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Figure 6
Indra from ceiling in front of Gommateśvara at Śravaṇa Belgola
(Drawing from original)

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NĀGEŚWARA : A MATURE HARAPPAN SHELL WORKING SITE ON THE GULF OF KUTCH, GUJARAT

By

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Recent explorations in the peripheral regions east of the Indus valley have established the spread of Harappan culture to settlements in Kutch, Saurashtra, Rajasthan and Harayana, but there has been much speculation on the reasons behind this cultural expansion. The discovery of Nāgeśwara on the southern shore of the Gulf of Kutch, Gujarat, has provided important new information regarding the Harappan expansion in this region. The site is located on the edge of a fresh water reservoir called Bhimgaja Talao, (22 20′ North Lat., 69 6′ East Long.) which is associated with an ancient Śaivite temple of Nāgeśwara Mahādeva. This temple is about 17 km northeast along the Dwarka-Gopi, Talao bus route.

In the course of his detailed survey of the archaeological sites in Jamnagar District, the first author was notified of the discovery of ancient pottery and artifacts from Bhimgaja Talao by contractors building a new earthen dam for the reservoir. At least half of the site has been destroyed through the systematic excavation of rectangular pits with meter-wide baulks. However, this method of excavation has resulted in the preservation of numerous sections, providing stratigraphic information that is generally lacking in surface surveys. Furthermore, the excavators were interested in removing only the soft organic soil for construction of the dam, leaving large accumulations of potsherds, shell fragments, grinding stones and stone foundations in situ. This unique situation has made it possible to observe important architectural features and distribution of shell manufacturing waste in their original contexts.

A rough estimate of the total size of the exposed site is about 120 × 100 meters, but it may extend a bit further to the south, where the new dam covers part of the site, and also to the northeast, where many excavated areas have already filled with water. On the basis of the surface contours and the evidence of the exposed sections, the site appears to consist of a low irregular mound, one to two meters thick.

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Geographically situated at the base of a peninsula separating Poshetra Bay and Pindara Bay (Fig. 1) the ancient inhabitants would have had access to both of these important marine resource areas. Presently the site is about 8 km from either of these bays, but the presence of intrusive salt marshes suggest that in the past, the sea may have extended further inland. In fact, a break in the northern ridge separating the site from Poshetra Bay may be the ancient mouth of a lagoon or bay connected directly to Poshetra Bay, and Bhimgaja Talao may be a more recent man-made alteration utilizing the ancient bay as a reservoir. Bhimgaja Talao is presently fed by fresh water springs and monsoon runoff, and the presence of these springs would have been an important factor to the ancient settlers in this region, where most ground water is quite brackish.

Due to the saline ground water the vegetation in the region is scanty, consisting primarily of acacia and cactus. Aquatic plants growing along the banks of the reservoir are dominated by the fresh water reeds locally known as "berdi" (*Typha angasta*) and "kasa". The modern inhabitants use these reeds to make mats, baskets and temporary shelters.[5] These reeds were probably used for similar purposes by the ancinet settlers, and the "berdi" reed may also have been used for building reed bundle ships as has been suggested by Heyerdahl (1981 : 277). The soil around the site is quite rocky and only a limited amount of agriculture is presently carried out ; including wheat, barley, pulses, castor bean and a few vegetables. Although there is better farming land inland from the site, most of the local inhabitants make a livlihood from fishing, pearling and collecting shells. It is unlikely that the vegetation or the marine fauna have changed much since the 3rd millennium B.C., suggesting that the Harappan settlers selected this location for its proximity to marine resources, the presence of fresh water and possibly the availability of reeds suitable for making boats.

Looking more closely at the ancient site, we find a wide range of diagnostic artifacts, many of which came from the stratigraphic contexts of the sections left by the systematic excavations of the contractors. These artifacts provide ample material to determine the chronological placement of the site and also the basic subsistence of the inhabitants.

Chronologically, the site represents a single period occupation during the mature phase of the Harappan or Indus Civilization, which is dated from about 2450 B.C. to 1900 B.C. at the site of Lothal (Rao, 1979 : 43-45). These dates are based on extrapolations made from C-14 dates from both Rangpur and Lothal and comparative studies of the ceramics from the major Harappan sites of Mohenjo Daro, Harappa, etc. Ceramics collected from various exposed strata at Nāgeśwara represent a single pottery tradition, with no evidence for a pre-Harappan or a late Harappan occupation. The assemblage consists primarily of vessels made from a reddish-yellow fine to medium sandy clay, well levigated,

and without any vegetable or grit temper, generally referred to as Harappan red ware. Classic Harappan forms are seen in the dish-on-stand with glossy red slip and black painted designs (Fig. 2 : 1), dish-on-stand with centrally incised designs (Fig. 2 : 3), a slender bulb-like column from a dish-on-stand (Fig 2 : 3), the base of a squat dish-on-stand (Fig. 2 : 4) ; sherds from globular pot/jars having red slip and characteristic Harappan painted designs of floral motifs (Fig. 2 : 6, 7), and geometric designs (Fig. 2 : 5, 9) ; perforated jar with exterior projecting bead rim (Fig. 2 : 8) ; bowls with bi-laterally projecting rims, having red slip on the interior and over the exterior of the rim (Fig. 2 : 13), and with red slip and black bands (Fig. 2 : 14); bowl with externally projecting rim, red slip with black painted designs (Fig. 2 : 11); and a stud handled bowl with red slip and black painted designs (Fig 2 : 12). This last form is comparable with the regional Harappan style of stud handled bowl found at Lothal and Rangpur II A and B (Rao, 1962-63; 68-101). Another unique form that is characteristic of the regional Harappan style is the channel-spouted bowl with red slip and black painted designs (Fig. 3 : 1). Comparative examples of this type of vessel are found in the so called " lamps " from Lothal, Period B and Rangpur Periods II C and III (Rao, 1962-63 : 101, 120). This form is considered to occur during the later degenerate Harappan phase at Rangpur (Rao, 1962-63 : 98) and therefore may indicate that the length of occupation at Nāgeśwara extends over a considerable length of time.

Other less diagnostic sherds of this same fabric are represented by large jar/pots with externally projecting rims and having sed slip (Fig. 3 : 5, 6, 8); red slipped bowls with simple or externally projecting rims (Fig. 3 : 2, 3, 4); red slipped jar/pots with externally projecting bead rims (Fig. 2 : 10); and a possible lid with red slip (Fig. 3 : 7). Besides red slipped wares, various undiagnostic sherds of unslipped buff wares have also been found at the site.

Grey wares are represented by a pot/bowl with simple rim and possibly having a black slip (Fig. 3 : 9), and a flat disc base from a small pot/jar with remains of a black slip on the exterior (Fig. 3 : 10). This type of grey ware is not common in the Harappan sites in Gujarat but is found at most Harappan sites in the Indus valley (Marshall, 1931 : 289).

A heavier ware made of clay with vegetable temper and coarse sandy inclusions is also found at the site. These vessels are represented by large pots with simple, externally projecting rims having punctated and combed designs at the neck (Fig. 3 : 25) and what is probably a crude bowl or basin with a simple vertical rim (Fig. 3 : 26). This type of pottery has been reported from Mithathal II B and Siswal I in Harayana (Choudhury, 1972 ; 1973), as well as from many sites in Gujarat, such as Jokha, Dhatva, and Kanewal (Mehta, 1971, 1975, 1980) ; Rangpur (Rao, 1962-63) ; and Somnath (Nanavati and Mehta, 1956 : 35).

It is unlikely that the Mature Harappan pottery was brought to the site from the Indus valley as several examples of overfired and vitrified sherds were collected in the course of the survey. These indicate that the inhabitants produced their own pottery from locally available clays, but using techniques and styles that were identical to those used at other Harappan sites in Gujarat and the greater Indus valley region.

Among the other artifacts recovered from the site we found parallel sided blades of chalcedony, but none of the chert blades common in the Indus valley sites. This absence of chert blades is understandable in view of the fact that chalcedony is abundant in this region, whereas the source for chert is hundreds of kilometers away. Interestingly enough, copper was not found during the survey, however, evidence of sawing on shell fragments indicates that a copper/bronze saw was used at the site. Ground stone objects found at the site include large concave grinding stones, mullers, hammerstones, and a curious broken stone object with two holes drilled through it.

Numerous faunal remains were discovered in the sections and a preliminary study indicates the presence of domestic cattle, sheep/goat and various species of marine fish. However, the most common faunal remains, even more abundant than pottery, are fragments of the marine gastropods *Turbinella pyrum* Linne. and *Chicoreus ramosus* Linne.. These fragments consist of broken shell ornaments, utensils and the manufacturing wasters left from their manufacture. The vast quantities of shell manufacturing waste indicate that the site was a major center for the production of shell ornaments and utensils during the Harappan period.

Before discussing the nature of the shell industry at Nāgeśwara, it is important to better understand the characteristic features and habitats of the gastropods used in this industry. The *Turbinella pyrum*, more commonly known as the chank or conch shell, is a very thick, sturdy gastropod with a smooth exterior surface. The central columella is solid, spiraling and therefore suitable for the manufacture of various solid objects. The organism living inside the shell is edible and quite nutritious. Geographically, this species is limited to protected bays along the western and southern coasts of the Indian sub-continent, preferring to live on sandy bottoms or the sandy areas between coral reefs or rocky areas. In the Gulf of Kutch they are found only along the southern shore, occurring at depths ranging from 3 to 10 fathoms. Mr. S. I. Patel (Research Officer, Gujarat Fisheries Research Station, Sikka) has observed that the T. pyrum in these waters appear to roll up with the current from deeper waters during the warmer months and disperse back to the deeper waters during the cold winter months. The present fishing season extends from April to June, then continues after the monsoon season from October till January. Shells are generally collected by diving from boats or wading between the reefs during low

tide. However, shells found in shallow waters near the coral reefs are often interlaced with bore holes from boring organisms such as the *Cliona* sponge. Hornell (1915 : 7) notes that these bore holes are not found on shells fished from deeper waters or from regularly fished beds. In other words, each new influx of shells is collected before they (i.e. shells) are exposed to the predations of boring organisms living on or near the coral reefs.

The *Chicoreus ramosus* is quite different from the T. pyrum, both in terms of morphology and preferred habitat. Structurally this gastropod is large, inflated, with a hollow spiraling columella and numerous spines and nodes covering the entire exterior surface of the shell. It has a much wider distribution, extending throughout the entire Indo-Pacific region, but along the western coasts of the sub-continent, it is found primarily in the Gulf of Kutch, and is not common further west along the Sind and Makran coasts. This species is generally found in rocky areas or coral reefs, where it preys upon oysters and other shellfish by perforating the hard calcium of the shell with an acidic secretion and then consuming the soft parts of the organism. Ironically enough, this species is also attacked by similarly equipped boring worms and sponges, so that the apex and anterior portions of the shell are generally perforated by numerous predator holes. The meat of this species is also edible, but it is not commonly eaten by any known groups in the sub-continent.

Fragments of T. pyrum collected from Nāgeśwara indicate that the shells were selected for the absence of bore holes and most probably were fished regularly from deep sandy beds. Only 4 out of 30 fragments show bore holes whereas for C. ramosus, 15 out of 18 fragments exhibit bore holes. The 3 pieces without holes come from the interior portion of the shell which would not normally exhibit such features even if the exterior was laced with holes. On the basis of these data we can suggest that the ancient fishermen were using boats and diving in deeper waters to collect T. pyrum, while the C. ramosus was collected from rocky areas and coral reefs during low tide or by making shallow dives.

On the basis of the preliminary surface survey, T. pyrum appears to have been more commonly used than C. ramosus, but it must be noted that C. ramosus fragments are more plentiful at Nāgeśwara than at any other Harappan site. As has been found from many other Harappan sites, T. pyrum at Nāgeśwara was used primarily for the manufacture of bangles and secondarily, the manufacturing waste was reworked into other objects such as beads or inlay pieces. So far, only bangle manufacturing waste has been discovered at this site, with no evidence for bead or inlay manufacture.

C. ramosus was also used to make bangles, but its main role was in the manufacture of ladles or spoons. These too, have been reported from most Harappan sites, but due to the paucity of recognised manufacturing waste, the

techniques for processing this species to make bangles and ladles, has not been fully understood until the discovery of Nāgeśwara.

In order to manufacture shell bangles from T. pyrum, the shell was first hollowed out by perforating the apex and breaking the internal septa using a long copper pick or chisel. The shell was then sawn at a diagonal to remove rough circlets, (Fig. 4 : 5, 6, 7) which were ground and polished to produce beautiful white bangles (Fig. 4: 1, 2, 3). A slightly different technique was developed for the C. ramosus, which has a radically different structure. First, the exterior spines were sawn and ground off to produce a smooth exterior surface for sawing the body of the shell. Then, instead of hollowing out the shell from the apex, the septa and hollow columella were broken by chipping from the large orifice of the shell. Once it had been hollowed out, the shell was sawn at a diagonal much like the T. pyrum, to remove rough circlets (Fig. 4 : 4). Although this difference in procedure did not effect the finished product, it does exemplify the ingenuity and technical skill of the Harappan artisans. Differences in shell morphology however, do effect the form of the finished bangle, such that bangles made from T. pyrum are generally thicker and sturdier than those made from C. ramosus. On the other hand, bangles made from C. ramosus are generally of a larger diameter because this grows to a larger size than the average T. pyrum. It is possible that these larger bangles were made specifically for wearing on the upper arm or as ankle ornaments.

Bangle fragments collected from Nāgeśwara represent the same major styles found at other Harappan sites; narrow bangles with a single ridge and a triangular section (Fig. 4 : 1, 2, 3); and wide bangles having a slightly convex or rectangular section (Fig. 4 : 4, 6). T. pyrum bangles range in width from 4 mm to 22 mm and C. ramosus bangles from 9 mm to 22 mm, but due to the small size of our sample, it has not been possible to determine if there is a definite stylistic break between narrow and wide bangles. The bangles are usually incised at the shell suture with the simple chevron motif that is characteristic of all bangles of the mature Harappan period throughout the extent of the civilization (Fig. 4 : 1, 2).

In addition to providing information on subsistence and chronology, a detailed study of shell manufacturing waste from sites such as Nāgeśwara can give us new insights into other craft specializations of the Harappan artisans, particularly their copper/bronze technology. Data from this site serves to further substantiate findings made by the second author at other Harappan sites regarding the size and form of the saw used to cut the shells. This saw was evidently designed specially for cutting hard shell, and its form can be partially reconstructed on the basis of cut marks left on the waste fragments. It appears to have been a large, heavy saw with a long convex cutting edge that was bi-directionally denticulated. This edge had a thickness of between .5 and .75 mm and could

cut to a depth of 250 to 300 mm. Bronze was the strongest metal known to the Harappans and it is interesting that their metallurgists could produce such a thin tempered bronze blade that could easily cut through the hard T. pyrum shell, which is between 5 and 6 on the Moh's scale of hardness. Unfortunately, no saws fitting this description have been discovered from the excavated Harappan sites, but it is possible that a site such as Nāgeśwara, which was primarily a shell working site, might contain examples on this illusive artifact.

Besides the manufacture of bangles, Nāgeśwara was producing a considerable quantity of shell ladles made from C. ramosus. These ladles were made by first sawing and grinding off the external spines and then sawing around the length of the largest shell whorl to produce a cup shaped piece with a long handle (Fig. 4). Most of the C. ramosus waste fragments are remains from ladle manufacture, and although we found numerous unfinished ladle fragments, no finished ladles were recovered from the site. Without carrying out excavations at the site it will be difficult to determine the actual presence or absence of finished shell ladles, however, their absence from the surface may indicate that ladles were being produced for the trade rather than local use. In studying the relative frequency of the finished bangles to bangle manufacturing waste, we see a similar pattern of immense qualities of manufacturing waste and relatively few finished bangles. On the basis of these data it would seem to indicate that the site was primarily a manufacturing site producing shell objects for trade to regional or central Indus valley sites.

Another aspect of the site that was apparent only because of the excavations of the dam builders, was the presence of extensive stone foundations throughout the entire site. These foundations were constructed from large, flat slabs of sandstone or limestone that had been partially dressed, and consisted of two or three courses, some of which were as much as 90 cm in width. The buildings represented by these foundations were square or rectangular, but due to bad preservation, it was not possible to determine the size or relationsip of the different exposed structures. The orientation of the walls appeared to be along the cardinal directions, but further surveys will be necessary to confirm this. It is assumed that the superstructures were made of mud brick, which was the common building material at rural Harappan settlements.

One important question, which cannot be answered from the preliminary surface survey, is the identity of the people who settled at Nāgeśwara. Were they colonists from the main Indus valley or other Harappan coastal sites, or were they indigenous peoples who had adopted Harappan traditions and material culture through possible trade contacts ? Whoever they were, the location of the settlement indicates a good knowledge of the regional resources ; with access to a reliable supply of fresh water, a limited amount of arable land and grazing land near the site, and most important, access to unlimited marine resources.

Although the main economic asset of the inhabitants was their production of shell objects for trade, they probably also raised some livestock and practiced limited agriculture in addition to fishing. These other resources would have provided food and security during off season or if there was a slump in the shell market. The surplus goods produced for trade were probably traded to the larger urban centers along well established trade and exchange networks, connecting the Indus valley with Gujarat, and Gujarat with the northern regions of Rajasthan and Harayana. The discovery of Shortugai in the lapis lazuli producing region of Badakshan, Afghanistan (Frankfort, 1978) and the location of numerous Harappan copper and pottery manufacturing sites in Cholistan, Pakistan (Mughal, 1980 : 94) have provided us with significant new data demonstrating the dependence of the major urban centers on outlying resource areas. Shell is another important material used at most Harappan sites, and Nāgeśwara appears to be one of the important coastal sites which provided raw shells and finished shell objects to urban centers situated far inland. As more surveys are done in the regions adjacent to the Indus valley, and especially in those regions with access to raw materials commonly used during the Indus period, we will be able to understand more of the socio-economic aspects of this important proto-historic culture.

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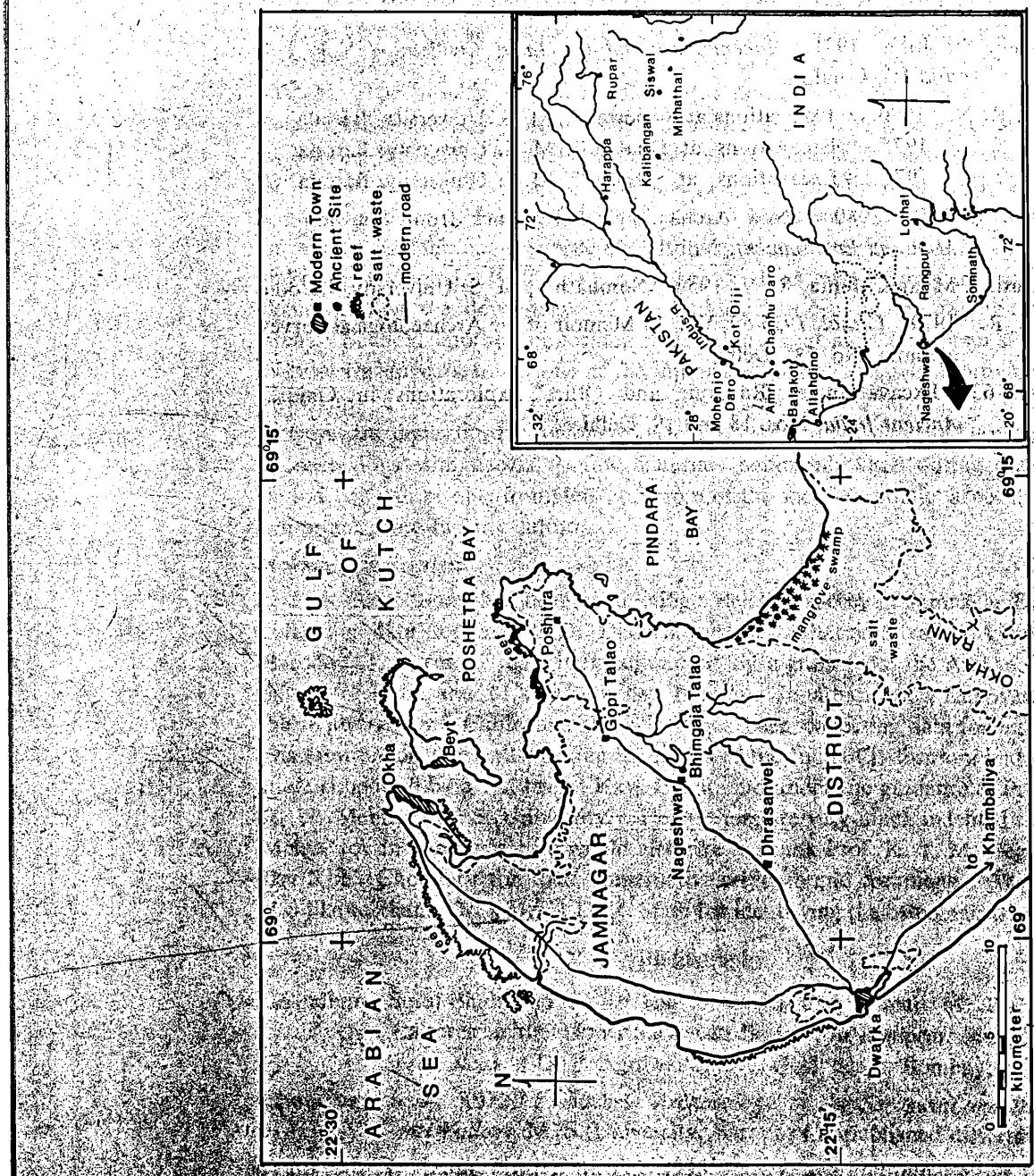

Fig. 1. Nageshwar and other important Harappan sites.

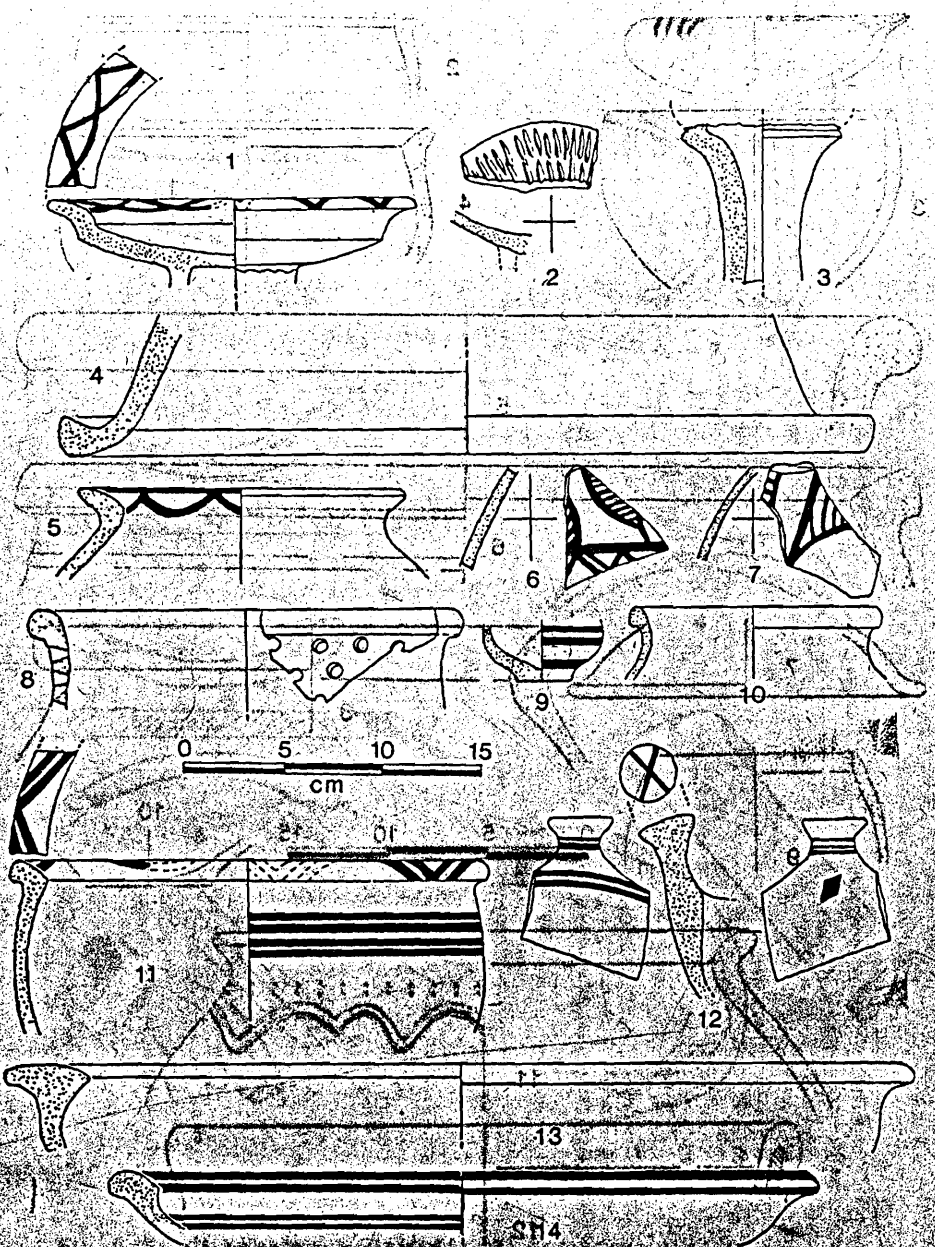

Fig. 2. Nageshwar: Red Ware

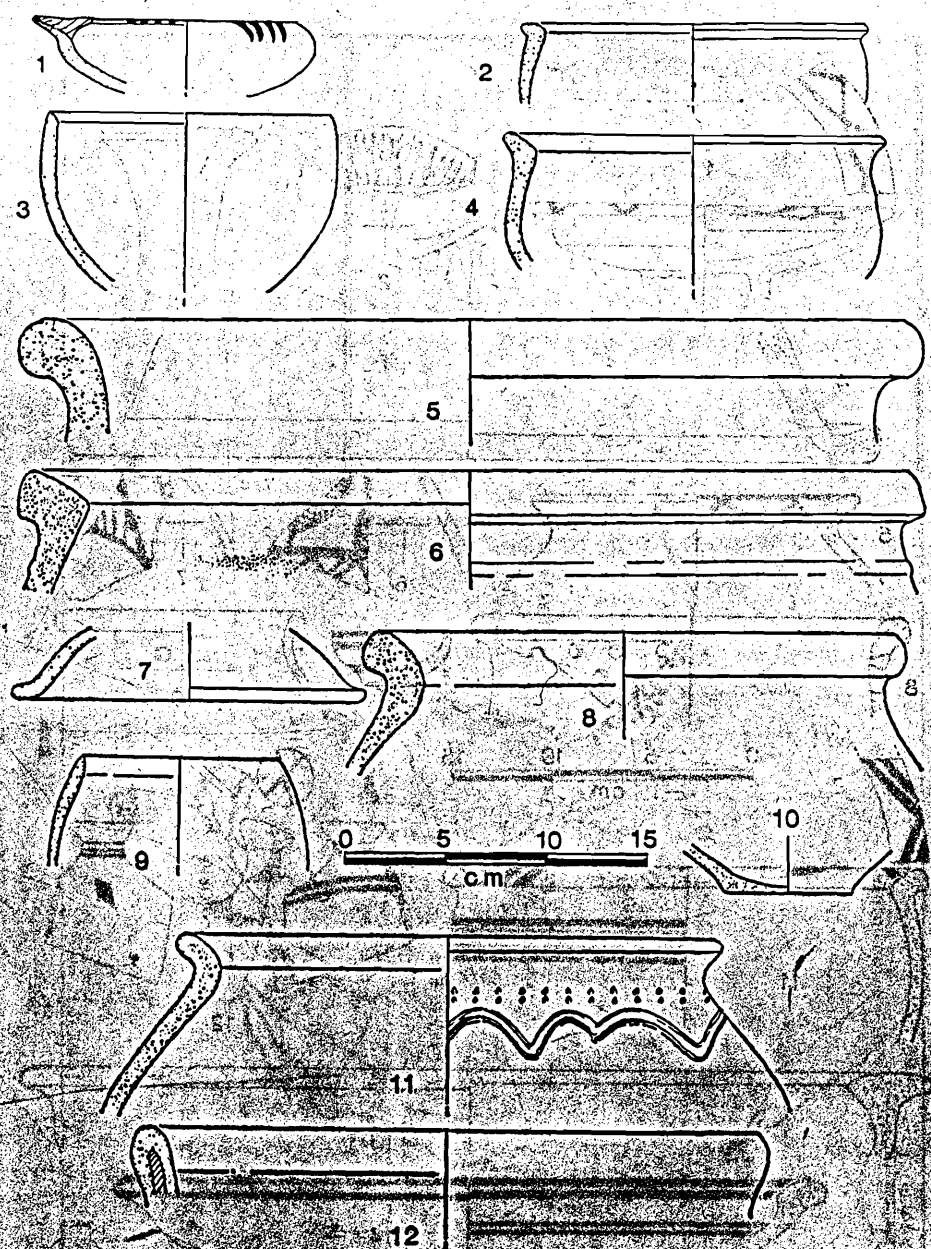

Fig. 3. Nageswar; Red Ware (1-8); Grey Ware (9,10); Coarse Ware (11,12).

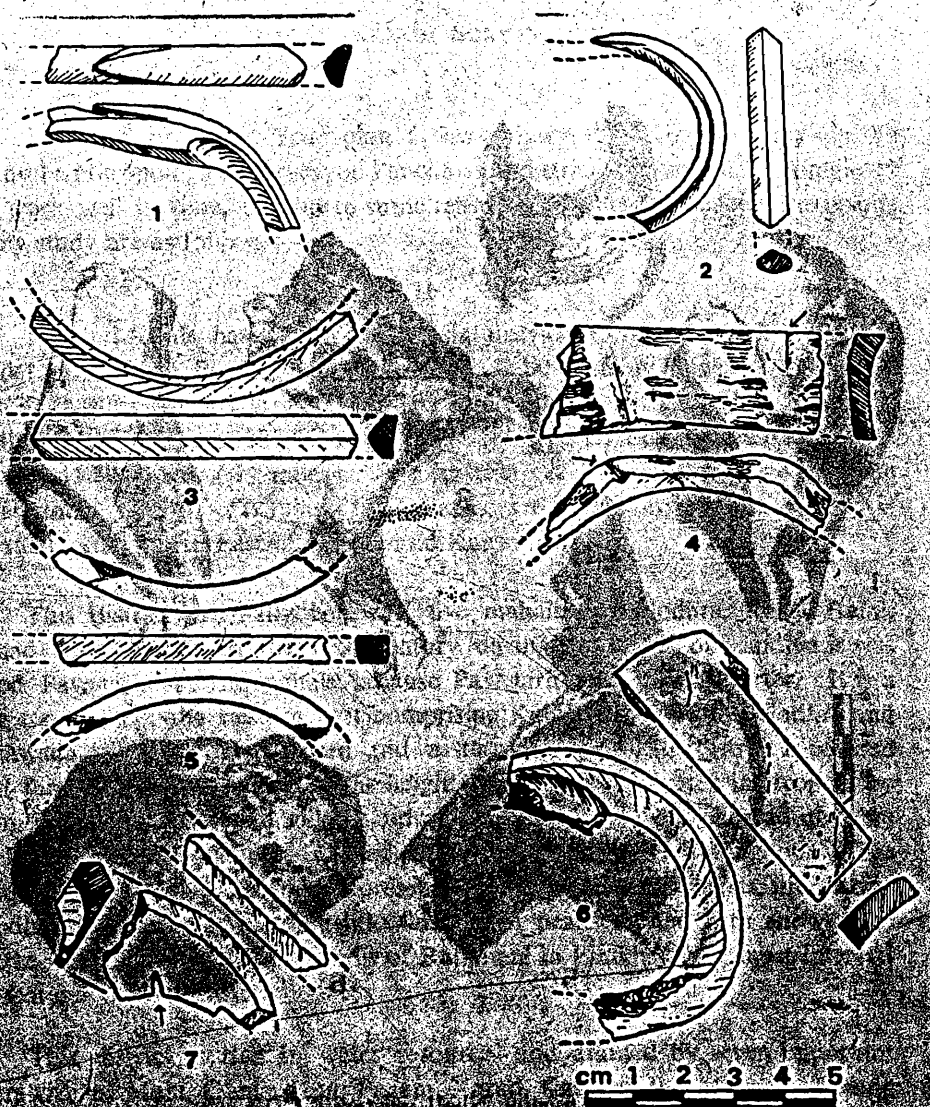

Fig.4 Shell bangles; finished(1-3),unfinished(4-7).

Fig. 5 *Turritella pyrum*, Shell wasters (1, 2)
Chicoreous ramosus, Ladle manufacturing waste (4-6)