 in MVN-1 and 1A were found cut into layer (4) and sealed by (2A). Two were dug into the spoil heap of the ditch and appear to follow its alignment. Post-hole no. 5 was associated with the brick structure. In MVN-1 two further post-holes were discovered, dating from the end of the early period of occupation.

No hearths attributable to Period I were found in MVN-1. In MVN-2, however, several such hearths occurred. The latest in point of time was in layer (2), sealed by Layer (1A). This took the form of a double hearth, each part with roundish form and slightly raised sides of burnt clay. A second and earlier hearth was found in (2A), sealed by (2). This was somewhat larger than the two just mentioned and was filled with loose ash and sherds to a depth of about 40 cm. A fourth and smaller hearth (pl.X) has also sealed by layer (2A).

Among pits of the earlier period mention may be made of that in MVN-1D, cut in (2A) and sealed by (2). In this quantities of burnt wattle and daub were discovered, along with a number of overfired sherds and pieces of pottery slag of Period I. Another interesting pit was found in MVN-II, cut in (3A) and sealed by (3). This contained mainly ash and sherds, including broken pieces of a complete vessel. In MVN-1B a further pit has been found sealed by the brick structure and yielded characteristic pottery of Period I.

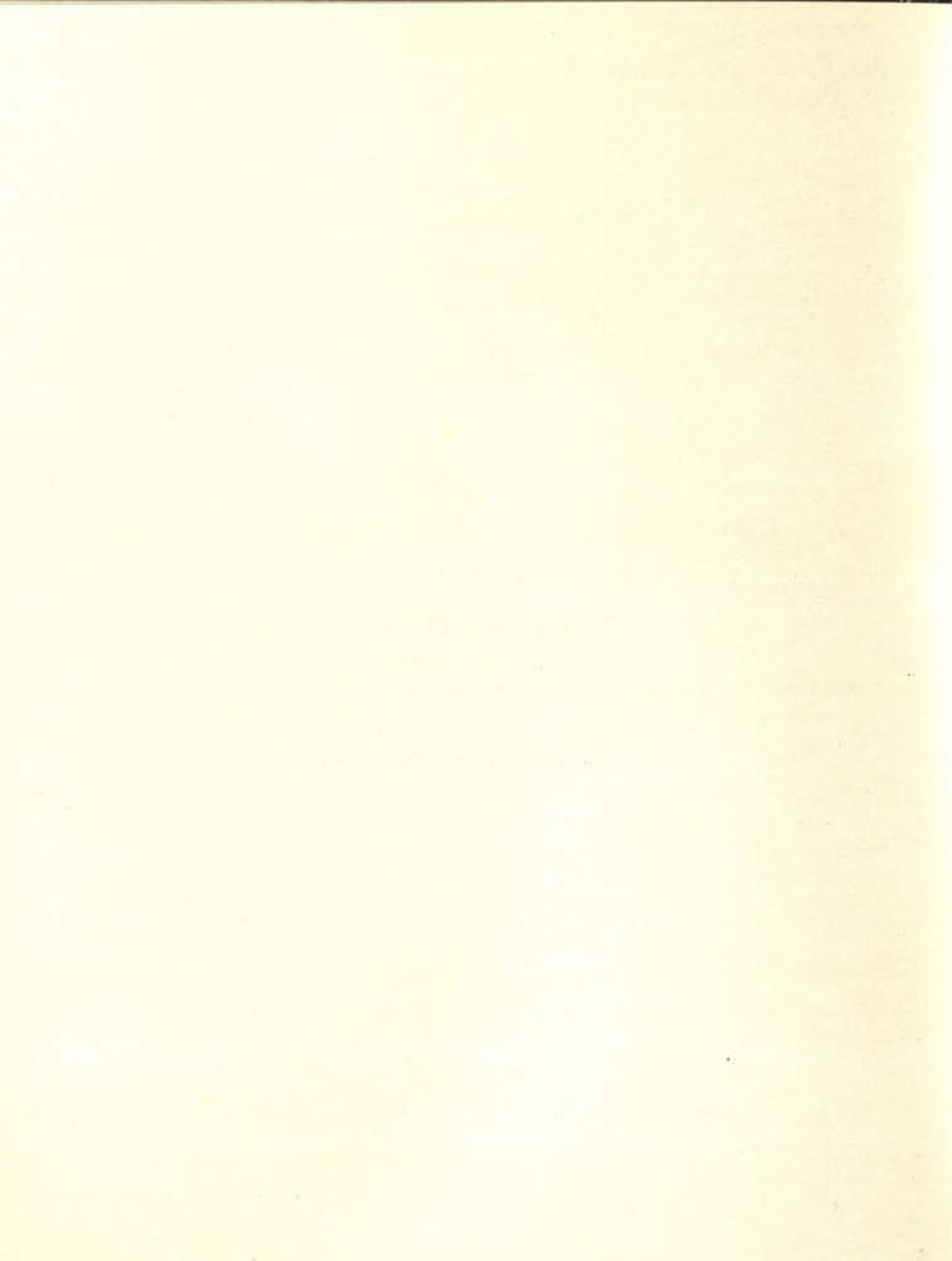
CHAPTER IV

THE POTTERY

A. Pottery of Period I

B. Pottery of Period II

F.R. Allchin & Jagat Pati Joshi



CHAPTER IV

THE POTTERY

The pottery from Malvan falls into two major groups representing the two principal periods of occupation at the site. While the bulk of pottery recovered from the levels of Period I is essentially associated with the Chalcolithic occupation, the pottery of Period II available from the upper levels of the site is characteristically representing a temporary occupation during later times.

A. POTTERY OF PERIOD I

The pottery of Period I can be subdivided into six major fabrics namely Red Ware; Buff Ware; Lustrous Red Ware; Black and red Ware; coarse Ware; Grey Ware and Black slipped ware. It is noteworthy that white painted black and red ware is totally absent from the assemblage, nor is the white painted grey ware of Prakash represented. While, some of these wares show similarity with the pottery of the comparable period found at some of the excavated sites in Saurashtra, others show affinities with the pottery of the contemporary chalcolithic cultures of northern Deccan and Kurnool area and thus provide a point where diffusion of cultural traits is high-lighted by the occurrence of different ceramic traditions.

1. RED WARE

Under this category a fine well-fired red ware with a resonant ring treated with a dull or slight red slip is present. The vessels both in thin and thick fabric in this ware are made of well-levigated clay, well potted and fired. No doubt some vessels are slightly coarser but not sufficiently so to warrant separate treatment. The quantities of over fired sherds turning to molten slag and of numbers of pieces of similar slag clearly indicate local manufacture of pottery on an appreciable scale. The main types represented are dishes, dishes-on-stand, jars, bowls, basins, miniature jars, comparable to types from Rangpur IIB, IIC and III. There is a complete absence of beakers and goblets (both plain and button based). Even perforated jars are very few. This class of pottery is frequently painted with black on dull or light red to brownish surface with a design repertoire which is discussed later. The ware as such gives an impression that technologically it stands out of the main Harappan tradition and lacks its classical nature both in typology and design repertoire. The mere continuance of some shapes cannot suffice to give it a Harappan label. The entire impression is of a devolved variety of the red ware so well known from Kathiawar and Saurashtra and other chalcolithic sites.

FIG. 9

1. Bowl with rim, flat on top, externally beaded with a sharp groove below, in medium fabric. From a mid-level of Period I.
2. Bowl with a rim, flat on top, externally beaded, having slight carinated profile, in medium fabric. From a mid-level of Period I.

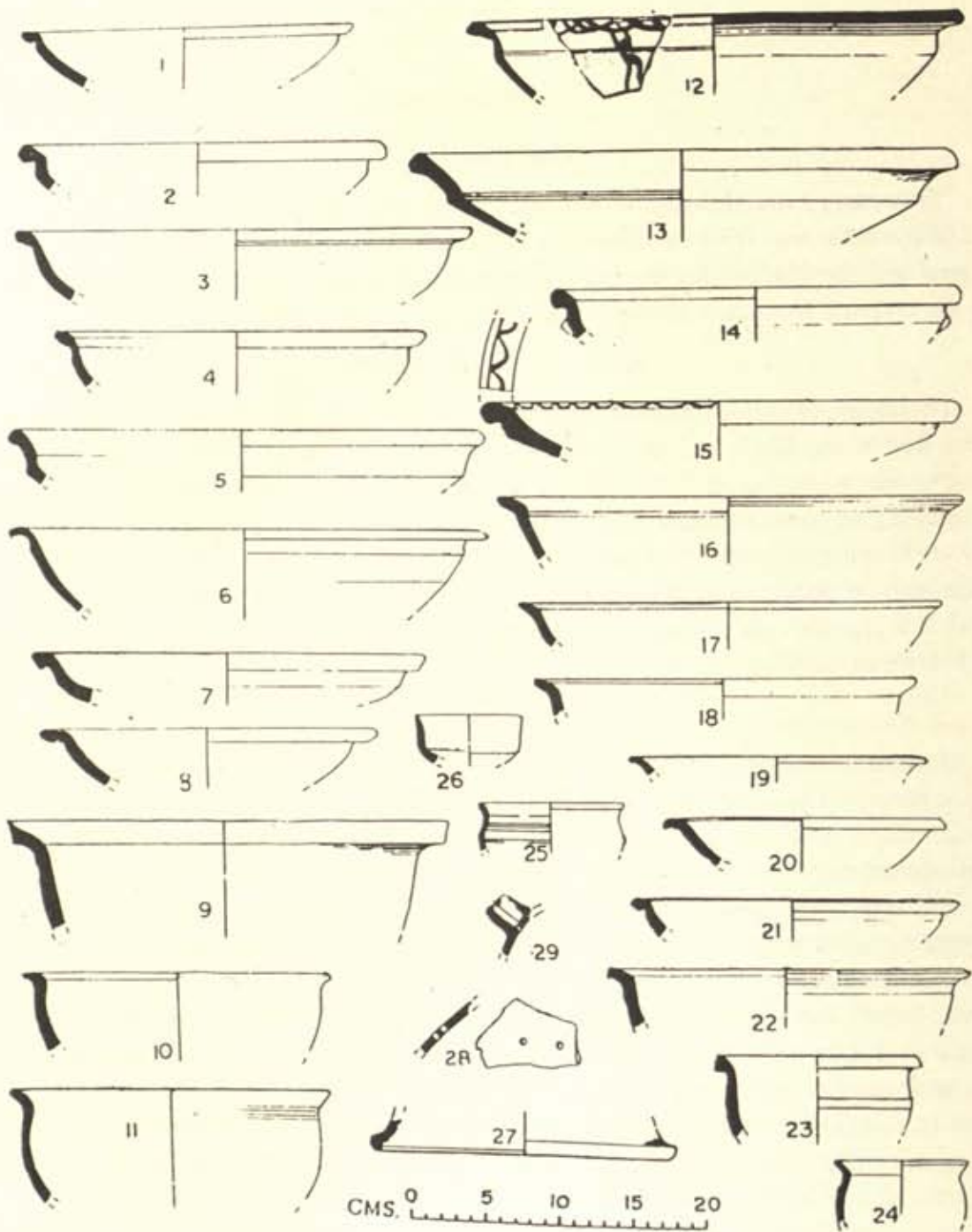


FIG. 9 : Red ware, Period I

3. Bowl with a wide mouth and bud shaped rim in medium fabric. From an early level of Period I.
4. Bowl with a bud shaped rim in medium fabric. From a mid-level of Period I.
5. Dish with a splayed rim and slightly carinated shoulder in thick fabric. From an upper level of Period I.¹
6. Deep bowl in thin fabric with a beaded and splayed rim. From an early level of Period I.
7. Shallow bowl with a splayed rim and slight carinated body in thick fabric. From an early level of Period I.
8. Bowl with a sharply projected bud shaped rim in medium fabric. From a mid-level of Period.
9. Large basin with an out-turned rim in thick fabric from a mid-level of Period I.
10. Deep bowl with a projecting rim, flat on the top. From mid-level of Period I.
11. Deep bowl with slightly everted rim, having concave-convex profile, in medium fabric from an upper level of Period I.
12. Dish with a projecting beaked rim and carinated shoulder, in thin fabric painted black-over-red intersecting loops and a stylized bucranium design from an early level of Period I.
13. Dish with a splayed beaded rim and carinated shoulder in thick fabric. From an early level of Period I.²
14. Dish with a beaded rim and sharply carinated shoulder, in medium fabric. From an upper level of Period I.³
15. Dish with a projecting beaded rim and carinated shoulder, in thick fabric painted black over red on the rim with running loops. From an early level of Period I.
16. Bowl with an everted rim in medium fabric. From an early level of Period I.
17. Bowl with an everted rim in medium fabric. From an early level of Period I.
18. Bowl with splayed rim in medium fabric. From a late level of Period I.

¹S.R. Rao, Excavation at Rangpur and other explorations in Gujarat, *Ancient India*, nos. 18 and 19 (1963), fig. 35, no. 57.; B.K. Thapar, 'Prakash, 1955 : a Chalcolithic site in the Tapti valley' *Ancient India*, nos. 20 and 21 (1967), fig.9, no. 31.

²S.R. Rao, *op. cit.*, fig. 38, no. 38.

³S.R. Rao, *op. cit.*, fig. 23, no. 67d.

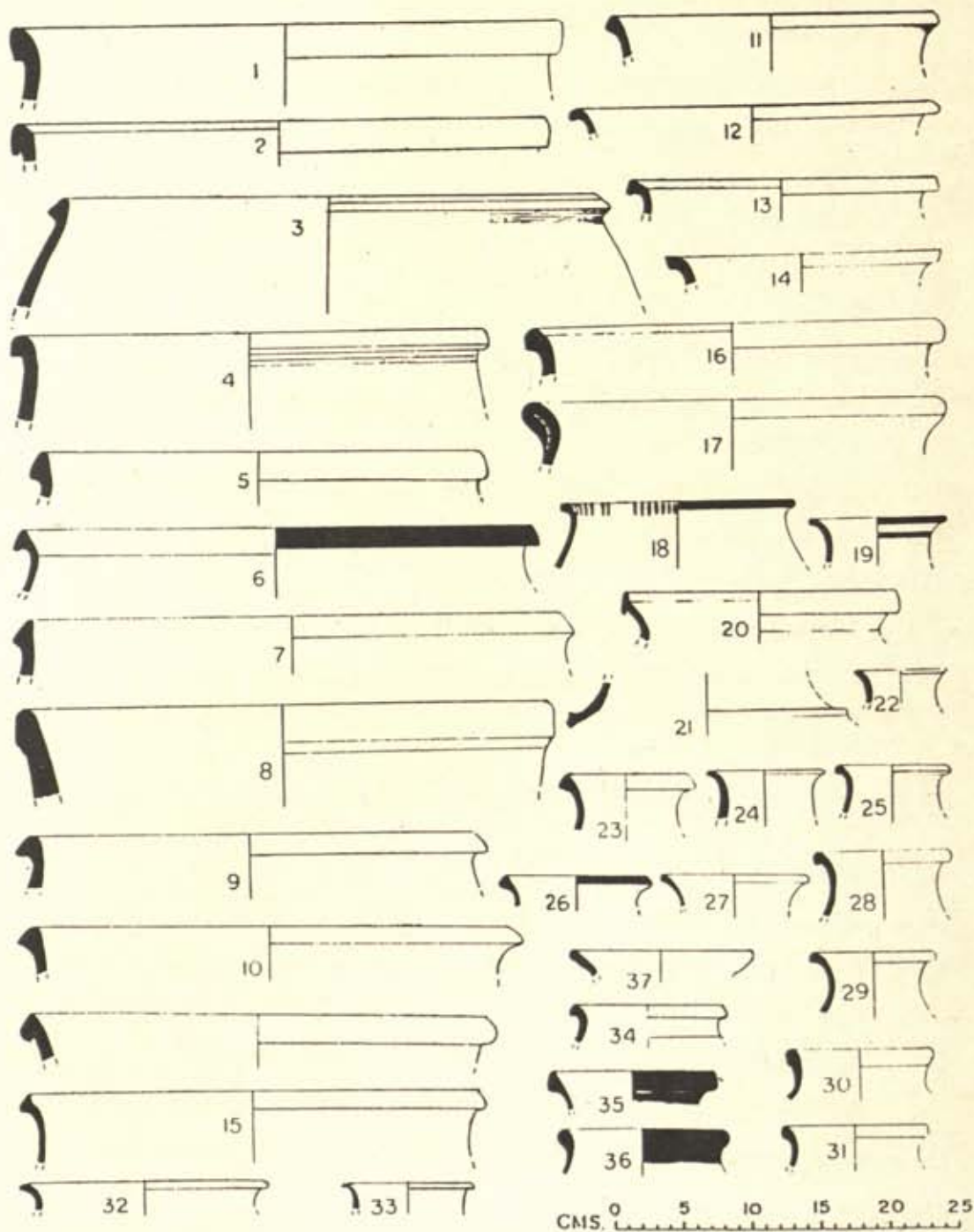


FIG. 10: Red ware, Period I

19. Bowl with a everted and beaked rim in thin fabric from a mid-level of Period I.
20. Bowl with a projecting rim in medium fabric. From a mid-level of Period I.
21. Bowl with a rim having flat top and externally beaded ending in groove, in medium fabric. From a mid-level of Period I.
22. Basin with a projecting beaked rim in medium fabric. From a mid-level of Period I.
23. Bowl with a splayed beaked rim from an upper level of Period I.
24. Bowl with a projecting rim in thin fabric from an mid-level of Period I.
25. Bowl with projecting rim in thin fabric. From a mid-level of Period I.⁴
26. Miniature bowl with everted rim and blunt carinated shoulder in thin fabric. From an early level of Period I.
27. Part of the base of a dish-on-stand in medium fabric from an early level of Period I.
28. Fragment of a perforated jar in thin fabric. From an early level of Period I.
29. Fragment of a spout in thin fabric from an upper level of Period I.

FIG. 10

1. Jar with a beaded rim in medium fabric. From an upper level of Period I.⁵
2. Jar with a beaded rim and straight sides in medium fabric from an upper level of Period I.
3. Jar with beaked rim bulbous body in medium fabric from a mid-level of Period I.⁶
4. Jar with a clubbed rim in medium fabric. From an early level of Period I.
5. Jar with beaked rim in medium fabric. From an upper level of Period I.⁷
6. Jar with a nail headed rim painted with a thick horizontal band in a comparatively thin fabric. From an early level of Period I.
7. Jar with a beaked rim in medium fabric from a mid-level of Period I.
8. Jar with a beaded rim in thick fabric. From an upper level of Period I.
9. Jar with a projecting beaked rim in medium fabric. From a late level of Period I.

⁴S.R. Rao, *op. cit.*, fig. 25, no. 121.

⁵S.R. Rao, *op. cit.*, fig. 27, no. 12; R.N. Mehta, *Excavation at Jokha* (1971), Fig. 9, no. 7.

⁶S.R. Rao, *op. cit.*, fig. 34, no. 22; R.N. Mehta, *op. cit.*, fig. 10, no. 15.

⁷R.N. Mehta, *op. cit.*, fig. 9, no. 8.

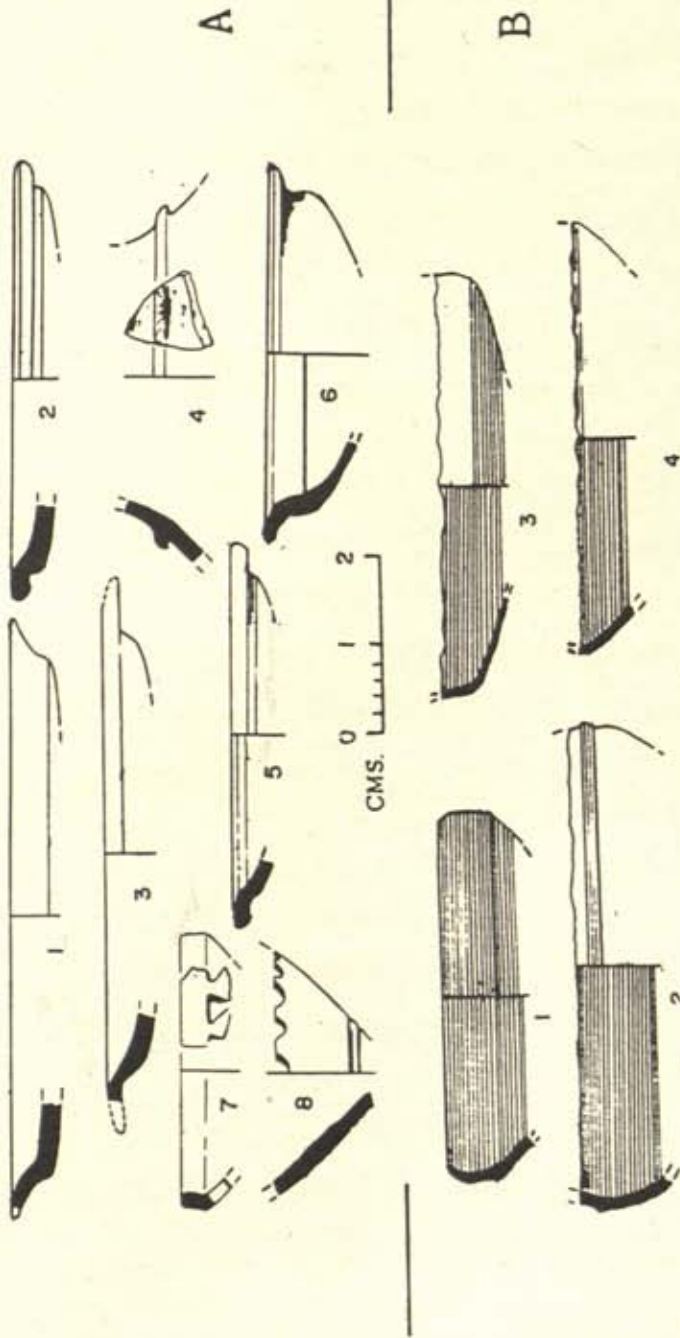


FIG. 11 : Red and black and red wares, Period I

10. Jar with a beaked rim in medium fabric. From a late level of period I.
11. Jar with a beaded rim in thin fabric. From an early level of Period I.⁸
12. Jar with a beaded rim and flaring neck in thin fabric. From a late level of Period I.⁹
13. Jar with beaked rim in medium fabric. From a mid-level of Period I.
14. Jar with a flaring obliquely cut rim. From a late level of Period I.¹⁰
15. Jar with a nail headed rim and straight neck in thin fabric. From a mid-level of Period I.
16. Jar with a beaded rim in thick fabric. From a late level of Period I.¹¹
17. Jar with a beaded rim in thick buff ware having a roughly added lug in the concavity of the rim. From an early level of Period I.
18. Jar in thin fabric with a flaring rim painted with vertical lines on inner side and a horizontal band on the exterior. From an early level of Period I.
19. Jar with a high neck and featureless rim having a chocolate slip and two horizontal bands in thin fabric. From an early level of Period I.
20. Jar with a nail headed rim in thin fabric. From an early level of Period I.
21. Jar with a cordoned shoulder, the rim is missing, in medium fabric. From mid-level of Period I.
22. Jar with an everted rim in thin fabric. From a late level of Period I.¹²
23. Jar with a high neck and beaded rim in medium fabric. From a mid-level of Period I.
24. Jar with a high neck and everted rim in thin fabric. From a mid-level of Period I.
25. Jar with a beaded rim in thin fabric. From a mid-level of Period I.¹³
26. Jar with a beaded rim, having a painted horizontal band in thin fabric. From a mid-level of Period I¹⁴

⁸R.N. Mehta, *op. cit.*, fig. 10, no. 10.

⁹R.N. Mehta, *op. cit.*, fig. 10, no. 17.

¹⁰R.N. Mehta, *op. cit.*, fig. 9, no. 6.

¹¹B. K. Thapar, *op. cit.*, fig. 9, no. 25.

¹²S. R. Rao, *op. cit.*, fig. 39, no. 51; R. N. Mehta, *op. cit.*, fig. 11, no. 41.

¹³S. R. Rao, *op. cit.*, fig. 30, no. 54; fig. 33, no. 3.

¹⁴S. R. Rao, *op. cit.*, fig. 33, no. 1.

27. Jar with an everted rim in thin fabric. From a mid-level of Period I.
28. Jar with a high neck and beaded rim in thin fabric from mid-level of Period I.¹⁵
29. Jar with a high neck and beaded rim in thin fabric from a late level of Period I.¹⁶
30. Jar with beaded rim in medium fabric, from an early level of Period I.
31. Jar with a beaded rim in thin fabric, from a late level of Period I.
32. Jar with a beaded rim in thin fabric, from a late level of Period I.
33. Jar with an everted rim in very thin fabric, from a mid-level of Period I.
34. Jar with a beaded rim in medium fabric from a late level of Period I.
35. Jar with a beaded rim in medium fabric with broad painted band on outside. From mid-level of Period I.
36. Jar with a beaded rim in medium fabric with broad painted band on outside from a mid-level of Period I.¹⁷
37. Jar with everted rim in medium fabric. From a late level of Period I.

FIG. 11A

1. Dish in red ware of thick fabric with a projecting rim and carinated shoulder. Oxidized core. Red slipped. From a late level of Period I.¹⁸
2. Upper part of a dish on stand in red ware of thick fabric with a beaded and projecting rim. Oxidized core. Red slipped. From a mid-level of Period I.
3. Dish with a projecting rim in medium fabric in red ware slipped. Oxidized red core. From a mid-level of Period I.¹⁹
4. Stem of the stand of a dish-on-stand, with an applique ledge, in red ware thick fabric. Oxidized red core. From an early level of Period I.
5. Dish with a projected rim and blunt carinated shoulder, red ware of medium fabric. Oxidized red core. From a mid-level of Period I.
6. Deep bowl with an outcurved projecting rim in red ware of medium fabric. Oxidized red core. From a mid-level of Period I.

¹⁵S.R. Rao, *op. cit.*, fig. 18, nos. 17 and 17A, fig. 39, no. 70.

¹⁶R.N. Mehta, *op. cit.*, fig. 11, no. 43.

¹⁷S.R. Rao, *op. cit.*, fig. 39, no. 271b.

¹⁸S.R. Rao, *op. cit.*, fig. 22, no. 67b.

¹⁹S.R. Rao, Rangpur, fig. 22, no. 67.

7. Bowl with incurved rim and carinated shoulder having a row of triangular perforations below the rim, in thick fabric. Chocolate slipped and burnished inside and out. Oxidized red core. From an early level of Period I.
8. Lower portion of bowl having a row of perforations towards the top, in thick fabric, chocolate slipped and burnished inside and out. Oxidized red core. From a late level of Period I.

2. BLACK AND RED WARE

Black and red ware, produced by the inverted firing technique, consists of convex sided bowls, dishes and jars. The ware has a characteristic burnish. The percentage of black and red ware was small, and there are few forms represented (fig. 11B).

1. Bowl with incurved rim and carinated shoulder in black and red ware. Unoxidized black core. From a mid-level of Period I.²⁰
2. Side of a dish with straight sides and carinated shoulder. Semi-oxidized core. Chocolate red and black colour. From an early level of Period I.
3. Bowl fragment with incurved rim and carinated shoulder. Semi-oxidized core. from a mid-level of Period I.
4. Bowl with incurved rim (?), in black and red ware with semi-oxidized red core. From a late level of Period I.²¹

3. BUFF WARE

The Buff ware is generally associated with red ware in the late Harappan and post Harappan sites in Saurashtra. Its appearance at Malvan is well within the context of the culture milieu. The ware is generally sturdy. The colour may be due to the presence of salt in the clay. The ware is mainly represented by dishes, dishes-on-stand and big jars. Sometimes the vessels are painted in thick brownish to red colour with a few examples bearing a polychrome effect.

4. COARSE WARE

A large amount of pottery of this class has been recovered which is mainly hand made, ill fired often with a white gritty core and dirty red to chocolate in colour. In all respects it contrasts strongly with the levigated clay and wheel throwing of the red and buff wares. A proportion of the sherds was brownish. The surface is often burnished, and the impressions of husks of grains are sometimes observed. A few sherds have scored oblique strokes, finger nail impressions, running bands of applique loops. The hand made jars and bowls are reminiscent of those of the Jorwe-Nevasa complex.

²⁰S.R. Rao, *op. cit.*, fig. 44, No. 122.

²¹S.R. Rao, *op. cit.*, fig. 44, Nos. 120.

However, a perforated vessel in chocolate ware, a spouted vessel and quite a few crude bowls are worth mention. Quite a few shapes in this ware are comparable to those in a similar ware from Prakash I.²²

FIG. 12

1. Jar with an everted rim and globular body. Hand made, of coarse medium fabric showing an unoxidized blackish core. Surface treated with a dull red wash. From a late level of Period I.
2. Shoulder of a jar of coarse medium fabric, having a chocolate-red surface wash, and burnished surface. The lower part has been scored with diagonal strokes beneath the burnish. There is an incised graffito which is described below. From the earliest level of Period I.
3. Jar with an outcurved featureless rim and concave neck. Hand made, of coarse medium fabric showing an unoxidized black core and white granulated surface. From an early level of Period I.
4. Jar with an outcurved featureless rim, concave neck and globular body. Hand made, of coarse medium fabric showing an unoxidized black core and white granulated surface, well smoothed externally. From an early level of Period I.
5. Jar with an outcurved featureless rim, concave neck and globular body. Hand made, of coarse medium fabric, showing an unoxidized black core. There are a few white granulates visible. Surface treated with a dull brownish wash. From a late level of Period I.
6. Jar with an outcurved featureless rim, concave neck and globular body. Hand made, of coarse medium fabric, well smoothed inside showing an unoxidized black core. From an early level of Period I.
7. Jar with an outcurved featureless rim and concave neck having single row running incised nail pattern on the lip. Of coarse, medium fabric showing an unoxidized black core. From a mid-level of Period I.
8. Jar with concave neck and an outcurved featureless rim, having single row of incised nail pattern. Of coarse medium fabric showing an unoxidized blackish core. Surface

²²We have not thought it necessary to make detailed comparisons of forms with the related coarse wares from other sites, since at most they would signify what is already apparent, that the ware in each case was made by a similar or closely related set of techniques. Nonetheless it is evident that a great number of the forms of coarse ware from Malvan occur in Prakash I; that among the small number of illustrated examples from Rangpur there are similar correspondences; that an almost identical fabric occurs at Jokha; and that many other correspondences of form may be found at Ahar, Navdatoli (in the Malwa ware), and even in the coarse wares of the Jorwe sites, though in similar number.

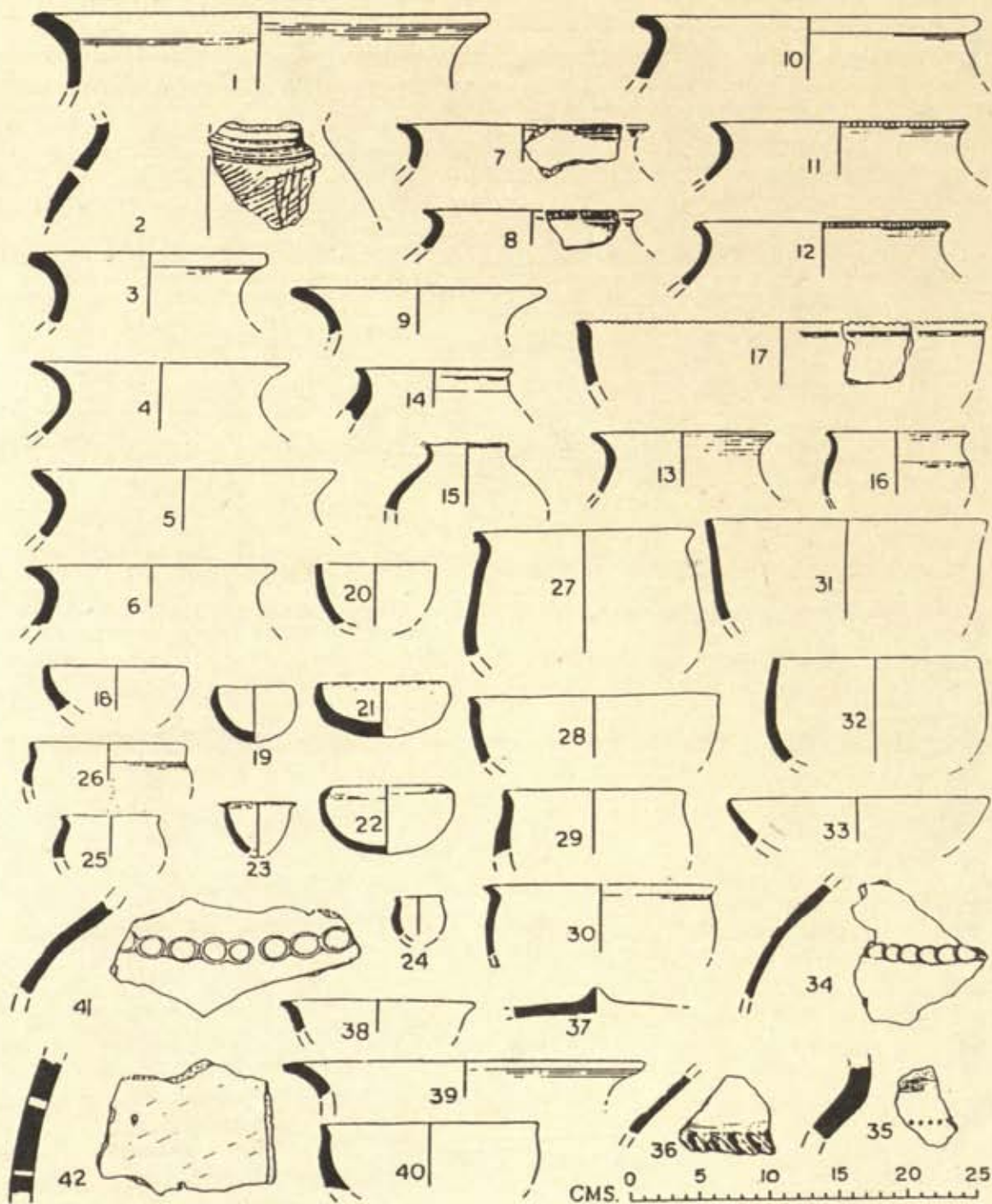


FIG. 12 : Coarse red ware, Period I

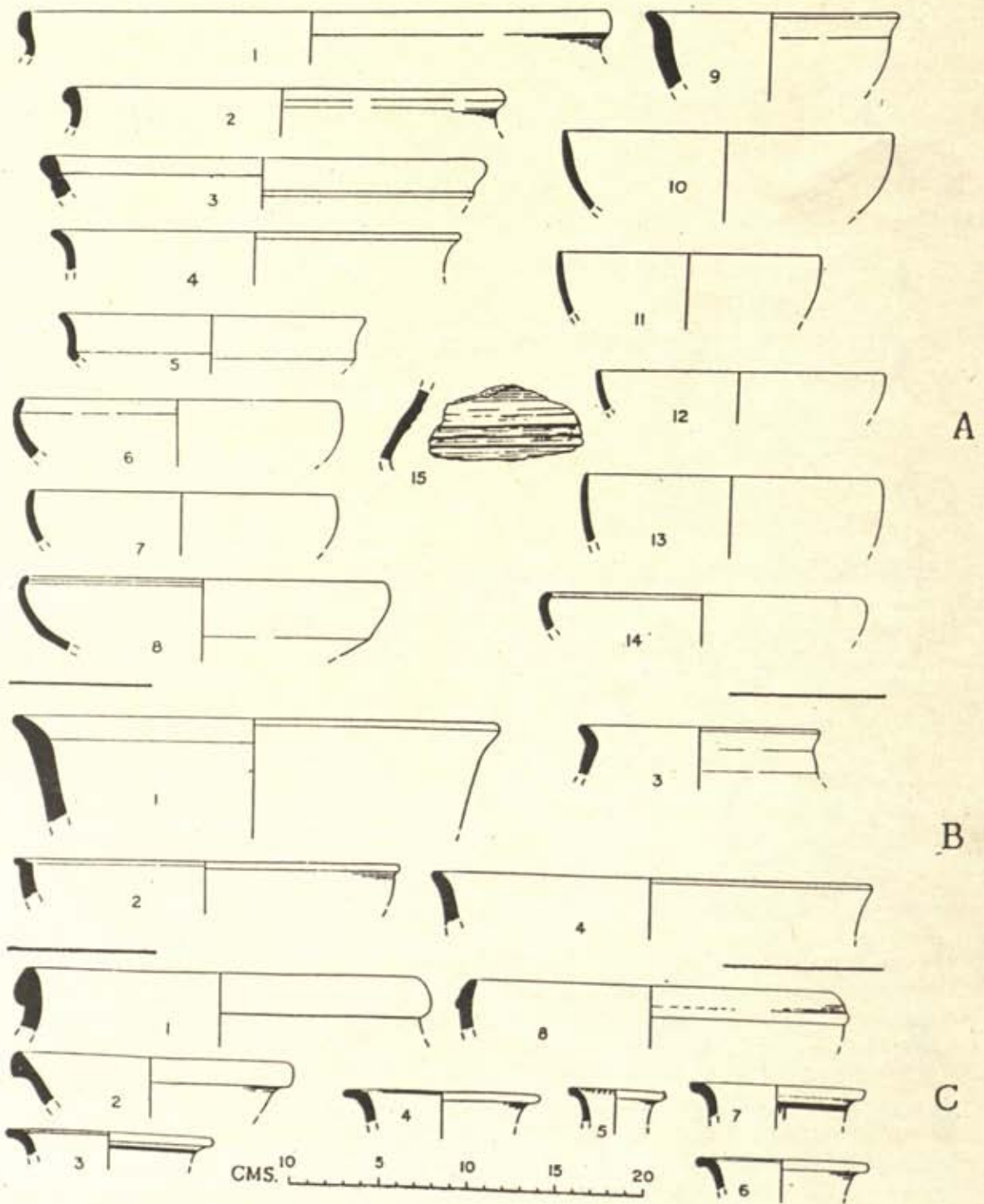


FIG. 13 : Black, grey and lustrous red wares

- treated with a red wash. From a mid-level of Period I.
9. Jar with an outcurved featureless rim, concave neck, hand made of coarse medium fabric showing an unoxidised black core. Lower surface treated with red slip. From an early level of Period I.
 10. Jar with an outcurved beaded rim and oblique neck. Hand made. Comparatively well fired, with an oxidized core. Surface treated with a red slip. From an early level of Period I.
 11. Jar with an outcurved rim and concave neck having incised finger nail pattern on the lip. Hand made, of coarse fabric and showing unoxidised black core, wet smoothed. From an mid-level of Period I.
 12. Jar with an outcurved rim and concave neck having incised finger nail pattern on the lip. Hand made medium coarse fabric, oxidized red core. Surface treated with a red slip and exterior burnished. From a mid-level of Period I.
 13. Jar with an outcurved featureless rim concave neck. Handmade medium coarse fabric, unoxidized black core. From a mid-level of Period I.
 14. Jar with an outcurved featureless rim with sharp lip and globular body. Hand made, of coarse medium fabric unoxidized black core. From a mid-level of Period I.
 15. Small jar in coarse, thin fabric with an outturned rim lip broken unoxidized black core. Hand made, with buff-brown surface. From an early level of Period I.
 16. Bowl with an outturned rim and concave neck and ledge at the shoulder. Hand made, medium fabric, well oxidized, interior wet smoothed, surface treated with red wash. This piece is comparatively better made and fired than the majority of pieces of this ware. From an early level of Period I.
 17. Bowl with an everted beaded rim, having incised nail pattern on the lip. Hand made, thick coarse fabric granulated, showing black unoxidized core. From a mid-level of Period I.
 18. Miniature bowl with rounded sides, hand made, oxidized core. From a mid-level of Period I.
 19. Miniature bowl with rounded sides. Hand made and well oxidized core. From a mid-level of Period I.
 20. Miniature bowl with rounded sides, hand made, showing black unoxidized core. From a mid-level of Period I.
 21. Dish with rounded sides, hand made, coarse very thick fabric showing black



- unoxidized core. From earliest level of Period I.
22. Bowl with incurved rim and round base, in thin but coarse fabric, showing black unoxidized core. From a late level of Period I.
 23. Bowl with an out-turned featureless rim, hand made thin coarse fabric, smoky unoxidized core. From a late level of Period I.
 24. Miniature vase with a rounded featureless rim. Hand made, medium fabric, unoxidized smoky core. From a mid-level of Period I.
 25. Miniature vase with an out curved featureless rim. Hand made, coarse medium fabric, smoky unoxidized core. From a late level of Period I.
 26. Bowl with a everted rim and convex sides, hand made, medium coarse fabric granulated, smoky oxidized core. From a mid-level of Period I.
 27. Deep bowl with an outcurved featureless rim, in a medium thick, coarse fabric with several coarse granules. Hand made, semi oxidized having smoky core. From an early level of Period I.
 28. Bowl with an everted featureless rim. Hand made, medium coarse fabric, red oxidized core. From mid-level of Period I.
 29. Bowl with an outcurved featureless rim and convex profile. Hand made, with thick coarse fabric and red oxidized core. From an early level of Period I.
 30. Bowl with an out curved featureless rim with convex profile. Hand made, of medium coarse fabric. From an early level of Period I.
 31. Bowl with an everted featureless rim. Hand made, medium coarse fabric and smoky, unoxidized core. From a late level of Period I.
 32. Bowl with an featureless rim and convex sides and probably a round base. hand made thick coarse fabric, black unoxidized core. From a late level of Period I.
 33. Bowl with an everted featureless rim. Hand made, medium coarse fabric, greyish semi oxidized core. From an early level of Period I.
 34. Fragment of jar, unoxidized black core, coarse medium fabric with some burnish on the upper section. Impressed pattern, forming a chain design. From an early level of Period I.
 35. Shoulder of a jar with deeply incised, running circulates, very thick coarse fabric. Black unoxidized core. From a mid-level of Period I.
 36. Fragment of the body of a jar with impressed, running rope design. Surface treated with a red slip and burnished. Black unoxidized core. From a mid-level of Period I.

37. Fragment of a lid with a conical pinched up knob at the centre, in coarse medium fabric. Upper surface treated with dirty chocolate slip. Hand made, black unoxidized core. From an early level of Period I.
38. Bowl with an outturned featureless rim. Hand made, medium coarse fabric. Unoxidized black core. From a mid-level of Period I.
39. Jar with an outturned featureless rim, surface treated with a red slip. Coarse medium fabric, unoxidized black core. From a mid-level of Period I.
40. Bowl with an out turned featureless rim. Hand made, coarse medium fabric. Unoxidized black core. From an early level of Period I.
41. Fragment of the body of a jar with thumb impressed design of running circles. Hand made, coarse medium fabric, surface treated with a red slip and partly burnished. From a mid-level of Period I.
42. Fragment of a jar with two small perforations, in thick, coarse fabric. Exterior treated with dull red wash. Black unoxidized core. From an early level of Period I.

5. BLACK WARE, GREY WARE AND LUSTROUS RED WARE

A. Black Ware

A black ware, mainly represented by jars, bowls and dishes, occurs at Malvan (fig. 13A). Technically it is almost identical to the black and red ware, having a similar fabric and being burnished.

1. Jar with a beaded rim and bulbous body in medium fabric. Burnished on the exterior. Probably made on a turntable. From an upper level of Period I.
2. Jar with a beaded rim and bulbous body, in thin fabric and burnished surface. From late level of Period I.²³
3. Bowl with a beaded rim in thick fabric and, corrugated shoulder. From a late level of Period I.
4. Jar with an out turned rim in medium fabric. From a late level of Period I.
5. Bowl with a concave profile and carinated shoulder. From a mid-level of Period I.²⁴
6. Bowl with convex profile, black slipped and lightly burnished. From a late level of Period I.
- 7. Convex sided bowl, black and burnished. From a late level of Period I.
8. Bowl with convex profile and slight carination at the shoulder. Burnished surface. From a late level of Period I.²⁵

²³S.R. Rao, *op. cit.*, fig. 44, no. 118.

²⁴S.R. Rao, *op. cit.*, fig. 35, no. 58.

²⁵S.R. Rao, *op. cit.*, fig. 44, no. 122.

9. Bowl with an out curved rim in thick fabric. This piece may more properly belong to the grey ware. The colour is blotchy black and grey. From a mid-level of Period I.
10. Convex bowl interior and exterior burnished, black un oxidized core. From a mid-level of Period I.²⁶
11. Convex bowl interior and exterior burnished, black unoxidized core. From a mid-level of Period I.²⁷
12. Convex bowl a variant of 11. From a late level of Period I.
13. Bowl with incurved sides. From a mid-level of Period I.
14. Bowl with incurved rim. Black unoxidized core. From a mid-level of Period I.
15. Fragment of shoulder portion of jar with corrugation. From a mid-level of Period I.

B. Grey Ware

There is also a thick grey ware, mainly represented by bowls, and like the coarse ware, invariably hand made (fig. 13 B). The clay, however, is generally finer and lacks the coarse granules of the former.

1. Deep bowl with an out-curved featureless rim, in thick coarse fabric, unoxidized black core. From a mid-level of Period I.
2. Jar with a flaring rim in medium fabric with a greyish burnished slip. Unoxidized black core. From a mid-level of Period I.
3. Bowl with a beaked rim and convex profile, treated with a greyish slip. Unoxidized core and in medium fabric. From a mid-level of Period I.
4. Bowl with an outturned featureless rim. Treated with a greyish slip and burnished in the exterior. Semi-oxidized core. From an early level of Period I.

C. Lustrous Red Ware

Lustrous Red ware, first recognised at Rangpur in post Harappan levels and later found at a number of excavated sites of the chalcolithic period, e.g. Bahal I B, Navdatoli IV, Ahar I C, Prakash I and Chandoli. The ware is made of a well levigated clay, having a lustrous slip from deep to orange red, fired at a medium temperature and occasionally painted with black pigment in a variety of designs. It is wheel thrown.

Lustrous Red ware is available at Malvan in a small quantity. The types (fig. 13 C) are mainly high necked jars and fragments of bowls; concave sided bowls with carinated body are absent, and

²⁶S.R. Rao, *op. cit.*, fig. 44, no. 108.

²⁷S.R. Rao, *op. cit.*, fig. 44, no. 111; fig. 25, no. 123

painting consists of parallel horizontal bands, wavy lines, hanging wavy lines, parallel bands and a black spotted design.

1. Jar with a beaded rim and possibly a bulbous body, medium fabric exterior surface treated with lustrous red slip, wheel made. From a mid-level of Period I²⁸
2. Bowl with a non-carinated shoulder and beaded rim in medium fabric, exterior surface treated with lustrous red slip. Wheel made well oxidized red core. From an early level of Period I.
3. Jar with an out curved rim and vertical neck in thin fabric exterior surface treated with red lustrous slip, horizontal line painted in black below the rim. Wheel made, well oxidized core. From a mid-level of Period I²⁹.
4. Jar with out turned rim and vertical neck in thin fabric, wheel made. Both exterior and interior surface treated with red slip. Black horizontal band on the neck. Oxidized red core. From an early level of Period I
5. Jar with a high neck and beaded rim in thin fabric, well oxidized red core. Exterior and interior surface treated with lustrous red slip. Interior of the rim painted with black oblique strokes. From an early level of Period I.³⁰
6. Jar with an out curved beaded rim and high neck exterior treated with a lustrous slip. Wheel made well oxidized red core. From a mid level of Period I.
7. Jar with an outcurved beaded rim and high neck in thin fabric. Exterior treated with red slip and painted with a black horizontal band with two vertical hanging strokes from it. Well oxidized core. From a mid-level of Period I.
8. Bowl with an incurved rim, slightly beaded. Of medium fabric with lustrous red slip on inside and out. From the earliest level of Period I.

6. PAINTED POTTERY

A large number of painted sherds have been found from the levels of Period I at Malvan. On the outset it will be better to point out that the painted tradition is confined only to Period I. Not a single painted sherd was discovered from Period II. The painted pottery consists only of red ware which is well fired and generally well levigated. A small number of sherds are not so well fired. This indicates that the potters painted only fine well fired pots, save for a few exceptions. The pottery is wheel made and not a single sherd is hand made. The slip used is red, orange to buff, and whitish to creamish slip. Black or purplish to brown, and in a few cases red pigment was used for painting over the slipped surface. The choice of the potter for painting fell mostly on the shoulder, neck and rim portions of

²⁸S.R. Rao, *op. cit.*, Fig. 37, No. 11.

²⁹S.R. Rao, *op. cit.*, Fig. 39, No. 60.

³⁰S. R. Rao, *op. cit.*, fig. 39, no. 71 etc.

the jars. Bowls, dishes and dishes-on-stand were also painted. Use of single or multiple brushes in drawing patterns has been noticed. Though some of the designs have Harappan similarities and give a sense of the same tradition, the majority attest to a free, bold hand more akin to the Chalcolithic painted pottery of Saurashtra and Malwa and northern Deccan. The designs consist of vertical strokes, horizontal bands, hanging or horizontal wavy lines, latticed upright or inverted triangles, volutes, concentric circles, semi-circles, hanging loops, criss-cross patterns, spots, stylized deer, wheat corn, inter secting loops and groups of wavy lines. On the whole the design repertoire is poor and lacks originality, and shows affinities with Prakash on the one hand and Rangpur II, III and Malwa ware on the other hand. It would be, but natural for the painted pottery of Malvan to show such features, if it were a port which was receiving cultural cross currents during the post-Harappan Chalcolithic times.

FIG. 14

1. Small jar in thin red ware with an out turned rim, red slipped, with the interior having a series of vertical strokes in black. From a mid-level of Period I.³¹
2. Small jar with a thin red obliquely cut rim, red slipped with exterior painted with a thick black band and shoulder with a horizontal band. Oxidized core. From a mid-level of Period I.
3. Small Jar in thin red ware with a beaded rim. Red slipped with exterior painted in black having two horizontal bands, one on the rim and the other on the shoulder. Oxidized core. From a mid-level of Period I.
4. Fragment of a jar in medium red ware having a thin red slip over which on the shoulder a thick band in blackish pigment. Oxidized core. From a mid-level of Period I.
5. Fragment of a vase in thin red ware. Red slipped, on the exterior one thick horizontal band is painted in black. Red oxidized core. From a mid-level of Period I.

³¹B.K. Thapar, "Prakash 1955: a chalcolithic site in the Tapti Valley", *Ancient India*, Bulletin of the Archaeological Survey of India, Nos. 20 and 21 (1967), fig. 9 : 26; H.D. Sankalia., B. Subbarao and S.B. Deo, *The Excavations at Maheshwar and Navdatoli* (1952-53) (Deccan College, Poona and M.S. University, Baroda: 1958), fig. 7 : 9 d, fig. 40: 54 i; R.N. Mehta, S.N. Chawdhary, K.T.M. Hegde and D.R. Shah, *Excavation at Jokha* (M.S. University, Baroda: 1971), fig. 11 : 38; S.B. Deo and Z.D. Ansari, *Chalcolithic Chandoli* (Deccan College, Poona, 1965), fig. 27 : 162. 3; S.B. Deo and M.K. Dhavalikar, *Paunar Excavation* (1967) (Nagpur University, Nagpur, 1968), fig. 4 : 4; *Indian Archaeology 1967-68-A Review* fig. 1 : 2, 4-8, 14-15, Singanapalli; I.K. Sarma, "Patapadu Revisited : A New Painted Pottery Culture of South-East-India," *Puratattva*, Bulletin of the Indian Archaeological Society, 1967-68, No. 1., fig. 3 : 15, 20-1 S.B. Deo, *Excavations at Takalghat and Khapa* (1968-69) (Nagpur University, Nagpur, 1970), fig. 9 : 2, 2A, 2B; fig 12: 28-9, 30 C, F, 31A, C; S.R. Rao, Excavations at Rangpur and other Explorations in Gujarat, *Ancient India*, Nos. 18 and 19 (1963), fig. 37 : 23a; V.S. Wakankar, Kayatha Excavation Number, *the Vikram Journal of Vikram University*. Ujjain (1967), fig. 10A : 43, 51, 55.

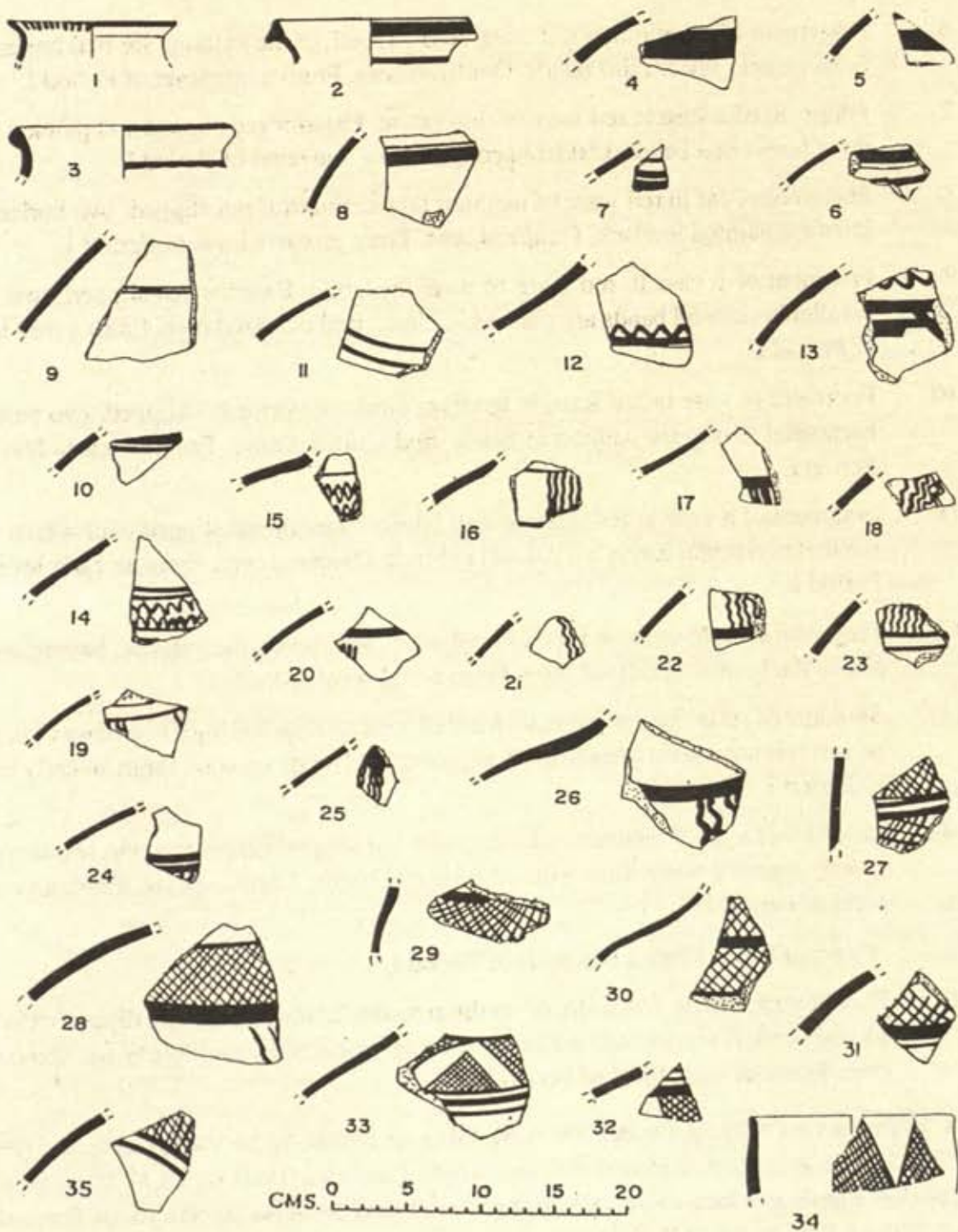


FIG. 14 : Painted sherds

6. Fragment of vase in thin red ware. Red slipped, in the exterior are two horizontal (upper thick, lower thin) bands. Oxidized core. From a late level of Period I.
7. Fragment of a vase in red ware of thin fabric. Exterior red slipped and painted with three horizontal bands. Oxidized core. From a late level of Period I.
8. Fragment of Jar in red ware of medium fabric. Exterior red slipped, two horizontal lines are painted in black. Oxidized core. From an early level of Period I.
9. Fragment of a vase in red ware of medium fabric. Exterior red slipped, two thin parallel horizontal bands are painted in black. Red oxidized core. From a mid-level of Period I.
10. Fragment of vase in red ware in medium fabric. Exterior red slipped, two parallel horizontal bands are painted in black. Red oxidized core. From an early level of Period I.
11. Fragment of a vase in red ware of thin fabric. Exterior red slipped over which two parallel horizontal bands are painted in black. Oxidized core. From an early level of Period I.
12. Fragment of a jar of thick fabric in red ware, red slip on the exterior, having loops above the border. Oxidized core. From a mid-level of Period I.
13. Shoulder of jar in thin red ware, with red slipped exterior having a row of wavy bands within two horizontal lines in black pigment. Red oxidized core. From an early level of Period I.
14. Shoulder of a jar of medium red ware, with red slipped exterior having two rows of closely running wavy lines within horizontal bands. Oxidized core. From an early level of Period I.³²
15. A variant of 14. From a late level of Period I.
16. Shoulder of a jar in red ware, of medium to thick fabric, with red slipped exterior having vertical wavy bands in black, probably produced by multiple brush. Oxidized core. From an early level of Period I.³³

³²B.K. Thapar, *op. cit.* (1967), fig. 10 : 16, 17; Sankalia et al *op. cit.*, (1958), fig. 50: VIII d; Rao, *op. cit.*, (1963) fig. 46: D. 12A, 17, 18; Sir John Marshall, *Mohenjodaro and the Indus Civilization* (1931), vol. III, Pl. XC : 9, Pl. XCII : 10; E.J.H. Mackay, *Chanhudaro Excavations 1935-36* (American Oriental Series No. 20, New Haven, Connecticut : 1943), Pl. XXXIV : 6, 7, 18, 19, 23, 24; Jhukar levels.

³³Thapar, *op. cit.* (1967), fig. 9 : 27; fig. 10 : 3, 4; Sankalia, et al, *op. cit.*, (1958), fig. 50 : VII d-k; fig. 53 : g-j; fig. 18 : 20 n; fig. 19 : 21a; Mehta et al, *op. cit.* (1971) fig. 12 : 61 ; Sankalia et al, *op. cit.* (1971), fig. 48 : D 178; fig. 50 : D 19A, 197; fig. 60 : D 269; fig. 67 : D 403-04; Rao, *op. cit.* (1963), fig. 34 : 28, fig. 36 : Cl, 11, 21; fig. 46 : D. 16, *IAR*, 1955-56, fig. 5 : Nagda; *ibid.*, 1956-57, pl. XVII B : 4, 8 : Prabhas Patan; *ibid.*, 1958-59, pl. XVII B : Lothal; *ibid.*, 1962-63, fig. 5 : H (C), fig. B : Kalibangan; Mackay, *op. cit.*, (1943), pl. XXX : 14.

17. A variant of no. 16, from an early level of Period I.
18. A variant of no. 16, save that it is painted over a light purplish slip. From an early level of Period I.
19. A variant of no. 16. From a late level of Period I.
20. Shoulder portion of jar in thin red ware. The exterior has a thin red slip, painted in black horizontal lines, and three vertical strokes below it. Red oxidized core. From a late level of Period I.³⁴
21. Fragment of the shoulder of a vase in thin red ware, exterior red slipped over which two wavy lines have been obliquely painted. Oxidized core. From an early level of Period I.
22. Fragment of the shoulder of vase in thin red ware, exterior red slipped with five wavy lines hand drawn over a horizontal line. Red oxidized core. From an early level of Period I.
23. Fragment of the shoulder of a vase in medium red ware, exterior with thin red slip over which six wavy lines hang-down over two horizontal lines. Oxidized core. From a mid-level of Period I.
24. Fragment of the shoulder of a vase in red ware of thin fabric with two broad closely painted horizontal bands and two strokes hanging at one corner. The design is incomplete. Red oxidized core. From a late level of Period I.
25. Shoulder of vase in thin red ware, exterior red slipped with painted thick horizontal band and five wavy lines hanging from it. Oxidized core. From a mid-level of Period I.
26. Shoulder fragment of vase in thick medium sturdy red ware, exterior painted in black with a horizontal band and hanging wavy lines in groups of two oxidized core. From a mid-level of Period I.
27. Fragment of a jar in medium fabric of red ware, having slipped and painted on the

³⁴The following references apply to our nos. 19 to 23. Thapar, *op. cit.*; (1967), fig. 9 : 21, 25; Sankalia et al, *op. cit.* (1958), fig. 40 : 54, e- g; fig. 51 : XI i- j; Deo and Ansari, *op. cit.* (1965) fig. 54. 54 : 2-4, 13; Sankalia, Deo, and Ansari and Ehrhardt, *From history to Prehistory at Nevasa* (1954-56) (Deccan College, Poona, 1960), fig. 110 : c-e; Deo and Dhavalikar, *op. cit.* (1968) fig. 4 : D 19; Deo and Majumdar, *Songaon Excavations - 1965* (Deccan College, Poona : 1969), fig. B : P. 5, 6, Deo, *op. cit.*, (1970), fig. 11 : D 21, 21A, 22, 22A; Trivedi, H.V., "Excavations at Arva", *Journal of the M.P. Itihasa Parishat*, Bhopal, No. 4 (1962), fig. 3; Sankalia et al, *op. cit.*, (1971), fig. 37 : D 27-8; E.J.H. Mackay, *Further Excavations at Mohenjodaro*, 1927-31, (Delhi : 1937) Vol. II, pl. LV : 5; *op. cit.* (1943), pl. XXX : 14, *IAR*, 1958-59, pl. XXIII B : 21 : Daimabad

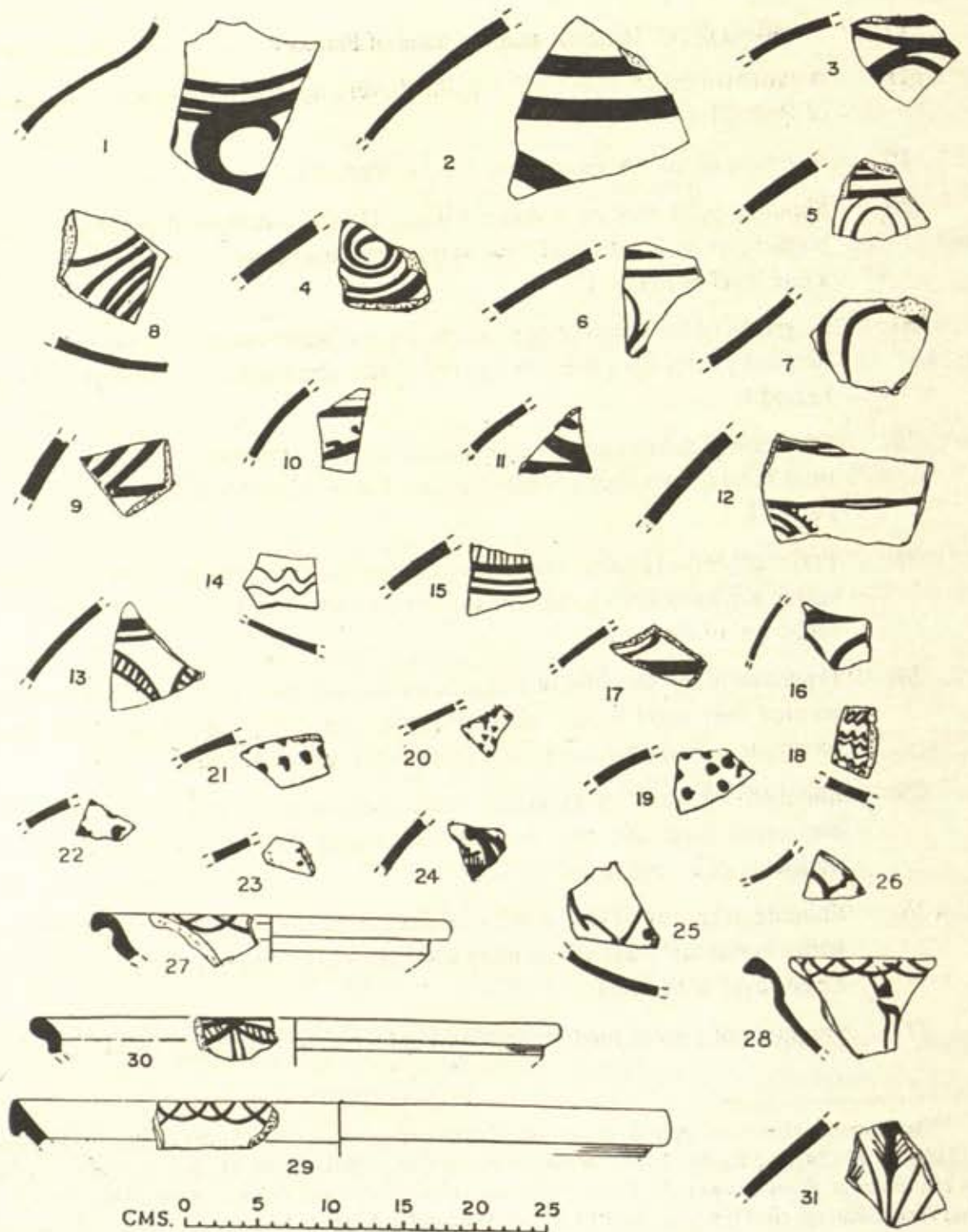


FIG. 15 : Painted sherds

- exterior with criss-cross pattern, separated by two horizontal bands. Oxidized core. From a late level of Period I.³⁵
28. Fragment of the shoulder of jar with thin red slip, in medium fabric with metallic resonance, painted with criss-cross pattern in black and broad purplish band below. Red oxidized core. From a mid-level of Period I.
 29. Fragment of the shoulder of a jar in thin red ware, treated with creamish slip over which a criss-cross pattern is painted in light black pigment. Oxidized red core. From a mid-level of Period I.
 30. Shoulder fragment of jar in medium fabric having thin whitish slip, over which a criss-cross pattern is painted, separated by a horizontal band on light black paint. Red oxidized core. From an early level of Period I.
 31. Fragment of a jar in thick red ware with thin red slip with a criss-cross pattern over a band. Red oxidized core. From an early level of Period I.³⁶
 32. Fragment of jar in red ware of thin fabric. Exterior treated with red slip over which a compartment of criss-cross pattern has been made in black. Red oxidized core. From a late level of Period I.
 33. Fragment of a jar in red ware of medium fabric, exterior red slipped over which latticed upright triangle and two pendant triangles on sides panelled by horizontal

³⁵The following references apply to our nos. 27 to 30. Thapar, *op. cit.* (1967), fig. 10 : 13, 16, fig. 14 : 6, 20; Sankalia et al, *op. cit.* (1958), fig. 15 : 19, fig. 53; Deo and Ansari, *op. cit.* (1965), fig. 27 : 1 b (3), fig. 33 : XII-4, fig. 48 : 6, 8, fig. 49 : 25; Sankalia et al *op. cit.*, (1960), fig. 89 : 2 u, fig. 107 : IV b; Sankalia and Deo, *Report on the Excavations at Nasik and Jorwe, 1950-51* (Deccan College, Poona, 1955), fig. 66 : 37, fig. 66 : 37; Deo and Mujumdar, *op. cit.* (1969), fig. D : D. 21; Sarma, *op. cit.* (1967-68), fig. 2 : 11; B.K. Thapar, Maski 1954 : A Chalcolithic site of the Southern Deccan, *Ancient India*, No. 13 (1957), fig. 9 : 7; Rao, *op. cit.*, (1963), fig. 34 : 28a, 45, fig. 9 : 7; Deo, *op. cit.* (1970), fig. 11 : D 17C, 41, *I.A.R.*, 1956-57, pl. XVII-B : 7 : Prabhas Patan; *ibid.*, 1961-62, fig. 14 : 35; fig. 15 : 10, 16-17, 19-20; *ibid.* 1962-63, fig. 3 : 8, 10, 21 : Kalibangan; R.E.M. Wheeler, "Harappa, 1946: The Defences and Cemetery R 37", *Ancient India*, No. 3 (1947), fig. 8 : 13; pl. XLIII : 2; fig. 15 : XI g; Mackay, *op. cit.* (1937), pl. LXII : 38 ; *op. cit.* (1943), pl. XXX : 8-10, 15, 19; Vats, *Excavations at Harappa 1920-21 and 1933-34* (Delhi : 1940), Vol. II, pl. LXIX : 16.

³⁶The following references apply to our nos. 31 to 34. Thapar, *op. cit.*, (1967), fig. 10 : 7, 8, 12; Sankalia et al., *op. cit.* (1958), fig. 48 : IV f; fig. 50 : VIII i; Mehta et al, *op. cit.* (1971) fig. 12 : 53; Deo and Ansari, *op. cit.* (1965), fig. 48 : 5; Deo and Dhavalikar, *op. cit.* (1968), fig. 4 : D 10 ; Deo and Mujumdar, *op. cit.*, (1969) fig. N : T. 88, 89, D 43., Sankalia et al., *op. cit.* (1971), fig. 94 : D 665; Marshall, *op. cit.* (1931), pls. LXXXVII : 1 and LXXXVIII : 7; *I.A.R.*, 1959-60, fig. 10 : 8, Nevasa; *ibid.* fig. 15 : 11, 16; Sankalia, *ibid.* 1954-55, pl. XVII-A : Lothal; *ibid.*, 1956-57, pl. XXA : 1, 3; Bahal; *ibid.* 1958-59, pl. XXIII-A : 4; Daimabad; *ibid.* 1961-62, pl. XL. B: Eran.

- lines in black are painted. Red oxidized core. From an early level of Period I.³⁷
34. Fragment of bowl with featureless rim and slightly convex sides in medium red ware, having red slip on the exterior and painted upright row of latticed triangles in black. From a late level of Period I.
 35. Fragment of jar in red ware of thin fabric with thin having criss-cross pattern above two horizontal bands. Oxidized core. From a late level of Period I.

FIG. 15

1. Shoulder of a jar in red ware in medium fabric. Exterior red slipped with volutes below three horizontal thick bands painted in black. The painting is bold. Red oxidized core. From a mid-level of Period I.³⁸
2. Shoulder of a jar in red ware in thick fabric with a metallic resonance. Exterior slipped with a thin buff slip. Bold horizontal bands and a portion of a circle (Volute?) is painted in light black pigment. Red oxidized core. From a mid-level of Period I.
3. Shoulder of a jar in red ware of medium fabric. Exterior red slipped over which roundles are made (probably volutes?) below two horizontal lines in black pigment. Oxidized core. From a mid-level of Period I.
4. Shoulder fragment of a jar in red ware in medium fabric, thin red slipped, having volutes painted in black. Red oxidized core. From a mid-level of Period I.³⁹
5. Shoulder fragment of jar in red ware, medium fabric, exterior with light red slip over which two concentric circles are painted below three horizontal bands in light blackish pigment. Oxidized core. From a mid-level of Period I.
6. Shoulder of a jar in red ware of medium fabric, light red slipped on the exterior, painted with two horizontal lines below which a portion of running volutes is painted in light black pigment. Red oxidized core. From an early level of Period I.
7. Shoulder fragment of a jar in red ware of sturdy, medium fabric treated with a red slip over which roundles are painted in black. Red oxidized core. From an early level of Period I.

³⁷The following references apply to our nos. 32 to 33 and 35. Thapar, *op. cit.*, (1967), fig. 10 : 11, 19; Deo and Ansari, *op. cit.* (1965), fig. 50; 47, F.R., Allchin, *Piklihal Excavation* (Government of Andhra Pradesh, Hyderabad : 1960), pl. 35 : 1-3, Mackay, *op. cit.* (1937), pl. LXX : 7.

³⁸Thapar, *op. cit.* (1967), fig. 11 : 24; S.R. Rao, *op. cit.* (1963), fig. 36 : C 3, 4, 7, 13.

³⁹B.K. Thapar, *op. cit.* (1967), fig. 11 : 25; S.B. Deo and Ansari, *op. cit.* (1965), fig. 50 : 38; Sankalia et al, *op. cit.* (1960), fig. 109 : XXVII; S.R. Rao, *op. cit.*, (1963), fig. 26 : A7; Triwedi, *op. cit.* (1962), fig. 4; Sankalia et al, *op. cit.* (1971), fig. 38 : D54, T. 2CI; fig. 67 : D 380; fig. 95 : D 666; Wheeler, *op. cit.* (1947), Pl. XLIII : 7.

8. Fragment of a dish in thick red ware, having five painted lines in black. The exact design is not clear. Semi-oxidized black to red core. From an early level of Period I.
9. Fragment of a jar in red ware, thick fabric, exterior red slipped, painted with three oblique lines over a horizontal line in black pigment. Oxidized core. From an early level of Period I.
10. Shoulder of jar in red ware of thin fabric, exterior slipped with purplish red slip over which a horizontal band and incomplete and unclear oblique motif is painted. Semi-oxidized core. From a late level of Period I.
11. Fragment of shoulder of a jar in red ware of medium fabric with a buff slip on the exterior with one horizontal band and a portion of a volute (?). Oxidized core. From a late level of Period I.
12. Fragment of the shoulder of a jar in sturdy thick red ware, light red slipped on the exterior, with two carelessly painted horizontal bands and a portion of concentric circles of which the outer has projecting short strokes. Red oxidized core. From a late level of Period I.⁴⁰
13. Fragment of the shoulder of a jar in medium fabric, in red ware, exterior light red slipped, having two horizontal bands below which two sets of hatched oblique bands, a plant motif (?). Oxidized core. From a mid-level of Period I.
14. Fragment of a dish in thin red ware, red slipped inside with two wavy lines. Red oxidized core. From a late level of Period I.
15. Fragment of the shoulder of a jar of red ware in medium fabric, with a purplish slip having three horizontal bands above which vertical strokes join it, painted in black pigment. Red oxidized core. From an early level of Period I.
16. Fragment of the shoulder of a jar in thin red ware. Exterior red slipped, over which below a horizontal line run a row of circles painted on black. Greyish semi-oxidised core. From a mid-level of Period I.
17. Fragment of the shoulder of a jar in red ware, with very thin red slip, over which in light black pigment a horizontal and oblique line are painted. Greyish core. From an early level of Period I.
18. Fragment of a dish in red ware of thin fabric. Interior red slipped with wavy lines in black pigment. From a late level of Period I.

⁴⁰B.K. Thapar, *op. cit.* (1967), fig. 8 : 19; Sankalia et. al. *op. cit.* (1958), fig. 18 : 20 p, Mehta, et. al, *op. cit.* (1971), fig. 12 : 75; S.R. Rao, *op. cit.* (1963), fig. 37 : 21 ; Sankalia, et. al, *op. cit.* (1971), fig. 95 : T 143A.



FIG. 16: Graffiti marks

- 19-23. Fragments of jars in red ware of medium fabric light red slip. Spots are painted in black to purplish pigment. From mid-levels of Period I.
24. Fragment of the shoulder of a jar of medium fabric in red ware, exterior slipped with a very light red slip over which some thin vertical lines and two oblique lines joining together are painted in black. Grey to semi-red oxidized core. From a late level of Period I.
25. Fragment of a dish of thick red ware, red slipped on inside over which are the horns of a tag and a dot in one side are painted in black-semi-oxidized grey to red core. From a late level of Period I.
26. Shoulder fragment of a jar in lustrous red ware of medium fabric red slipped, over which a lightly stylized deer is painted. Oxidized red core. From an early level of Period I.
27. Dish with an out turned beaked rim and carinated shoulder in thick red ware, red slipped, over which in the interior a row of intersecting loops has been painted in black. Red oxidized core. From a mid-level of Period I.⁴¹
28. Dish with a projecting rim and carinated shoulder in red ware, medium fabric, with intersecting loops and what is probably a pair of horns below it, painted in black pigment. From a mid-level of Period I.
29. Dish with projecting rim in red ware, medium fabric, red slipped. Rim painted with intersecting row of loops in black. Greyish, semi-oxidized core. From a late level of Period I.
30. Dish with out-turned beaded rim in red ware, medium fabric, with double hatched loops on both sides and two vertical lines dropping from the centre. Red oxidized core. From an early level of Period I.⁴²
31. Fragment of the shoulder of a jar in red ware, sturdy fabric, slightly red slipped in exterior, painted in black with a plant or wheat like motif. Red oxidized core. From an early level of Period I.⁴³

⁴¹Thapar, *op. cit.* (1967), fig. 8 : 12, 14 and fig. 9 : 28, 30; Sankalia et al, *op. cit.* (1958), fig. 38 : 51 a and fig. 34 : 52 h; *IAR*, 1959-60, fig. 14 : 18; Bahurupa and *ibid.*, 1957-58, fig. 10 A : 4-5; Rojdi; S.R. Rao., *op. cit.* (1963), fig. 16 : 13, 15, fig. 24 : 100, fig. 33 : 11b and fig. 34 : 39; Wakankar, *op. cit.*, (1967), fig. 10 A : 35, 50 and fig. 10 B: 12.

⁴²Mehta et al, *op. cit.* (1971), fig. 12 : 54, 59; Deo and Ansari, *op. cit.* (1965), fig. 53 : 88; *IAR*, 1956-57, pl. XVII A : 15; Prabhas Patan; Marshall, *op. cit.* (1931), Pl. LXXXVIII : 8; Mackay, *op. cit.* (1937), pl. LXX : 30; Vats, *op. cit.* (1940), pl. LXVII : 4, 15.

⁴³Sankalia et al, *op. cit.* (1958), fig. 52 : XIII C; Mehta, et al, *op. cit.* (1971), fig. 12 : 73; Deo and Ansari, *op. cit.*, (1965), fig. 23 : VII; Sankalia, Deo, Ansari, and Ehrhardt, *From History to Prehistory at Nevasa* (1954-56), (Deccan College, Poona : 1960), fig. 111 : m; *IAR*, (1956-57), pl. XIII-A : 6. 14; 1958-59, pl. XVII-A : 1955-56; pl. VIII top left : Lothal; *IAR*, 1961-62, fig. 14 : 48; 1962-63, fig. 2 : Y (A); fig. 3 : 3 (A) : Kalibangan; Deo and Mujumdar, *op. cit.* (1969), fig. B : D P 7; Mackay, *op. cit.* (1937), pl. LV : 36.

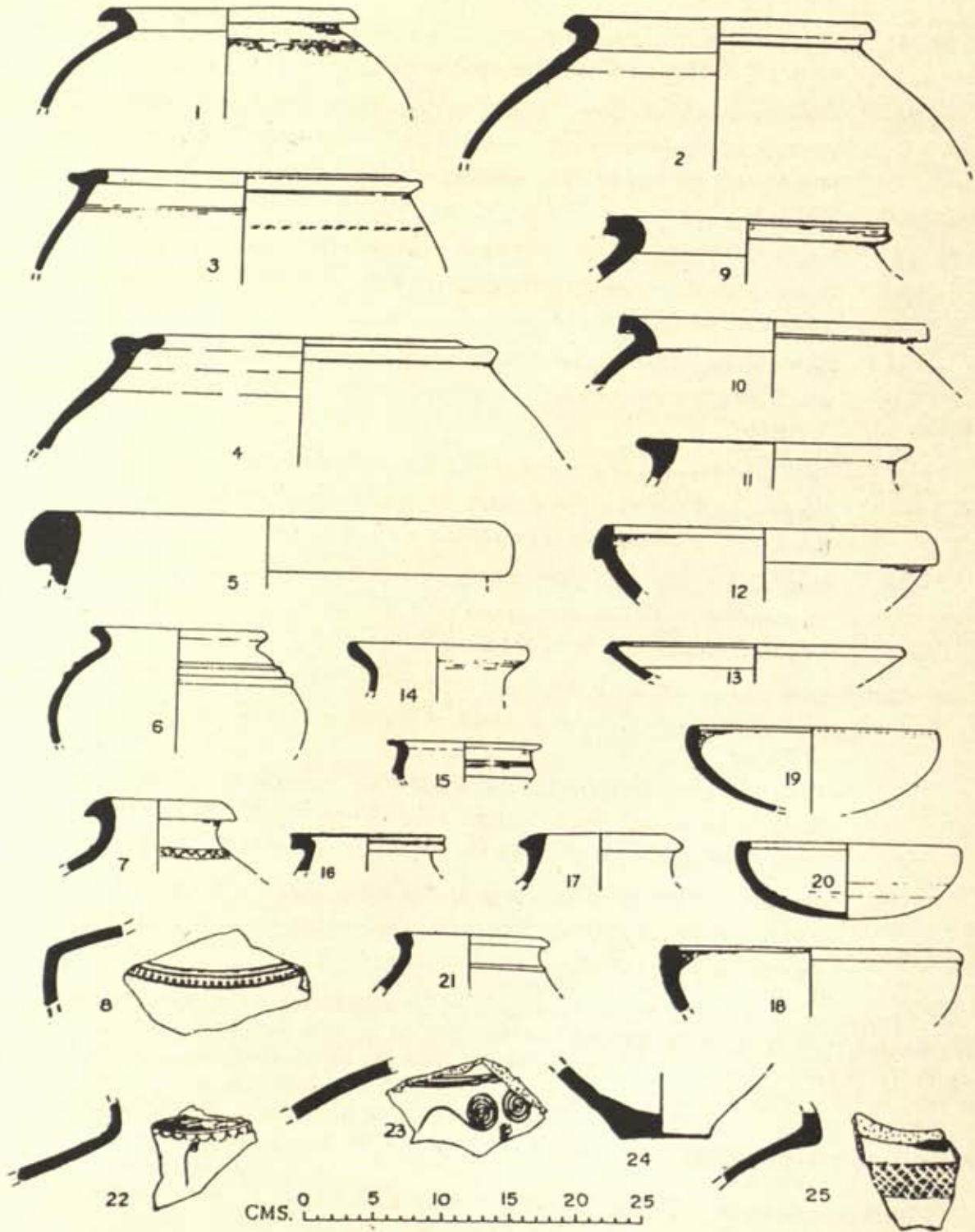


FIG. 17 : Pottery, Period II

7. GRAFFITI

In the last decade considerable attention has been drawn towards a systematic study of the graffito-marks occurring in pottery. These marks are no more regarded to be a fanciful production or unmeaningful. B.B. Lal, has given a scientific orientation to the study of graffito marks and has attempted to standardize their description and has thus paved the way for a working hypothesis. These symbols may be the carriers of some earlier cultural traits.⁴⁴

In all there are fourteen sherds having graffito marks. Out of these eight are on black and red ware, five on red ware and one in coarse ware. All these sherds belong to Period I. No graffito-mark could be recognised on the pottery of Period II. Another fact which has been observed is that all the graffiti are post-firing and hence probably were made by the owners, the potter being not necessarily involved in their production. While the graffiti on nos. 1, 7, 9, 13 have similarities with Harappan symbols, no. 10 bears a resemblance to the specimen from Navdatoli. Since Malvan shows both the post-Harappan and Chalcolithic influences in this period, such similarities further confirm the position. The recorded symbols are given as below (fig. 16):-

1. Two vertical lines that on the left being the longer cut by a horizontal line. The representation seems to be portion of a loosely drawn ladder symbol (Lal's symbol no. 15). On the outside wall of a pot, black and red ware of coarse-medium fabric. From a mid-level of Period I.⁴⁵
2. One horizontal line (the other is missing due to the breakage of the sherd) joined by four vertical lines at regular intervals. The representation seems to be or a horizontally placed ladder.⁴⁶ From a mid-level of Period I.
3. Three horizontal lines cut by four vertical lines making a criss-cross pattern (Lal's symbol No. 40). On the outside wall of a pot in red ware, of medium fabric. From an late level of Period I.⁴⁷
4. A variant of no. 3. on outside wall of a pot of red ware, chocolate slipped. From an early level of Period I.
5. Three radiating lines, the major portion being broken (Lal's symbol No. 17) On the outside of a pot in black and red ware of thin fabric. From a mid-level of Period I.⁴⁸

⁴⁴B.B. Lal, 'From Megalithic to Harappa : Tracing back the Graffiti on the pottery', *Ancient India*, no. 16, pp. 4 ff. B.K. Thapar, 'Maski 1954 : A chalcolithic site of Southern Deccan', *Ancient India*, no. 16 (1960), p. 66.

⁴⁵Lal, *op. cit.* p. 11. Occurs at Chalcolithic levels at Chandoli, Nevasa, Rangpur and in Harappan levels at Kalibangan.

⁴⁶Lal, *op. cit.* p. 11. Horizontally placed ladder symbol is rare and occurs in Tozhupedu (Perumbiar) megalithic levels.

⁴⁸Lal, *op. cit.* p. 11. Occurs at Rangpur, Navdatoli, Harappa and Kalibangan etc.

Lal., *op. cit.* p. 2. Occurs at Chalcolithic sites at Prakash, Bahal etc., B.K. Thapar, *op. cit.* p. 67.

6. Three vertical lines cut by three horizontal lines, (Lal's symbol No. 40). From a late level of Period I.⁴⁹
7. Two parallel horizontal lines cut by three vertical lines. Apparently, this is a representation of horizontally placed ladder symbol (Lal's symbol No. 15). On the outside wall of a pot red ware of medium fabric. From a mid-level of Period I.
8. Two parallel oblique lines (Lal's variant symbol No. 33).⁵⁰ From a mid-level of Period I.
9. Five radiating lines. The central portion is broken. This is apparently Lal's symbol No. 17.⁵¹ It occurs on the outside wall of a pot of thin fabric of black and red ware. From a mid-level of Period I.
10. Four vertical lines (Lal's symbol No. 33). On the outside wall of a pot, of medium fabric in red ware. From an early level of Period I.
11. Two oblique lines joining each other at their lower ends and making a 'V' shape (Lal's symbol No. 7). On the outside wall of a pot of red ware of medium fabric. From an early level of Period I.⁵²
12. Two lines crossing each other, (possibly a variant of Lal's symbol No. 12) on the outside wall of a dish of medium fabric in black and red ware. From a late level of Period I.
13. A vertical line which is joined in each side by three oblique lines sloping towards it (Lal's symbol No. 42), on the out-side wall of a jar in black and red ware. From a late level of Period I.
14. A horizontal line, sloping at one end and cut by four vertical lines, on the outside wall of a pot in thick coarse red ware burnished and chocolate slipped. From the earliest level of Period I.

B. PERIOD II

The pottery of Period II calls for only brief notice. It comprises in the main a homogeneous set of forms and techniques, with only a small number of doubtfully associated pieces.

There are two principal fabrics, a black-grey ware which is in the majority, and a red-pink ware which forms a minority.

The black-grey ware includes mainly jars and cooking pots thrown on a wheel and beaten out in characteristic fashion. Hence many of the sherds reveal a thin brittle texture, generally associated with this technique. A few forms including bowls and lids were probably made upon the turntable.

⁴⁹The criss-cross pattern in the present example is smaller than no. 3.

⁵⁰Lal, *op. cit.* p. 15.

⁵¹Lal, *op. cit.* p. 12.

⁵²Lal, *op. cit.* p. 9. Also reported from Rangpur, Harappan and Kalibangan etc.

The surface is variously treated, some pieces being rough, others slipped, and yet others slipped and burnished. The incised decorations on the shoulders of the water pots are characteristic, no. 23 being particularly notable.

The red-pink ware, also, includes mainly smaller jars and a small number of plain bowls. It occurs in both unslipped pink ware, and slipped and burnished red ware.

The following select types are illustrated (fig. 17) :

1. Jar with an out-curved beaded rim, with a groove on the upper side in black ware, of medium fabric. Shoulder has a row of nail impressions. Outer surface slipped and burnished. From an early level of Period II.⁵³
2. Jar with an out-curved beaded rim in black ware. Outer surface burnished. From a mid-level of Period II.
3. Jar with an in-curved rim and ledge having two grooves on the upper surface. The shoulder has a row of nail impressions, in black ware. Black slipped and burnished. From a late level of Period II.⁵⁴
4. Jar with an in-curved rim and a prominent ledge in black ware. Black slipped and burnished. From a mid-level of Period II.
5. Jar with a thick beaded rim in red ware. Semi-oxidized greyish core. Unslipped. From a late level of Period II.
6. Vase with an out-turned featureless rim, pronounced ledge at the shoulder, and three horizontal grooves. Semi-oxidized red to greyish core,⁵⁵ From a mid-level of Period II.
7. Vase of black ware with an out-curved rim with concave shoulders and thin pinched-up ledge, below which hanging loops are incised and having black slipped exterior. From an upper level of Period II.
8. Carinated *handi*, having incised running grooves within horizontal band in black slipped and burnished ware. Black unoxidized core. From a mid-level of Period II.
9. Jar with an outcurved thickened rim, with a groove on the upper side, in thick black ware. Black slipped exterior. From an upper level of period II.⁵⁶
10. Jar with an out-curved obliquely cut rim (with a foaming tendency), internally thickened at the shoulder. Black slipped and burnished, unoxidized black core. From a mid-level of Period II.

⁵³Thapar, b.K., *op. cit.* fig. 30, No. 14.

⁵⁴R.N. Mehta, *op. cit.* (1971), fig. 16, No. 17.

⁵⁵B.K. Thapar, *op. cit.* fig. 29, No. 9b; R.N. Mehta, *Excavation at Nagara* (1968), fig. 21, No. 32; H.D. Sankalia, *op. cit.* 1958, fig. 85, No. 143 b.

⁵⁶R.N. Mehta, *op. cit.* (1971), fig. 16, No. 190.

11. Jar with an out-turned flat rim. Greyish, semi oxidized core. Red slipped and burnished. From a late level of Period II.
12. Shallow basin with an in-curved rim in medium grey ware. Unoxidized, greyish core. Without slip. From a late level of Period II.⁵⁷
13. Dish with a nail headed rim in red ware, of thin fabric, unslipped. Oxidized red core. From a late level of Period II.
14. Jar with an in-curved rim in red ware of thin fabric. Red slipped. Oxidized red core. From a late level of Period II.
15. Small shallow vase in red ware, of thin fabric, with an out-turned featureless rim, convex corrugated. Shoulder ending in a carination. Unslipped, with oxidized core. From a late level of Period II.⁵⁸
16. Jar with an out-turned, grooved rim, in red ware of medium fabric. Red oxidized core. Red slipped. From late level of Period II.
17. Vase with beaded rim and convex shoulders in red ware of medium fabric. Red slipped semi-oxidized greyish core. From a late level of Period II.⁵⁹
18. Bowl with an in-curved rim in coarse grey ware. Black slip, has mostly peeled off. Thick fabric, From a late level of Period II.
19. Bowl with an in-curved rim and convex profile. Red ware in medium fabric. Red oxidized core. From a late level of Period II.
20. Bowl with an in-curved rim. black slipped in the inside. Greyish unoxidized core. In thick fabric. From a mid-level of period II.
21. Jar with out-curved beaded rim having a pinched up cordon at the shoulder. Red ware of medium fabric. Red oxidized core. Red slipped outer surface. From a late level of Period II.
22. Fragment of jar in black burnished ware of medium fabric black slipped with incised hanging loops for horizontal lines and a knotted incised symbol. Black unoxidized core. From an early level of Period II.⁶⁰
23. Fragment of a jar in black ware of thick fabric, burnished outer surface, with incised running volutes under horizontal bands. Below the volutes are incised small objects. Unoxidized black core. From a mid-level of Period II.
24. Base of a jar in red ware of medium fabric, inside slipped. Oxidized red core. From an upper level of Period II.⁶¹
25. Fragment of jar in black unslipped ware of medium fabric with a row of incised dots above a wavy lines. Unoxidized black core. From a late level of Period II.

⁵⁷R. N. Mehta, *op. cit.* (1971), fig. 17, No. 136.

⁵⁸H.D. Sankalia, *op. cit.* (1958), fig. 83, No. 138.

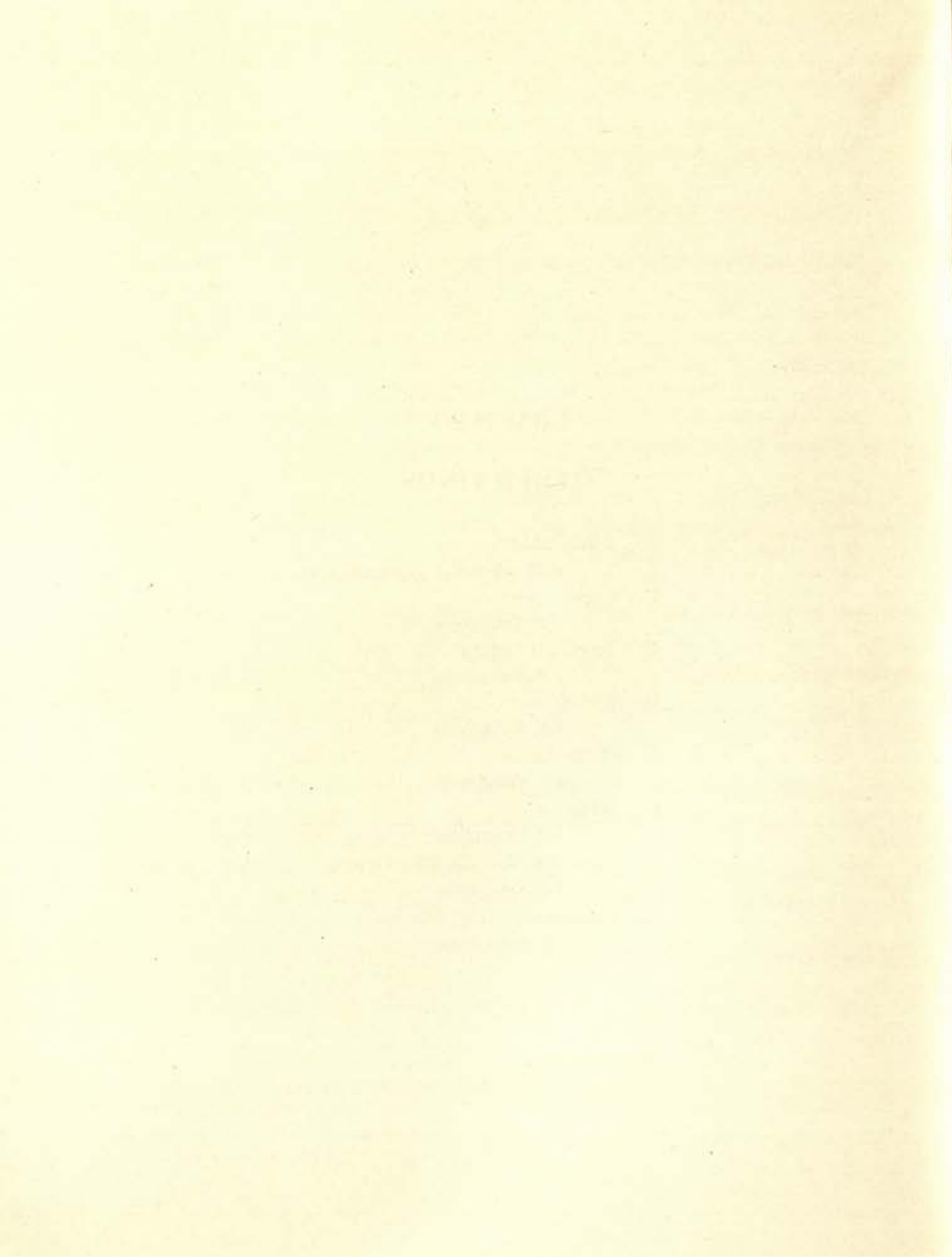
⁵⁹B.K. Thapar, *op. cit.* fig. 30, no. 18a.

⁶⁰R.N. Mehta, *op. cit.* 1968, fig. 21, no. 43.

⁶¹R.N. Mehta, *op. cit.* 1971, fig. 17, no. 140.

CHAPTER V
OTHER FINDS

- A. Blade Industry
F.R. Allchin & Jagatpati Joshi
- B. Copper Objects
J.P. Srivastava
- C. Terracotta Objects
J.P. Srivastava
- D. Shell Objects
J.P. Srivastava
- E. Glass Objects
J.P. Srivastava
- F. Beads
J.P. Srivastava
- G. Other miscellaneous stone Objects
J.P. Srivastava
- H. Miscellaneous stone Objects
J.P. Srivastava



CHAPTER V
OTHER FINDS
A. BLADE INDUSTRY

The blade industry discovered as a component of the material culture of Period I was, by any standard, a poor affair. The tools were made from cores, produced from suitable pebbles. The raw materials employed were mainly chalcedony, green jasper and agate. These stones are not locally available but were most probably brought from a short distance up the valley of the Tapti, and are derived from the trap rocks. Several of the cores are of tiny size, and this, taken with the scarcity and small size of the blades recovered seems to testify to the general poverty of the industry. Only two pieces had any sort of retouch, a backed blade and a minute and very poorly made lunate. A somewhat unexpected aspect of the assemblage is the comparatively high proportion of blade cores. No explanation of this seems to be forthcoming.

It will not be inapposite to compare our industry with that from the neighbouring site of Jokha. The raw materials used are largely common, being probably derived from similar if not the same sources, which are in any case much nearer to Jokha. Both industries show a similar and perplexing preponderance of cores (30% of the total at Jokha and about the same at Malvan), but the character of the finished tools at Jokha and the presence of a considerably greater number of lunates and geometric forms quite marks it off from the extremely impoverished industry of Malvan.

<i>Worked pieces and nodules</i>	<i>Cores</i>	<i>Blades or pieces of blades</i>	<i>Backed blade</i>	<i>Lunate</i>	<i>Core trimming flake</i>	<i>Flakes and pieces</i>
24	10	5	1	1	1	12

The following pieces are illustrated in (fig. 18).

1. Fluted core of agate. From an Unstratified level. Baulk
2. Flake of chalcedony. From layer (3A), MVN-1A.
3. Core of chalcedony etc. From layer (3A), MVN-1A.
4. Core of green jasper. From layer (2A), MVN-1A.
5. Core of green jasper. From Surface MVN-1.

¹R. N. Mehta, *Excavation at Jokha*, 1971, pp. 36-47.

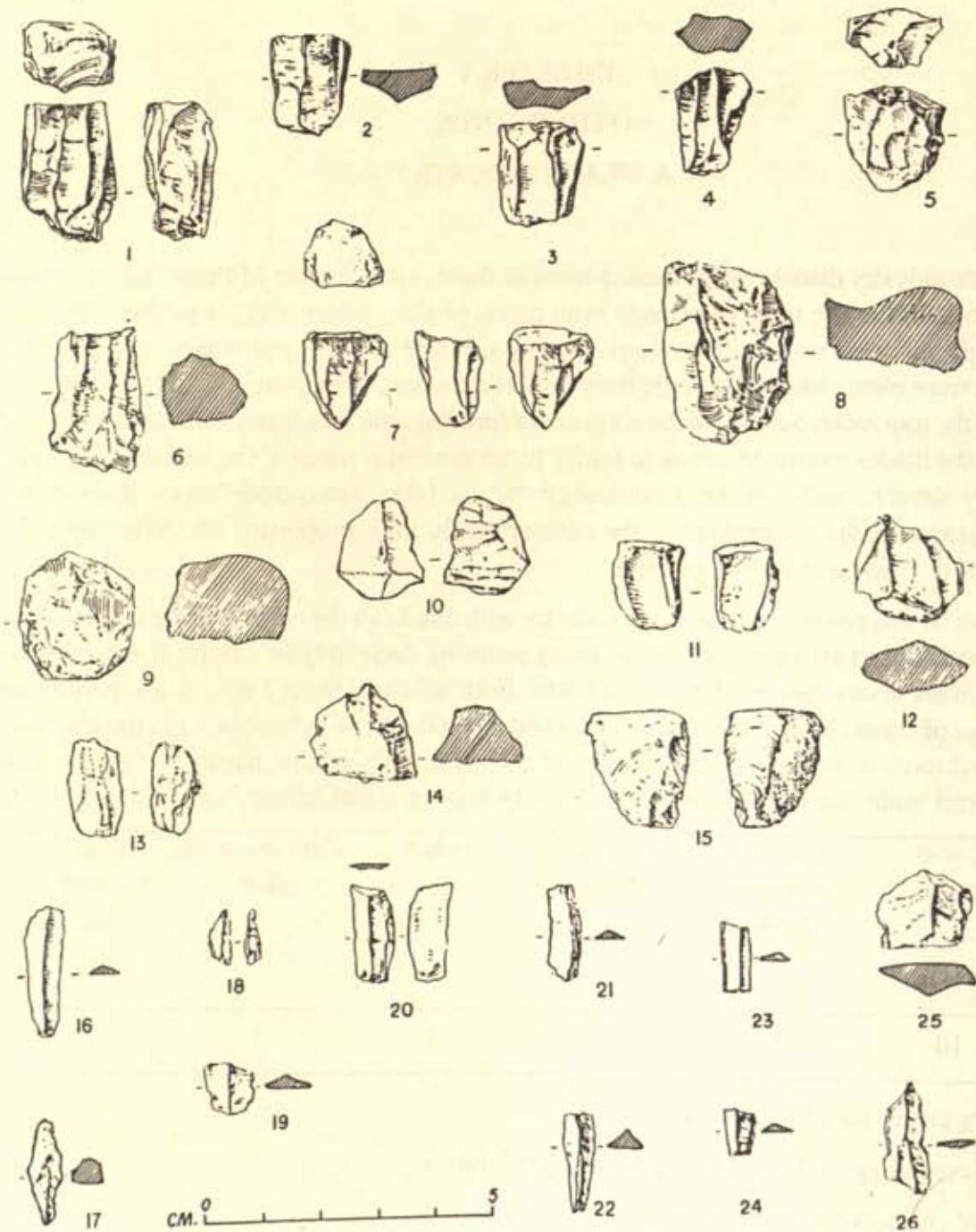


FIG. 18 : Stone blade industry

OTHER FINDS

6. Core of agate (burnt.) From an unstratified level. MVN 1/IA.
7. Core of chalcedony. From Baulk, (2), layer MVN-1D.
8. Nodule of chalcedony. From an unstratified level.
9. Unfinished nodule of chalcedony. From layer (2), MVN-1-A.
10. Nodule of green jasper. From layer (3A), MVN-1-A.
11. Core of green jasper. From Layer (1), MVN-8
12. Core of chalcedony. From Surface, MVN-1.
13. Core of chalcedony. From an unstratified level.
14. Worked piece of jasper. From an unstratified level.
15. Flake of agate. From layer (2A), MVN 1A.
16. Blade of chalcedony. From layer (3), MVN 1A.
17. Core trimming flake of green jasper. From layer (1), MVN-1B.
18. Minute lunate of chalcedony, From layer (3), MVN-1.
19. Waste flake of jasper. From an unstratified level.
20. Blade of chalcedony. From layer (3), MVN-1A.
21. Blade flake of chalcedony, From layer (1), MVN-B.
22. Blade flake of chalcedony. From an unstratified level.
23. Blade of agate, with retouch on back. From layer (2), MVN-1.
24. Piece of blade of agate. From layer (2), MVN-1.
25. Flake of agate. From layer (1), MVN-2.
26. Flake of Jasper. From layer (2), MVN:1.

Although the Malvan excavations yielded only a small number and range of antiquities, yet there are enough interesting pieces to throw considerable light on the culture which flourished in coastal Gujarat at the mouth of the river Tapti during post-Harappan times.

Notable among the finds are fragments of copper, shell and terracotta bangles; circular and triangular terracotta tablets, circular terracotta cakes; a small terracotta bull; terracotta wheels or spindle-whorls; terracotta hopscotch or game objects; a terracotta plug or ear ornament; small red

sandstone marbles; and glass bangles.

A brief account of these object is given below:

B. COPPER OBJECTS

Copper objects are reported from the nearby sites of Rangpur,² to the north-west, and Prakash³ to the east.

Only three copper objects were discovered (pl. XI A) and although two of them come from mixed or unstratified deposits, there seems little doubt that all should be assigned to Period I.

1. A copper rod, circular in section with a slight depression in the central part (from a mixed deposit, MVN no. 3).
2. A small copper pin, squarish in section (from a mixed deposit), MVN no. 19).
3. Mutilated copper bangle, circular in section and solid. From a late level of Period I (MVN no. 25).

C. TERRACOTTA OBJECTS

Terracotta is a readily available material for manufacturing a variety of small objects, and perhaps for this reason the range of objects discovered at Malvan is fairly comprehensive. Most of the objects listed below are attributable to Period I, even though several of them derive from the mixed materials of Period II. Some are strongly suggestive of the Harappan tradition. For example, bangles of terracotta are almost universal finds in Harappan sites, but according to S.R. Rao⁴ no bangles are found in the subsequent, properly post-Harappan phase at Rangpur (II B, C, etc.). Similarly the terracotta cake and triangular tablets have a reminiscence of the Harappans. The following chart gives a picture of the terracotta finds in the excavation.

Period	Bull wheel or Whorl	Hopscotch or circu- lar tablets	Triangular Tablet	Plug	Ear ornament	Terra- cotta cake
I	1	7	2	x	x	1
II	x	2	2	1	1	x
Total	1	9	4	1	1	1

²S. R. Rao, 'Excavation at Rangpur and other Explorations in Gujarat', *Ancient India*, nos. 18-19, p. 149, ff

³B.K. Thapar, 'Prakash 1955 : A chalcolithic site in the Tapti valley', *Ancient India*, nos. 20-21, p. 121 ff.

⁴*Op. cit.* 2. p. 116.

OTHER FINDS

The following catalogue describes the illustrated pieces (pl. XII A) :

1. Small figure of a bull, the right horn broken, in dull brown colour, the four legs and tail are modelled separately. Length 3-4 cm. From an early level of Period I (MVN no. 18).
2. Fragment of a terracotta bangle,⁵ circular in section, buff surface and grey.unoxidized core. From a late level of Period I (MVN no. 12).
3. Fragment of a wheel or spindle whorl made in black and red ware, with a central hole. The outside edge has been ground smooth. From a mixed deposit, attributable to Period I (MVN. no. 17).
4. Circular tablet⁶ or hopscotch, made of red ware with a grey core. The edges are ground smooth. From a mid-level of Period I (MVN No. 8).
5. Circular tablet or hopscotch, made of grey ware. The edge has been ground smooth. From a mixed level of Period II (MVN no. 30).
6. Triangular tablet or hopscotch, made on red ware. The edges have been ground smooth. From a mid-level of period I - (MVN no. 37).
7. Triangular tablet or cake⁷ of small size, made of red ware, with edges ground. Approx. 3 cm each side. From a mid level of Period I (MVN no. 31).
8. Triangular cake or tablet of small size, made of red ware, with edges ground. Approx. 3 cm on each side. From a mid-level of Period I (MVN no. 32).
9. Triangular cake or tablet, of small size, made of red ware, with ground edges. Approx. 2.5 cm on each side. From an early level of Period I (MVN no. 33).

PL. XII B

1. Fragment of a wheel of spindle whorl, with central hole, made on bright red ware, with ground edges. Approx. diametre 3 cm and thickness 1 cm. From a mixed deposit of Period II (MVN no. 36).
2. Fragment of a wheel or spindle whorl, with central hole made on sherd of black ware with high gloss. Edges ground. From a mid level of period I (MVN no. 5)

⁵Indian Archaeology 1960-61 - A Review. p. 32, pl. 4 A.

⁶Rao, *op. cit.*, p. 140. Rao describes them as unidentified and suspects them to be unfinished cart wheels, but in our view they are more likely to have served as game objects.

⁷Rao, *op. cit.*, p. 140. Rao describes typically Harappan terracotta cakes of larger size than any of the Malvan specimens, as occurring in Rangpur Period IIA, and very rarely in II B.

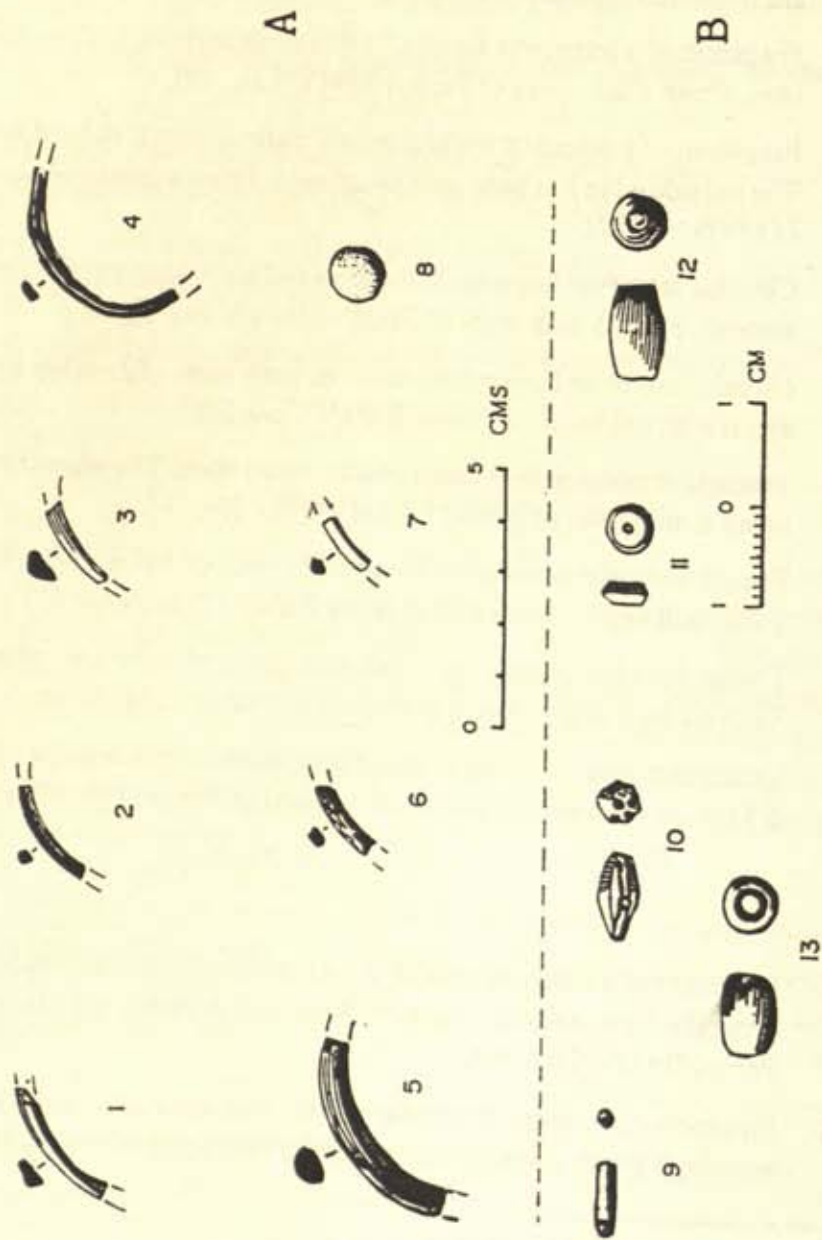


FIG. 19 : Shell and glass objects and beads

OTHER FINDS

3. Fragment of a hopscotch, circular made on a thick sherd of coarse black and red ware, with edges roughly ground. From an early level of Period I (MVN no. 28).
4. Hopscotch or circular game piece, made of coarse red ware. From a mid-level of Period I (MVN no. 29).
5. Stopper or plug, circular in section, with a low boss in the centre of its top, made from black-grey ware. From Period II (MVN no. 27).
6. Ear plug, circular, tapering towards one end. From a mid-level of Period II (MVN no. 6)

PL. XI B

1. Cake of rough terracotta, well fired, circular and flat, having the shape of a bun. Diameter 9.5 cm. From an early level of Period I.⁸

D. SHELL OBJECTS

Although quantities of both fresh water and marine shells were found associated with cultural materials at Malvan, only one artefact of this category was discovered. This comes from a late level of Period I and may be compared with examples from Rangpur IIA and IIC.⁹

FIG. 19 A

1. Fragment of a shell bangle, with plano-convex section, from a late level of Period I (MVN No. 4).

E. GLASS OBJECTS

The only objects of glass discovered at Malvan are fragments of bangles. All are attributable to period II. Three are of a very dark black or blue colour, and three in a lighter dull green.

2. Fragment of a glass bangle, opaque, pentagonal in section, black. From a late level of Period II (MVN no. 24).
3. Fragment of a glass bangle, opaque, plano-convex in section, from a late level of Period II.
4. Fragment of a glass bangle, opaque, rectangulate in section, black. From a late level of Period II (MVN no. 26).
5. Fragment of a glass bangle, opaque, plano-convex in section, black. From a late level of Period II (MVN no. 13).
6. Fragment of a glass bangle, opaque, squarish section, grey-green. From Period II (MVN. No. 14).

⁸Similar cakes occur occasionally in Harappan sites.

⁹Rao, *op. cit.* p. 14 a.

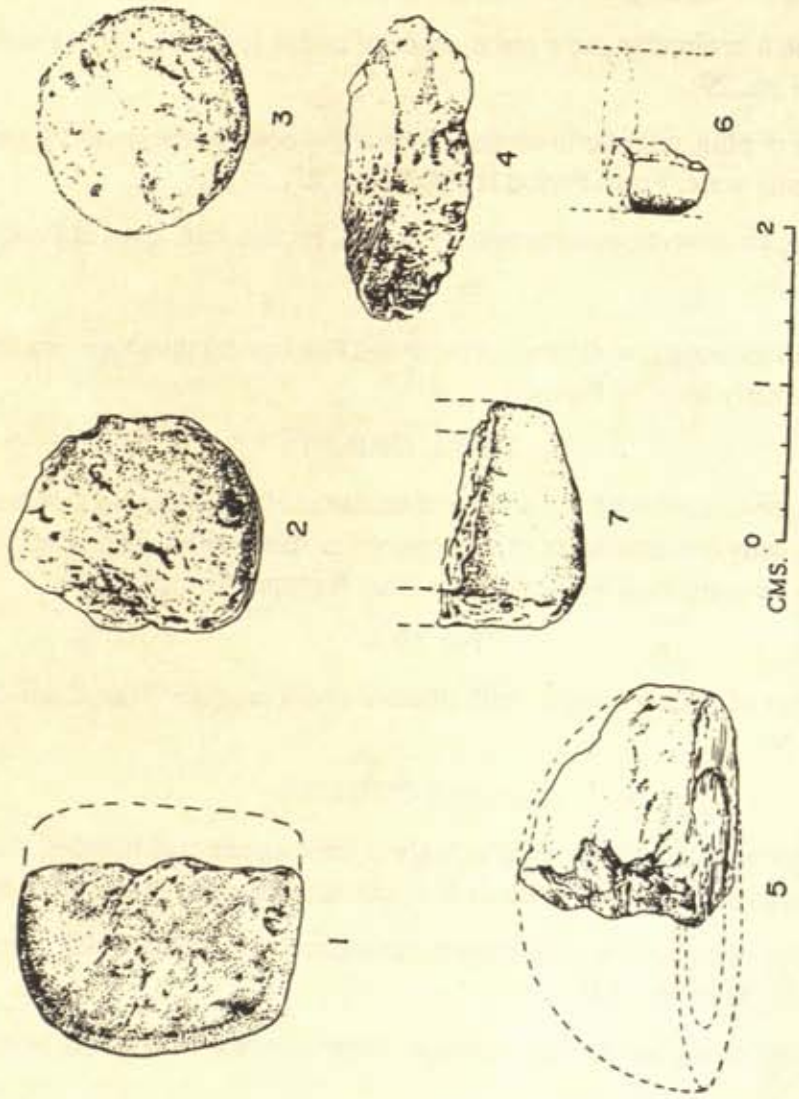
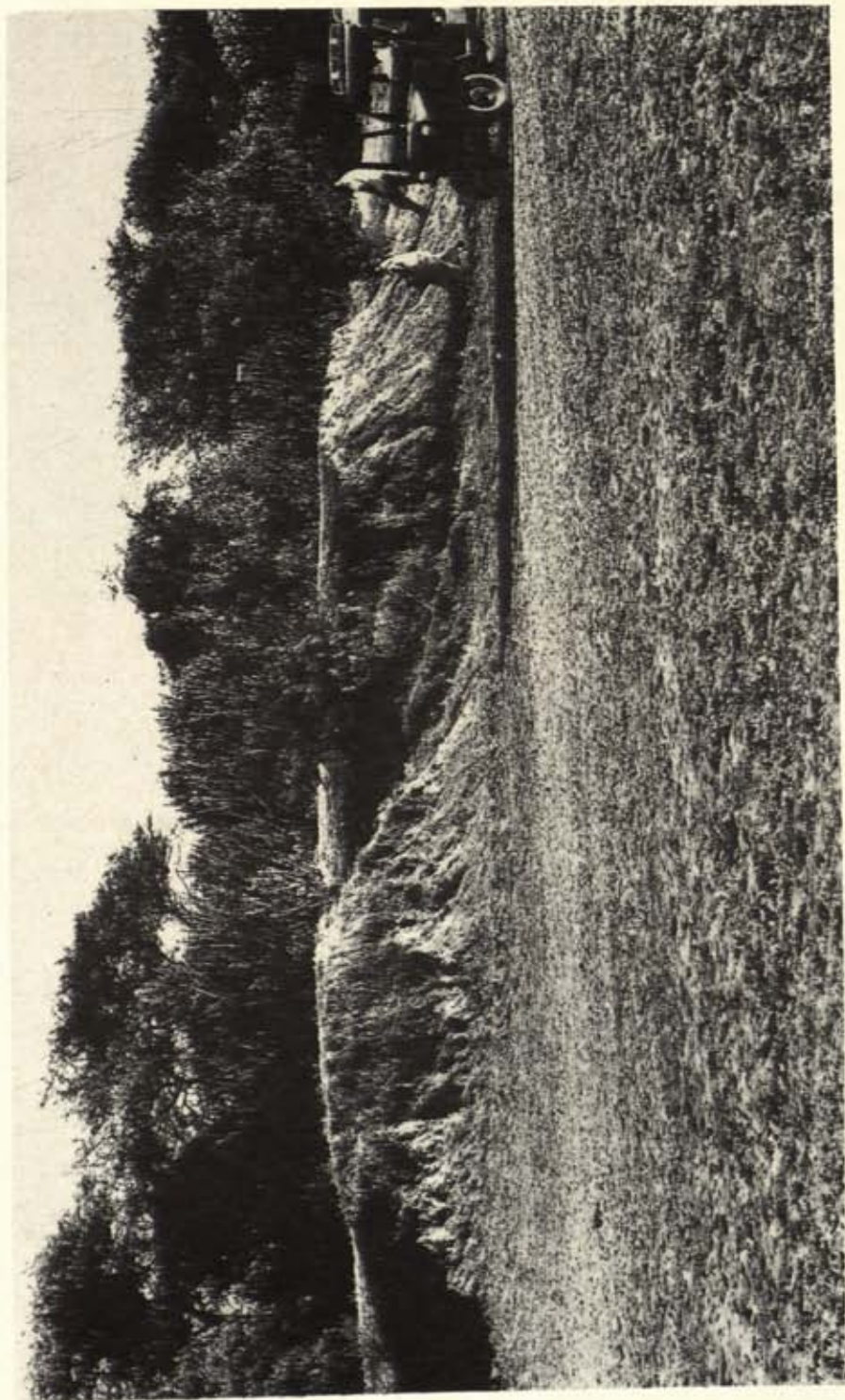


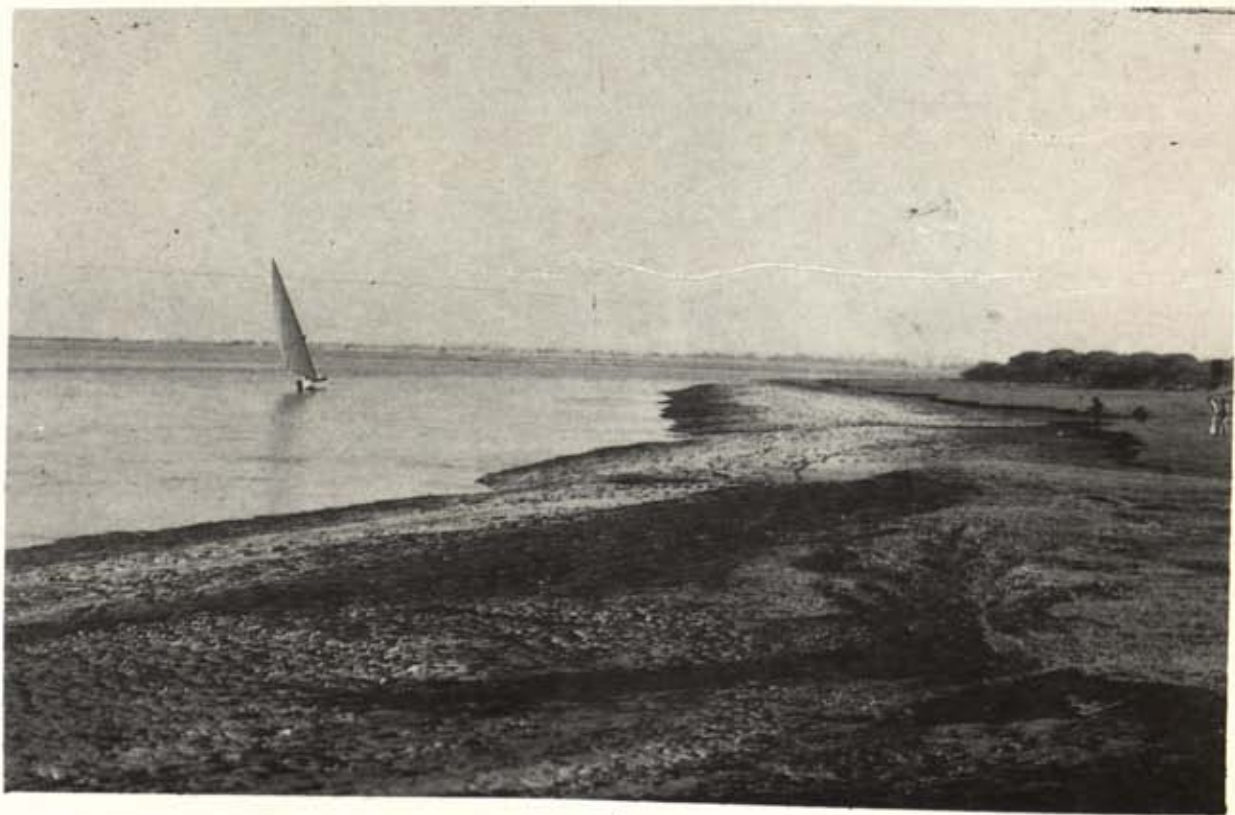
Fig. 20 : Miscellaneous stone and terracotta objects



Malvan : general view of site on bank (exploration). See p. 3

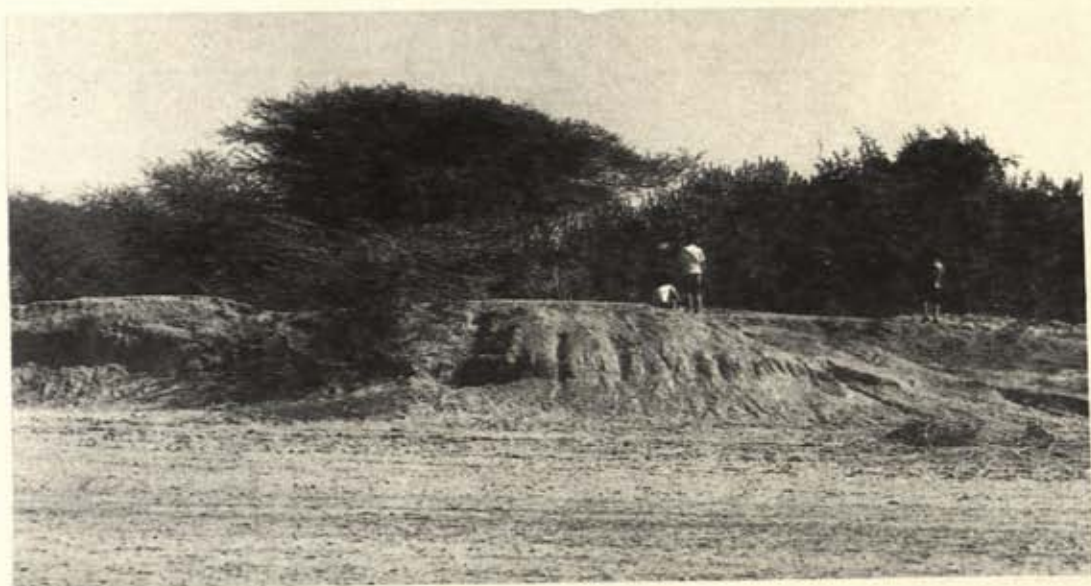


A

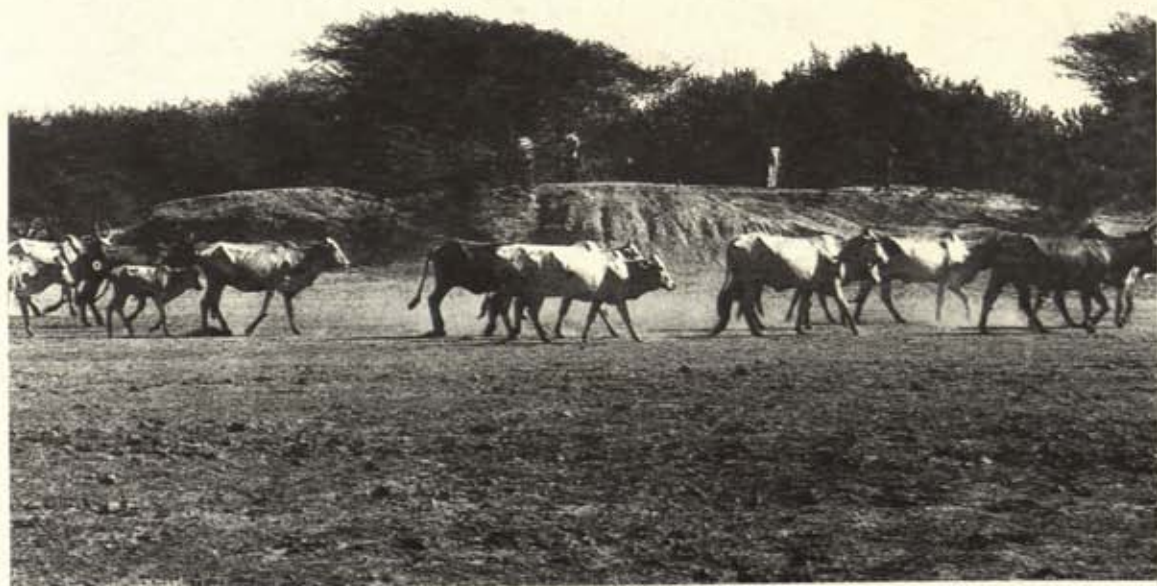


B

Malvan : view of Tapti river bank. See p. 11

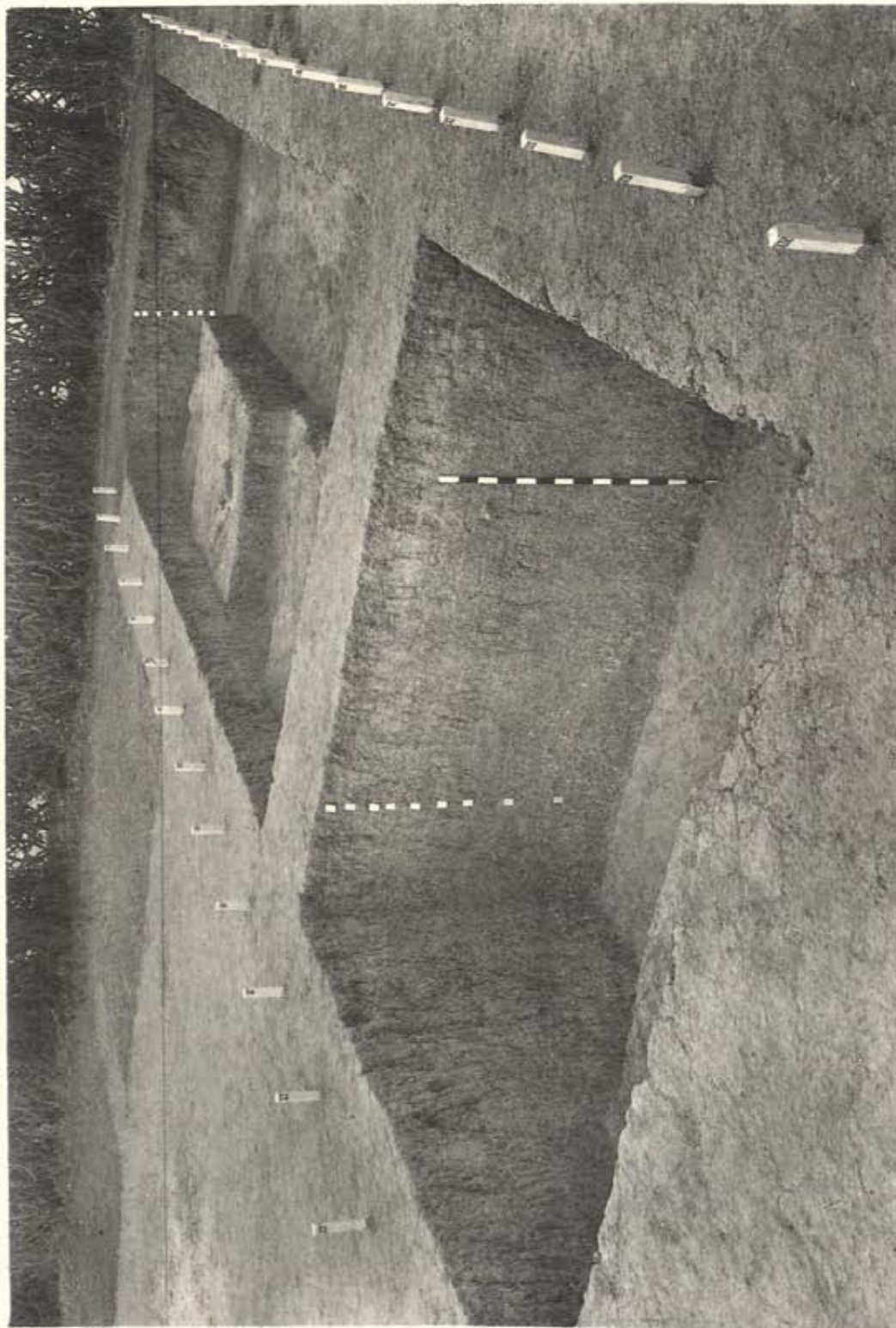


A



B

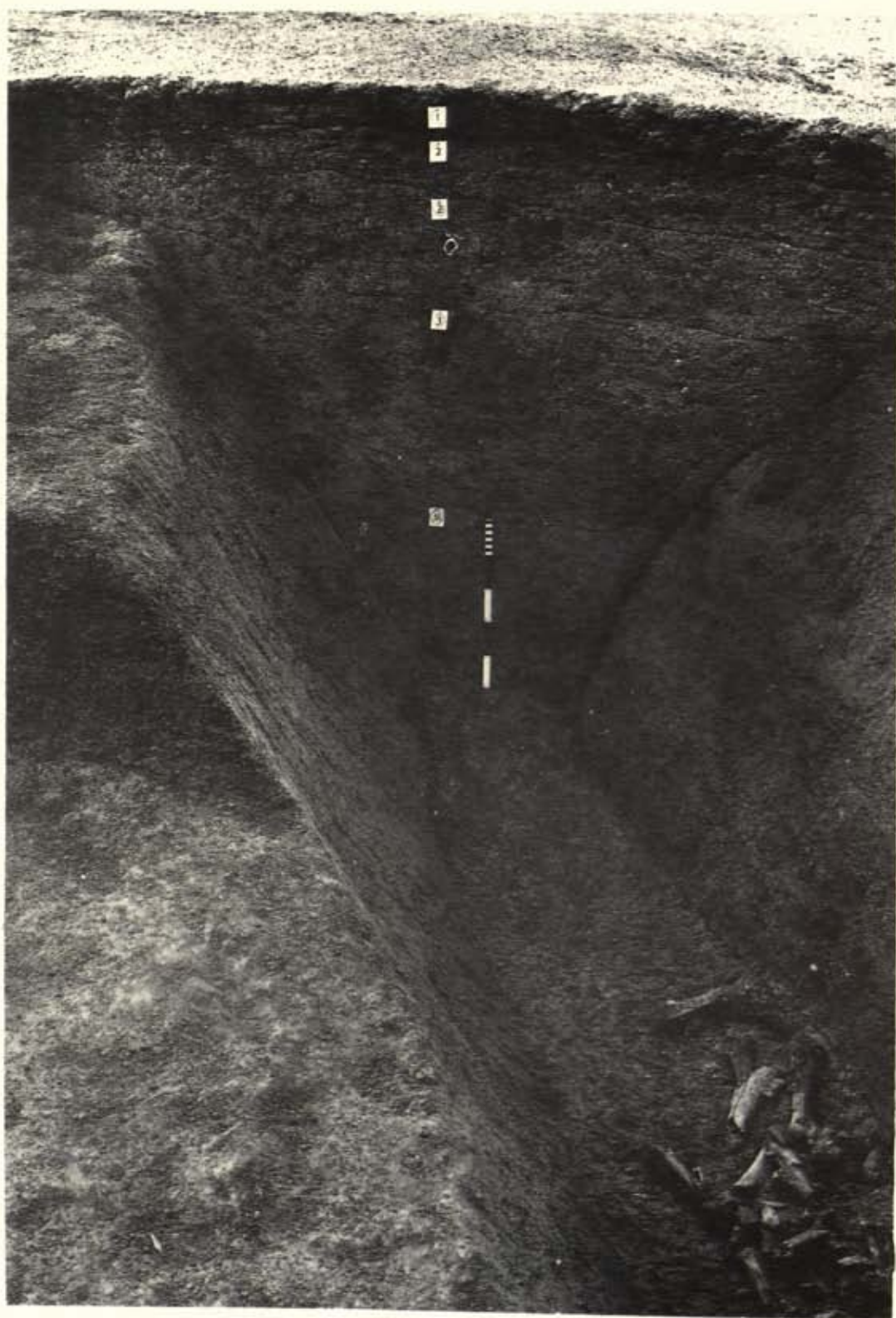
Malvan : general view of site, See p.13



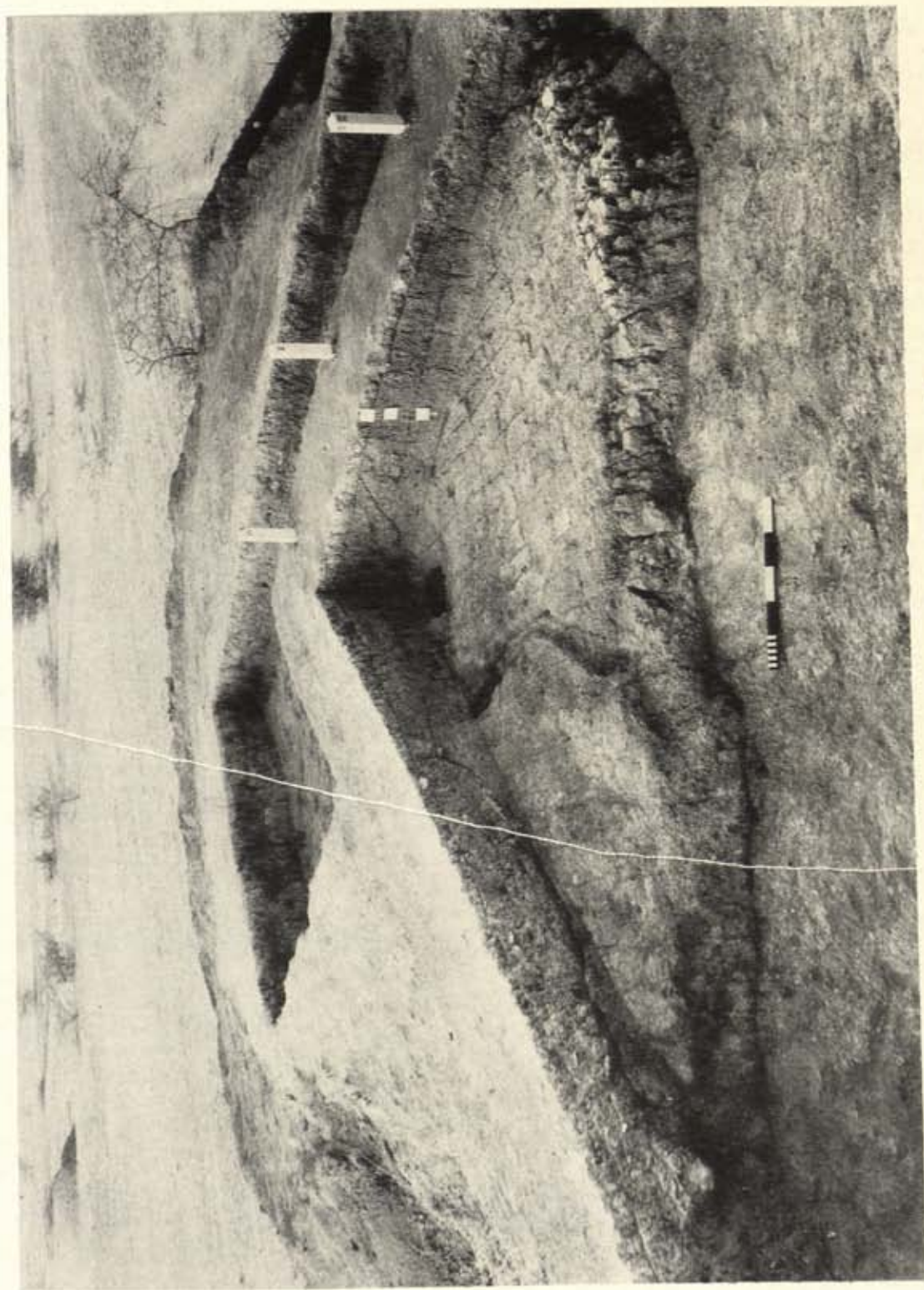
Malvan : view of trench MVN 2. See p. 25



Malvan : Section of MVN 4 showing alluvial and sand deposits. See p. 33



Malvan I : view of the ditch with cattle bones. See p. 34



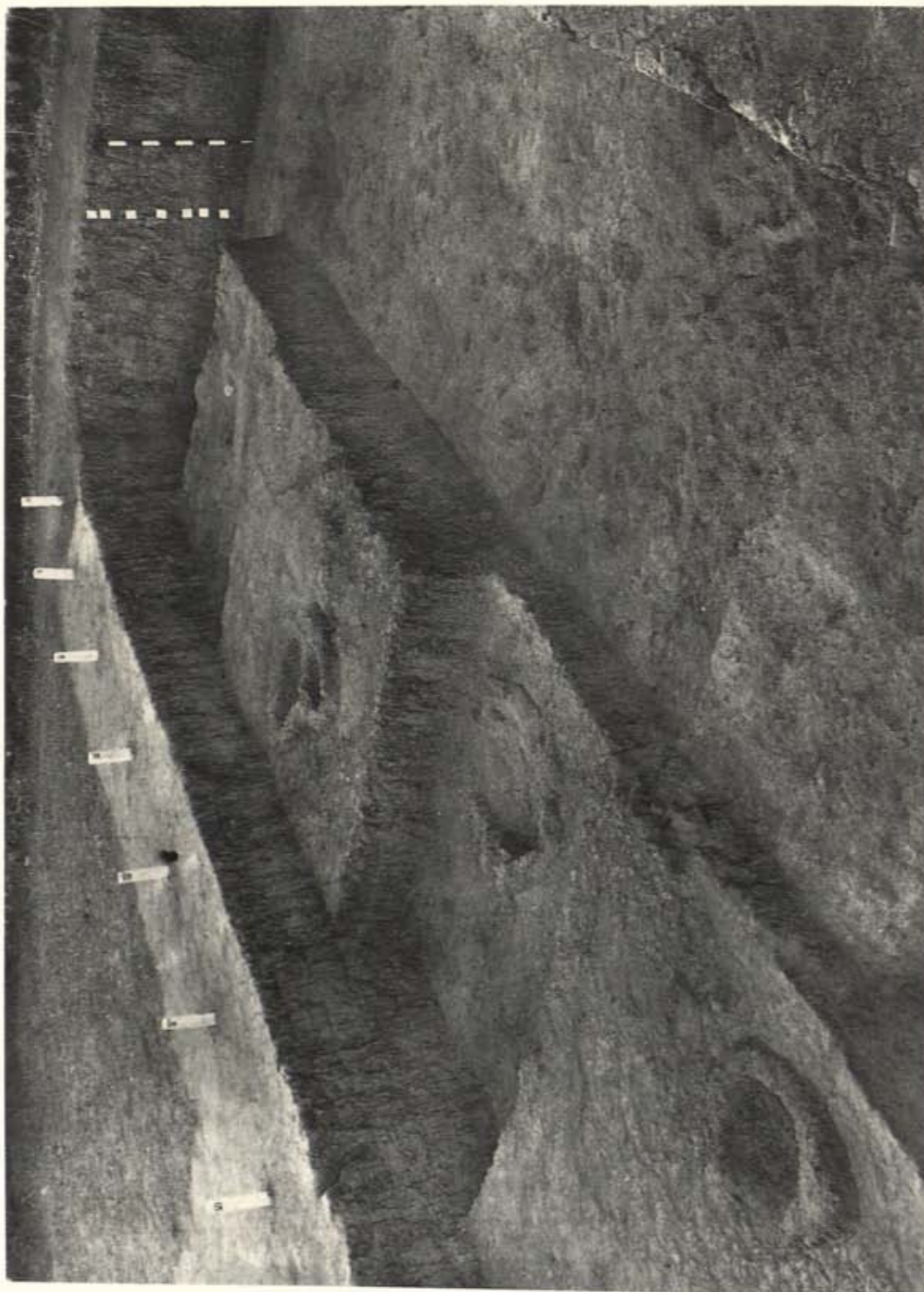
Malvan I B : remains of mud brick structure. See p. 34



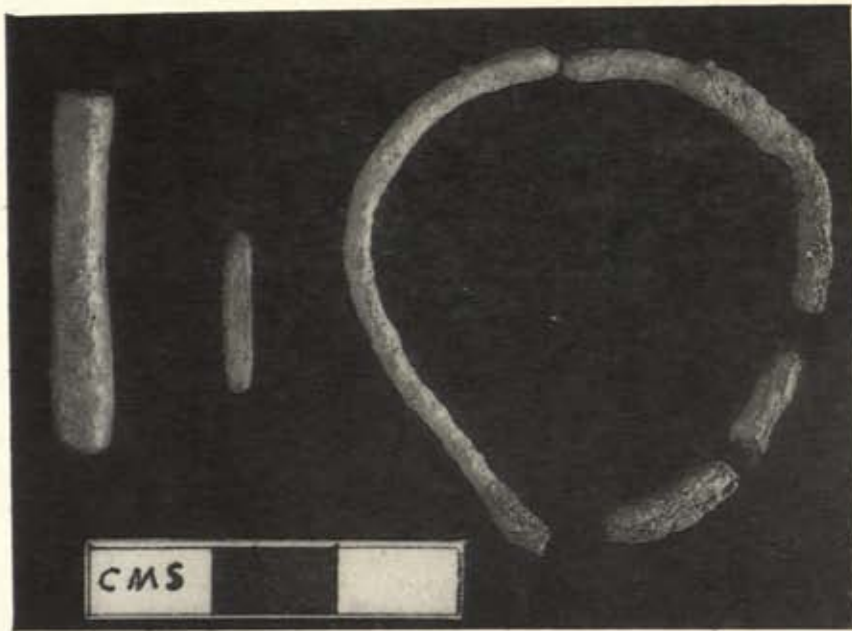
Malvan I B : extension of section showing brick structure. See p. 34



Malvan I D : ditch and embankment. See p. 34



Malvan II : showing hearths of different levels. See p. 35

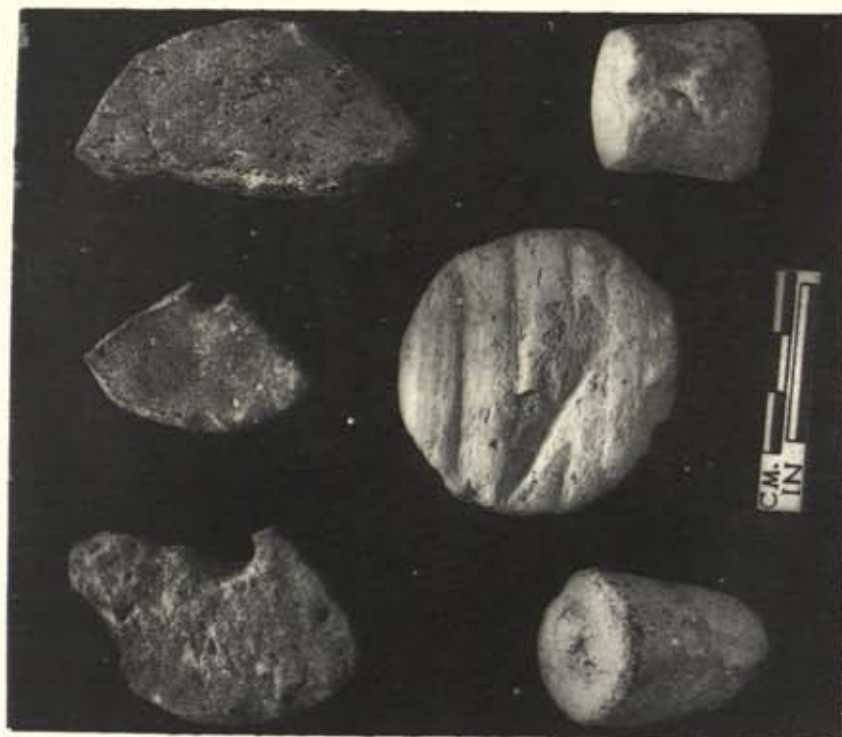


A

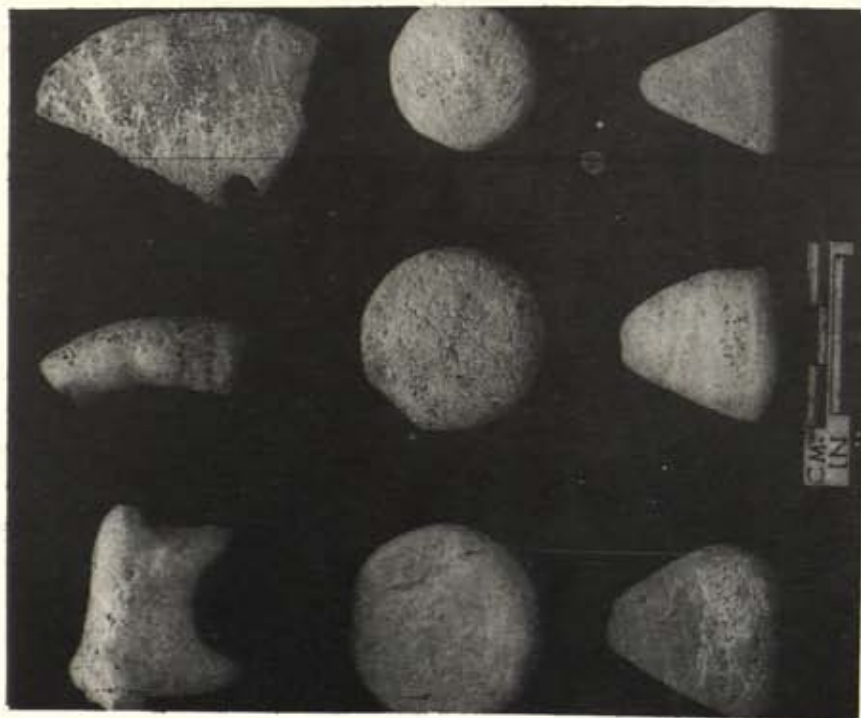


B

Malvan : A, copper objects ; B, terracotta cake. See pp. 76 and 79



B

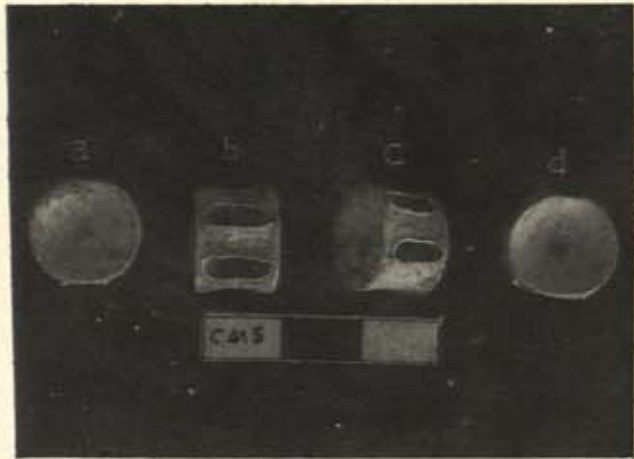


A

Malvan : terracotta objects. See p. 77



A

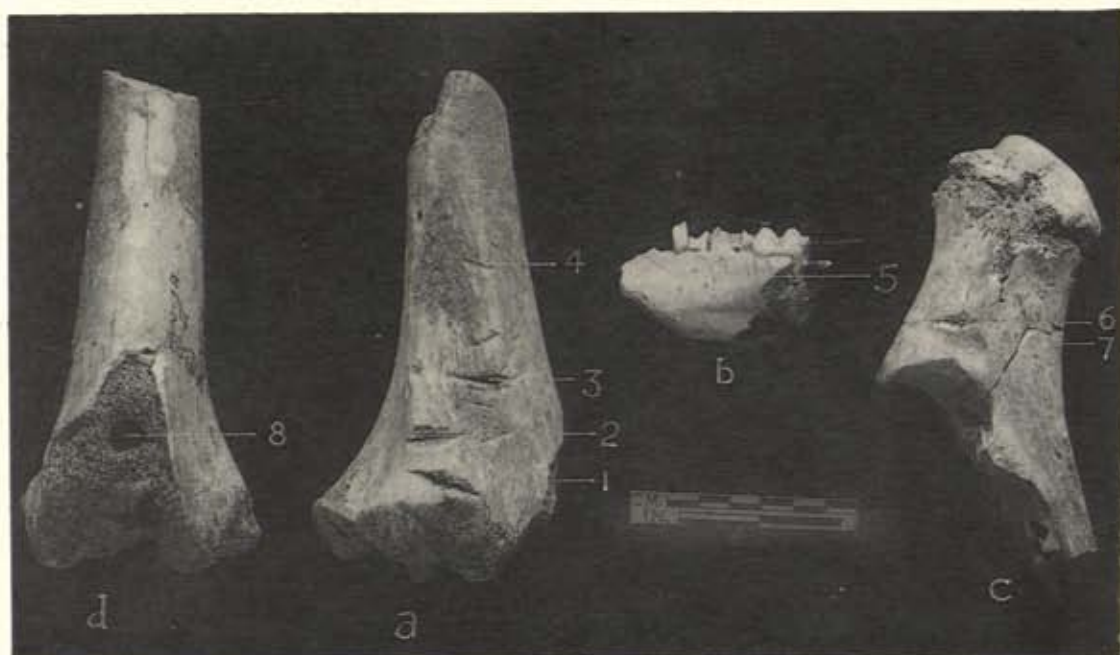


B

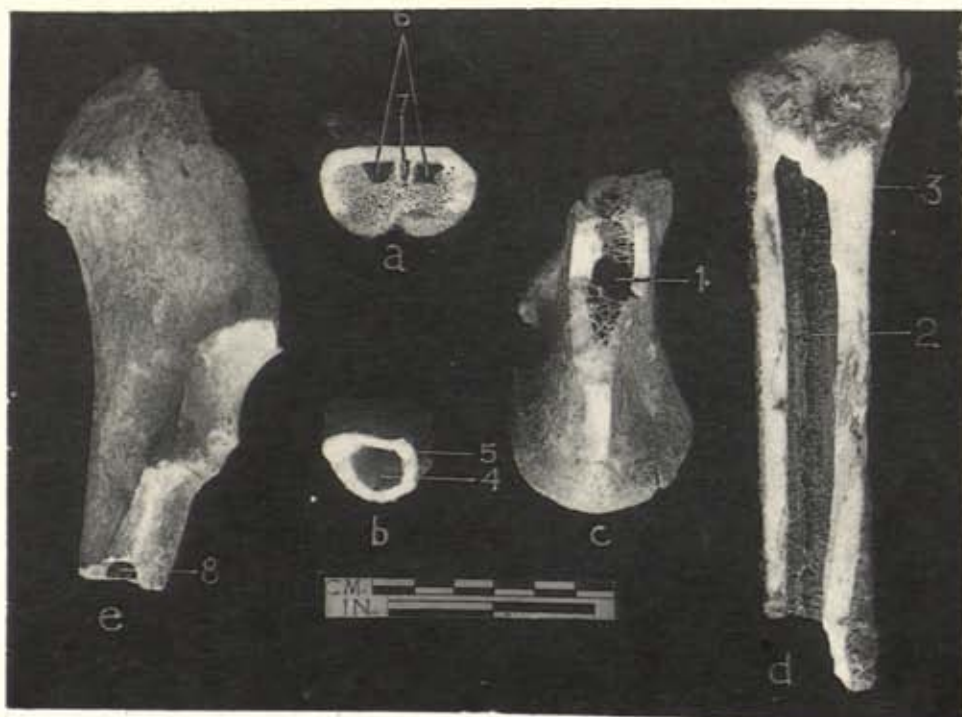


C

Malvan : animal remains. See p. 88

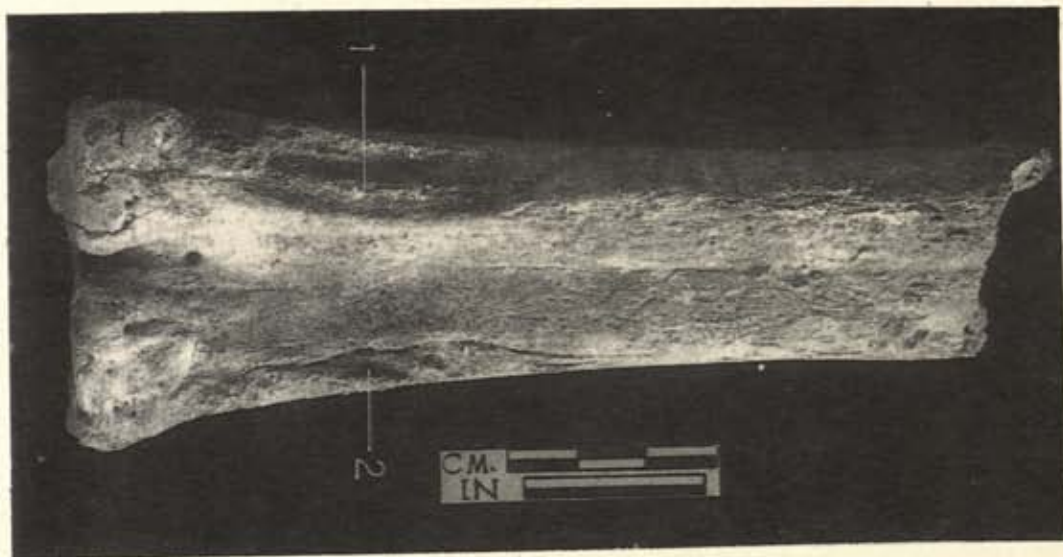


A

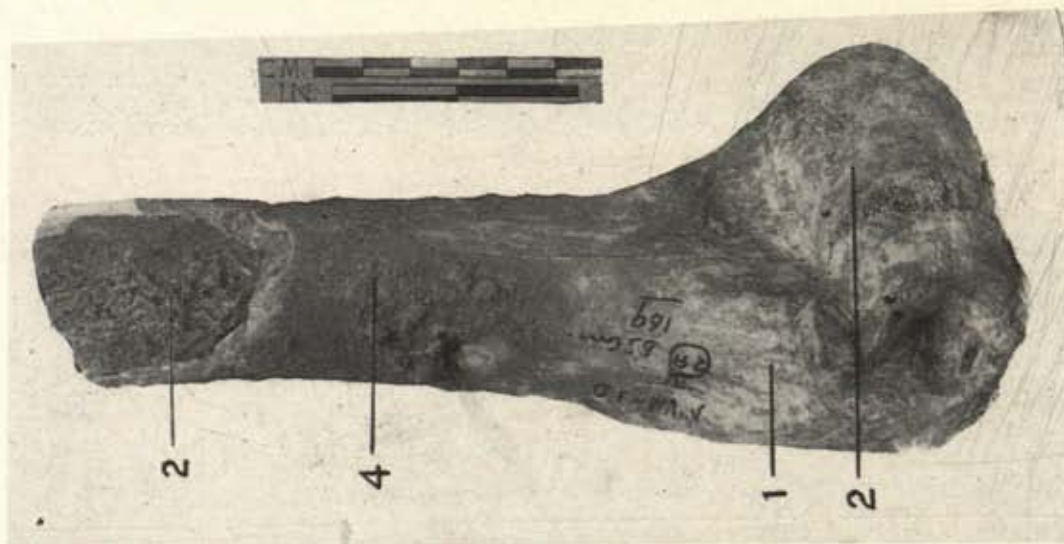


B

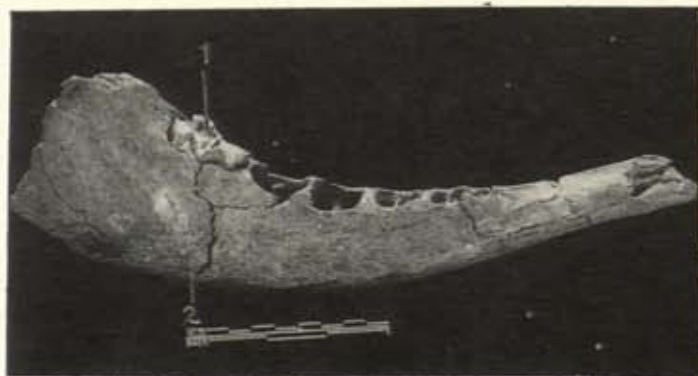
Malvan : animal remains. See pp. 89 and 91



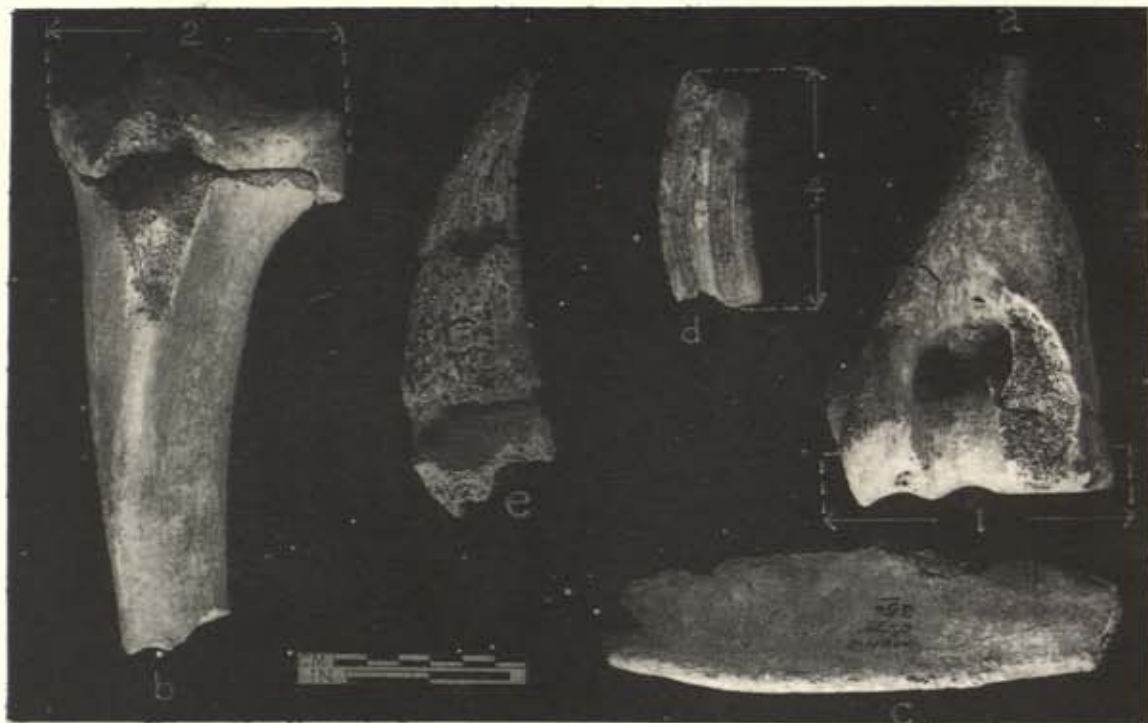
A



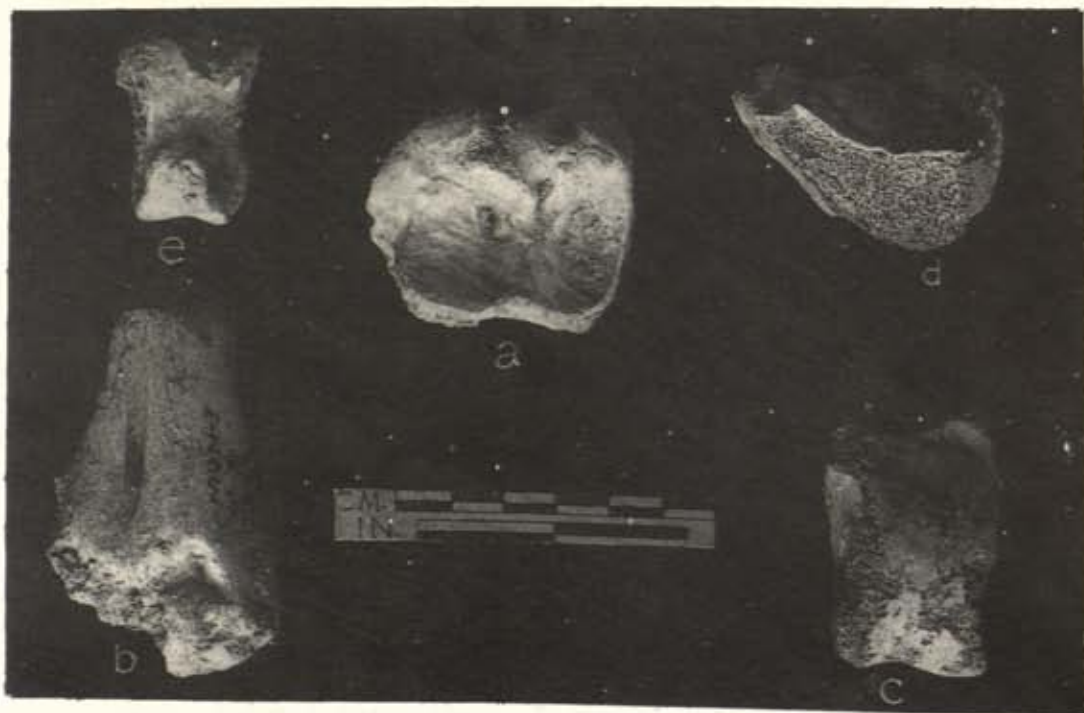
B



C

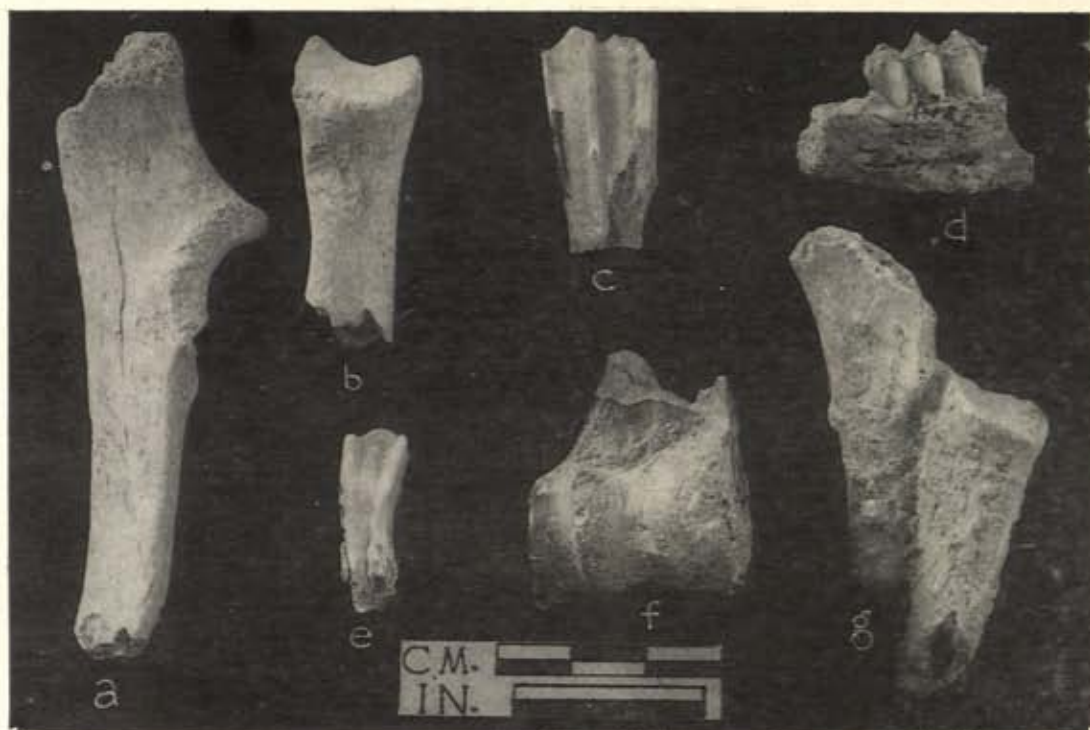


A

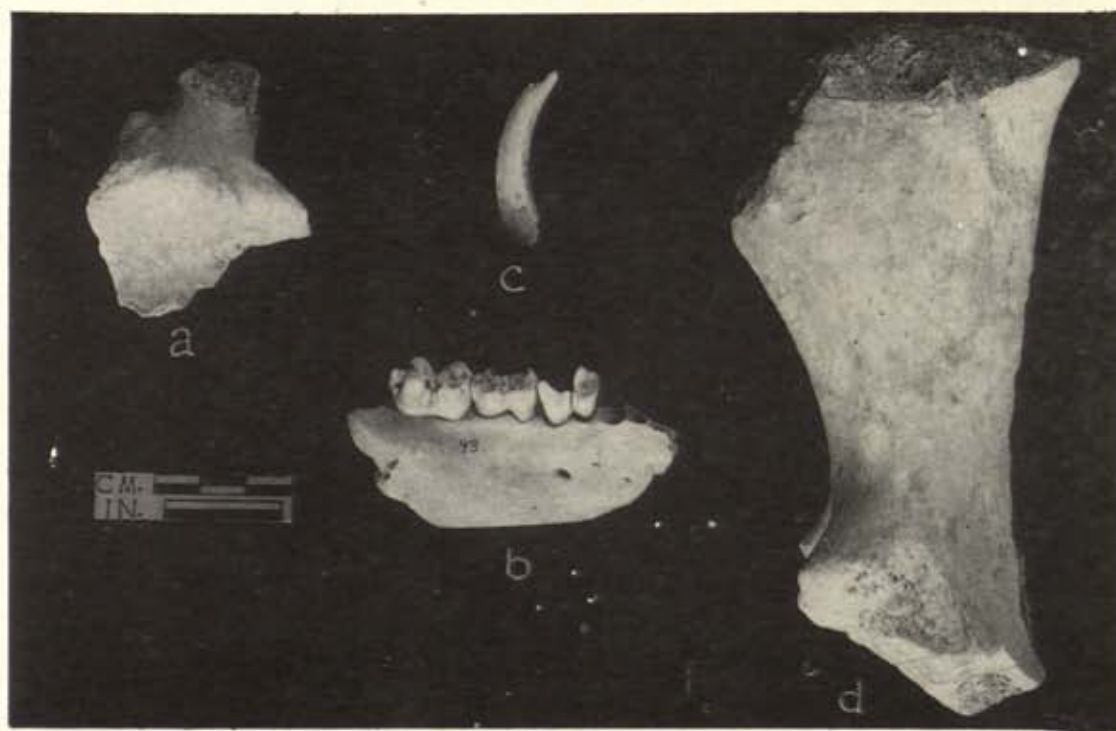


B

Malvan : animal remains. See p. 94



A

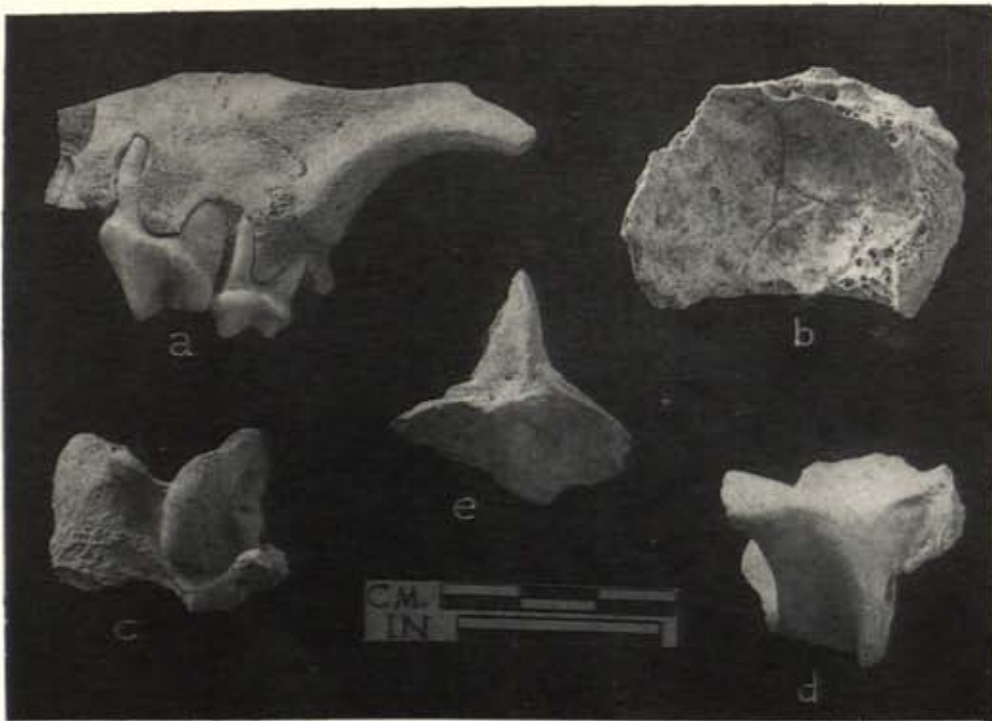


B

Malvan : animal remains. See p. 94

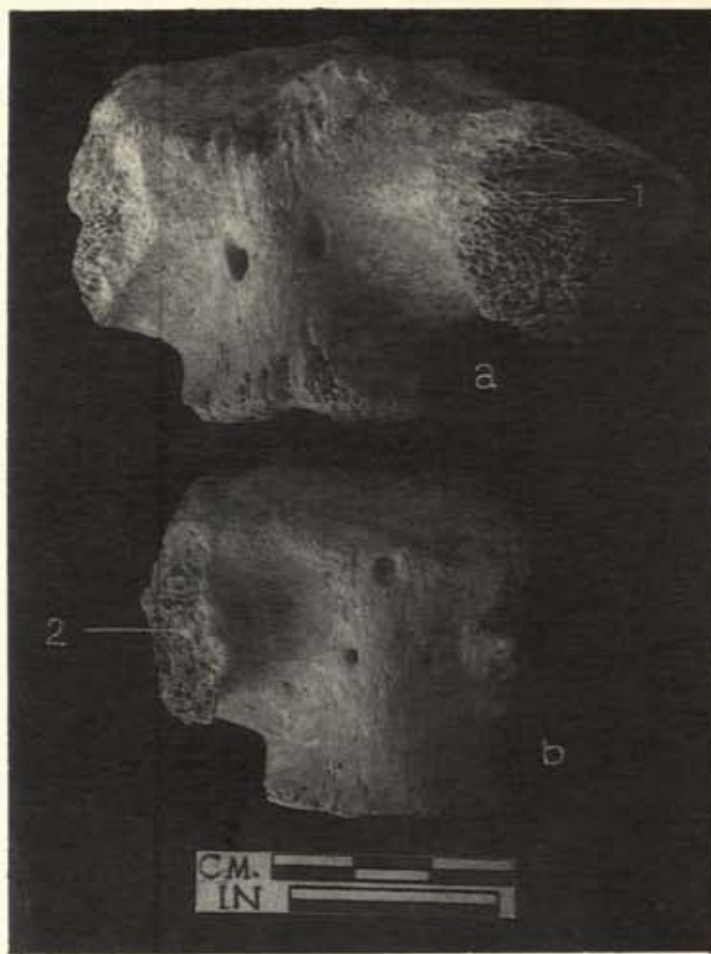


A



B

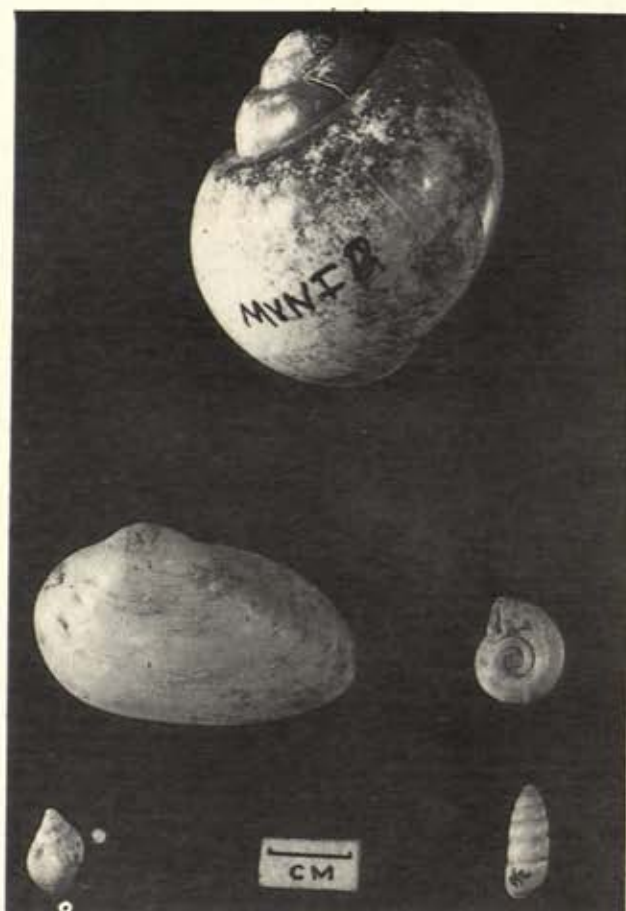
Malvan : animal remains. See pp. 94-95



Malvan : lumbar vertebra of horse. See p. 95



C



A



B

OTHER FINDS

7. Fragment of a glass bangle, opaque, roundish section, grey green. From a late level of Period II (MVN. No. 1).

F. BEADS (FIG. 19 B)

Five beads were discovered, of these, one is of steatite, two are of carnelian and two are of terracotta. All except the hexagonal piece may be compared with beads from Rangpur of various periods.

9. Steatite: long cylindrical circular bead. From an early level, of Period I (MVN no.16).
10. Carnelian: long convex hexagonal bead. From a mid-level of Period I (MVN no.23).
11. Carnelian: standard truncated becone short circular bead. From a mid-level of Period II (MVN no. 10).
12. Terracotta: long barrel circular bead. From a late level of Period I (MVN no. 11).
13. Terracotta: long barrel circular. From a late level of Period I (MVN no. 9).

G. OTHER MISCELLANEOUS STONE OBJECTS

Under this heading we include a selection of illustrated rubbing stones, querns, etc. Altogether, some forty larger pieces of rock were discovered in the excavations. Because of the situation of the site on an alluvial plain, and the consequent absence of any local source for these pieces, we noted their character. The great majority are of trap or doleritic rock, and may thus have been obtained from the ghats to the east of Malvan. A smaller number are of sandstone, of which two varieties were noted, the one a characteristic Vindhyan sandstone, and the other, evidently obtained during Period I, is a fine grained sandstone whose place of origin is unclear. A few nodules of laterite, which are exposed at various points in the Tapti valley, were also obtained. Among the illustrated pieces is a large lump of terracotta (fig. 20).

1. A broken rubbing stone of trap, rectangulate in plan and with a plano-convex section. 9.5 cm. in width, and 30 cm in thickness. Has been rubbed smooth. From an upper level of Period II (MVN II).
2. Fragment of a rubbing stone of trap has been rubbed smooth. From an upper level of Period I.
3. Spheroid rubber or hammerstone of coarse pink sandstone. Diametre 7.5 cm. Rubbed smooth on one side. From an unstratified level.
4. Fragmentary saddle quern of trap, heavily worn on the concave upper surface. 3 cm in thickness. From an early level of Period I.
5. Terracotta, bun-shaped, flattened and rounded cone of well fired red earthenware. The original diametre is approx. 13.5 cm and height 8 cm. The under side is flat and has had

a shallow depression scooped out of the centre, leaving a regular band of about 2 cm in width around the outer edge. There is a suggestion of a central hole pierced from the top. Function cannot be determined. From a late level of Period II.

6. Small fragment of fine brownish pink sandstone, texture resembling Chunar sandstone, part of a cylindrical pestle. From a late level of Period II.
7. Rectangulate rubbing stone of trap, heavily worn and smoothed on two faces. From an early level of Period I.

H. MISCELLANEOUS STONE OBJECTS

Under this heading we include sandstone marbles, attributable to Period I.

1. Red sandstone marble, 1.3 cm diameter, nearly spherical. From the an upper levels of Period I (MVN no. 15).
2. Brown sandstone marble, nearly spherical, 2.0 cm diameter From a mid-level of Period I. (Not illustrated).
3. Brown sandstone marble, nearly spherical, 1.6 cm diameter From an early level of Period I (Not illustrated).

CHAPTER VI

SCIENTIFIC REPORTS

- A. Animal Skeletal Remains
K. R. Alur & A. K. Sharma
- B. Study of basin floor Sediments Samples
K. T. M. Hegde
- C. Pollen Analysis of Samples
Vishnu Mittre
- D. Shell Remains
D. Shah

CHAPTER VI

SCIENTIFIC REPORTS

A. ANIMAL SKELETAL REMAINS

Animal bones, recovered from different layers of the trenches at Malvan, have been packed separately as found in each layer, after initial cleaning. Bones from one layer are packed in one bag. Bones belonging to smaller animals have been packed in paper packets in order to avoid further damage. Thus, there are in all 25 bags and 28 packets. Each bag and packet bears label indicating the locus, layer no., depth and serial number of bones it contains. Each bone has been marked indicating its serial number, locus, layer from which it was recovered and the depth at which it was found. In all there are 375 pieces of bones that have been selected for study and report, after initial sorting at the site. Out of these 375 pieces, bones bearing number 1 to 17, 101 to 119, 125 to 135, 162 to 168, 225 to 230 and 308 (in all 61 pieces) belong to Period II and the rest to Period I.

Due to the nearness of the river and presence of high percentage of salt in the soil of the area, the majority of the bones obtained from the excavation have become fossilised. They have developed numerous cracks and many are heavily incrustated with carbonate deposit. Almost all have gained weight except for a few found deposited in a predominantly ashy deposit, which have become light and porous. The majority are in good state of preservation.

Animal bones excavated from Malvan, have been studied in order to get a knowledge of faunal assemblage, and to try to reconstruct the geographical, economic and social history of the site with the help of other finds, as far as possible. In this process an attempt has also been made to find out the food habits of the people of Malvan, domestication of animals and their subsequent use for agriculture and draft purposes.

Modern specimens as well those from some other excavated sites, were used for comparative purposes. In order to inspect the interior and to have correct details some bones were cut through and observed under the microscope.

As most of the bones are encrusted with a carbonate deposit, in some cases it was necessary to remove it for proper identification and study. Such pieces were treated with dilute acetic acid. Some were mended with different grades of perspex solution in toluene and were preserved with polyvinyl acetate.

Chart showing the provenance of bones

PERIOD II			
<i>Trench no.</i>	<i>Layer</i>	<i>Sr. no. of bones</i>	<i>Bag/Pkt. no.</i>
MVN 2,0-IV	(1A)	1-17	1
MVN-1A,0-IV	(1)	101-107	6
MVN-1, I-III	(1)	108-119	7
MVN-1A	Pit sealed by (1)	125-135	9
MVN-2A	(1)	162-168	12
MVN-2, 0-IV	(2)	225-230	18
MVN-1D	(1)	308	23
PERIOD I			
MVN-1, 0-II	Ditch	18-37	2
MVN-1, 0-II	(3A)	38-69	3
MVN-1D	(1A)	70-96	4
MVN-1C	Ditch	97-100	5
MVN-1A, 0-II	(2)	120-124	8
MVN-1, 0-II	(3)	136-141	10
MVN-1C	(2A)	142-161	11
MVN-1D, IV	(3A)	169-171	13
MVN-1D	(1A)	172-190	14
MVN-11A	(3A)	191-199	15
MVN-1C, I-III	(3A)	200-202	16
MVN-1C	(2)	203-224	17
MVN-1A, 0-IV	(2A)	231-237	19
MVN-1A, II-IV	(3)	238-249	20
MVN-1, III-IV	(2)	250-264	21

Trench no.	Layer	Sr. no. of bones	Bag./ Pkt. no.
MVN-1B	(2)	265-280	22
MVN-1A, II-IV	(3A)	281-297	23
MVN-1, 0-II	(2)	298-307	24
MVN-1, 0-I	(3)	314-339	25
MVN-1A.	(3A) Ditch	309	24
MVN-1, VII-V	(2)	310-311	25 & 26
MVN-1D	(1D)	312	27
MVN-1, III-IV	(2)	313	28
MVN-1, 0-III	Ditch	340-374	1-21
MVN-16	(4) pit	375	22

Period II has yielded the skeletal remains of the following species the identification of which is given in Table I :

1. *Bos indicus* Linn - The domestic cattle
2. *Bubalus bubalis* Linn - The Indian buffalo
3. *Equus caballus* Linn - The Horse
4. *Capra hircus aegagrus* - The goat
5. *Ovis vignei* Blyth, *race-domesticus* - The sheep
6. *Sus Scrofa cristatus wagner* - The pig
7. *Canis familiaris* Linn - The dog
8. Fish
9. *Cervus duvacelli cuvier* - The barasingha

Cattle and buffalo formed the major part of the collection. By now cattle were completely domesticated. There is an absence of marks of chopping and cracking of bones for the purpose of food and very scanty evidence of roasting. This shows that in Period II people of Malvan had become predominantly agriculturists.

Notes on bone specimens of Period II

(i) *Size of cattle* : The cattle of the locality were of the same size as modern cattle. Breed variation is negligible but a few specimens of massive size were found. This is ascertained by the

presence of the first phalanx of a beast which is (Sr.no. 112&126) double the size of their of present day cattle, so also the scapula.¹

As bone fragments of this type are few, a definite opinion on the breed variations present on the location is not expressed.

(ii) *Bone diseases* : Upper molar of cattle indicates the presence of tartar at two places. (Sr.no. 166). That at the top is due to deposition of food material in the furrows which got hardened becoming encrusted in of the enamel. The tartar at the base is of ochre colour and it is only a thin deposit (pl.XIII A) . Molar (Sr.no. 163) of cattle-encrusted with tartar. When tartar is removed, the corroded area below is visible-indicative of enamel infection.

(iii) *Fish bones* : Four vertebral segments of fish (Sr. nos. 130-133; pl. XIII B): They belong to a fish of medium size. The suggestion that they formed a part of the diet is remote, because the number identified is too scanty. The bones of other parts of the diet is remote, because the number identified is too scanty. The bones of other parts of the body being fragile, are likely to have been disintegrated. It is usual to find fish vertebra alone.

(iv) *Food habits* : The evidence of roasting is mostly wanting, but for the few fragments mentioned above, which indicate that they formed part of the roasting process. Even in them the process is light involving the surface compact layer only.

All the bones are fossilized and bear no external symptoms of either chopping or severance from the articulated joint.

One of the roasted segments (229) appears to have been used as a bone tool scraper (pl. XIII C.a).

The skeletal remains of the following species of animals have been identified in Period I (see Table II) :

1. *Bos indicus* Linn - the domestic cattle
2. *Bubalus bubalis* Linn - the indian buffalo
3. *Equus caballus* Linn - the horse
4. *Capra hircus aegagrus* - the goat
5. *Ovis vignei* Blyth, *race domesticus* - the sheep
6. *Sus scrofa cristatus wagner* - the wild boar

¹The explanation of these bones may be due to the mixed character of these strata. These bones may therefore be more properly associated with Period I.

7. *Canis familiaris* - the domestic dog
8. *Cervus duvacelli cuvier* - the barasingha
9. *Axis axis Erxleben* - the spotted deer

Here also cattle and buffalo formed the major part of the collection. Clear and consistent evidence of chopping, cracking and roasting of bones shows that during this period the people of Malvan, apart from agriculture were augmenting their food with meat and by hunting. This is confirmed by the presence of wild species of different animals in the collection, along with domesticated ones. By now domestication had already started and people had acquired the knowledge of breeding of cattle. The presence of a large number of antelope bones shows that they were frequently hunted for food. Though the collection did not show any fish bones from this Period, fishing cannot be ruled out.

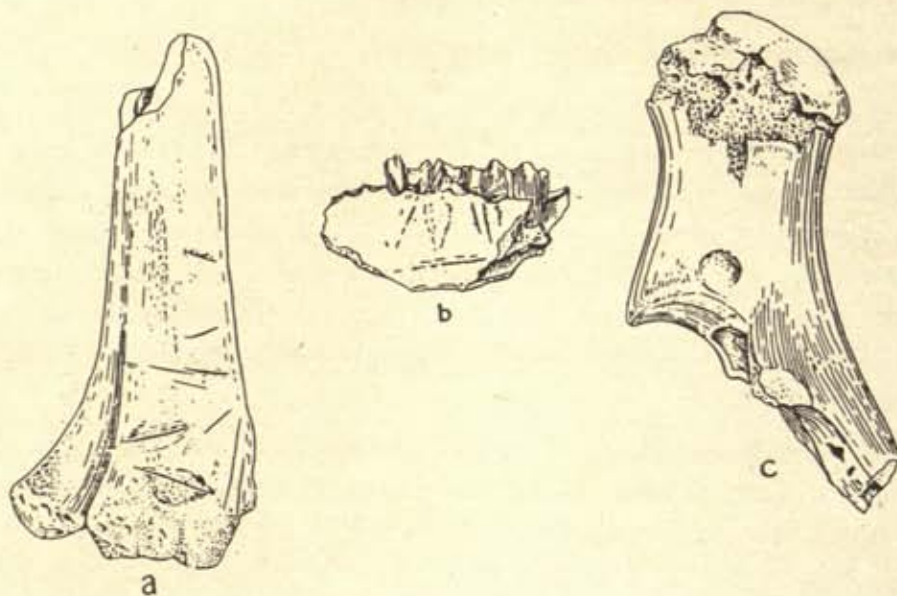
Notes on bone specimens of Period I : The roasting of animal flesh appears to have been common in this period. The heavy charring of bones has not been noticed. There is definite evidence of contact with fire. A few (e.g. bearing no. 49, 223 and 299) approach the stage of charring. This light burning may indicate that roasting was done under field conditions, using mostly dry grass and leaves and not more solid fuel. Bones of cattle, sheep and goat have been generally subjected to this process.

Chopping of bones : The marrow contained in bones was a known edible material. The method used for marrow extraction was either very artful or by a heavy, bone-cracking process. The contents, being semi-liquid, have to be extracted without spilling. This has sometime been done by chopping and may also have been the method of removing the flesh. Chopping marks on specimen nos. 93, 122 (pl. XIV A. a-b; fig. 21 A.b and a) and 194 are indicative of the results of the severance of flesh, because they are superficial and do not penetrate beyond the depth of the compact tissue; while that on specimen no. 122, indicated by a boring 1.1 cm wide and 3.4 cm deep, is a clear sign that the purpose was to extract marrow. This is confirmed by the fact that the hole was bored when the bone was green, as indicated by the lateral surpression of the cancellous tissue surrounding the bone. This hole penetrates to the medullary cavity contained in the shaft (diaphysis) of the bone.

In specimen no. 333 (pl. XIV A.d; fig. 21 A. c) a similar approach for extracting marrow has been made with a blunt pointed instrument

Medullary cavity (cavum medullare) : "Medullary cavity is tubular and is enclosed in the shaft of all long bones, during the course of their development, which are first laid down in cartilage. This is absorbed by osteoclasts and is replaced by bone deposited by osteodasts. The osteoclasts also cause absorption of the primitive bone, producing the marrow cavities, thus in the case of long bones the primitive central spongy bone is largely absorbed to form the medullary cavity of the shaft. This cavity contains marrow (medulla ossium). The marrow occupies the interstices of the spongy bone

A



B

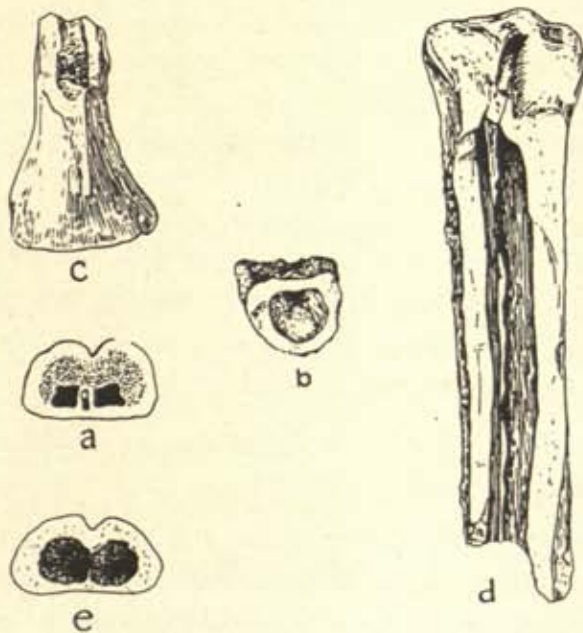


FIG. 21 : *Animal remains*

and the medullary cavity of the long bones".¹

With the growth and development of the animal, the cavity also expands and acts as one of the seats for the absorption of concussion. Animals known for their agility, exposure to forest hazards and insecure living, develop a thick compact tissue with a well defined medullary cavity. In the present day domesticated animals, this cavity is limited to long bones only, but in their early ancestors it is also identified in flat and elongated bones. Specimen no. 81 (pl. XIV B. c ; fig. 21 B. c) scapula, which is a flat bone, indicates the presence of this medullary cavity at the articular (glenoid) angle. Its extension into other parts could not be assessed as only a fragment of the bone was available. However the available depth in the specimen is 6.5 cm high and 1.5 cm wide.

Specimen no. 136 (pl. XIV B. e), ulna, reduced long bone, manifests the medullary cavity 7 cm long and 1 cm wide at the olecranon and shaft (which may extend downwards to the same length). This confirms the belief that bones of the ancestral animals had a medullary cavity contained in them irrespective of their classification characters.

Regarding the medullary cavity in the metacarpal or metatarsal bones, the story is different. In specimen no. 71 (pl. XIV B. d and fig. 21 B. d) the medullary cavity, which is nominally divided by the presence of a vestigial septum, is indicated by the presence of thick (1 cm) compact tissue encircling the bone with the practical absence of cancellated tissue, which should pervade both the extremities. The same picture is repeated in specimen no. 28. The weight is enhanced in such bones ranging in the proportion of 1.0 to 1.5 or sometimes 2.0. This is suggestive of the fact that compact tissue which is originally formed, gives rise to loose cancellated tissue, in animals either domesticated or those whose life hazards are scanty. This finding is also supported in specimen no. 261. pl. XIV B. b; fig. 21 B. b) which is the distal end of first phalanx presenting a medullary cavity from 1.5 cm wide and with a wall of compact tissue varying from 0.4 to 0.8 cm thick.

Associated with the above character is the varying stage of the growth of the medullary cavity, particularly in the region of the manus and digits. Cattle which are now classed as artiodactylus (even toed) animals had originally five metacarpals of which no. 3 and 4 have united to form a single bone called metacarpus or metatarsus. This double origin is indicated in the bone of the present day animals, by the presence of two clear medullary cavities separated by a median septum (fig. 21 B., e). In their ancestors, where the bone first started fusion, (the period of which is still to be identified) the medullary cavity surrounded by a thick compact layer slowly began to give rise to two separate cavities, sometimes indicating the presence of third in a vestigial form, wedged in between the two (fig. 21 B. a and pl. XIV B. a). With the continuance of evolution the cavity slowly enlarged absorbing the middle vestigial medullary cavity. So the bones which indicate the presence of a third medullary cavity are sufficiently ancestral to the modern animals which possess only two medullary cavities. Along with this, the compact tissue also degenerates in thinning out its walls and reduction in weight.

¹ Sisson and Grossman, *Anatomy of the Domestic animals*, London, 1967, pp. 20-21.

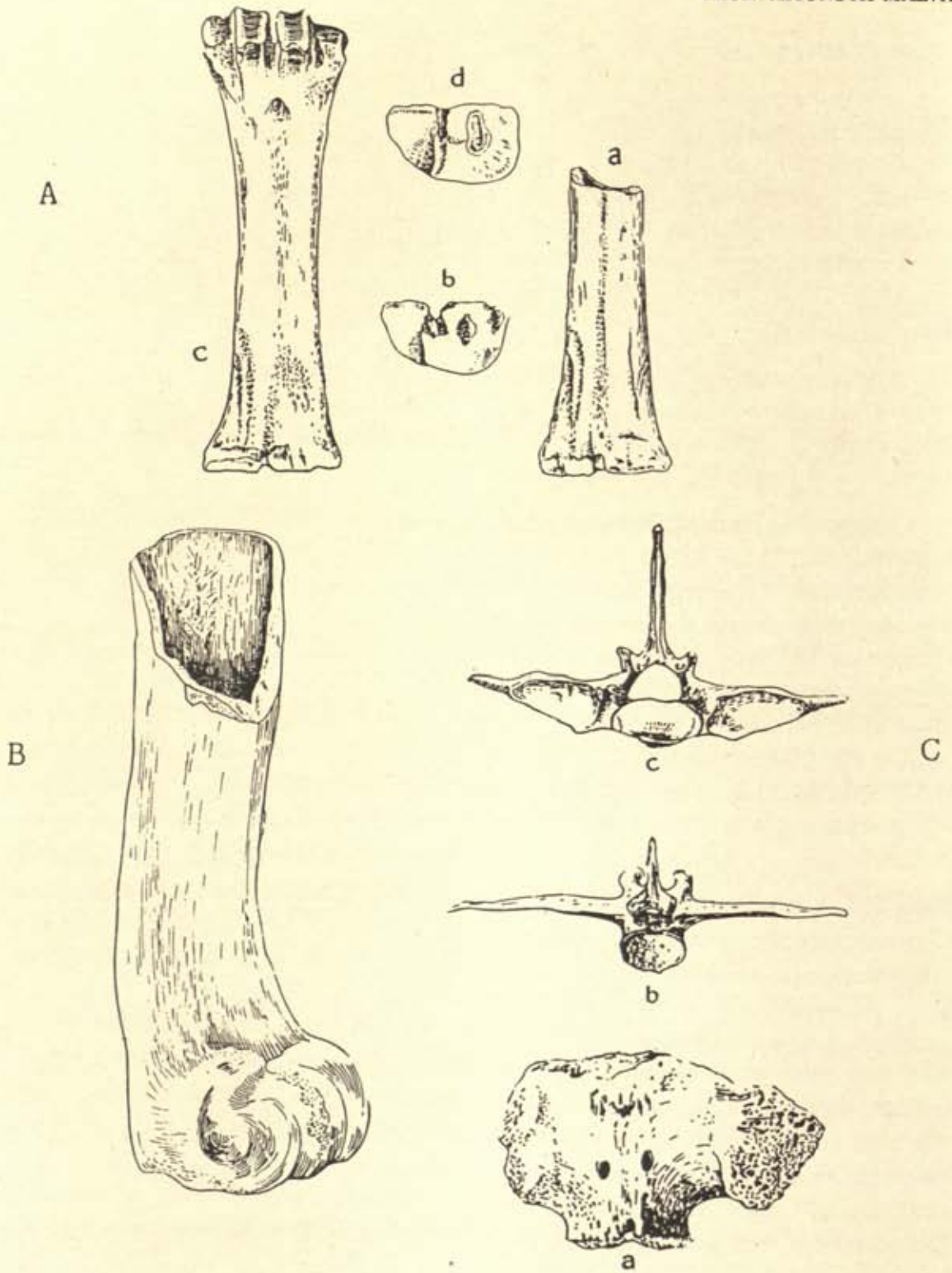


FIG. 22 : Animal remains

Associated with this is the indication given by the presence of the small metacarpal (fifths) which is one of the pentadactylus manus. In the present day animals this small metacarpal bone (Ms.5) is a rounded rod about an inch and half (ca. 3.5 to 4.0 cm) in length. As it was originally a separate bone which under the process of evolution is degenerating, it has now reached the above stage. The find of the gradual stages of suppression indicates not only the phase of evolution but also the ancestry of the specimen. Specimen no. 296 (pl. XVA and fig. 22 A, a) indicates a roughened area measuring about 6 cm, for the attachment of the small fifths metacarpal bone, suggesting that the bone itself may have extended to about 8-10 cm. This is more than double the size of the small metacarpus of the present day animals. In addition, it also shows the area of adhesion with the fused first and second metacarpus which is completely absent in the present day animals (It is not only intended to assess the ancestry of the bones but also to know the gradual stages of suppression of the metacarpals of the original pentadactylus animals).

Diseases identified from bones : The specimen no. 169 (pl. XV B; fig. 22 B) humerus of cattle has a vertical shaft marking a shallow, lateral, musculo-spiral groove and hence appears elongated and untwisted. The medullary cavity is 5.0 cm × 3.5 cm with the encircling compact layer which is only 0.4 cm. In its hollow there is very little cancellated tissue indicating that the bone has primarily got softened and drained off its calcium content, equally the twisted appearance had changed into a elongated form. Compared to the condyles which are 7.0 cm long, the shaft has widened to 4.5 cm. which is a great increase in its width. Consequently the weight of the specimen which has been considerably reduced is now 355 gm. This reduction of compact tissue increases the volumetric capacity of the medullary cavity with rarification, which is a symptom encountered either in osteoporosis or rickets, which mostly effect either milch cattle or cattle grazing on pastures with low vitamin content. The presence of rickets is ruled out for the reason that the bones usually bend under their own body weight, a symptom which is wanting in the present specimen. Symptoms of this disease are rare on animals grazing on plain or hilly tract areas. It is probably, due to some dietary deficiency in the present case. The vicinity of the sea and subsequent back flooding of the neighbouring tract during high tides with saline water might have deprived the herbage of their normal constituents.

Right ramus of the mandible of cattle (specimen no. 346; pl.XV C) has only one embedded last molar, others have dropped off leaving the buried stump of the second molar in its alveolus. The last molar has fractured at the base which may be the result of a natural split caused by the heavy superlying debris. The molar is a heavy enamelar structure twisted into 3 or 4 folds and is one of the hardest structures in the body. It is more apt to split vertically than horizontally. Those embedded are more prone to fracture the alveolar wall than the molar itself as the former is weaker in strength than the latter. Besides this, the fracture ends, indicate the line of pressure exerted on them. The consequential fracture of the jaw is a second indication of the situation. Hence it is identified as a fracture of the molar which might be due to, either, a hard substance and accidentally bitten, or a

traumatic injury caused by some physical violence, such as a mutual fight or violent fall.

Animals of Malvan Area

The cattle inhabiting the locality are of average size. As is common in a mixed population of animals, variation in size is also noticed. More than 60% of the animal population is of average size, the variation in height, physique and structure are established factors.

Specimen no. 203 (pl. XVI A. a) : has a humeral condyle measuring 8 cm wide, while specimen no. 44 (pl. XVII A. b) has condyloid width of the occipital measuring 8.5 cm and specimen no. 70, the First phalanx of cattle has a height of 6.0 cm. All these are in far excess of the normal size and may vary in percentage of 25 to 35, larger than the normal ones. Outstandingly large is the width of the rib which extends to 6 cm (specimen no. 350, pl. XVII A. c). Specimen no. 85 (pl. XVII A. d) is a molar 8.0 cm high at the crown region leaving the fans which may have been of the same length. These specimens could well be of animals from the wild fauna, which might have been hunted for food purposes. The breed variation will not assume such a large proportion in a habitable fold. Horns are generally considered as the chief indicators of breed characters. Judging from specimen nos. 187, 185 (pl. XVI A. e and 234, the average height of the cattle of the locality would not be more than the present day cattle. This vagrant variation in size is also encountered in other situations, where domestication of animals and the practice of husbandry methods are not fully established. The resulting probability is the introduction of wild species of animals of large size for food by hunting.

In the locality, there are also some extremely small animals, as borne out from specimen nos. 154, 342, 151, 34 and 84 (pl. XVI B). These are the bones of mature animals. The breed is definitely small which may be due to the fact that uneconomic animals were badly neglected and consequently their growth got stunted.

In addition to cattle, the other animals identified from the collection are sheep and goat (pl. XVII A) Though few, in numbers, they are typical of the species. It is not common to find a large percentage of these bones in any collection as they tend and disintegrate quickly.

Swine is another animal identified in the present location. In the plate specimen 'B', left lower jaw of pig shows cut marks on the surface. These might have been caused in the process of removing the flesh. Specimen no. 18 (pl. XVII B. a) is a clear indication of a swine of wild fauna which might have been either killed or captured by the inhabitants. It is considerably bigger in size than the present day domesticated pigs.

The presence of antelopes is identified mostly by the find of antlers (specimen nos. 173, 184 and 250 (pl. XVIII A). The skeletal bones are usually not recovered, probably on account of their fragility and proneness to disintegration. Though the edibility of their flesh is a historical factor, scientific evidence corroborating it has yet to be established. The evidence of their use for food or of their domestication are still wanting. However the find of antlers has been repeatedly encountered in collections of animal remains from numerous sites.

Canine (pl. XVIII B) bones of dogs are identified in the collection and indicate that the species was on the location. As in the case of other small animals, the bones of the dog are fragile and hence disintegrate after their burial. As seen from the specimens collected (specimen nos. 275, 49, 152, 223, 285, 235 and 295), they appear to be that of *canis familiaris* and their size is not more than the present day medium sized dogs.

Specimen no. 63 and 25 (pl. XIX; fig. 22 C) are the bodies of the lumbar vertebra of horse. Their transverse processes are cut off at the base. The point of identification is the thickness of this base which is thin in case of cattle. "The medial part of the sixth process is thick, the lateral part thinner, narrow and curved forward. The medial part of the fifth is also somewhat thickened—Horse."² This has provided a clue to the identification of the presence of horse on the location. The character present is a diagnostic point. From amongst the bones only two segments are identified to be that of the horse. The reasons for the find of so few segments is a question, still to be answered.³

Bone Tools

The find of bone tools specimen nos. 259, 229 (Period II), 312 and 352 (Period I) at Malvan seems to be an associate symptom of roasting flesh for food because even after roasting, the flesh has to be removed from the bone. Various types of used bones are identified, most common being points, scrapers and gauges. The chief indication of that use is on their exterior which develops a smooth surface as a result of handling. Those which are shaped bear the marks of their having been ground against rough stones, in the form of grooves and lines. Those which are used to dislodge roasted flesh usually become black from carbon sooting and their surface gets a shine typical of contained marrow or fat. These symptoms are available in the present specimens, hence they may confidently be identified as bone tools. Antler is the most common choice for points as it is solid and can be sharpened to a piercing point. The other varieties are mostly from fragments of long bones which have a thick layer of compact tissue.

Specimen no. 352 appears to have been used as a handle as the musculo-spiral groove provided a grip. The whole shaft has a smooth polish on its exterior but the nature of the tool cannot be ascertained, as it is broken off.

Majority of the animal bones recovered from Malvan are in a highly mineralized state. Both Period I and II have yielded the following species of animals — the domestic cattle, Indian buffalo, horse, sheep and goat, pig, dog, *barasingha* and spotted deer. A few fish vertebra were recovered from Period II only.

²The occurrence of few bones of horse in excavations is probably due to the reason that as even today in a rural economy the proportion of horse population to that of cattle is much less. In a village hardly one or two horses can be found in India. There are many villages which do not have a single horse though the horse is well known everywhere. This does not mean that the horse was not known to the people. To prove or disprove this, only extensive excavations can lead us to some conclusion.

⁴"Their borders are thin and irregular and bear projections of variable size and form. Cattle (fig. 5, b)" Sisson and Grossman, *The Anatomy of the domestic Animals*, London, 1967, pp. 34-35 and 128-129.

Conclusion

The study of the collection reveals a partly hunting economy in Period I, and a predominantly agriculture economy in Period II. In Period I we get wild species along with domesticated ones. Evidence suggests that these wild species were generally hunted for food. There is ample evidence to show that in Period I people used the crude methods of chopping, craking and stabbing in order to get flesh and bone marrow. They enjoyed flesh roasted in the open air. To remove the roasted flesh from the bone, they used crude bone tools, such as pointers, scrapers etc. These bone tools were hurriedly and roughly made to serve the immediate purpose. In Period II people were less preferent to this practice as we get very scanty evidence of roasting, cracking and chopping. *Barasingha* was preferred for hunting though wild boar were also liked. Period I shows the presence of mixed population of cattle. Breed variation is clearly noticed. This shows that people of this period have started animal husbandary practices.

Study of wild species shows, that the forest was near and climate was moderately wet. Presence of wild boar in the collection indicates the nearness of marshy ground. Occurrance of osteoporosis in some of the bones indicates that the hurbage on which these animals grazed got deprived of their normal constituents due to presence of saline water. Few decisive fregments of horse bones show that horse was known to the people of Malvan both during Period I and II. They might have been kept by few for riding and carrying loads.

References

- Julliet Clutton-Brock, *Excavations at Langhnaj : 1944-63*, part II, The Fauna, Poona, 1965.
- F.E. Zeuner, *Environment of Early Man with special reference to tropical regions*, Maharaja Sayajirao University of Baroda, Baroda, 1963.
- D.R. Shah, 'Bones', in R.N., Mehta, *Excavation at Nagara*, Maharaja Sayajirao University, Baroda, 1968.
- George C. Kant Jr., *Comparative Anatomy of the Vertebrates*, London, 1954.
- Bhola Nath, 'Animal's remains from Rangpur', in S.R. Rao's, *Excavation at Rangpur and other-Explorations in Gujarat in Ancient India*, Nos. 18 & 19, New Delhi-1987.
- Chelva Ayyangar and K.R., Alur, *Anatomy of Ox*, Indian Council of Agricultural Research, New Delhi, 1964.
- K. R. Alur, 'Animal Remain' in M.S. Nagaraja Rao, *Protohistoric Cultures of Tungbhadra Valley - A Report of Hallur Excavations*, Dharwar, 1971.

TABLE I
MALVAN (GUJARAT) PERIOD II
BONEWISE IDENTIFICATION OF ANIMALS

S. No.	Bone Identification	Cattle	Horse	Sheep or goat	Swine	Canis	Fish	Antelopes	Unidentified
1.	Tooth (molar)	11	-	1	-	-	-	-	5
2.	Mandible & Maxilla	5	-	-	-	-	-	-	-
3.	Horn cores	-	-	-	-	-	-	-	-
4.	Vertebra (atlas)	-	-	-	-	-	-	-	-
5.	Vertebra (Cervical)	1	-	1	-	-	4	-	-
6.	Vertebra (Lumbar)	1	-	-	-	-	-	-	-
7.	Ribs	1	-	-	-	-	-	-	-
8.	Scapula	4	-	-	-	-	-	-	-
9.	Humerus	-	-	1	2	-	-	-	-
10.	Radius	-	-	1	-	-	-	-	-
11.	Ulna	-	-	-	-	-	-	-	-
12.	Ulnar carpal	1	-	-	-	-	-	-	-
13.	Astragalus	5	-	-	-	-	-	-	-
14.	Calcaneum	1	-	-	-	-	-	-	-
15.	Metacarpal	6	-	-	-	-	-	-	-
16.	1st Phalanx	2	-	1	-	-	-	-	-
17.	2nd Phalanx	1	-	-	-	-	-	-	-
18.	3rd Phalanx	-	-	-	-	-	-	-	-
19.	Acetabulum	-	-	-	-	-	-	-	-
20.	Femur	2	-	-	-	-	-	-	-
21.	Tibia	-	1?	-	-	-	-	-	-
22.	Fibula	-	-	-	-	-	-	-	-
23.	Patella	-	-	-	-	-	-	-	-
24.	Central & IV the Tarsal fused	1	-	-	-	-	-	-	-
25.	Metatarsal	-	-	-	-	1	-	-	-
26.	Ilium	-	-	-	-	-	-	1	-
27.	Antler	-	-	-	-	-	-	-	-
Total = 61		42	1	5	2	1	4	1	5

TABLE II
MALVAN (GUJARAT) PERIOD I (POST-HARAPPAN)
BONEWISE IDENTIFICATION OF ANIMALS

S. No.	Bone Identification	Cattle	Horse	Sheep or goat	Swine	Canis	Antelope	Unidentified
1.	Tooth (molar)	21		1	1			25
2.	Mandible & Maxilla	25		2	3	1		
3.	Horn cores	4						
4.	Vertebra (atlas)	4						
b)	Vertebra (Axia)	1						
c)	Vertebra (Cervical)	16						
d)	Vertebra (Thoracic)	1						
e)	Vertebra (Lumbar)	3	2					
f)	Vertebra (Sacral)							
g.)	Vertebra (Coccygeal)	1						
5.	Ribs	6		1				
6.	Scapula	12		1				
7.	Humerus	12			1	3		
8.	Radius	10		1				
9.	Ulna	8						
10.	Ulnar carpal	1						
11.	Astragalus	11						
12.	Calcaneum	3						
13.	Metacarpal	17	1?	2				
14.	1st Phalanx	9						
15.	2nd Phalanx	6						
16.	3rd Phalanx	4						
17.	Acetabulum	5			1	1		
18.	Femur	19			1	1		
19.	Tibia	15				1		
20.	Patella	2						
21.	Central & IVth Tarsal fused	2						
22.	Metatarsal	8						
23.	Ilium	6		1	8		18	
24.	Tibial Tarsal	5						
25.	Antler							
26.	Fibula							
Total :		237	3	9	15	7	18	25 = 314

B. STUDY OF THE BASIN FLOOR SEDIMENT SAMPLES

Location of the Chalcolithic site at Malvan is interesting. It appears that the settlement was spread out on the shore of an oxbow lake formed by the Dumas branch of the Tapi river. Then the lake was 'Permanent', it may have been useful as a dockyard to bring in barges at high tide. But now the lake is silted up and forms a roughly two kilometre square floor plain right in front of the Chalcolithic mound. The flood plain is two and half metre below the height of the mound and is still a metre below the highest high tide at Malvan. During the last decade there has been an attempt to reclaim the flood plain for agriculture. A two metre high earthen embankment around the edge of the flood plain along the present course of the river has been raised to restrict the flow of high tide on to the flood plain. Today this has resulted in partial leaching of salinity and consequent growth of grass on the surface of the flood plain.

The ancient shoreline topography of the oxbow lake is clear at Malvan. Within a kilometre towards the south of the mound, the ancient meandering cliff arching towards the present course of the river, is clearly visible. An uplift in the eastern land mass appears to have rejuvenated the river to straighten it to its present course. An evidence of such an uplift and stream rejuvenation is vertical river banks extending right into the coast. Extant remains of six metre high perpendicular river bank was observed on the Tapi at a distance of one and half kilometre north of the site. Further upstream at Waracha and Kamrej also perpendicular banks have been observed on the Tapi.

When the Tapi straightened its course at Malvan, an oxbow lake was formed between the present course of the river and its former cliff line. Analytical studies in the sedimentary fill in the lake indicate that the lake was 'permanent' for a period of time and subsequently it was gradually silted up to form the present flood plain.

In the flood plain a series of four small trenches, MVN 4, 5, 6 and 7 were put by the excavators. All these trenches revealed three horizons in common. In MVN 5, which can be taken as representative of the other three trenches, *mutatis mutandis*, there was a thin veneer of weathered horizon was its parent material, pale yellow silt, going down in depth to 1.55 metres from the surface. A close examination of this silt deposit revealed, in all trenches, that it was a finally laminated deposit and the thickness of laminations was fairly uniform. Below the silt, right down to the bottom of the trench, 2.15 m deep from the surface, there was a very dark greyish brown clayey deposit.

Samples for analytical study in these sediments were collected from the west wall of the trench, in the form of a column, beginning from the bottom, at an interval of 25 cm. Their colour, silt and clay fraction were determined as given below in Table I.

TABLE I

<i>Sample no.</i>	<i>Description</i>	<i>Colour</i>	<i>Silt fraction</i>	<i>Clay fraction</i>
1.	Top weathered horizon	2.5 Y 7/2	89.7	10.3
2.	Pale yellow silt	2.5 Y 7/4	90	10
3.	Pale yellow silt	2.5 Y 7/4	91	9
4.	Pale yellow silt	2.5 Y 7/4	91.5	8.5
5.	Pale yellow silt	2.5 Y 7/4	90	10
6.	Pale yellow silt	2.5 Y 7/4	91	9
7.	Very dark greyish brown mud	2.5 Y 3/2	77	23
8.	Very dark grey mud	2.5 Y 3/1	72	28

Chemical analysis in these samples were carried out to determine their carbonate, humus and alkali contents. Total carbonate and alkali soluble humus fraction in them were quantitatively determined. But alkali content was estimated qualitatively and relatively. The results are given below in Table II.

TABLE II

<i>Sample no.</i>	<i>Humus %</i>	<i>Carbonate %</i>	<i>Alka</i>
1.	0.2	14	high
2.	Nil	17	Very high
3.	Nil	18	Very high
4.	Nil	18	Very high
5.	Nil	17.5	Very high
6.	0.4	16	Very high
7.	3.8	8	less
8.	6.8	5	least

From the analytical data it is possible to observe that the very dark greyish brown and dark grey deposit at the bottom of the trench is rich in clay and humus, but poor in carbonate and alkali salts. It is like lake mud. Accumulation of plant and animal remains, both autochthonous and allochthonous, grown, flown and blown into the lake have made the lake bed rich in dark humus complex which is precipitated in the lake bottom in colloidal state. Constant hydrolysis and hence breakdown of the complex silicates has rendered the lake bed rich in clay. The thickness of the lake mud deposit indicates that the lake was not ephemeral but 'Permanent' for a sufficiently long period of time to allow for the changes observed in the deposit. Among the shell remains collected from this deposit were *Pila globossa* (fresh water snails) and *Rachis Practermissus* (another fresh water form). In this period therefore the high tide probably did not reach the lake

The pale yellow silt above the lake mud is free from humus, but it is rich in carbonates and alkali salts. It is also finely laminated. It is, therefore, possible to observe that this deposit was brought in by successive high tide that flowed into the lake. When the sea level rose up sufficiently high, the high tide repeatedly inundated the lake. When each tide ebbed, it left behind a lamination of pale yellow saline silt on the lake bottom.

Post-Harappan was the time when the lake began silting up. If the high tide was as high it is today at Malvan at this stage, the tide water would have been two and a half metre high above the dark grey clay lake bed. If the sea level was higher, the tide height at Malvan would have been correspondingly higher. During the post-glacial climatic optimum between 5000 B.P. and 3000 B.P., the warmest period since the Ice age, the universal sea level was in many areas higher than at present. It was probably while the lake was being silted barges floated into the lake with the tide and thus Malvan was a port. When silting was sufficiently advanced and the sea level went down, the site could not have continued as a port.

Gradual silting process destroyed the oxbow lake at Malvan but the extant ancient cliff of the Tapti around the flood plain and the nature of its sedimentary fill, however, help us to identify its former existence.

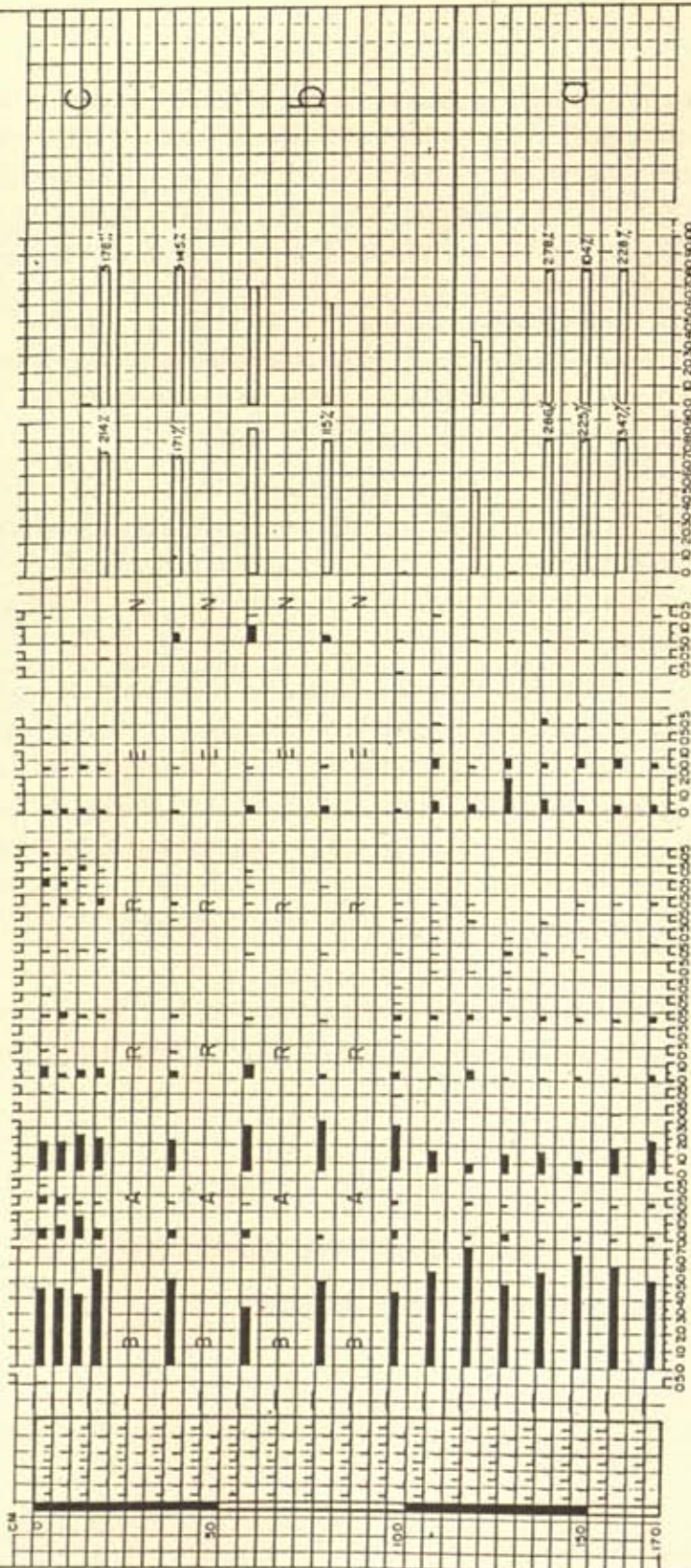
References

- E.C. Dapples, *Basic Geology for Science and Engineering*, John Willey and Sons, 1959.
R.J. Russel, *River Plains and Sea Coasts*, University of California Press, 1967.
P.S. Welch, *Limnology*, McGraw - Hill Book Co., 1935.

MALVAN 1970

PERCENTAGES CALCULATED IN TERMS OF TOTAL POLLEN OF TOTAL LAND PLANTS POLLEN

TOTAL POLLEN DIAGRAM



- STAGES
- GRAMINEAE
 - CYPERACEAE
 - CEREALES TYPE
 - PLANTAGO
 - CHENO - AMARANTH TYPE
 - CARYOPHYLLACEAE
 - ACANTHACEAE
 - ARTEMISIA
 - JUSTITIA
 - LABIATAE
 - LECUMNOSAE
 - LIGULIFLORAE (COMPOSITAE)
 - LIACEAE
 - ROSACEAE
 - TUBULIFLORAE (COMPOSITAE)
 - URTIACEAE
 - XANTHUM ?
 - FERN (MONOLETE)
 - FERN (TRILETE)
 - BRYOPHYTIC SPORES
 - HOLOPTELEA
 - MYRTACEAE
 - ACACIA
 - OLEACEAE
 - PRINUS
 - CEDRUS
 - ALNUS
 - BETULA
 - MICROFORAMINIFERA (ROTALOID)
 - MICROFORAMINIFERA (RECTILINEAR)

Fig. 23

C. POLLEN-ANALYSIS OF SAMPLES

The local vegetation consists of mostly Acacias, *Aegle maimelos* and thorny bushes. A large Baobab tree (*Adansonia digitata*) also grows in the vicinity. The uncultivated banks are overgrown with grasses. Cotton, millets and *Seasamum* are grown in the area

The western side of District Surat adjoining the Arabian Sea is devoid of forests but towards the east, moist deciduous and dry deciduous forests occur. The forests are constituted by *Terminalia tomentosa* (dominant), *Tectona grandis* teak (co-dominant), *Dalbergia latifolia*, *Ougeinia dalbergioides*, *Pterocarpus marsupium*, etc. The undergrowth comprises *Bauhinia racemosa*, *Acacia intsia*, bamboos and grasses. The important crops in the district are millets (*Jowar*, *bajra*, *ragi*), rice, wheat, maize, and pulses.

A large number of the plant species distributed in this region are pollinated by insects, consequently their representation in the pollen rain is either nil or negligible. We have no positive knowledge of the composition of pollen rain at the site or in the region, in the light of the preponderance of insect-pollinated species we expect the pollen rain to be dominated by pollen of grasses, and it will therefore give a false picture of the local vegetation.

Pollen Analyses

The samples for pollen analysis were collected from the basin lake by Statira Guzder and Cyrus Guzder. In all 34 samples collected at an interval of 5 cm from MVN-5, were sent for palynological investigations.

Each sample was first boiled with 10% potassium hydroxide solution for about five minutes in order to deflocculate the matrix. The material was then sieved and the residue examined for seeds, fruits and megascopic remains. The filtrate was kept in 40% hydrofluoric acid for a week to remove silica. After decanting off hydrofluoric acid, the material was washed with a few ccs of dilute hydrochloric acid (1 part acid +2 parts water), followed by 3-4 washings with water. The residue was then acetolysed following usual technique of Erdtman (1943) and the slides prepared in 50% glycerine.

About 150-300 pollen grains were counted per sample and percentages of each were calculated in terms of total land-plant pollen. Microforaminifera of Rotaloid and Rectilinear forms comprising loose-coiled, compact-coiled and biserial types have been found in abundance and their frequencies per sample are shown on the extreme right of the pollen diagram.

Vegetational development

The pollen diagram (fig. 23) reveals a considerable lack of arboreal pollen and depicts an open vegetation dominated by grasses and Chenopodiaceae. The lack of arboreal pollen is obviously due to the prevalence of insect-pollinated species in the district. In view of the estuarine environment the possibility of local occurrence of moist or dry deciduous forests is ruled out. The Chenopodiaceae

pollen among pollen grains of Cheno-amaranths are largely of local origin. Owing to the presence of open conditions or poor representation of local vegetation in pollen rain, the pollen rain has been influenced by pollen transported from long distances, as evidenced by the recovery of pollen of *Pinus*, *Cedrus*, *Alnus*, *Betula* transported by wind from the Himalayas.

The pollen diagram shows predominance of gramineae, suggesting the occurrence of vast open areas inhabited by grasses. At its face value this may be correct, but considered together with the prevalence of insect pollinated species, this interpretation may also be somewhat misleading. The other prominent curve is that of Cheno-amaranths, suggesting the occurrence of Chenopods perhaps characteristic of brackish water situations. In the lower half of the pollen diagram pollen grains of *Holoptelea* and Myrtaceae seem to be comparatively better represented than in the upper half of the diagram. Both *Holoptelea* and members of Myrtaceae family are high pollen producers. The occurrence of their pollen about or under 5% suggests their transport from a distance, but their further reduced frequencies in the upper half of the diagram are indeed suggestive of their transport from a much longer distance. The upper half of the diagram is further characterized by increased values of Cheno-amaranths, slight increase in *Artemisia* and a corresponding decline in Gramineae. Towards the extreme top there is an increase in the Cyperaceae, slight decrease in Cheno-amaranths and appearance of spores of Ferns, suggesting change in the composition of open vegetation. These three phases stand out prominently in the diagram and suggest recognizable changes in the open vegetation, otherwise dominated by grasses, and recognized here and designated as three stages.

'Stage A' comprising the lower half of the diagram, 'Stage C' the extreme top of the diagram, and 'Stage B' the upper half of the diagram below 'Stage A'.

Dominance of microforaminifera is seen in the lower and upper half of the diagram, but they are either rare or extremely poor in frequency in the lower middle, extreme top and extreme bottom. Their rarity or dominance is not correlatable with the fluctuations in the curves, suggesting that the local edaphic situations either did not have any marked influence upon vegetation.

Large sized grass pollen grains

Attempts have been made specially to record the large sized pollen grains of Gramineae in a separate curve under the Cerealia type. Pollen grains larger than 50 μ were not encountered. The Cerealia type pollen curve represents pollen grains ranging in size from 40 to 50 μ . Pollen grains of wheat, barley and rice fall within this range, but at the same time a large number of wild grasses such as *Pennisetum orientale*, *Brachypodium sylvaticum*, *Hordeum murinum*, *Agropyron repens*, *Imperata cylindrica*, *Saccharum* spp. and *Themeda triandra* have pollen falling within this size range. The Cerealia type pollen grains could belong either to the Cereals or to the wild grasses, or to both.

The Cerealia type pollen curve starts from the base of the diagram and fluctuations in it are not correlatable with those of the other curves to suggest any clearance phase. There is practically

no indication of farming activity.

Long distant pollen grains

The recovery of pollen grains of Himalayan spp., such as *Pinus*, *Cedrus*, *Alnus* and *Betula* is of considerable interest. The values are sporadic except that of *Alnus*, the values of which reach 10% just below 50 cm depth. These genera do not occur in south and central India. Their pollen has obviously been derived from the Himalayas through wind currents. The high values attained of *Alnus* below 35 and 75 cm in the pollen diagram are indeed interesting.

Pollen grains of Himalayan species have earlier been recovered by Singh (1970) in pollen-analysis of Rajasthan lakes. One of us (Vishnu-Mittre, 1957) recovered Pine pollen grains in archaeological sediments at Maski, Deccan and also in marshes bearing wild rices from Cuttack, Orissa (Vishnu-Mittre, unpublished). Pollen grains of *Pinus*, *Betula* and *Alnus*, the Himalayan elements in the Rajasthan diagrams, appear right from the base of the diagrams, dated to about 10,000 B.P., and unlike our diagram, *Pinus* is more frequent in the Rajasthan diagram, in comparison with the other elements. Its high values are attained about 6000 B.P., 4600 B.P. and 3000 B.P. (Singh, 1970).

Climatic inference

Local estuarine conditions have prevailed for a long time except for some intervals.

From the face value interpretation of the pollen sequence, it appears that open land conditions prevailed for a long time. Vast stretches of grassland existed. If the Chenopodiaceae type is derived solely from Chenopodiaceae then, there is evidence of increase in salinity in the soil during 'Stages B' and C. The Myrtaceae pollen curve in the lower half is, however, suggestive of the occurrence of comparatively moister conditions of climate in the remote region from which its pollen has been derived. The climate during 'Stage A' was probably moist. During this stage the values of Chenopodiaceae are considerably reduced which on their own suggest a low evaporation/precipitation ratio. Extreme bottom samples tend to show higher values of Chenopodiaceae suggesting higher ratio of evaporation/precipitation. The distribution of Chenopodiaceae may be due to the local edaphic situation created by the influence of tide bringing in salt water.

Conclusion

To support the above interpretation and inferences, we have no information of the modern pollen spectra in relation to modern vegetation in this area. The conclusions offered here cannot be stretched any further. There is need to evaluate the extremely sporadic and poor frequencies of insect pollinated species so as to properly assess their factual occurrence in the past. The polyads of *Acacia* suggest that acacias might have existed locally and in much greater frequency than represented in the diagram. The pollen of Leguminosae at the same time might indicate the occurrence of leguminous trees, which are the constituents of deciduous forest in the Surat district.

The present aspect of open conditions dominated by Gramineae is due to lack of pollen of arboreal vegetation in this region. If due allowance is made for the pollen of insect-pollinated species in regard to their present distribution and percentages of various kinds of pollen grains recalculated, the high values of Gramineae indicating open conditions will be considerably depressed. Thus, there is great need for detailed study of the pollen content of modern surface samples in relation to present day vegetation.

The past environmental conditions provide a background for the evolution of human cultures at Malvan, and it is highly desirable to date the pollen sequence through radiocarbon to apply precisely the environmental background to the cultural evolution at the site. The events of cessation of tidal influence as brought to light through pollen analysis must be dated and their significance properly assessed.

References

- Anonymous, *Gujarat State Gazetteers, Surat District*, Ahmedabad, 1992.
- F.R. Allchin and J.P. Joshi, 'Malvan-Further light on the southern extension of the Indus civilization' *J. R.* 1970, pp. 20-28.
- G. Erdtman, '*An Introduction to Pollen-Analysis*', Waltham, Mass, U.S.A. 1943.
- G. Singh, 'History of Post-glacial vegetational and climate of the Rajasthan Desert', Unpublished Report submitted to the University of Wisconsin, Madison, U.S.A. 1970.
- Vishnu-Mitre, 'Pollen-Analysis'. *Ancient India*, no.13, 1957, pp. 129-131.

D. SHELL REMAIN (pl. XX)

The shell remains from Malvan were studied with the following aims :-

(a) Whether they are all fresh water forms or (b) entirely marine forms or (c) backwater forms Further, these remains have been systematically represented below according to their position in the phylum Mollusca.

A. *Fresh water forms*

Class - *Gastropoda*

Family - *Ampullariidae*

Species - *Pila glebosa* (Swainson)

These species live in clear waters filled with aquatic vegetation. Sometimes they burrow deep into the mud or crawl on the sand banks of rivers and ponds in search of food.

Recorded from trench MVN-1 A, MVN-1 A (II_IV), MVN-1 A (3_A) and also from the trench MVN-1, 2, 4, 7 & 8 of different depths such as 30, 40, 45, 65, 75, 125 & 170 cm.

Family - *Planorbidae*

Species - *Planorbis exustus* (Desh)

They inhabit sluggish streams, stagnant ponds or marshes and often attach themselves to aquatic plants.

Recorded from trench MVN-4, 7 and 8 of different depths such as 40, 45, 55, 65, 75, 125, 170 & 205 cm.

Family - *Subulinidae*

Species - *Zootecus Chion* (Pfeiffer)

Recorded from trench MVN-1 A (2A) only

Family - *Lymaeidae*

Species - *Lymanea pinguis* (Dehrn)

Lives in sluggish ponds and pools filled with aquatic vegetation.

Recorded from trench MVN-4 of 75 cm depth.

Class - *Pelecypoda*

Family - *Unionidae*

Species - *Parreysia (Parreysia) Corrugate Var nagpoorensis (Lea)*

They are found on sandy bottoms in clean running water of pools and tank,

Recorded from trench MVN-4 of 75 cm depth.

B. Marine Forms

Class - *Gastropoda*

Family - *Neritidae*

Species - *Neritina Crepidularia (Lam)*

Narita lives in sea, rocky shores and reefs just below high tide level mark and also in brackish estuaries.

Recorded from trenches MVN-1 B and 1 D and also from the trenches MVN-1, 2, 3, 4, 5, 7, & 8 having depths of 20, 40, 55, 75, 170 & 205 cm.

Family - *Naticidae*

Species - *Natica merochiensis (Gmelin)*

This species lives buried in loose sand in the littoral zone and hence known as Sand-burrowing molluscs

Recorded from trench MVN-1D of 40 cm depth.

Family - *Cymatiidae*

Species - *Cymatium cingulatum (Pfeiffer)*

It is found just below the low tide mark.

Recorded from trench MVN-2 of 20 cm depth.

Species - *Ficus ficus (Lin)*

Recorded from trench MVN-1 B (2).

Family - *Muricidae*

Species - *Thias rudolphi (Lin)*

This species littoral in habitat found in the low tide mark in muddy rock.

Recorded from trench MVN-1 A, 1 B, 1 B, 1 D, and also from trenches MVN-1, 2, 4, & 5 of depths such as 20, 55, 75 & 160 cm.

Family - *Ellobiidae*

Species - *Ellobium auris judoe (Lin).*

SCIENTIFIC REPORTS

Recorded from trench MVN-1 A, 1 D, 2, 2D and also from trenches MVN-1, 3, 4, 5, 7, & 8 of 40, 65, 75, 95, 160, 170 & 205 cm depths.

Species - *Melampus fasciatus* (Desh)

Recorded from trenches MVN-4 & 7 of 55, 75 & 205 cm depth.

Class - *Pelecypoda*

Family - *Mytilidae*

Species - *Mytilus viridis* (Lin)

Found in sea water.

Recorded from trench MVN-1 (1 A)

C. Backwater forms

Class - *Castropoda*

Family - *Cerithiidae*

Species - *Cerithidea fluviatilis* (Fotiez & Michaud)

Occur in saline backwater.

Recorded from trench MVN-1, 1 A, 2 D and also from trench MVN-4, 5 and 8 of 55, 75, 95 & 160 cm depths.

Family - *Littorinidae*

Species - *Littorina Sacbra* LIN (Gravelly)

This is semi-aerial in habitat and is able to live a long time out of water especially on coasts where the rise and fall of the tide is great. It is also found attached to the marshy plants fringing the back water.

Class - *Pelecypoda*

Family - *Veneridae*

Species - 1 *Meretrix ovum* (Hanley)

Recorded from trench MVN-1 A

Species - 2 *Meretrix casta* (Gmelin)

Recorded from trench MVN-1 B (V - VI)

Species - 3 *Meretrix meretrix* (Lin)

CHART SHOWING THE POSITION OF SPECIES AT DIFFERENT DEPTHS

Sr. No.	Specimen Present	20 cm	30 cm	40 cm	45 cm	55 cm	65 cm	75 cm	95 cm	125 cm	160 cm	170 cm	205 cm	Remark
1.	<i>Pila Globosa</i>	-	+	+	+	-	+	+	-	+	-	+	-	Fresh water
2.	<i>Planorbis exustus</i>	-	-	+	+	+	+	+	-	+	-	+	+	"
3.	<i>Lymnaea Pinguis</i>	-	-	-	-	-	-	+	-	-	-	-	-	"
4.	<i>Parreysia (Parreysia) Corrugata var Nagporensis</i>	-	-	-	-	-	-	+	-	-	-	-	-	"
5.	<i>Neritina crepidularia</i>	+	-	+	-	+	-	+	-	-	-	+	+	Marine or backwater
6.	<i>Natica merochianis</i>	-	-	+	-	-	-	-	-	-	-	-	-	Marine
7.	<i>Cymatium Gingulatum</i>	+	-	-	-	-	-	-	-	-	-	-	-	"
8.	<i>Thiass rudolphi</i>	+	-	-	-	+	-	+	-	-	+	-	-	"
9.	<i>Ellobium auris judoe</i>	-	-	+	-	-	+	+	+	-	+	+	+	"
10.	<i>Melampus fasciatus</i>	-	-	-	-	+	-	+	-	-	-	-	+	"
11.	<i>Cerithidea fluviatilis</i>	-	-	-	-	+	-	+	+	-	+	-	-	Backwater
12.	<i>Littorina Sacbra</i>	-	-	-	-	-	-	+	-	-	-	+	+	Backwater

Sign + Denotes presence of species
 - Denotes absence of species

Recorded from trench MVN-1 a (0 - iv), 1 B (0 - 1)

All these three species of *Meretrix* are found in sand in estuaries and connected backwater where the water is saline throughout the year.

Beside these shells, the collection contained fragments of otoliths of some teleosts and a broken molar tooth of pig which are recorded from trench MVN-2.

In all eighteen species of shells are identified. Among them six species are found to be exclusive in the collection from trenches MVN-1, 2 & 3 which are put in the habitation deposit. About four species are found to be exclusive in the collection from the trenches MVN-4, 5, 6, 7 & 8 which are put in the flood plain deposit in front of the mound. The remaining eight species are found to occur in the collections from both the deposits. Only the shell remains from 20 cm to 205 cm depth are tabulated in the Chart.

The chart shows that there are four fresh water species, five marine ones & three of saline or backwater forms. At 20 cm depths three species of Marine forms occur whereas at 30 cm depths only one freshwater species is found. The shell remains from the rest of depths comprises of all the three categories namely fresh, marine and backwater forms. With the exception of two marine species, all the rest of the species are found to occur at 75 cm depth. Further the shell remains from the depths of 170 cm & 205 cm show the presence of marine as well as fresh water forms. This may be possibly due to the high tidal water of the sea which brought in marine species into this past and left them there.

Finally, the study of shell remains reveal that as there are freshwater, marine and backwater species, it is possible that these shells must have been collected from the area which might have been estuarine in the past.

Acknowledgement

I express my sincere thanks to Prof. P. N. Govindau, Annamalianagar for valuable help and discussion while carrying out this study. I am also grateful to Prof. R. N. Mehta and Dr. K. T. M. Hegde for their help.

References

- M. D. Crichton, 'Marine shells of Madras'. *J. Bombay Nat. Hist. Soc.* 42(1941), p. 323-41.
- J. Hornell, *Report to the Government of Baroda on The Marine Zoology of Okha Mandal in Kathiawar, London 1916.*
- J. Hornell, 'Indian Molluscs', *Journal of the Bombay Natural History Society, Bombay* (1951) p. 96.

H. L. Kundu, 'On the marine fauna of the Gulf of Kutch part III-Pelecypods'. *J. Bombay Nat. hist. Sec.* 62-2. (1965), pp. 211 - 235.

H. B. Preston, 'Fresh Water Gastreopoda and Pelecypods', *Fauna of British India, Series - Mollusca.* (1915).

S. T. Satyamurti, 'The Mollusca of Krusadai Island (in the Gulf of Manar). II. Scaphopoda, Pelecypoda and Cephalopoda'. *Bull. Madras Govt. Mus. New Series - Natural History Section I (2) part 7-* (1956) p. 202.

S. T. Satyamurti, 'The land and fresh water Mollusca in the collection of the Madras Government Museum', *Bull. Madras Govt. Mus. (Nat. Hist. Series)* 6 (4) 1960, p. 1 - 174.

Subramanyam *et al* Marine Gastropoda of Bombay - Part II. *J. of Univ. of Bombay*, 21 (New Series) 3, 1952 pp. 26 - 73.

APPENDIX

- A. Pottery from Ghor
 - B. List of Sites explored by the Joint Expedition
- F. R. Allchin & Jagat Pati Joshi*

APPENDIX A

POTTERY FROM GHOR (fig. 24)

1. The ringwell, of which only one segment was exposed; is made of a coarse grey-back pottery. The outside is decorated at the top by a row of impressed angular points, giving the impression of a herring bone pattern. The well is made so that each segment fits into a slight groove in the top of the next. The lower side being plain and square. The well therefore approximates to type 3 of the classification given by B. M. Pande,¹ and may be dated to between third century B.C. - first Century A.D. The well was not excavated, but the following three pottery forms were obtained from its surface. Height of each segment, 27.5 cm, diameter, 114 cm.
2. Rim and neck of a vase of red ware, with an out-turned externally thickened rim, and concave neck. The surface has a red slip. Similar forms occur at Prakash, Period II.²
3. A shallow carinated bowl with vertical featureless rims and slightly expanding sides, in a light grey ware. Similar forms occur at Prakash, late level of Period II, Patna, Mauryan levels of Purana Qila, and many other Northern Indian sites associated with the N. B. P. horizon.
4. Base of a conical bowl in coarse red ware. Although some-what worn, the trace of string cutting is still visible below.

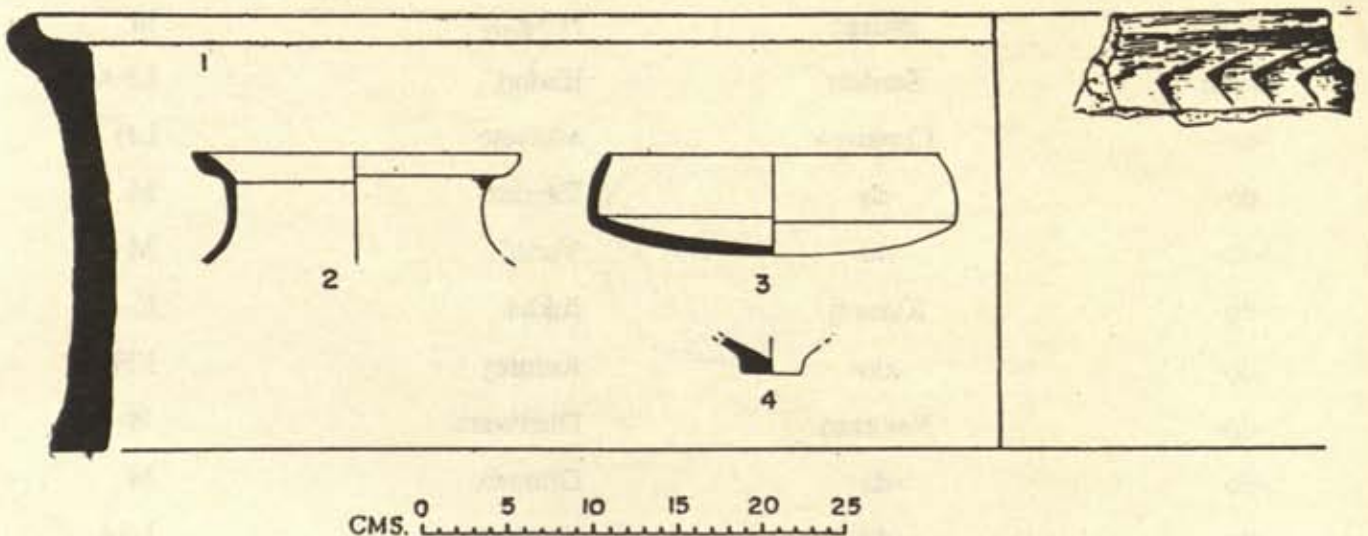


FIG. 24 : Pottery from Ghor

¹B.M. Pande, "Ringwells in Ancient India", *BDCRI*, vol. 25., pp. 1-13.

²B.K. Thapar, *op. cit.* fig. 25, No. 29.

APPENDIX B

LIST OF SITES EXPLORED BY THE JOINT EXPEDITION

(LH = Late Harappan ; C = Chalcolithic ; EH = Early Historical; M = Medieval; MSA = Middle Stone Age ; LSA = Late Stone Age).

<i>District</i>	<i>Taluk</i>	<i>Site</i>	<i>Cultural affiliation</i>
Bharuch	Jambusar	Andhi	M
-do-	Jhagadia	Kadiya Dungar	Eh
-do-	-do-	Limbodra	EH to M
-do-	Nandod	Aditeswara	MSA, LSA
-do-	Vagra	Dahej	M
-do-	-do-	Makhneswara	M
-do-	-do-	Mathwagha	EH, M
Bulsar	Bulsar	Hingloj	M
Surat	Bardoli	Kadod	LSA
-do-	Chaurasi	Malvan	LH
-do-	-do-	Rander	M
-do-	-do-	Varial	M
-do-	Kamrej	Jokha	C
-do-	-do-	Kamrej	EH, M
-do-	Navasari	Dherwara	M
-do-	-do-	Dhunda	M
-do-	-do-	Kasbapa	LSA
-do-	-do-	Navasari	M
-do-	Olpad	Bhagwa	M
-do-	-do-	Thunda-Wagha	M

APPENDIX

<i>District</i>	<i>Taluk</i>	<i>Site</i>	<i>Cultural affiliation</i>
Vadodara	Chandod	Chanded	M
-do-	Broach	Broach	EH
-do-	-do-	Chavaneshwara	LH, EH
-do-	-do-	Dongri-no-Tekro	EH, M
-do-	-do-	Bharhut	EH
-do-	-do-	Mehgam	LH
-do-		Telod	LH, EH, M
-do-	-do-	Vijalpur-I	M
-do-	-do-	Vijalpur-II	EH
-do-	Hansot	Bhagatrav	LH
-do-	-do-	Visod	M
-do-	-do-	Wamaleshwar	M

84102



"A book that is shut is but a block"

CENTRAL ARCHAEOLOGICAL LIBRARY

GOVT. OF INDIA
Department of Archaeology
NEW DELHI.

Please help us to keep the book
clean and moving.
