

Kanmer: A Multicultural Site in Kachchh, Gujarat, India

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Kanmer (23°23'N; 70°52'E)

The ancient site of Kanmer, locally known as Bakar Kot, is located close to the modern village of Kanmer in Rapar taluka in the Kachchh district of Gujarat (Fig. 1), Western India. It was discovered

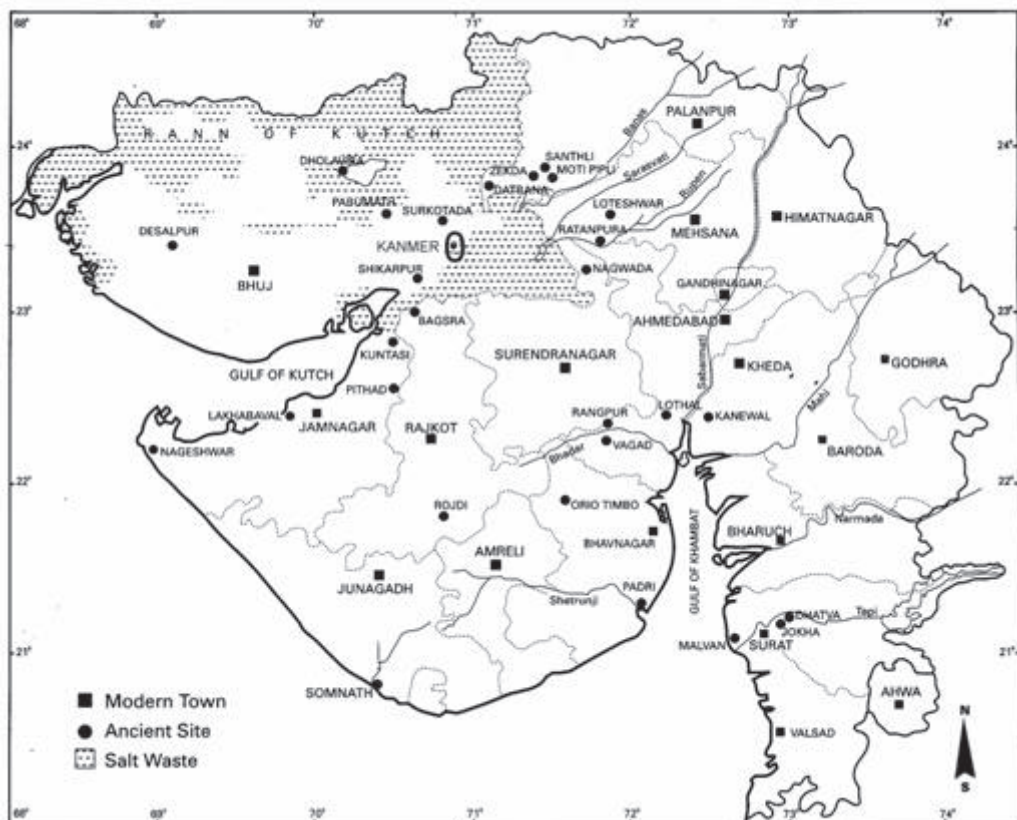


Fig. 1 Location map of Kanmer

by R.S. Bisht and his colleagues of Archaeological Survey of India way back in the eighties of the last century (IAR 1985–86: 15–19). A truncated pyramid shaped hillock next to the site marks the location very well from a distance; it is located about one kilometer off the national highway number 15. Aludawaro Vokro, a seasonal nala, originating in a hillock located hardly two km north-west of the site, drains the area around the ancient site.

Though the region of Kachchh is very dry, the vegetation available here is characterised by tropical thorny forest. *Azadirachta indica* (neem), *Piloo Calotropis* sp., *Acacia* sp., *Tamarindas* sp., *Mangifera* sp. and *Ricinus communis* are some of the common plants of Kachchh. A variety of grasses which grow after the first showers of monsoon support the livestock (Bhan 1994: 73). More than five dozen Harappan settlements have been discovered in this region and about thirty are reported as urban settlement. Only a few such sites as Dholavira (IAR 1967–68: 14–16; Bisht 1989a, b, 1991, 1997), Surkotada (Joshi 1990) and Junikuran (Pramanik 2003–2004) have undertaken for large scale excavation. The concentration of such sites has been found in the eastern part of the peninsula, which is believed to be an arm of the sea in the past (Gupta and Pandya 1980). It is held that the accessibility to marine resources, semiprecious stones and arable land were major factors for the expansion of enterprising Harappans in Gujarat. Out of 63 known sites, half of them have been identified as urban settlements (Possehl 1999; Seth *et al.* 2007).

The site at Kanmer, though small in size (115m (N-S) × 155m (E-W)), is quite high and rises from a horizontal plane up to a height of about eight meter (i.e., 20m above the mean sea level). The main mound is measured 115 (N-S) × 105 (E-W) (Fig. 2, 3). To the east of it was found flimsy deposit extending up to a length of about 50m whereas the western and south western parts are being used as burial ground by the modern inhabitants of the village. Besides, scatter of Harappan pottery was in a small area was also found about 500m to the south east of the main mound. The main mound, being quite high and squarish on top looks like a small plateau, hence it is visible from a distance. Our close examination revealed that barring the corners and slopes, the mound was largely intact for systematic excavation. The upper periphery of the mound being once part of the high fort wall remained slightly higher than the central inner area which shows a slight depression with a slope towards south central direction. There is a difference of about 4m between the highest contour on the peripheral zone and the lowest contour on the central depression of the mound. On account of such surface features controlled digging was started in 2005–06.

The thickness of the deposit was found about 9.50m to 10m and analysis of the cultural materials allowed us to identify fivefold cultural sequence at the site i.e., KMR V (Medieval), KMR IV (Historic), KMR III (Late Harappan), KMR II (Mature Harappan), KMR I (Early Harappan) (Kharakwal *et al.* 2005, 2007, 2009).

The cultural period KMR I was identified as pre-fortification deposit and is represented by a 40cm thick deposit that was found underlying the western arm of fortification right on the virgin soil.

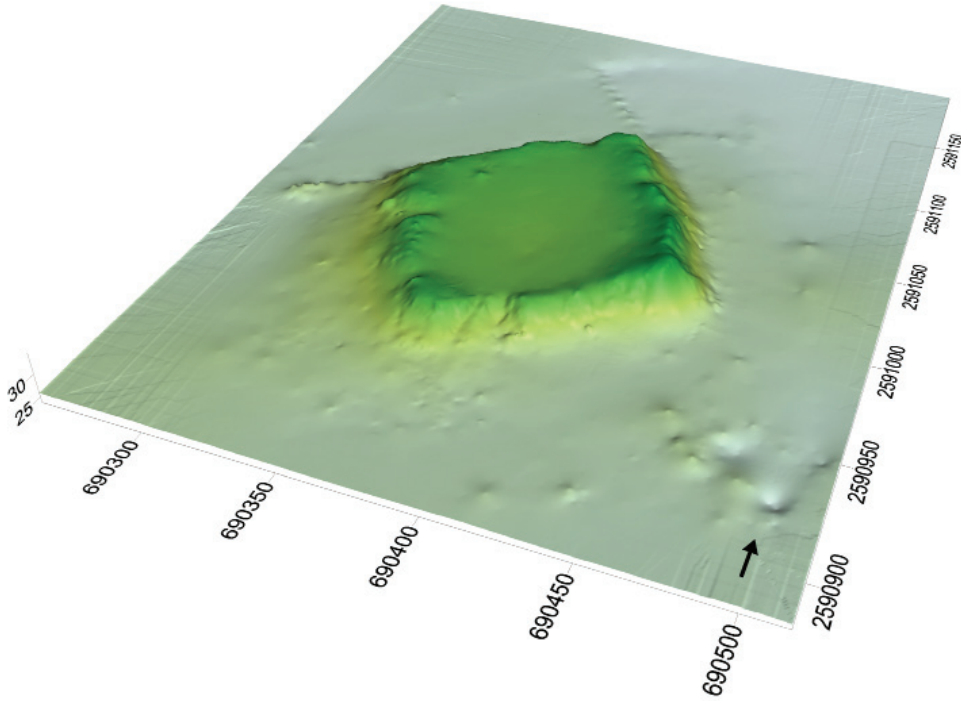


Fig. 2 Digital elevation model of Kanmer



Fig. 3 View of Kanmer from south west

KMR II was characterized by remains of the urban phase of the Harappan. This period was further divided into KMR IIa and IIb. The latter revealed a few new elements in ceramic assemblage, change in planning and marked difference in the nature of deposit. Unlike KMR IIa it was ashy and quite loose in composition. KMR IIa deposit measured 2.50m thick in the central part and about 1.80 m in the western part suggesting gradual increase in the deposit towards the central area. Contrary to this in KMR IIb the deposit in the central part is found hardly 2.00m in thickness whereas in the western part it measures about 3.50m. This deposit was ashy in appearance and had tendency of gradual rising towards the peripheral areas. Thus our controlled cutting revealed a bowl shaped stratigraphy within the fortified area.

Period KMR III also designated as the Late Harappan period was represented by a 40cm thick deposit in the central part and about 1m thick deposit the south eastern area of the main mound. The average thickness of the cultural deposit of Historical people (KMR IV) has been found about 1.50m. During this period the inhabitants prepared several large conical shaped pits by digging the Harappan deposit and some of them were as deep as 2m. The fifth cultural period (KMR V) is represented by a thin (about 20cm) deposit yielding remains of medieval period.

After the Harappans, the site was deserted for a long period until it was reoccupied during the Historic period. Following the Historical settlement the site was again deserted for a few hundred years till the medieval period. Such long cultural sequence indicates that due to its suitable ecological setting the location remained very significant right from Harappan period for trade, administrative or for some



Fig. 4 Bichrome pottery from KMR I

other reasons. Therefore, to understand the function the site in the context of its geographical setting a few trenches were laid in the south central part of the mound and the area of operation was gradually expanded towards the peripheral (NE, NW, SE and western) areas.

The find of a hoard of steatite beads, a hoard of shell beads, a typical furnace, a variety of ceramics, hundreds of beads of semi precious stone, significant quantity of drill bits, raw material of beads and drill bits, seals and seal impressions, weights, fragments of crucible etc. are some of the important discoveries which indicate intra-site and long distance cultural or trade contacts (Kharakwal et al. 2007, Kharakwal et al. 2009; Agrawal et al. 2010). In the limited period of excavation attempt were made to understand the nature and history of the rampart, craft areas and sources of various kinds of raw material that was used by the Harappans and subsequent cultures at the site. Following is the summery of our observations at the site.

KMR I

KMR I is the earliest cultural deposit (about 40cm thick) at the site. This deposit was found resting on the bed rock in the central part and on a thin deposit of fine sand in western area. The cultural material was marked by Red Ware with a variety of surface treatment such as bichrome, cream slip, chocolate and buff. The shapes were represented mainly by bulbous and spherical jars/ pots with everted or externally projecting rims and a variety of bowls and basins.

The Red Ware was further identified as Coarse Red, un-slipped types. The hand made as well as wheel thrown material was found in all the types, though bichrome (Fig. 4) was mostly prepared by fast wheel and its core often looked dark grey or black. Most of the potsherds of this ware were decorated with wide white bands on the neck or shoulder portion or on the body, on which a variety of red paintings were executed. The common paintings in these varieties include fish scale, series of strands arranged horizontally and vertically, bands of wavy lines and chess board pattern. The Red Ware with buff slip or without slip variety was often decorated with a thick register of corrugated lines below the shoulder part of the body of medium size jars. The bichrome and cream slipped pottery, often beautifully decorated, was found mostly concentrated in the upper part of KMR I deposit. This pottery type gradually disappear in the subsequent cultural period i.e. KMR II. This assemblage appeared identical to the Anarta type reported from North Gujarat (Sonawane et al. 2003).

Though a few Harappan artefacts were also found from this level, the characteristic 'S' shaped and perforated jars, terracotta cakes, weights or beads of Harappan vintage were conspicuous by their absence. There is no break between the KMR I and KMR II. Several pottery types of KMR I continue in KMR II, of course with some change in shape and surface treatment, we therefore, designated this deposit as Early Harappan. This assemblage is perhaps similar to that of Stage I and II of Dholavira (Bisht 1991: 76) and also somewhat similar to Surkotada Pd IA (Joshi 1990).

KMR II

The remains of KMR II, overlying KMR I, was marked by appearance of a massive fortification, planned residential complexes, characteristic Harappan pottery, seals, seal impressions, terracotta cakes, pot sherds inscribed with Harappan letters and a variety of beads. KMR II has been further divided into KMR IIa and IIb on the basis of appearance of new ceramic type such as Gritty Red Ware, Ahar type white painted Black and Red Ware, beginning of a fresh planning and all together a different nature of deposit. Period KMR IIa is composed of compact yellowish fine sandy clay (pila lilva) deposit, which was perhaps used as binding material in the walls. The houses were made at cardinal direction with the fort wall. It seems that during this period the inhabitants made abundant use of pila lilva for day to day uses such as plastering of house walls, making of bricks and so on, therefore the entire deposit

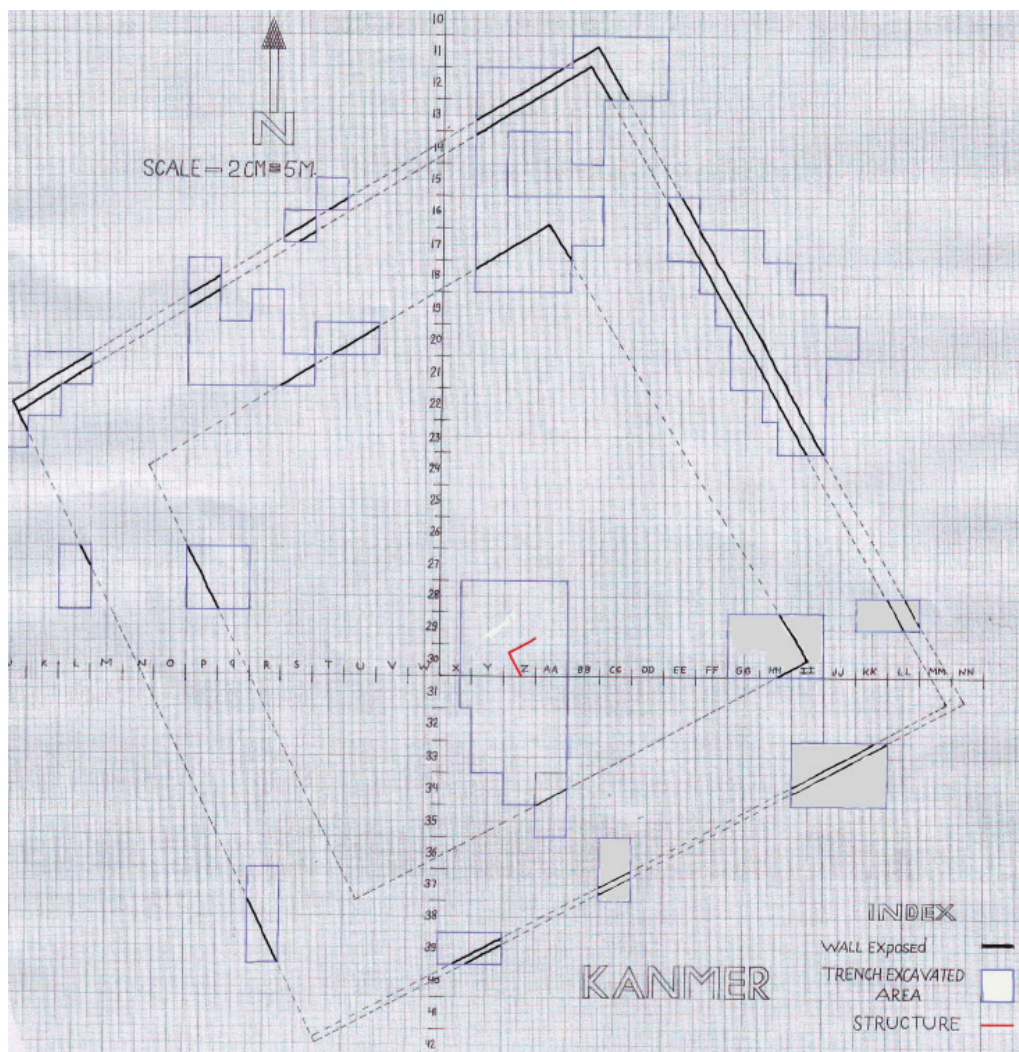


Fig. 5 Plan of Kanmer fort of Harappans

(2.50m) looks yellowish in appearance. The local villagers still use this soil for plastering the walls of their houses and other purposes. The compact nature of this yellowish deposit seems to be due to even distribution of sand particles in the clay. This deposit has yielded planned structures, beautiful pottery, beads and structures.

Structures

Presence of a strong fortification around a small site of like Kanmer is one of the most impressive and significant discoveries at the site. This fortification stratigraphically belongs to KMR IIa. It was not found along the cardinal directions like most of the Harappan settlements rather oriented in NNW-SSE direction (Fig. 5). To understand its nature and plan a few trenches were laid down at the south eastern and north eastern corners of the main mound. The outer face of the fortification was partially visible on the northern as well as on the southern slopes of the mound. It was noticed that the fort wall was provided with an addition or veneer all along its outer face (Fig. 6). The surviving of north-eastern and south-eastern corners were exposed internally and the outer face of the north eastern corner. The core of the wall as prepared by brown or yellowish sandy clay to which were sometimes added bricks of the same material. Finally it was veneered on either side by large semi-dressed blocks of locally available sand stone other hard rocks. Some of the blocks placed in the lower part of the wall measured 2 m in length and 50cm in breadth and 40cm in thickness. On the northern and eastern side, the outer arm as well as the later addition was exposed up to a length of 35m and 40m respectively. A few cuttings on the northern and southern slopes revealed that the addition was actually a support provided to the



Fig. 6 Outer face and addition of Eastern arm



Fig. 7 Inner face of western arm

cuttings at this location the wall was found overlying the earliest cultural deposit, which has been identified as KMR I or pre-fortification deposit. In this area the inner face of the wall has survived up to a height of 5.70m with 29 stone courses. The veneer on either side revealed a battering as the result the breadth of the wall decreases with increase of height. This inner face of the western wall shows a considerable tilt towards west in its upper levels. In fact, barring the 4 courses at the base, the entire wall seems to be repaired in this cutting which indicates some serious damage caused to the fort wall soon after its construction. Was it an earthquake (?), which brought about this damage? Perhaps the aforesaid additions to the exterior of wall on all three sides appear to be the measures taken up to protect the wall after the calamity.

The average width of northern and eastern arms at a depth of about 2.20meter from the highest point was measured about 18m. The base of this tapering would measure around 20m. Compared to its northern and eastern counterparts the western wall is thinner as its width measured only 15m at a depth of 3.70m from the highest point. The inside area of the fort has been measured 76m (N-S) and 75m (E-W), which means only about 5852 sq. m. area was available for residential purpose and other

fortification. This face was found abutting the fortification and apparently there was no visible gap between the two on the eastern and southern side but in the northern side a narrow gap was noticed which widened gradually from east to west. At places (near the north western corner) the gap was found more than 1m wide. This kind of situation betrays a slight change in orientation or planning at a later date too. The eastern arm, surviving 3m higher than the western arm, appeared much stronger than its counterpart. Perhaps it was robbed by the local villagers for building graves located on the western and south- western slope of the mound.

To understand the history of the defense wall, the inner face of western wall (Fig. 7) was exposed near the modern shrine of Hanuman which is located on the extant top of the wall. In one of the

activities. It is, therefore, obviously a difficult question to address that why such a miniscule settlement was protected so well by a strong fortification.

Residential

Excavation at the site revealed five major phases of structural activity. Of them the first three have been identified in the central area (Fig. 8) while the two later ones were exposed in the south eastern area of the site. Each major structural phase has sub phases perhaps suggesting constant addition or alteration by various generations. Structures belonging to all these phases were partially exposed and it was noticed that most of them were largely disturbed or sometimes robbed or destroyed by the activities of the subsequent occupants of the site.

In the south central part of the settlement houses were constructed around a large open space. This open space which was partially exposed measured 7m (N-S) and 5 m (E-W). To the south of this open space and beneath the first main structural phase were found four floor levels (in trenches AA28, Z28 and Z30). Interestingly, the successive floors show a gradual shift towards north to a street or open space. It was therefore also possible that the aforesaid open space could have been originally little wider than it was found during this period.

Two structural complexes one located to the north and another to the south of the above mentioned open space belong to the first major structural phase. In the north side complex only one structure and in the southern complex eight rooms were partially exposed. Of them only one structure



Fig. 8 Various structural phases

(4.80m × 3.00m) was exposed completely. These structures were made of semi-dressed stones and the yellowish fine sand with clay (*pila lilva*) was used as binding material. The thickness of walls was found varying between 45cm and 50cm. The lay out plans of these structures indicate that they restrictedly followed the orientation of the main fort, thus indicating a planned settlement inside. A partially exposed rectangular platform (2 × 1.25m), attached to a structure in the southern complex was perhaps built at the entrance of a house. A medium sized jar was found placed near its north-eastern corner could be a sullage jar. The floors prepared by leveling and filling of soil were finally plastered possibly with powdered shale mixed with cow dung. It is a common practice of preparing floors in the local village even today.

KMR IIb

The ceramic assemblage of KMR IIa continued in IIb, but a variety of new material such as Ahar type white painted Black and Red Ware, Gritty Red Ware, and Sorath material appeared at the site. There appeared some change in planning too in the south central part as the open space, explained under KMR IIa, was then completely occupied. Of course the orientation remained same, but the width of structures increased. The entire deposit is ashy in nature perhaps due to constant or large scale burning of certain fuel. Both structural phases were partially exposed in the south central part. The third one was found superimposed on the second one. In each phase 8 rooms were partially exposed, the length of which varies from 2.50 to 4m and width 2.50 to 3.50m. Generally only 2 or 3 courses of the walls have survived, but in a few cases as many as 9 courses were also recorded. Though floor levels were exposed in most of the cases, only two fire places were identified, which may have been cooking hearths.

Furnace

A bulb shaped furnace with a central cylindrical hollow column (diameter 31cm, depth 35cm) (Fig. 9) was exposed in trench Z17 about 10m west of north eastern corner of the fort. It was built close to the inner face of the wall and was oriented NNW-SSE direction. It was measured 1.40m (N-S) and 96 cm (E-W). The clay walls of the furnace were barely 4cm thick and the area between the column and outer clay wall was found completely filled with ash. The column with an opening only from top was found filled with whitish ashy material. The burnt red colour of the cylindrical column, the outer clay wall and the earth around the furnace indicate that the temperature raised in the furnace may have been more than 700°C. The face of the fort wall was also found damaged due to high temperature. A small square (90cm sq) platform made of flat stones just to the east of the furnace also seems to be associated with it. This platform was prepared on a floor level. A thick cubical sandstone block was found lying on the eastern margin of the floor to which was found sticking some whitish substance identical to what was found inside the column. Several tubular faience beads and bangles were recovered from the furnace area and near the square platform. We do not know if it could be a faience bead making furnace? It was

found sealed by layer numbered as 4, which consists of several episodes of ash possibly thrown from the top of the fortification wall perhaps by inhabitants of KMR IIb.

KMR III

On the basis of ceramic assemblage the remains of KMR III may be associated with the Late Harappans. In the northern part of the mound the KMR III remains were found overlaying the dumping of ash, whereas in south eastern and central area they appear to have reused some of the structures of KMR IIb phase. This period has been identified mainly on the basis of absence of the urban phase pottery, weights and terracotta cakes. The structures of this phase were found and sealed by a dark greyish layer, which represents a long break between the KMR III and KMR IV (Historic).

On floors were found parallel sided querns, hammer stones, complete or broken pots of the Gritty Red Ware, and bowl fragments of the white painted Black-and-Red Ware, Buff Ware and Fine Red Ware. Apart from these, beads of faience, steatite and shell were other interesting discoveries.

It seems that the KMR III people initially used the existing fort wall for protection, but subsequently this function ceased for some reason yet unknown to us. Towards the end of their occupation they erected their structures either right on top of the rampart or joining to the fort wall or sometime robbed the fort wall for making their houses. A small bulbous pot (broken) of Red Ware with narrow opening and flared mouth was found full of beads of steatite and faience on the floor of a house of this period located right on top of rampart (in trench GG 31). The total number of beads was 11707

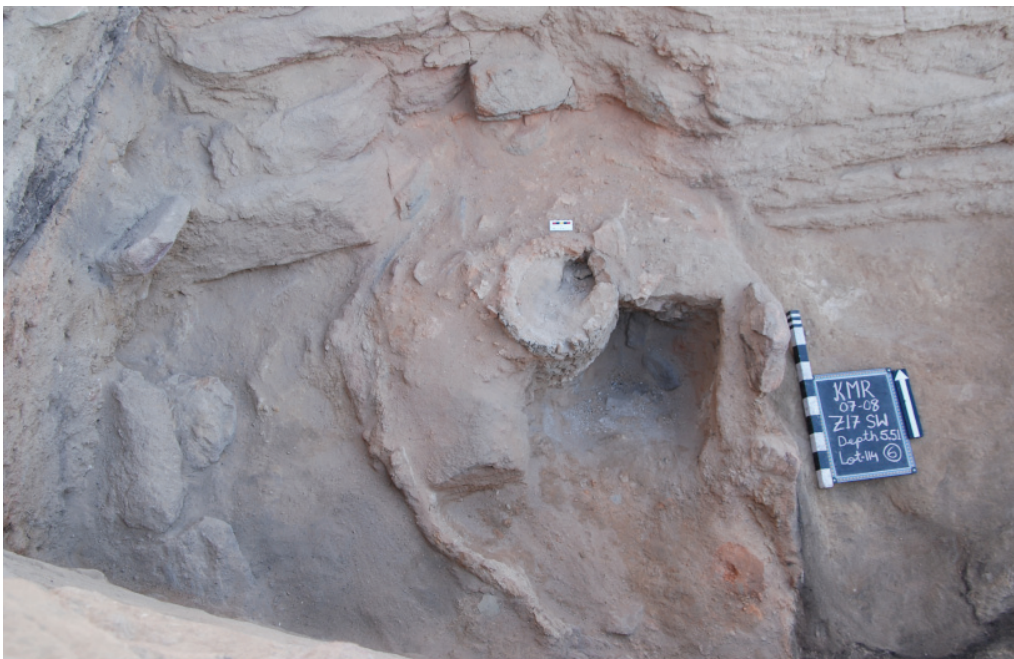


Fig. 9 Furnace with central column

out of which 27 were faience ones.

Pottery

The KMR IIa (similar to urban phase material) ceramic assemblage is composed of a variety of Red Ware (Fig. 10), which has been treated with red, chocolate, buff and cream slip. A variety of paintings including geometrical and non-geometrical ones have been executed on the outer surface. The cream slip is only confined to shapes which have been categorized as Anarta. This pottery gradually disappears in these levels. Very small percentage of Reserve Slipped, Black Slipped and Black Burnished pottery was discovered. Interestingly a local variety has also been identified, which appears to have been prepared by powdering the white shale. It has been generally treated with red slipped. The coarse red ware is often decorated with deep incised designs confined to the neck and shoulder portions.

In KMR IIb all the wares of KMR IIa continue, but the quality of surface treatment show some change. In this phase the quantity of Buff Ware increases, besides new pottery types like Ahar type white painted Black and Red Ware (Misra *et al.* 1997) and Gritty Red Ware is introduced at the site. The Coarse Red Ware of KMR I is now replaced by the Gritty Red Ware. Besides, Sorath Harappan type material also appears at the site.

In KMR III many pottery types of KMR I and II e.g., the Red Slipped Ware, the Buff Ware though continued but in general the quality of their surface treatment declined, design pattern and shapes changed. For example, the fine variety of the Red Ware with red slip has turned ochreous type towards the end of the occupation and it outnumbers all other types. Geometrical designs were preferred on the pottery. The Ahar type Black-and-Red Ware the Gritty Red Ware continued in this deposit with other



Fig. 10 Jars and bowls of Kanmer KMR II

major types. Sometimes the surface treatment of pottery of this phase also reminds the KMR I pottery tradition of the site.

KMR IV

This cultural period was represented by remains of the Historical period at the site. A large structural complex of this period was partially exposed in the north western part of the mound (in trenches R 21 and S 21) (Kharakwal et al. 2007). The thickness of the deposit of this period was hardly 1.00m in the northern area of the mound but in the central part it is more than 1.50m. This Historic cultural period is identified on the basis of discovery of terracotta sealing with Brahmi characters, fragments of Roman Amphorae, Tarpedo jar of West Asia, the Red Polished Ware, the Rangmahal type Red pottery, a variety of beads of semiprecious stones and iron objects, dices and shell objects such as beads and bangles and so on. In case of Tarpedo ware a thick layer of black substance, perhaps bitumen, was found sticking on the inner face all the discovered pot sherds. The ceramic assemblage indicated that during the early centuries of Christian era Kanmer again emerged as an active center of trade. It may surely be connected to sites like Vadnagar in Mehsana district in the north Gujarat and several contemporary coastal sites such as Dwarka in Saurashtra and Nani Rayan near Mandvi, Kachchh. In fact an identical ceramic assemblage has been discovered from these sites. Perhaps the Historic settlement lasted for about 300 years (from 1st to 3rd century).

KMR V

This last cultural phase at the site was represented by a thin cultural deposit in the central area of the site. The activities of this period were attested by a few large fire places and over a dozen circular storage pits (silos) in south eastern and north western area of the mound. Most of them had alternate layers of sand and ash at the base. Some of these pits yielded charred grains and ritualistic pots. Therefore it appears that majority of them might have been used for storing cereals. A few small stone structures, visible at several places on top of the Harappan rampart, seem to be built during this period. The thickness of medieval settlement did not exceed more than 40cm anywhere in the mound, which suggests a short occupation here. However, there is a Medieval fort on top of hillock next to the site of Kanmer, which provided commanding view of the entire region including the Little Rann. The modern village of Kanmer is also situated right on the remains of an ancient village. A radio carbon date placed this settlement around 13th century AD. There are remains of ancient Brahmanic and Jain temples on the hillock and in the village datable to early medieval times. Over one hundred copper and silver coins have been discovered from the site, which read Sri Jam in devnagari, possibly belonging to Jamnagar state. The ceramic assemblage of this period was mainly represented by the Red and Grey Ware. The Red ware, which also dominates the assemblage, is decorated with red paintings on the outer surface.

Dates

We have received more than a dozen AMS dates (see Table 1.1, 1.2) for Kanmer. Of course most of them demonstrate consistency for the urban phase remains of Harappans at Kanmer and provide a bracket of around 500 years i.e., between 2500 and 2000 BC. Though we have cultural material of pre fortification or pre urban phase as well as post urban phase, there are no dates available for them. The total deposit of KMR I (pre fortification) was found about 45cm in which the dating material (charcoal) was recovered only from upper horizons. Therefore the dates available for KMR I do not reveal the beginning of the settlement at Kanmer. Based on available deposit, cultural material, tentative comparison with the material of other known contemporary sites either from North Gujarat, Padri or from Amri region, the beginning of rural folks at Kanmer may be another 100 to 200 years older than the beginning of urban phase.

Besides, there are a few ¹⁴C dates available for Kanmer, which bracket the pre urban or pre fortification deposit between 3600 and 2800 BC. As we do not have any pre Harappan deposit at the site or material comparable to early phases of Amri or Ravi phase at Harappa we can not interpret these dates. Since we exposed very little area of the lower level or KMR I, we are not aware if such early remains exist at the site.

Table 1.1 ¹⁴C dates of wood charcoal from Kanmer

No	Trench	Depth (cm)	Layer	Lab ref. no.	¹⁴ C date	Calibrated date (BP)	Calibrated date (BC/AD)	Sample from cultural period
				BSIP	(yrs BP)			
1	Y-30	930	19	BS-2619	4190±80	4838-4573	2888-2623 BC	KMR Pd I
10	Z-30	942-967	12	BS-3028 (Charcoal)	4630±90	5152-5472	3099-3600 BC	KMR Pd I
11	Z-30	900-923	11	BS-3042 (Charcoal)	4750±100	5356-5578	3100-3600 BC	KMR Pd I

Table-1.2 : AMS radiocarbon dating of charcoal/grains of Kanmer archaeological site

No	Archaeological provenience (Trench/Layer/ Depth)	Lab ref. no. (Paleo-labo Japan)	$\delta^{13}\text{C}$ (‰)	Conventional radiocarbon age (not rounded)	Conventional radiocarbon age (rounded)	Calibrated age (BC)	
						1 σ range	2 σ range
1	AA-17/6/3.63m Sample type: Charcoal	PLD-14748	-25.08±0.25	3782±26	3780±25	2278 (22.7%) 2251	2292 (95.4%) 2137
2	FF-29/3/3.85m Sample type: Charcoal	PLD-14749	-25.50±0.28	3751±27	3750±25	2204 (62.6%) 2134 2077 (5.6%) 2064	2279 (7.2%) 2250 2230 (1.5%) 2220 2211 (68.2%) 2121 2095 (18.5%) 2041
3	FF-29/3/3.85m Sample type: Charcoal	PLD-14750	-25.54±0.21	3769±24	3770±25	2271 (8.0%) 2259 2206 (60.2%) 2141	2287 (92.7%) 2133 2079 (2.7%) 2061
4	Z-30/12/9.72m Sample type: Charcoal	PLD-14751	-22.76±0.13	3984±24	3985±25	2564 (37.9%) 2534 2494 (30.3%) 2472	2571 (56.2%) 2513 2504 (39.2%) 2466

5	Z-30/10/9.04m Sample type: Charcoal	PLD-14752	-24.76±0.13	3935±24	3935±25	2476 (35.6%) 2437 2421 (30.3%) 2404 2379 (20.2%) 2349	2560 (3.2%) 2536 2491 (92.2%) 2341
6	EE-30/4/4.58 Sample type: Charcoal	PLD-14753	-24.53±0.24	3682±24	3680±25	2132 (44.8%) 2084 2058 (23.4%) 2030	2141 (89.2%) 2011 2001 (6.2%) 1977
7	Q-28/11/8.00m Sample type: Charcoal	PLD-14754	-25.92±0.29	3896±25	3895±25	2462 (42.4%) 2398 2384 (25.8%) 2346	2467 (95.4%) 2299
8	Q-28/12/8.20m Sample type: Charcoal	PLD-14755	-26.07±0.14	3866±25	3865±25	2455 (16.2%) 2420 2406 (15.5%) 2377 2350 (36.5%) 2291	2464 (90.4%) 2281 2250 (3.9%) 2231 2219 (1.1%) 2212
9	Z-28/12/8.91m Sample type: Charcoal	PLD-14756	-25.45±0.20	3873±24	3875±25	2455 (19.0%) 2419 2406 (17.3%) 2377 2350 (31.9%) 2296	2465 (94.9%) 2286 2247 (0.5%) 2243
10	AA-28/9/788 Sample type: Charcoal	PLD-14757	-11.41±0.22	3809±23	3810±25	2286 (68.2%) 2205	2337 (2.2%) 2323 2308 (86.7%) 2196 2172 (6.5%) 2146
11	Q-28/13/8.45m Sample type: Charcoal	PLD-14758	-21.25±0.18	3892±24	3890±25	2459 (42.1%) 2391 2385 (26.1%) 2346	2466 (95.4%) 2298
12	Q-28/11/8.09m Sample type: Charcoal	PLD-14759	-25.29±0.14	3898±22	3900±20	2462 (42.8%) 2402 2382 (25.4%) 2348	2468 (87.9%) 2335 2324 (7.5%) 2301
13	AA-28/8/7.11m Sample type: Charcoal	PLD-14760	-22.33±0.15	3875±23	3875±25	2455 (20.0%) 2419 2406 (17.7%) 2377 2351 (30.5%) 2298	2464 (95.4%) 2288
14	Q-28/10/8.03m Sample type: Charcoal	PLD-14761	-25.68±0.17	3886±27	3885±25	2457 (68.2%) 2342	2466 (95.4%) 2292
15	A-28/12/9.24 Sample type: Charcoal	PLD-14762	-24.22±0.20	3814±24	3815±25	2288 (18.5%) 2267 2260 (49.7%) 2206	2344 (90.6%) 2196 2172 (4.8%) 2146
16	Y-30/20/9.30m Sample type: Grain	PLD-16352	-24.14±0.12	3882±20	3880±20	2456 (25.6%) 2418 2408 (22.9%) 2374 2368 (17.7%) 2340 2314 (2.1%) 2310	2461 (95.4%) 2298

Other Minor Objects

A large variety of minor objects such as microliths, beads of terracotta, paste, semi precious stones (Fig. 11), gold, copper, shell, seals, seal impressions, terracotta cakes, dices, gamesman, amulets, pendants, bangles, TC animal figurines, bone tools, bead polishers, drill bits, roughouts and weights have been discovered. Beads out number all other finds as they have been discovered over 20,000.

The find of three identical terracotta seal impressions (Fig. 12, 13) was perhaps the most significant discovery. The seal impressions were circular in shape, flat on the obverse and convex on

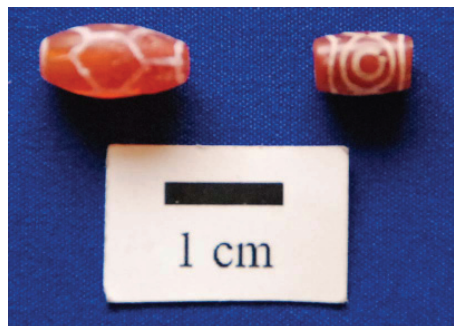


Fig. 11 Etched carnelian beads from Kanmer



Fig. 12 Different signatures on the reverse



Fig. 13 Identical seal impressions

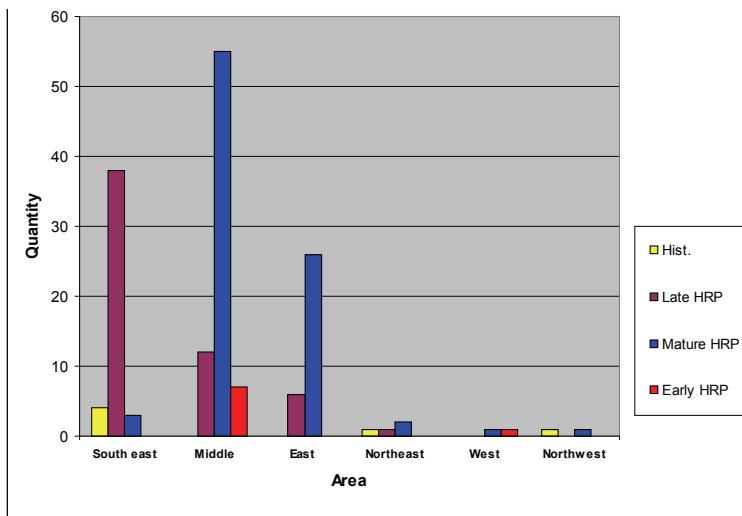
the reverse. They were stamped by a square seal, the dimension of which may have been about 26.7 × 25mm. The diameter of seal impressions was measured about 34mm. They have a perforation (diameter 4.15mm) slightly off the center. On the obverse is depicted a unicorn, besides a few Harappan letters. On the reverse were found different signatures. They looked like sort of identity cards used by Harappans during their long distance trade.

Among others a button shaped steatite seal of donkey appears to be quite significant. The discovery of over 150 drill bits (see table) of sillemanite and about half a dozen of Rohri chert is perhaps the most important one considering the size of site and length of work carried out at the site. The Rohri material appeared at the site from KMR II.

Distribution of drill bits of sillemanite at the site

	Southeast	Middle	East	Northeast	West	Northwest	
Hist.	4			1		1	
KMR III	38	12	6	1			
KMR II	3	55	26	2	1	1	
KMR I		7			1		
Total	45	74	32	4	2	2	161

Drill bits distribution



The find of large quantity of raw material, particularly agate, variety of drill bits, rough outs of carnelian, debitage, chips, unfinished products, beads polishers all strongly indicate that perhaps bead making was one of the most popular or prized occupation of Harappans at Kanmer.

The majority of Harappan beads are disk type, bicone and tubular. Beads of steatite outnumber all others as more than 15000 have been discovered so far. They have been identified as micro-beads, mini disk type, disk type, cylindrical or tubular, segmented, wafer type and triangular ones. Except for one hoard from a house of the KMR II Harappan level most of them have been found from streets. Some of the tubular beads have been decorated with circular marks. In the KMR III phase the quantity of tubular beads decreases and sometimes they have been coated with green or blue colour, perhaps to look like faience. Faience beads are disk type, short tubular or tubular and blackish, greyish and greenish in appearance. The blackish or greyish examples appear to be the result of ill or over firing. Most of the tubular ones are two-three centimeter in length and have been discovered from north eastern area (Trenches Z 16, 17, 18, and AA 17). It is likely that they were manufactured in the northern area of the mound, which strongly appears to be used for craft activities. The paste beads though poor in quantity compared to steatite, their shapes and appearance is quite attractive. Most of them are either black or red or white and globular, disk type or cylindrical in shape.

The beads of semi precious stone have been identified as carnelian, agate, lapis lazuli/ sodalite, chalcedony, serpentine and bloodstone. The site yielded raw material of agate besides, chipped, roughouts, grinded, unpolished bead blanks. A large variety of shapes such as cylindrical, disc type, biconical, truncated bicone, circular, barrel, globular, circular, flat bicone, diamond were found. All these findings indicate that these beads were manufactured at the site. Perhaps the raw material was brought from Mardak Bet located about 20km NE of Kanmer in the Little Rann. Except for lapis lazuli/ sodalite, source of raw material for all these beads types could have been the Little Rann and its adjacent areas. Lapis may have been brought either from Afghanistan. The beads of carnelian are disk type, globular, bicone and tubular and etched ones. These beads were drilled after polishing as the find of many broken but polished examples would indicate. In the KMR III the quality of surface treatment of such beads was inferior. A few examples of shell, bone and metal ones have been found from the KMR II and KMR III levels.

Faunal Remains

The faunal analysis is being carried out by P. P. Joglekar and Pankaj Goyal from Deccan College, Pune. They have identified several animal taxa, which include mammals, birds, fish, reptiles and molluscan species. Among the domestic animals, cattle, buffalo, sheep, goat and pig were identified. More than a dozen wild animals were identified in the collection, including the nilgai, antelopes, deer, carnivores and rodents.

As many as twenty-four species were identified, out of which the domestic mammals were

represented by seven species (cattle, buffalo, sheep, goat, pig, dog and cat) wild mammals were represented by 14 species (Nilgai, wild pig, antelopes, Blackbuck, Chinkara and Four-horned antelope), deer (Sambar, Chital, and Mouse deer), a felid species, porcupine, hare and rodents (house rat and desert rat). Besides these, a few birds, reptiles, fish and shells were also identified.

In KMR II 96% faunal remains belong to cattle and buffalo (81.09%), followed by sheep and goat (13.93%). Besides these, wild animals like nilgai (blue bull), four-horned antelope, a suidae species and the porcupine were identified. In KMR III also cattle and buffalo predominate the recovered remains and many of them bear cut marks or are charred suggesting that they were consumed. The wild animals represented in the KMR III include a large bovid, wild pig, antelopes, deer, carnivores and small mammals like hare and rodents (9.60%).

Evidence of charring, butchering and cut marks has been found on a large number of bones which perhaps indicate that these animals may have been part of their diet. The relative proportion of charred bones was larger in the KMR II compared to KMR III and Historic. Some of the bones of cattle/buffalo and sheep/goat were fire hardened and it is likely that they may have been used as tools. Goyal and Joglekar (in press) point out that the proportion of wild mammals used in KMR III was more than any other cultural phase, clearly indicating an increase on the dependence on the wild mammals.

Charred Grains

In order to understand subsistence of the Harappans, Anil K. Pokharia retrieved botanical remains by water floatation technique. He examined over one hundred samples from various levels and discovered remains of charred grains from as many as 91 samples. Most of the samples supplied to him for washing were collected from floor levels, fire places and from hearths. A sizable amount of botanical material was found in utterly fragile, highly burnt and mutilated state of preservation. The inferences of the study, therefore, are based on a small fraction of the material. The remains were sorted out under the stereo-binocular microscope and thereafter cleaned in acid-alcohol (glacial acetic acid 10% + ethyl alcohol 50% in equal volume). The identification is based on the morphological details preserved in the carbonised grains and seeds by comparing them with the corresponding parts of extant plants of the same species. These remains represent the accidentally scorched portion of a larger amount.

He has been able to identify a variety of cereals, oil seeds, cotton, weeds and wild taxa e.g., barley (*Hordeum vulgare*), bread-wheat (*Triticum aestivum*), dwarf-wheat (*Triticum sphaerococcum*), jowar-millet (*Sorghum bicolor*), pearl-millet (*Pennisetum typhoides*), rice (*Oryza sativa*), field-pea (*Pisum arvense*), grass-pea (*Lathyrus sativus*), and green-gram (*Vigna radiata*), cotton (*Gossypium arboreum/herbaceum*) sesame (*Sesamum indicum*), and horse-gram (*Macrotyloma uniflorum*) (see also Kharakwal *et al.* 2009), *Setaria* sp., *Trianthema triquetra*, *Trianthema potulacastrum*, *Abutilon* sp., *Asphodelus tenuifolius*, *Scleria* sp., *Trianthema* sp., *Scirpus* sp., *Rumex* sp., *Cyperus* sp., *Cenchrus* sp., *Coix lachryma-jobi*, *Acacia* sp., *Solanum* sp., and *Ziziphus nummularia*.

This kind of palaeobotanical collection indicated that the subsistence of the Indus people so also in later phases was largely based on agriculture. The wild taxa and weed perhaps indicate presence of water in the area under study. Of course the charred rice grains have been discovered from various layers belonging to the Indus people. Since the site was subsequently reoccupied by the Iron Age cultures too and there was considerable disturbances in the stratigraphy we can not be very sure about the beginning of rice in the KMR II or urban phase of the Harappans at Kanmer. In the late levels (KMR III) also rice has been recovered but none of the same was found from Harappan hearth. In the forthcoming field seasons we plan to look into this more carefully.

Discussion

From the early levels at Kanmer i.e., pre fortification deposit nodules of agate, flakes, blades, and roughouts were discovered. In the second cultural period i.e., KMR II (contemporary to urban phase) a large number of drill bits, nodule of chert and agate, rough outs, unfinished and finished beads were discovered. One may argue that the local rural non urban folks or the early Harappans knew the source of raw material and technology of bead making. The Harappans, being enterprising people, begun the marketing of raw material as well as finished products. Besides this, a large number of faience beads have been discovered from the site and many among them were un-oxidized. Perhaps they were also supplying faience otherwise they would not buy un-oxidized faience. To protect the resource or raw material the Harappans required a strong protection. This may be a possible answer to understand why they spent so much of energy to build massive fort at Kanmer. The discovery of seals, seal impressions suggested that they were involved in trade. There were many other sites in Kachchh with strong fortification which may have played similar role. Thus it may be stated that the Harappans of Kanmer were engaged in some kind of resource management (Agrawal et al. 2010).

Conclusion

The Early Harappan settlement was raised on a thin soil cover overlying the bed rock. The urban deposit has been levelled as KMR II, which is further sub-divided in two parts KMR IIa and KMR IIb on the basis of appearance of new traits in ceramic at the site. It was found that during this period a planned settlement was built secured with a massive and strong fortification. Towards the end of the urban phase the height of fortification was further raised but its width was reduced. The post urban structures were found overlying the remains of KMR II b or urban phase remains. Thus there is no gap or cultural discontinuity in the Harappan deposit right from early levels. It is likely that the local folks co-existed with the urban Harappans and the shared their knowledge and technology with the immigrants. Many of their traits e.g., cream slipped ware, coarse pottery particularly with a mat appearance, continued and gradually their shapes or surface treatment changes in the second half of the urban phase. After the decline of the Harappans the site was deserted and as the result a thick layer of dark grey soil was formed

over the ruins of Harappan period. This deposit is often loose and sandy in nature. The Historic materials overlie this deposit. During the long spell of abandonment after the historical period the site again got deposition of fine silt mixed with clay indicating that Aeolian soil getting deposited in a large depression and later on worked by rain water.

The lay out plan documented during our archaeological diggings and the results of digital recording indicates that the shape of the fort was squarish. The total thickness of the wall was measured about 18m in the middle level of its height. It is likely that the KMR III people initially also used the existing rampart but did not maintained it as it was not required then and finally they raised their houses right on top of the rampart.

Outside the rampart area no other settlement like a lower town could be located. Of course there is a very thin deposit similar to KMR III to the east of the main mound. This feature also makes the site unique. From the urban phase deposit considerable quantity of nodules of agate were recovered, which might have been brought from Mardhak Bet, an island, located in the Little Rann about 20km to the northeast of Kanmer. It is likely that this raw material was used for making variety of beads, blades and weights discovered from the site. The faunal and floral remains clearly indicate that agriculture and cattle breeding were among the important occupation at the site right from third millennium.

As the Historical deposit also revealed West Asian and Roman pottery at the site and a large number of coins from the medieval phase, it is likely that the site remained very important right from Harappan phase possibly for trade and administrative purpose.

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