The Ceramics from Ras Hafun in Somalia:
Notes on a Classical Maritime Site

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Introduction

At least since the end of the first millennium BC the peoples of the eastern coasts of Africa — in common with others throughout the littoral of the Indian Ocean — developed their diverse lifeways in the context of a transoceanic maritime trade. Though we know of trade with East Africa from classical documentary sources, direct archaeological evidence of this contact has not yet been reported. Such evidence will be difficult to recognise if we do not know what kind of technology early mariners could have left behind. The late H. Neville Chittick, then Director of the British Institute in Eastern Africa, made a fundamental contribution to the resolution of this problem by initiating survey and soundings in Somalia in 1974. Early in his survey, he found two littorine sites on Ras Xaafuun or Hafun (Chittick, 1976, 1980), 160 km south of Ras Asir or Cape Guardafui (fig. 1), likely to be near the emporium referred to in the *Periplus of the Erythraean Sea* as 'Opone' (Huntingford, 1980, pp. 26, 94). In addition to their contribution to ceramic systematics, these small sites provide vital information about the development of transregional maritime economies in the Indian Ocean.

Excavations were undertaken at these two sites, termed the 'Hafun West Site' and the 'Hafun Main Site', during 1976. This fieldwork and the subsequent ceramic study were the immediate responsibility of the late Matthew Smith, who prepared a manuscript on ceramic fabrics and their stratigraphic distribution. Chittick himself prepared final copies of various maps, plans and sections. These with the original field notes and photographs, various correspondence, and a sample comprising about a quarter of the excavated diagnostic ceramics are conserved at the B.I.E.A. in Nairobi. Preparation of a full report on Chittick's Hafun work will require, at minimum, a comprehensive study of the notes and photographs and of the artefacts conserved in Mogadishu. Also important would be technical studies of the ceramics and a re-examination of the sites themselves. Until such is possible, it may be useful to those who may encounter related sites in eastern Africa, the Comoros or Madagascar to have a description of the Hafun ceramic sample in Nairobi, incorporating Smith's observations on the fabrics and further observations and illustrations made by Wright in Nairobi in August, 1988.[1]

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1. Acknowledgement is due to the Swedish Agency for Research Cooperation with Developing countries (S.A.R.E.C.), which, through the agency of Gustav Trotzig and Paul Sinclair of the Central Board of National Antiquities, supported my travel to East Africa in 1988. I would also like to acknowledge Mark Horton, Gregory Possehl, Thomas Wilson and Donald Whitcomb for comments on the illustrated ceramics and the text.

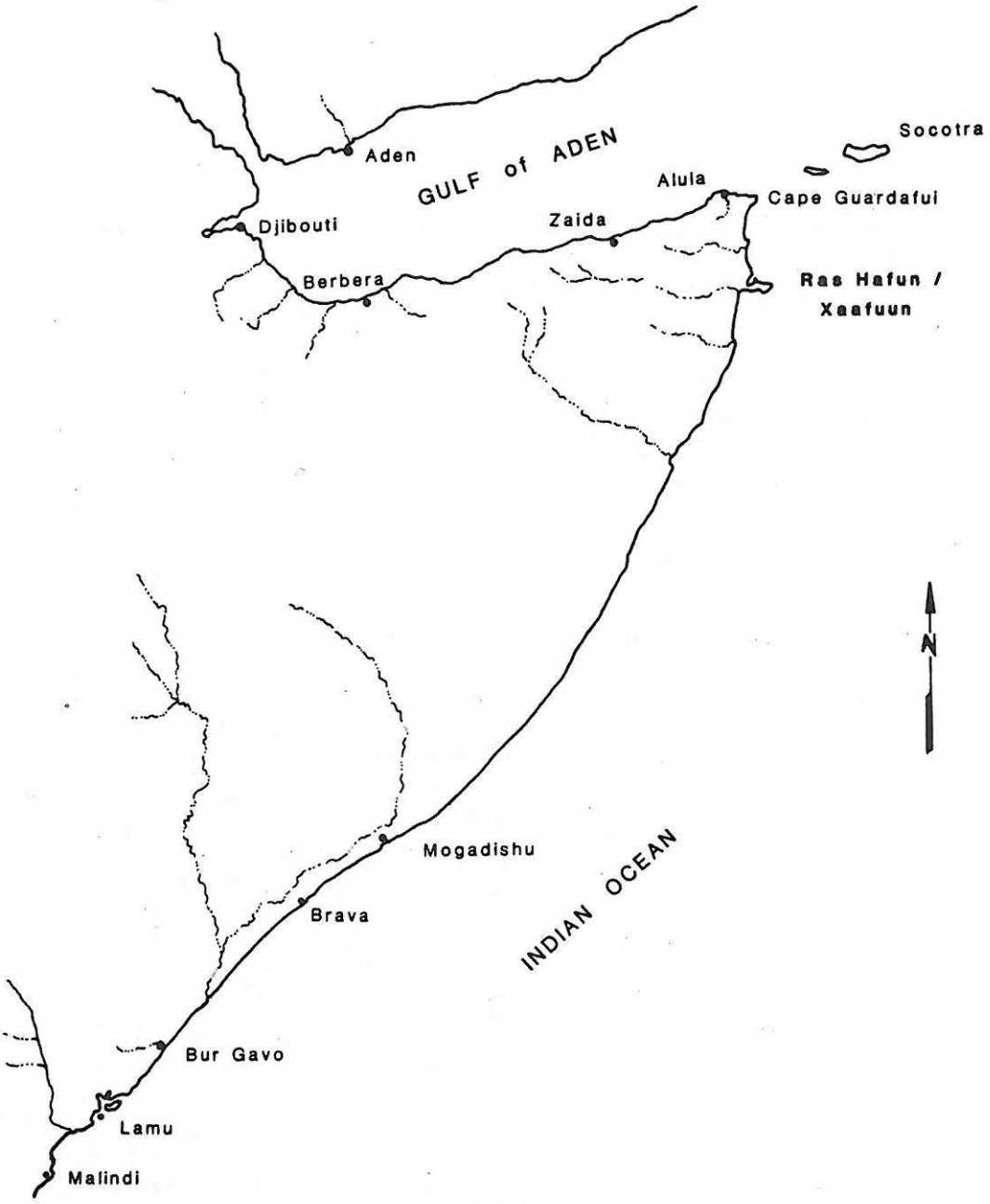


Figure 1

Archaeological investigations at Ras Hafun

The Cape of Hafun or Xaafuun is an isolated mass of resistant rock extending some 40 km into the Indian Ocean from the coastline of Somalia (fig. 2). The waves of the Indian Ocean break directly onto the cape itself, but the Hafun South Bay with its sandy beach is well-protected during the north-east monsoon from November to March. This beach cuts off access from the south to the Chori Hurdiyo (Khor Hordio), an embayment lying between the rock mass of the cape and the mainland proper which today has a metre of water or less at low tide. Present access is from the Hafun North Bay, and small ships may find shelter here in any season. The

Hafun area is now arid, with less than 25 cm of rain falling mostly between April and June. There is a thorny vegetation; gazelle, wild ass, jackal, lion and cheetah were present until recently. The only potable water is that from shallow wells dug near wadi beds. In later times there were records of local inhabitants providing sheep, goats and dried fish to mariners (Guillain, 1858, pp. 389-98). The earlier Hafun West Site of the first century BC faces west across the embayment. Five km to the south-east, the later Hafun Main Site of the second to fifth centuries AD faces south-west across Hafun South Bay.

Since the two sites are in different locations, were occupied in distinctively different periods and were investigated with different strategies, individual discussion is warranted.

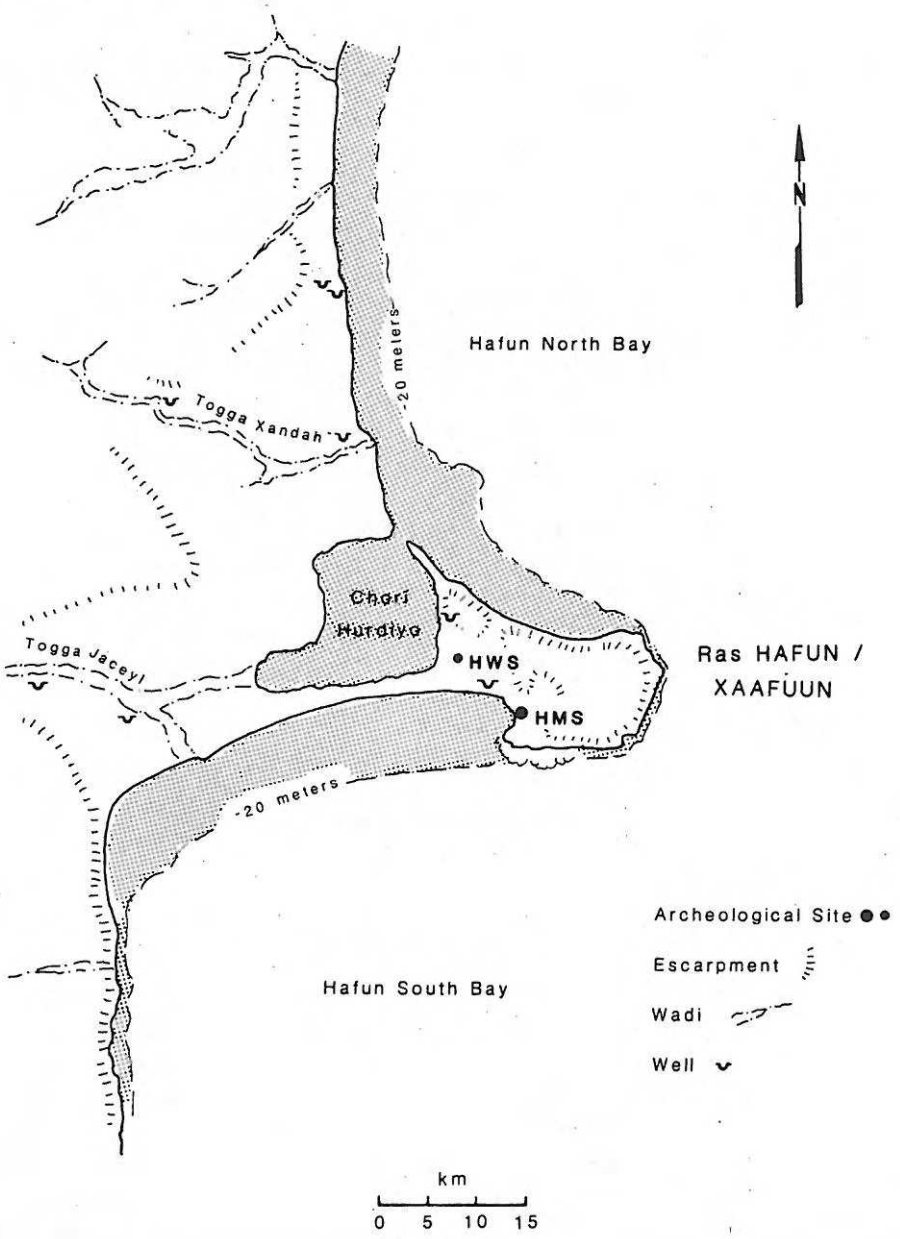


Figure 2

The Hafun West Site (10°27′ N, 51°10′ E) is marked by an eroded surface scatter of rocks, covering 0.12 ha on the coastal shelf, but just above a small slope that probably represents a higher sea level several metres above the high-tide mark at the time of excavation (fig. 3 upper). This higher stand seems to have cut away much of a small complex of stone-footed constructions, probably several rooms facing a walled courtyard. Just north-east, or inland from these constructions, was a depression in which lenses of ashy sand, possibly burnt red sand, and pale sand accumulated during the time in which the complex was in use. The deposit reached depths of 0.5 to 0.8 m. The lenses were difficult to perceive during excavation, and the layer ascriptions given to the excavated ceramics are of limited stratigraphic utility. The excavations undertaken at Hafun West utilised a block-and-baulk system uncovering about 130 sq. m including most of the remnants of the architectural complex and about half of the remaining refuse-filled depression. Since the ceramic density was low (30–35 sherds per cu. m were noted), the sample is small. Most of the diagnostic sherds available in Nairobi have been recorded and drawn.

The Hafun Main Site (10°25′ N, 51°16′ E) is on a sand ridge apparently created by a high sea stand no more than 5 m above the high-tide mark at the time of excavation. In contrast to the Hafun West Site, there is no evidence that the sea cut significantly into the occupational deposit. The site is marked by a scatter of potsherds with a few rocks covering about 1.3 ha. No traces of buildings are evident, though there are several nearby rock cairns. Some of these had traces of human burials and ceramics, all now in Mogadishu and therefore not discussed here. Six soundings, from 1.5 x 1.5 to 3.0 x 2.0 m were scattered about the occupational area (fig. 3 lower). Each revealed a complex stratigraphy of sand layers, ash lenses and oven features from about 1.5 to 2.5 m deep. Though the strata were often sloping and sometimes cross-cut, adequate control was usually maintained in excavation, and the stratigraphic ascriptions given to the sherds are usually significant. However, even the strata of nearby soundings cannot at present be correlated, and here we limit ourselves to statements about ceramic categories occurring relatively earlier or later within the Hafun Main Site deposits. Only about 30 sq. m of the site were excavated, about 0.025 percent, and it is likely that future work will reveal much, perhaps even evidence of buildings in the lower layers. In spite of the small excavated area, the often higher sherd densities (25–70 sherds per cu. m were noted), and deeper deposits resulted in a larger sample of diagnostic sherds than that available from Hafun West. Only those from the three better-excavated among the six soundings (IV, V and VI) were studied in detail, though a few others are illustrated in the following discussion.

Ceramic fabrics

Utilising observations on the full range of sherds recovered in the soundings at the two sites, as well as of the rim sherds and of selected body sherds returned to Nairobi, Smith recognised twelve distinctive categories of ceramic fabric, which he termed 'wares'. Some of these have been subdivided for purposes of the following discussion, creating fifteen categories. Smith's original terms have been standardised to refer descriptively to inclusions, colour and surface treatment without functional implications. Each term is expressible as a set of letters, which are used in the figure captions. In the following descriptions, Smith's original 'ware' names as used in the fieldnotes and in his manuscript are included in inverted commas in order to aid those who may refer to the archives in the future. Restudy of

HAFUN / XAAFUUN 1976

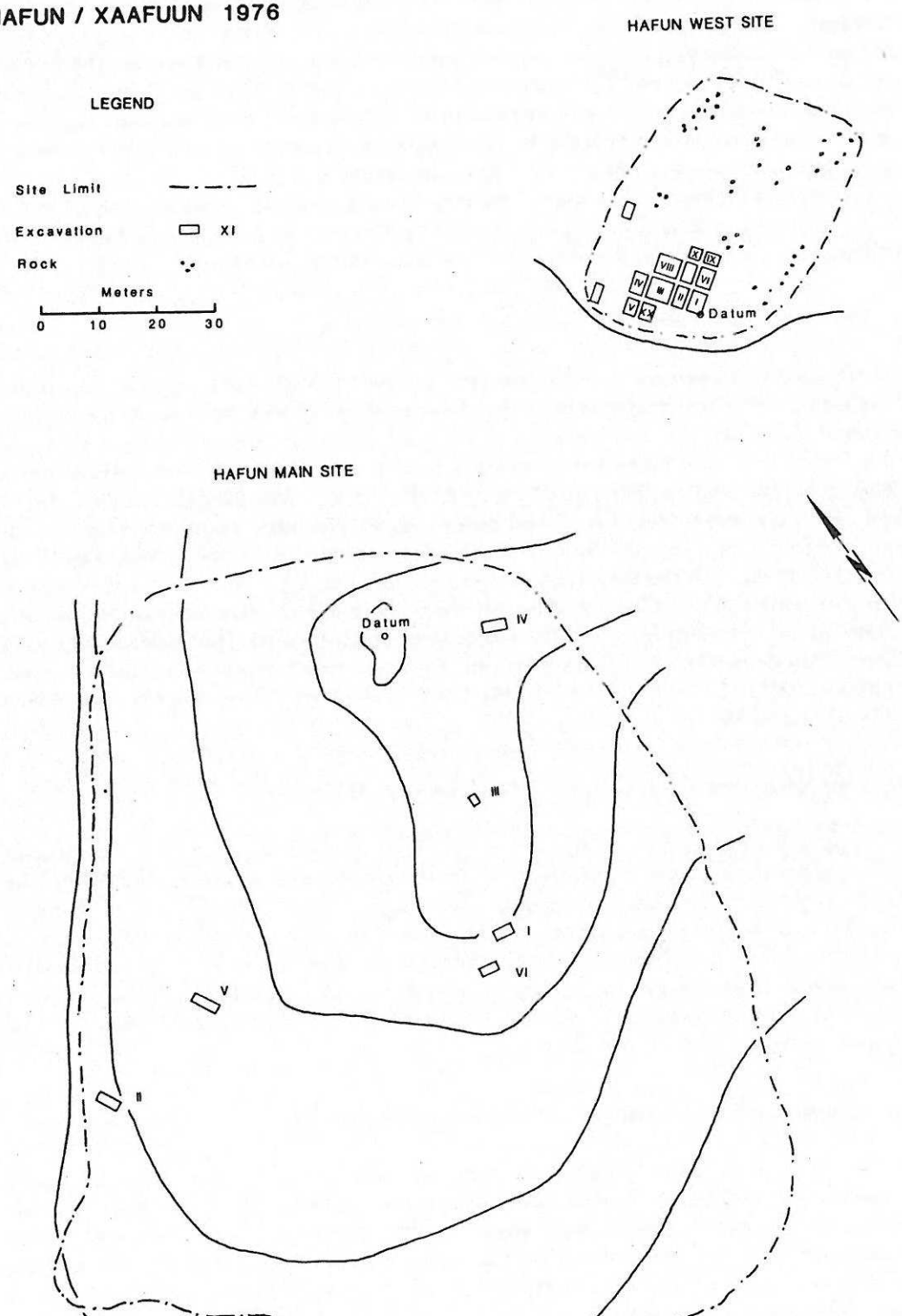


Figure 3

the Nairobi sample has allowed Wright to specify, with varying degrees of certainty, the geographical origin and date of many of the ceramics. Detailed comparisons are given in the figure captions after specification of the locus, diameter (D), thickness (T) and colour of body (CB, taken with a Munsell Colour Chart just under the outer surface) and other attributes. Needless to say, technical analysis to verify and enrich the identification of inclusions and to better evaluate the suggested comparisons remains to be undertaken.

The fifteen categories grouped by possible areas of origin are presented in the following paragraphs. The evident wealth of diversity in what are relatively small ceramic samples will be considered in the concluding discussion.

I. Fine Sandy Buff Fabric (FSyB) 'Buff Amphora Ware'

This light brown pottery has varying proportions of medium sand, limestone fragments and plant fragments in the clay, perhaps simply because it is a poorly cleaned sediment of the sort used to make bricks. Internal ridging indicates the use of a fast wheel. The body has been fired to a brown or pale brown colour, but a whitish surface sludge, perhaps a result of salts, occurs. Most sherds are rims (fig. 4 a, d), necks, handles (fig. 4 b, c) and bases (fig. 4 e) of large amphorae identical to types ubiquitous along the Nile from the first century BC until at least the third century AD, though the interior grooving of one rim (fig. 4 a) seems to be early in this range of time at Coptos. Also on this fabric are shallow bowls (fig. 4 h, i) identical with examples recently excavated at Coptos on the Nile and Luecos Limen (modern Quseir Qadim) on the Red Sea coast from layers of the first centuries BC and AD. Sherds with this Fine Sandy Buff Fabric have been verified only at Hafun West.

II. Fine Sandy Pink Fabric (FSyP) 'Pink Amphora Ware'

This yellowish red ceramic has traces of fine sand, occasionally with inclusions of finely crushed limestone or mica. Whitish surface sludges are also notable. The fast wheel has left regular interior surface ridging. Rims (fig. 4 l, m) and handles (fig. 4 j, k) of amphorae are represented at Hafun West, but more precise ascription is not possible in the absence of more complete examples. Similar rims and handles have a wide distribution in the first centuries AD and BC. There are some body sherds of this fabric in earlier layers at Hafun Main Site, but no statement about the shapes of these vessels is possible.

III. Coarse Sandy Red Fabric (CSyR) 'Coarse Red Ware'

Many readers will recognise the vessels on this fabric as the ubiquitous and typologically difficult 'Roman cooking ware' of the Mediterranean world. However, similar ceramics were made in the contemporary Iranian and South Asian worlds as well. Coarse sand is usually present in the clay body, but inclusions of limestone, mica and possible crushed sherds or grog all occur. Light sludges are rare. The common vessel form is a small jar with simple everted neck (fig 4 f; fig. 6 a, b, d-h), but possible deep ledge rim bowls occur (fig. 4 g, fig. 6 c). Carbonised debris on vessel exteriors indicates that the jars were often used in cooking. This fabric is rare at Hafun West. It is common in the earlier layers at Hafun Main Site but also occurs in the later layers as well.

IV. Sandy Greenish Buff Fabric (SyGB) 'Buff Ware'

This pale yellow or pale brown ceramic has quantities of sand in the clay. One shape, a medium-sized neckless jar (fig. 5 a-c; fig. 7 a, b), is represented in both the Hafun West and Hafun Main Sites, but seems most common in the former. Vessel interiors are usually covered with bitumen. Though such vessels occur at first-century AD Luecos Limen on the Red Sea coast of Egypt, the clay body, firing and form are all similar to common and long-lived Mesopotamian and Iranian types of Parthian and Early Sasanian date (first century BC to fourth century AD).

V. Sandy Glazed Buff Fabric (SyGz) 'Glazed Ware'

This fabric is very similar to that previously described though usually with less sand. Concentric tooling of the basal sherds, internal ridging and external grooving all indicate use of a fast wheel. The vessels were well-fired, the greenish or yellowish colour probably resulting from the presence of salts in the clays in Mesopotamia and nearby regions (Matson, 1943, pp. 81-88). Glazes are much deteriorated, but variants range from pale yellow to green. During the 1975 season, Chittick recognised four glaze variants A-D, which are indicated in the figure captions where known. Only two general vessel forms are definitely attested. One is represented by bases (fig. 5 d, e; fig. 7 i) at both the Hafun West Site and various layers of the Hafun Main Site and by rims (fig. 7 d), handles (fig. 7 f) and necks at the Hafun Main Site. It is typically a medium-sized jar, with relatively wide mouth, thickened or flattened rims and vertical strap handles. Several reconstructible examples were apparently found in cairns at Hafun Main Site, but these remain in Mogadishu and have not been restudied. One bottle neck was found (fig. 7 c). These two shapes are relatively long-lived forms known from many Parthian and Sasanian sites. The other vessel form is a small bowl, attested only in the Hafun Main Site (fig. 7 g, h, j, k). The grooved ledge rim variant from the lower layers has Parthian parallels of the first century BC to third century AD, while the larger everted rim variant and the small ledge rim variants with their distinctive beading of glaze on the rim, all from later layers, have Sasanid parallels of the third to fifth centuries AD. These bowls from the Iranian portion of the Indian Ocean world at present provide the best dating evidence for the Hafun Main Site.

VI. Vegetal-tempered Soft Buff Fabric (VgB) 'Soft Buff Ware'

Thick sherds of this pale yellowish-green to whitish fabric have either chopped straw or animal dung mixed in the clay, leaving the clear impressions of plant fragments after firing. The only diagnostic sherd in the sample examined in Nairobi is the rim of a large neckless jar with Sasanid parallels. Sherds of this fabric occur only in the later layers of the Hafun Main Site.

VII. Sandy Red-slipped Fabric (SyLsRS) 'Burnished Red Sandy Ware'

The ceramics in this category have a diversity of inclusions, among which are sand, limestone and plant fragments, usually present in small quantities and perhaps merely the result of incomplete cleaning of the clay. The vessels are usually fired to a reddish yellow or yellowish red colour, and the surfaces were finished with a red slip, probably burnished. Preservation of these slips, however, is poor and few show remaining evidence of burnishing. All diagnostic sherds seem to be from relatively

large wide-bodied jars with narrow necks and elaborated rims (fig. 8 a-f). The category is South Asian in general origin, with dated parallels generally of the first to third centuries AD in south and east-central India or identified as 'Indian' in contemporary Gulf and Red Sea sites. Within this grouping, two nearly identical grooved band rims, found in adjacent layers of the same excavation, warrant comment (fig. 8 c, f). Both have a distinctive streaky slip or wash, but one was fired in a reducing atmosphere and has a grey body colour and black wash. It seems possible that this category has diverse local origins within a region but that these two vessels came from the same locality. Sandy Red-slipped vessels seem to be restricted to the earlier layers of the Hafun Main Site.

VIII. Vegetal-tempered Dark Brown Burnished Fabric (VgDBBr) 'Dark Brown Burnished Ware')

Sherds in this category have quantities of limestone and plant fragments in the clay. They were typically fired in a reducing atmosphere to a dark brown colour, but one example (fig. 8 j) was fired in an oxidizing atmosphere and is red. All examples were at least partially burnished. The most commonly attested form is a heavy, markedly carinated jar with a heavy ledge rim. The vessels have been hand-built from rings and filets, rather than wheel-turned. We have found no precise parallels for this fabric and shape, but the general form is common in South Asian contexts. Sherds of this fabric were found almost exclusively in the earlier layers of the Hafun Main Site.

IX. Shell-tempered Dark Grey Fabric (ShDG)

The two vessels placed in this category have quantities of coarsely crushed shell fragments in the clay (fig. 5 l, m). (Whether these were recent or fossil shell at the time of use cannot be known until larger samples are recovered from the location of manufacture.) The better preserved of the two examples was made by patching together rings and filets as above and the carination of this small jar with very everted rim reinforced by scalloping the juncture (fig 5 l). No precise parallels for this shell-tempered fabric are known, but the carinated form and the scalloping are attested in South Asia. The two examples are from lower levels of the Hafun West Site.

X. Limestone and Vegetal-tempered Red Fabric (LsVgR) 'Standard Red Ware'

This common fabric has a mixed temper of limestone, plant fragments and occasionally sand. It is fired to the point that the surface is red or reddish yellow, but the core is often still unoxidized. The common vessel form is a large hole-mouth jar with heavy band rim (fig. 9 a-g). Internal striations suggest production or finishing on a wheel. While individual vessels similar to this common Hafun Main Site jar are known from Egypt and India, it is rare in the few assemblages in which it occurs and is unlikely to be local to either region. At present, we have no suggestions regarding its locality of manufacture. Shallow conical tops occur on a variant of this fabric also containing possible crushed sherds or grog (fig. 9 i, k). One of these has been reworked and recycled to some other use, as indicated by chipping of a hole through the small end and burning on the inner lip (fig. 9 i). Though conical tops of this general type are widespread, none with its characteristic inner lip have been recognised elsewhere. Both the jars and tops on this fabric are common in the earlier layers of the Hafun Main Site, but they occur in the upper layers as well.

XI. Vegetal-tempered Soft Red Fabric (VgR) 'Soft Chaff Ware'

This relatively rare fabric has quantities of plant fragments in the clay. It is fired to the point that its surface is red, but the core is still unoxidized. Internal striations suggest finishing, if not production, on a wheel of some sort. The sherds are very thick, and the one attested form is a very large jar with heavy ledge rim (fig. 5 h). No exact parallels can be suggested. This fabric is found only at Hafun West.

XII. Sandy Light Brown Burnished Fabric (SyLBBr) 'Light Brown Burnished Ware'

This pottery has generally coarse sand inclusions and has been fired to a red to light brown colour. The sole vessel shape is a medium-sized jar with distinctively thickened everted rim (fig. 6 i-k). These vessels have been hand-built with rings or filets, rather than wheel-thrown. The interior and exterior surfaces are well burnished. Carbonised debris on the vessel indicates use in cooking. No parallels for these vessels are known, but we suggest that they could have been produced either locally near Hafun or elsewhere in the region. Sherds of this fabric are found in the lower levels of the Hafun Main Site.

XIII. Sandy Limestone Tempered Grey Fabric (SyLsG) 'Stone Wares' including 'Purple Ware', 'Thick Ware' and 'Prodded Ware'

This rare and unusual ceramic group has large quantities of sand and crushed limestone (now marked by rectangular voids) in the clay. It has been fired to give an appearance of vitrification, though it does not have the hardness of a true 'stone ware'. Internal striations and suggestions of interior ridging indicate production or finishing on a wheel of some sort. At least some of the thick examples of this fabric must come from large basins such as the illustrated heavy ledge rim example with irregular incised decoration (fig. 7 l). The rest, however, including the 'prodded' examples with the large rounded punctates (fig. 7 m), seem to be from large wide-bodied jars. Though the basin has a parallel from the perhaps mixed later levels of Arikamedu in South India, we cannot suggest a locality of manufacture for vessels of this fabric. Examples were found in various layers of the Hafun Main Site.

XIV. Crude Sandy Fabric (SyC) 'Utility Ware'

This rough ceramic has quantities of sand and what may be crushed sherds or grog in the clay. Firing was variable, leaving a red or brown colour, sometimes with an unoxidized core. Both small everted rim jars (fig. 5 g) and large open basins (fig. 6 l) are common. All seem to have been hand-built with patches of clay. This fabric is common at the Hafun West Site and occurs in the earlier layers at the Hafun Main Site. It is possible that these are expedient vessels made locally in the Hafun area itself.

XV. Crude Vegetal-tempered Fabric (VgC) 'Utility Ware'

This rough ceramic differs from the preceding only in having quantities of plant fragments in the clay along with possible grog. The only recognisable shapes are various basins (fig. 5 i-k), also apparently hand-built from patches of clay. This fabric is known only from the Hafun West Site. It is possible that these are also expedient vessels made locally in the Hafun area.

Having provided basic descriptions of the ceramic fabrics recognisable at the two sites, and having said what is possible at present about identical or comparable ceramics elsewhere, we can now discuss the ceramics from the two sites as assemblages in order to better assess dates of the visits to these shores, the activities undertaken at these beach localities and the economic and geographical implications of these visits.

The ceramic assemblage of the Hafun West Site

The evidence of the amphorae and small bowls on fine sandy fabrics from the Hafun West Site indicates a date sometime in the first century BC or first century AD. Two other items indicate that occupation during the earlier part of this range is more likely. First, tucked amidst the small ceramic sample in Nairobi is a badly eroded fragment of a lamp (fig. 4 n). The relatively domical shape of the lamp top indicates a broadly Hellenistic date, and the radial pattern of ridges alternated with roughly oval elements most closely parallels types usually dated to the second or first century BC. Second, Chittick has reported the sherds of a painted Hellenistic *lagynos,* conserved in Mogadishu but identified by various specialists on the basis of photographs. These were made no later than the middle of the first century BC. It seems likely that the relatively short occupation of the Hafun West Site was during the first century BC, a century or more before the *Periplus* was written.

The ceramic material discarded around hearths on a small area of sand next to a few modest buildings is a very limited inventory. A number of hand-made Crude Sand and Vegetal-tempered basins and jars show some direct evidence of use in cooking. A few small hand-made jars with Shell-tempered Dark Grey fabric and possibly wheel-made jars with Coarse Sandy Red fabric probably had a similar use. In contrast are a number of wheel-made Sandy Greenish Buff jars with interior bitumen coatings which must have contained necessary liquids such as water. The relatively few Sandy Glazed jars and Fine Sandy amphorae probably also had a similar use in the storage of liquids. Note that there were very few small bowls which could have been used in the serving of food or drink. It is possible, however, that some of the basins served as communal serving dishes.

The suggestions for the geographic origin of this material are diverse. The substantial quantity of hand-built crude vessels could have been made locally. The next most common element are the Sandy Greenish Buff and Glazed Buff jars, which are most similar to vessels from Mesopotamia and Iran. The next most common are the Fine Sandy amphorae and perhaps the few Coarse Sandy Red vessels from the Eastern Mediterranean and the Fine Sandy amphorae and bowls from the Nile. Least common are the Shell-tempered Dark Grey jars, which seem to be of South Asian affinity. In sum, these vessels in no way indicate the identity of the people, presumably mariners, who prepared their meals on this beach on Chori Hurdiyo, but they do suggest that they regularly provisioned at ports in the Nile sphere, perhaps near the head of the Red Sea, and at ports in the Iranian sphere, perhaps near the mouth of the Gulf. There is surprisingly little amidst the kitchen gear which might be ascribed to South Asian ports.

The ceramic assemblages of the Hafun Main Site

The richer assemblages from this larger site facing Hafun South Bay prove somewhat more difficult to date than might be expected. The best archaeological indications of the date of occupation are the vessels of Mesopotamian or Iranian

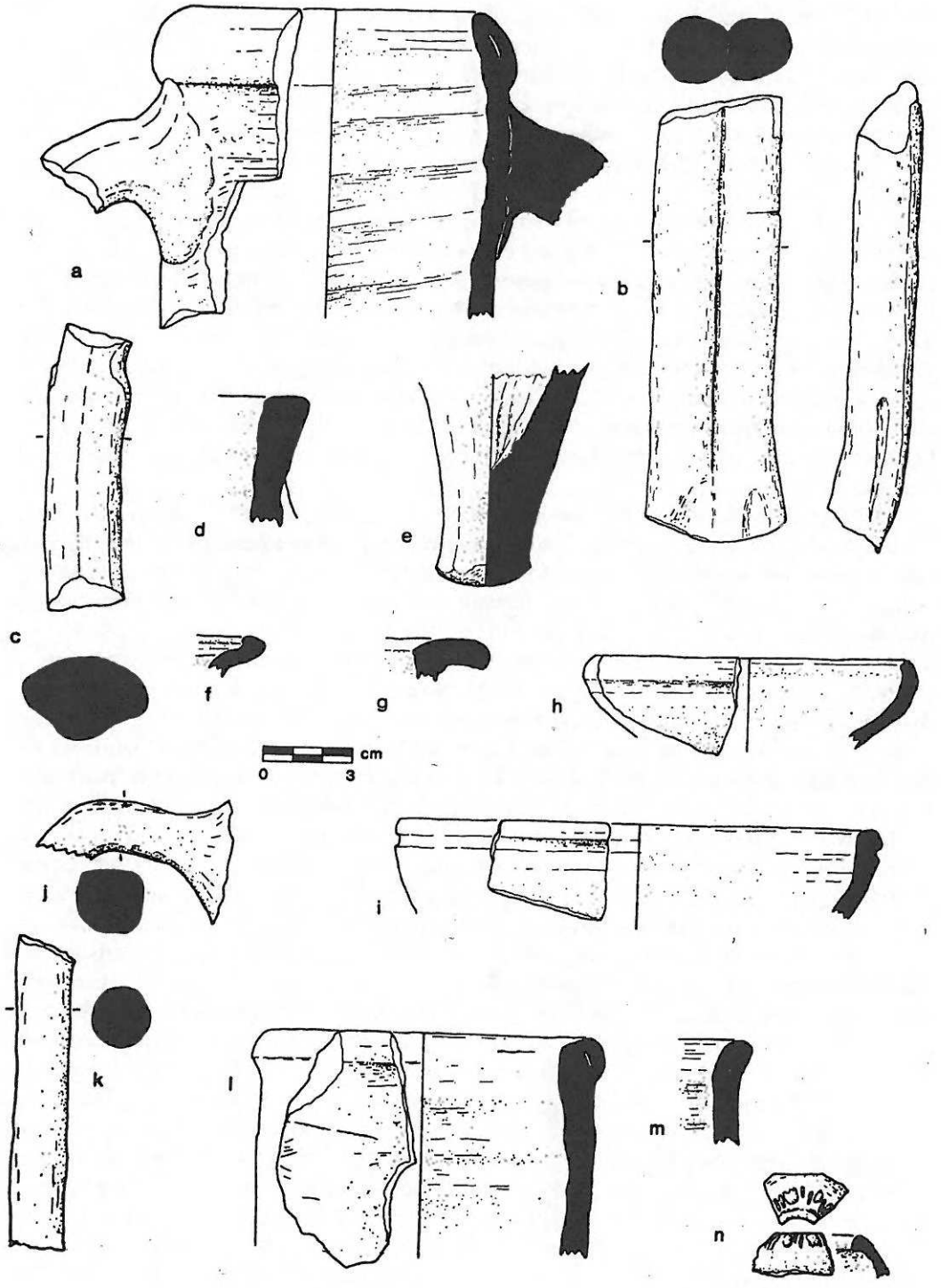
fabrics. The glazed bowls and large Soft Buffware jar from the upper layers indicate dates of third to fifth centuries AD. A glazed bowl from the earlier layers indicates a date of the first to third centuries AD. Some of the Indian Sandy Red-slipped jars from the earlier layers have been dated to the first to third centuries, but it is not clear when these vessels went out of use.

There is a single radiocarbon determination from Layer (4) in Sounding V, a relatively early layer. It is 2030 BP ± 65 (P-2611). The actual date would be around 45 BC, with a 67 percent probability that it falls between 110 BC and AD 20 (Stuiver and Pearson, 1986, p. 836), somewhat earlier than other evidence for the date of the Hafun Main Site. This is a single determination on an unidentified wood. In arid climates, vegetation grows slowly and even bushes can have inner rings hundreds of years older than the date of the plant's death. Also, on an arid coast, there is the problem of old driftwood. This problem is compounded by the fact that mangrove species, which could have occurred locally or have been washed in, utilise some old carbon dioxide from seawater (J. Stipp, Beta Analytic, pers. comm.) and can give a falsely early date. In sum, this date cannot be taken as more than a broad indicator of the site's age.

While the evidence is far from satisfactory, we suggest that the earlier layers at Hafun Main Site were deposited in the second to third centuries AD, and the later layers were deposited in the third to fifth centuries AD. A more certain dating will probably be possible when the full sample is studied and further comparisons are documented.

From the point of view of use, the assemblages from the Hafun Main Site are as limited as those from the Hafun West Site. A substantial proportion of the diagnostic sherds represent jars used directly in cooking. These include wheel-made examples on the Coarse Sandy Red fabric and hand-made examples on both the Sandy Light Brown Burnished and Vegetal-tempered Dark Brown Burnished fabrics. The occasional hand-made Crude basin and Sandy Grey basin may also have been used in cooking. Of these only the Coarse Sandy Red fabric is definitely present in the later layers. Complementing these cooking vessels, a substantial proportion of the diagnostic sherds represent large wheel-made or wheel-finished jars whose primary use was probably the storage and serving of liquids. Among these are the Sandy Red-slipped jars, the Sandy Greenish Buff and Glazed Buff jars, the Limestone and Vegetal-tempered Red neckless jars, and the Sandy Limestone-tempered Grey jars. Only the Red-slipped jars fail to continue in use in the later layers. The only small serving vessels are the various Sandy Glazed bowls and a few Sandy Red-slipped bowls. The basins noted as cooking utensils could have served as larger serving vessels. The scarcity of small serving vessels is more intelligible in this site because the excavators found both hearths and a number of small ovens made from large sherds, which they termed 'mofa'. The hearths could have been used for grilling the fish and goats whose bones were identified by John Harris of the Kenya National Museum, and the ovens are most suited for the baking of small cakes. If these inferences were correct, small bowls would have been needed only for condiments or for pouring a drink out of one of the jars. Additional studies of the faunal sample and efforts to recover and study carbonised plant remains are certainly needed.

The suggested geographical origins for this material differ in emphasis from those suggested for the Hafun West Site. Only the Coarse Sandy Red cooking jars may be of Nile or Mediterranean origin, and this is far from certain. These are found both early and late at the Hafun Main Site. The Sandy Greenish Buff jars, the Sandy Glazed jars, the Vegetal-tempered Soft Buff large jars, and the Sandy Glazed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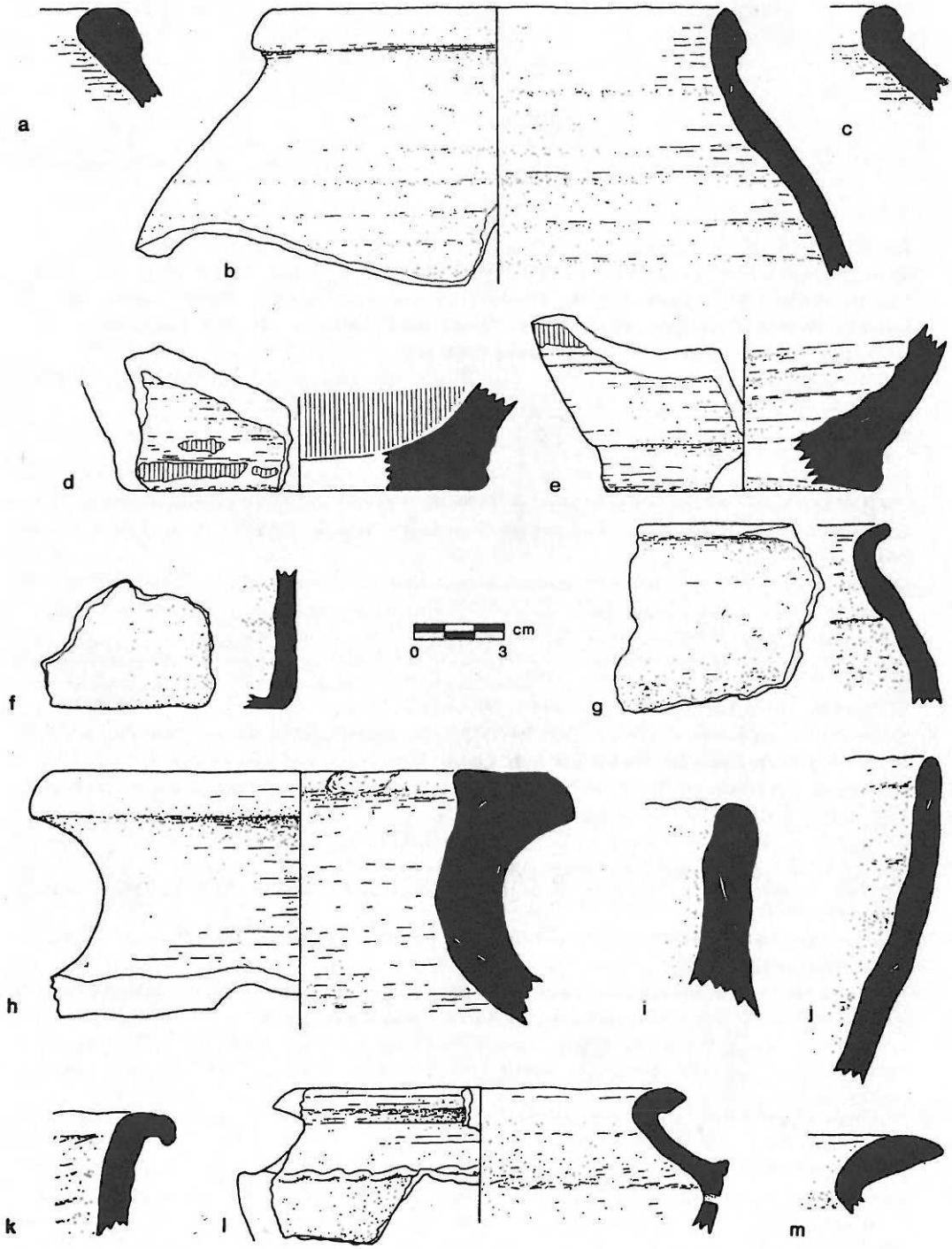
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Fig. 5 Vessels with Gulf and other fabrics from Hafun West, first century BC-first century AD.

a. Restricted jar rim (SyGB) (II [3]), 20 percent fine sand, D *c.* 19, T .95, CB pale yellow (2.5Y 7/4), interior bitumen coated. *Quseir:* Whitcomb and Johnson, 1979: Pl. 27 e (first century AD); *Sohar:* Kevran and Hiebert, 1988: Fig. 6:13 (early Sasanid).
b. Restricted jar rim (SyGB) (VII [2]), 10 percent fine sand, D 16, T .95, CB pale yellow (2.5Y 7/3), see previous references.
c. Restricted jar rim (SyGB) (III [3]), 30 percent fine sand, D ?, T .96, CB pale yellow (2.5Y 7/4), see previous references.
d. Base of glazed vessel (SyGz) (I [1]), 5 percent plant fragments, base D 12, side T 1.62, CB white (2.5Y 8/3), light yellowish brown (2.5Y 6/4) glaze with olive (7.5Y 5/3) speckles, 'Type B'.
e. Base of glazed vessel (SyGz) (III [2]), 10 percent fine sand, base D 9, T .98, CB white (5Y 8/2), brown (10YR 4/3) glaze, 'Type B'.
f. Base of possibly glazed vessel (SyGz) (VIII [3a]), 30 percent medium sand, base D 18, side T .58, CB pale yellow (2.5Y 7/3), possible brown (10YR 5/3) glaze, 'type A'.
g. Hand-made everted jar rim (SyC) (VIII [3e]), 20 percent medium sand and grog?, D *c.* 15, T .75, CB reddish yellow (5YR 7/6) with dark core.
h. Very large jar rim (VgR) (III [3]), 20 percent plant fragments, D 18, T 2.15, CB red (2.5Y 8/2) with dark core.
i. Hand-made basin (?) rim (VgC) (III [3]), 30 percent plant fragments and grog?, D 18, T 1.50, CB red (2.5YR 5/6).
j. Hand-made plain basin rim (SyC) (III [3]), 25, percent grog? and plant fragments, D 25, T 1.02, CB light brownish grey (10YR 6/2) with dark core.
k. Hand-made ledged basin rim (VgC) (VIII [2e]), 20 percent plant fragments, D 25, T 1.01, CB brown (10YR 5/3) with dark core.
l. Small hand-made jar with scalloped carination (ShDG) (III [3]), 25 percent coarse crushed shell, D 14, T .51, CB very dark grey (10YR 3/1), carbonised cooking debris on the exterior. *Nevasa:* Sankalia *et al.*, 1960: 306, Fig 140: T 107 (late first century BC-first century AD) for parallel form and firing; *Maheshvar:* Sankalia *et al.*, 1958: 155, Fig. 82: T 135a (fourth-fifth centuries AD) for parallel form, firing and use of scalloping.
m. Everted jar rim (ShDG) (VII [4]), 35 percent coarse crushed shell, D 19, T.52, CB reddish brown (5YR 4/4), surfaces damaged. *Nevasa:* Sankalia *et al.*, 1960: 306, Fig 140: T 104a (second century AD).

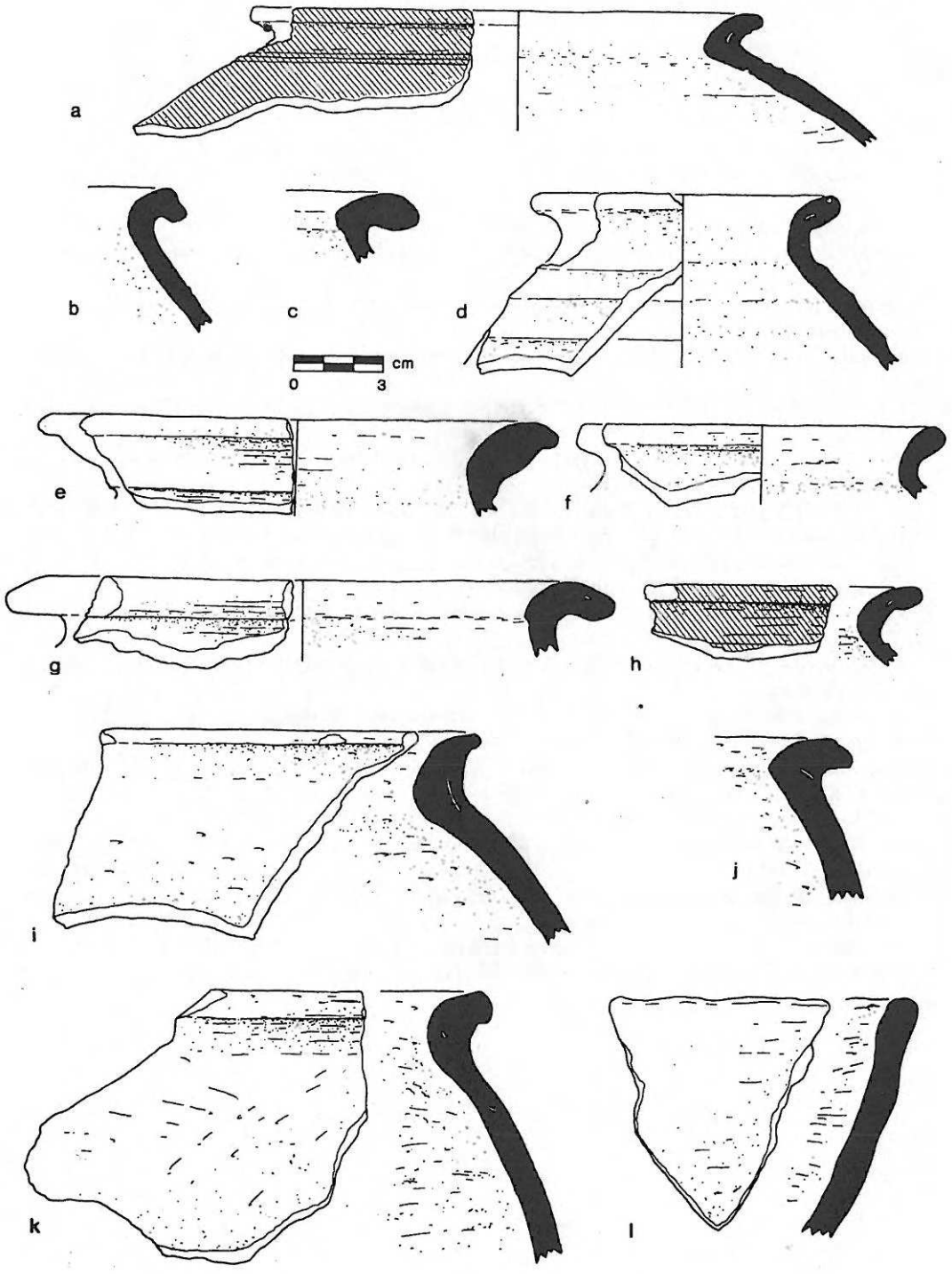
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Fig.6 Vessels with various fabrics from the Hafun Main Site, second-fifth centuries AD.

a. Everted jar rim (CSyR) (VI [8]), 20 percent coarse sand and mica, D 16, T .62, CB yellowish red (5YR 5/6), burnished-reddish brown (5YR 4/4) exterior slip, carbonised cooking debris on exterior.
b. Very everted jar rim (CSyR) (VI [8]), 25 percent limestone, D 20, T .59, CB light brown (7.5YR 6/4), exterior red (2.5YR 5/5) wash.
c. Very everted jar rim (CSyR) (VI [6]), 30 percent coarse sand and limestone, D 20, T .73, CB reddish yellow (5YR 6/6), carbonised cooking debris on the exterior.
d. Thickened everted jar rim (CSyR) (V [2]), 10 percent limestone, grog? and medium sand, D 10, T .87, CB red (2.5YR 5/6), light grey (2.5Y 7/2) surface sludge.
e. Thickened everted jar rim (CSyR) (V [5]), 30 percent coarse sand, D 18, T .57, CB reddish yellow (5YR 7/5).
f. Everted jar rim (CSyR) (IV [3]), 15 percent grog? and limestone fragments, D 12, T .51, CB red (10R 5/7), eroded trace of light coloured sludge.
g. Very everted jar rim (CSyR) (VI [8]), 25 percent coarse sand, limestone and plant fragments, D 20, T .75, CB brown (7.5YR 5/4), carbonised cooking debris on outside.
h. Everted jar rim (CSyR) (IV [4]), 15 percent medium sand, D 12, T .51, CB pink (5YR 7/3), red (10R 4/5) slip, carbonised cooking debris on rim, possible use abrasion on interior of neck.
i. Hand-made everted jar rim (SyLBBr) (VI [8]), 20 percent medium sand, D 22, T .94, CB light reddish brown (5YR 6/5), mottled light brown (7.5YR 6/3) surface, interior and exterior surfaces burnished, carbonised cooking debris on exterior.
j. Hand-made everted jar rim (SyLBBr) (VI [8]), 25 percent coarse sand, D 25, T .98, CB red (2.5YR 5/6), interior and exterior surfaces burnished, carbonised cooking debris on exterior.
k. Hand-made everted jar rim (SyLBBr) (VI [4]), 30 percent coarse sand, D 30, T .87, CB yellowish-red (5YR 5/6), interior and exterior surfaces burnished.
l. Hand-made basin rim (SyC) (VI [6]), 30 percent medium sand and mica, D *c.* 36, T.89, CB very pale brown (10YR 7/3) with dark core, carbonised cooking debris on exterior.

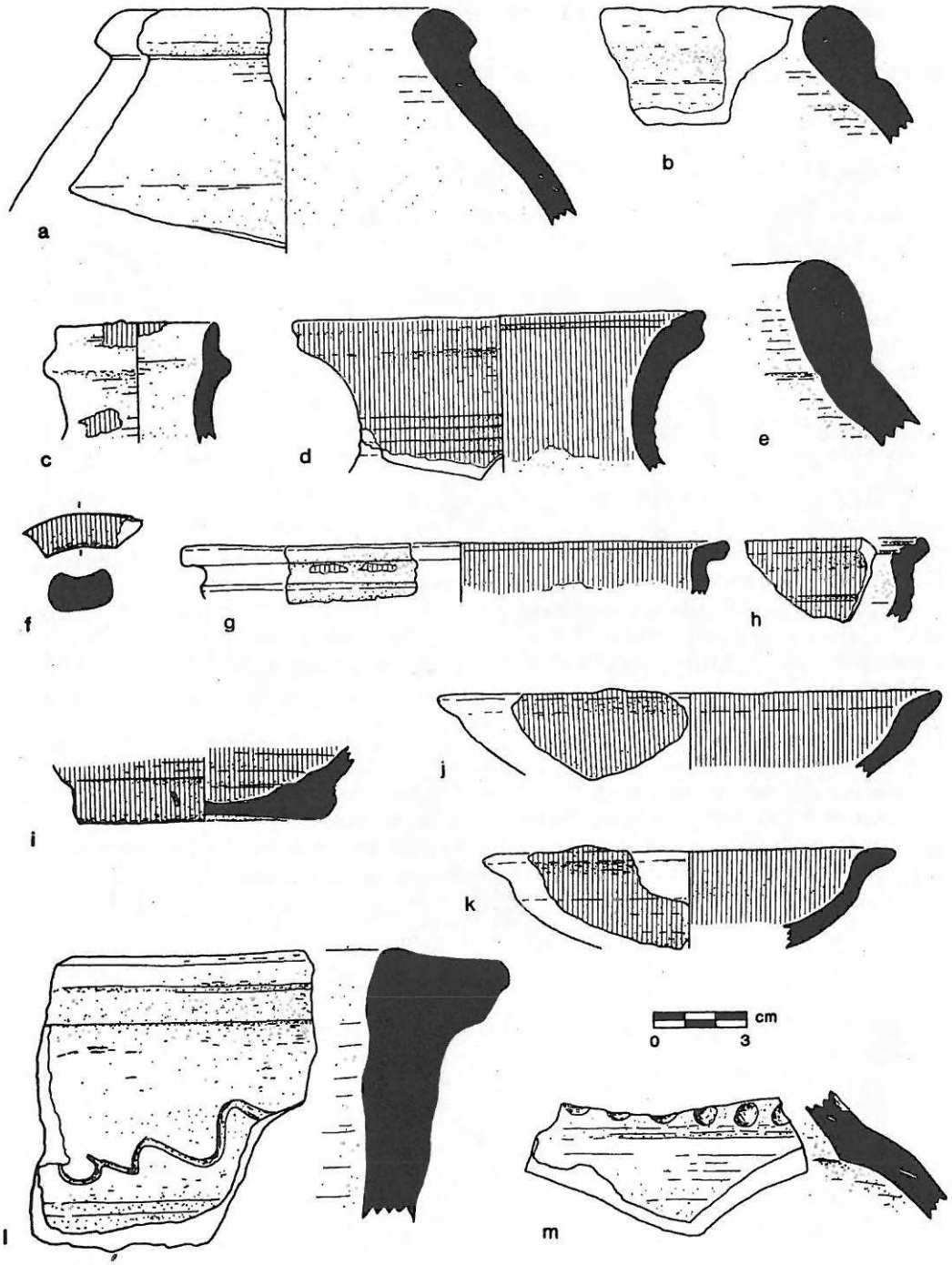
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Fig. 7 Vessels with Gulf fabrics from the Hafun Main Site, second-fifth centuries AD.

a. Restricted jar with thickened rim (SyGB) (IV [3]), 30 percent medium sand, D 12, T 1.03, CB very pale brown (10YR 7/3), interior bitumen coated. *Quseir:* Whitcomb and Johnson, 1979: Pl. 27e (first century AD); *Susa:* Labrousse and Boucharlat, 1974: Fig. 35: 8 (early Sasanid), Boucharlat and Labrousse, 1979: Fig. 37: 10 (Sasanid); *Sohar:* Kevran and Hiebert, 1988: Fig. 6: 13 (early Sasanid).
b. Restricted jar with thickened rim (SyGB) (VI [7]), 20 percent fine sand, D 13, T 1.74, CB very pale brown (10YR 7/3), light grey (2.5 Y 7/2) surface, interior bitumen coated, (see previous references.
c. Glazed bottle neck (SyGz) (V [1]), 10 percent fine sand, D 6, T .67, CB very pale brown (10YR 7/3), exterior pale yellow (2.5Y 8/3) glaze 'Type F'. *Susa:* Boucharlat and Labrousse, 1979: Fig. 34: 18 (Seluecid), Fig. 28: 14 (Sasanid); *Sohar:* Kevran and Hiebert, 1988: Fig. 4: 10-11 (Parthian), Fig. 7: 28 (Sasanid).
d. Glazed expanded lip jar rim (SyGz) (IV [4]), 15 percent fine sand, D 13, T .61, CB pale yellow (2.5Y 8/3), deteriorated interior and exterior pale olive (5Y 6/5) glaze.
e. Restricted jar with band rim (VgB) (IV [1]), 20 percent plant fragments, D 28, T 1.67, CB white (5Y 8/2). *Susa:* Labrousse and Boucharlat, 1974: Fig. 34: 14 (late Sasanid).
f. Glazed handle fragment (SyGz) (V [4]), traces of fine sand, CB very pale brown (10YR 8/3), green (2.5G 5/5) glaze.
g. Glazed ledge rim bowl (SyGz) (V [5]), traces of fine sand, D 18, T .51, CB pale yellow (2.5Y 8/3), deteriorated pale yellowish green (5Y 8/4) glaze. *Sohar:* Kevran and Hiebert, 1988: cf. Fig. 4: 12-13 (Parthian).
h. Glazed ledge rim bowl (SyGz) (VI [2]), traces of fine sand, D 30, T .56, CB pale yellow (2.5Y 8/3) glaze. *Susa:* Boucharlat and Labrousse, 1979: Fig. 28: 2 (Sasanid).
i. Glazed flat base (SyGz) (V [2]), 30 percent fine sand, base D 9.5, side T .53, CB pale yellow (2.5Y 8/3), pale yellow (5Y 7/3) glaze with dark speckles.
j. Glazed small bowl (SyGz) (IA [1]), 15 percent fine sand, D 16, T .66, CB very pale brown (10YR 8/3), olive yellow (2.5Y 6/6) glaze. *Susa:* Labrousse and Boucharlat, 1974: Fig. 35: 2 (Sasanid), Boucharlat and Labrousse, 1979: Fig. 28: 1 (Sasanid); *Sohar:* Kevran and Hiebert, 1988: Fig. 6: 24 (early Sasanid), Fig. 7: 28 (Early Sasanid); *Kish:* Harden, 1933: Fig. 26: 1-4 (Sasanid); *Abu Serifa:* Adams, 19XX: p. 106, Fig. 11y (Sasanid).
k. Glazed small bowl (SyGz) (IA [4a]), 20 percent fine sand, D 13, T .645 CB pale yellow (2.5Y 8/3), green glaze (colour not recorded), see previous references.
l. Basin rim with curved incising (SyLsG) (V [4]), 40 percent fine sand and limestone (?) and plant fragments, D *c.* 50, T 2.39, CB brown (7.5YR 5/2). *Arikamedu:* Wheeler, 1946: Fig. 35: 146 (late first-second centuries AD).
m. Jar shoulder with prodded decoration (SyLsG) (V [5a]), 25 percent fine sand and limestone, T .83, CB grey (5YR 5/1).

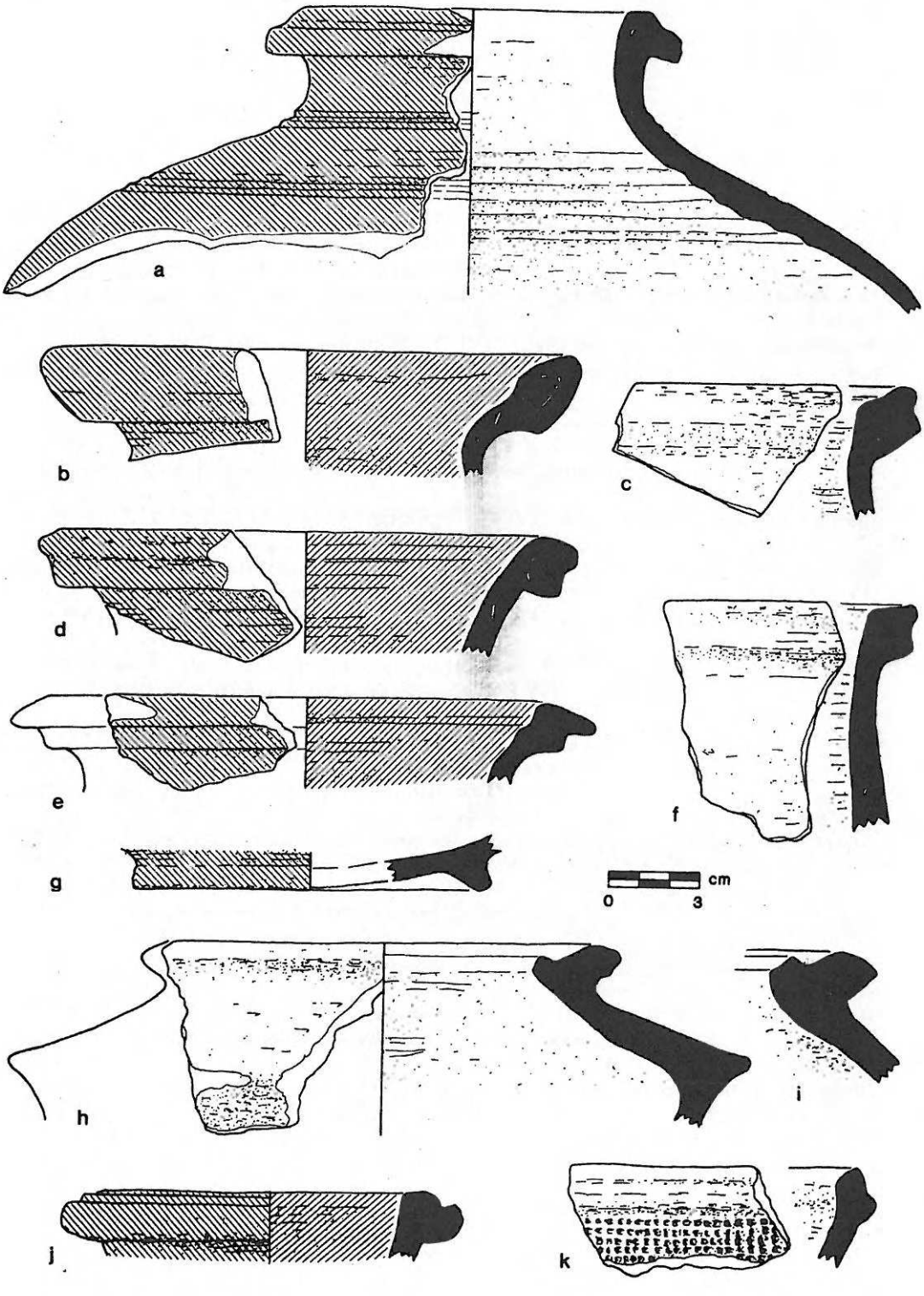
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Fig. 8 Vessels with Indian and African fabrics from the Hafun Main Site, second-fifth centuries AD.

a. Ledge rim jar rim (SyLsRS) (V [5a]), 15 percent fine sand and limestone, D 13, T .65, CB yellowish red (5YR 4/6), burnished exterior red (10R 4/6) slip, burning on lip. *Sohar:* Kevran and Hiebert, 1988: cf. Fig. 5: 16 (late Parthian); *Arikamedu:* Wheeler, 1946: Fig. 24: 47 (early first century AD), Fig. 28: 69 (late first century AD and later); *Chandravali:* Wheeler, 1948: 286, Fig. 49: A74 (second century AD); *Nevasa:* Sankalia *et al.*, 1960: 292, Fig. 131: T 77 (second century AD); *Bhramapuri:* Sankalia and Dikshit, 1952: Fig. 20: 79 (third-ninth centuries AD).

b. Thickened band lip jar rim (SyLBBr) (VI [6]), 10 percent plant fragments and limestone fragments, D 17, T .83, CB reddish-yellow (2.5YR 5/5), red (2.5YR 6/6) slip. *Arikamedu:* Wheeler, 1946: Fig. 25: 53a (late first century AD), Fig. 25: 53c (mixed first century AD); *Chandravali:* Wheeler, 1948: Fig. 49: A73 (first century BC), Fig. 49: A 61 (first-second centuries AD); *Brahmagiri:* Wheeler, 1948: Fig. 244, Fig. 30: T 196, T 198 (late first-early second centuries AD); *Nevasa:* Sankalia *et al.*, 1960: 293, Fig. 134: T 83 (second century AD).

c. Grooved band rim jar rim (SyLBBr?) (IV [5]), 15 percent fine sand and plant fragments, D 21, T .70, CB very dark grey, traces of black wash.

d. Grooved band lip jar rim (SyLBBr) (VI [7]), 15 percent limestone and plant fragments, D 17, T .75, CB reddish-yellow (5YR 7/6), red (2.5YR 6/6) slip. *Quseir:* Whitcomb and Johnson, 1979: Fig. 31g (first-third centuries AD); *Sohar:* Kevran and Hiebert, 1988: Fig. 4: 16-19 (early Parthian and later, first century BC to second century AD).

e. Grooved ledge rim jar rim (SyLBBr) (VI [8]), 20 percent limestone and medium sand, D 18, T .83, CB red (2.5YR 5/6), light reddish brown (2.5YR 6/4) slip. *Quseir:* Johnson and Whitcomb, 1983: Pl. 13e (second century AD); *Sohar:* Kevran and Hiebert, 1988: Fig. 4: 17-18 (early Parthian and later, first century BC to third century AD).

f. Grooved round lip jar (SyLBBr) (IV [4]), 25 percent fine sand, limestone, and mica, D 28, T .77, CB reddish-yellow (7.5YR 6/5), traces of streaky brown (10YR 5/3) wash.

g. Ring base (SyLBBr), (VI [6]) 10 percent medium sand, limestone and plant fragments, base D 11, side T .65, CB reddish yellow (5YR 6/6), red (10R 6/5) exterior slip.

h. Carinated ledge rim jar (VgDBBr) (VI [6]), 20 percent limestone and plant fragments, D 15, T 1.03, CB reddish-brown (5YR 4/5) with dark core, burnished upper exterior.

i. Carinated ledge rim jar rim (VgDBBr) (VI [8]), 25 percent limestone and plant fragments, D 22, T .93, CB reddish brown (5YR 5/5) with dark core, burnished exterior.

j. Heavy ledge rim jar rim (VgDBBr?) (VI [8]), 20 percent limestone and plant fragments?, D 12, T .84, CB red (2.5YR 4/6), burnished red (10R 4/7) slip. *Nevasa:* Sankalia *et al.*, 1960: 293, Fig. 132: T 80b (second century AD); *Maheshvar:* Sankalia *et al.*, 1958: 155, Fig. 81: T 132a, T 132b (fourth century AD).

k. Thickened rim bowl with dentate impressions (VI [6]), 30 percent angular quartz and mica, D *c.* 25 (warped), T. 76, CB brown (10YR 4/3), carbonised cooking debris on the exterior.

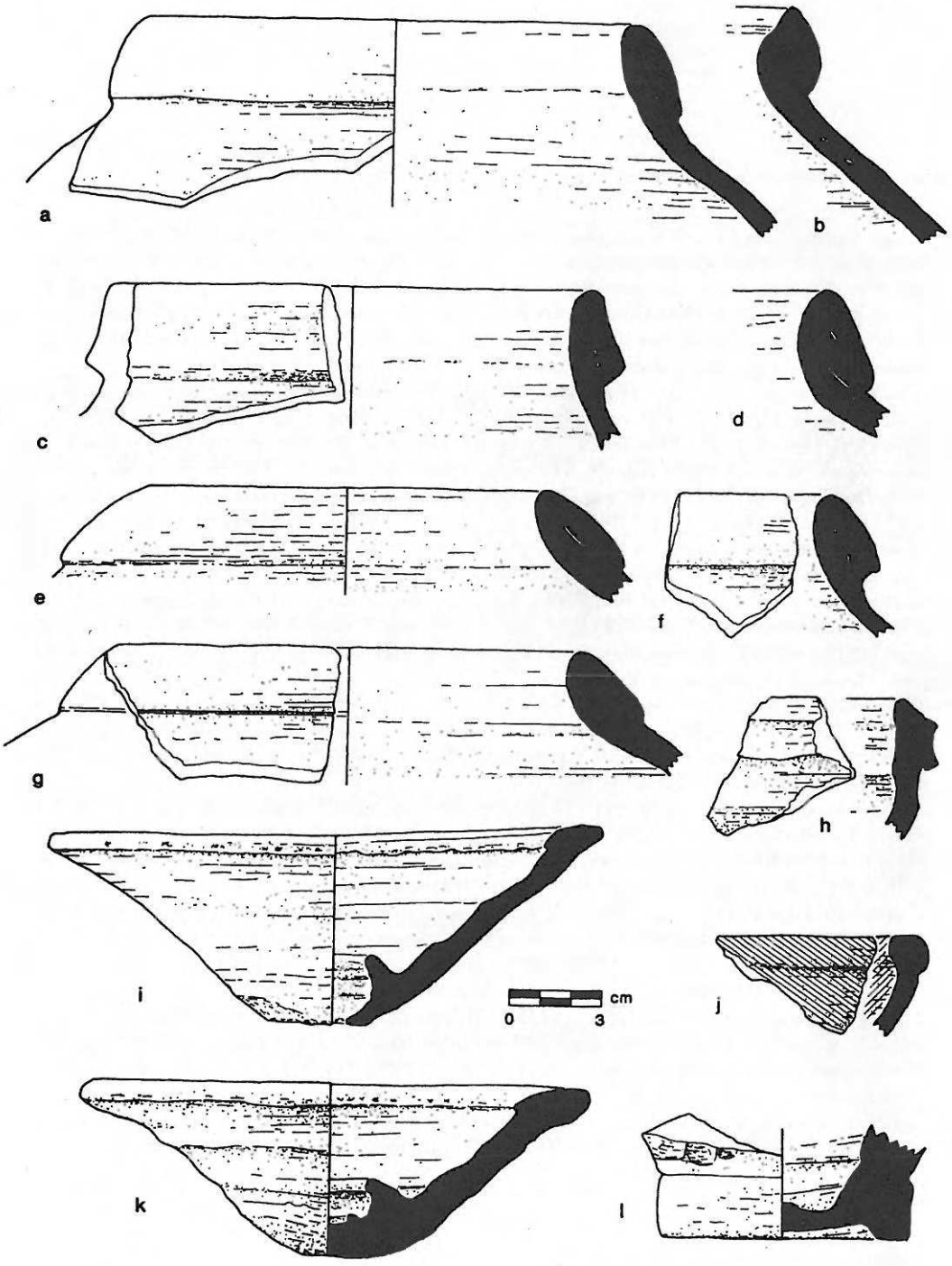
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Fig. 9 Vessels with various fabrics from the Hafun Main Site, second-fifth centuries AD.

a. Neckless band rim jar (LsVgR) (VI [6]), 20 percent limestone, plant fragments and medium sand, D 19, T .67, CB yellowish red (5YR 6/6). *Quseir:* Johnson and Whitcomb, 1983: Pl. 23 c, *Alexandria:* Rodziewicz, 1984: Pl. 57: 242 (fifth-sixth centuries AD); *Arikamedu:* Wheeler, 1946: Fig. 27: Type 61, 61d (first century AD).
b. Neckless band rim jar (LsVgR) (VI [5]), 25 percent limestone, plant fragments and medium sand, D 19, T .94, CB brown (7.5YR 5/4), cloth gloved fingerprint on the surface, see previous references.
c. Neckless band rim jar (LsVgR) (VI [8]), 15 percent medium sand, plant fragments and limestone, D 16, T .78, CB light red (2.5YR 6/6) with dark core, red (10R 4/5) wash, see previous references.
d. Neckless band rim jar (LsVgR) (VI [7]), 10 percent plant fragments, limestone and medium sand, D 21, T .85, CB reddish yellow (5YR 7/5), see previous references.
e. Neckless band rim jar (LsVgR) (V [4]), 15 percent limestone and plant fragments, D 18, T 1.20, CB reddish yellow (5YR 7/6), see previous references.
f. Neckless band rim jar (LsVgR) (IV [4]), 25 percent limestone, plant fragments and medium sand, D 18, T .59, CB red (10R 5/6) with dark core, see previous references.
g. Neckless band rim jar (LsVgR) (IV [4]), 25 percent limestone, plant fragments and medium sand, D 19, T .98, CB light red (2.5YR 6/6) with dark core, see previous references.
h. Bowl(?) with band rim (SyLsRS?) (V [2]), 10 percent limestone and medium sand, D *c.* 20, T .71, CB light red (2.5YR 6/7), possible very pale brown (10YR 7/4) slip.
i. Top (LsVgR) (VI [6], [7]), 15 percent medium sand, limestone and grog (?), D 18.5, T .73, CB reddish yellow (5YR 7/6), hole broke through string cut base, interior lip burnt, exterior rim abrasion, bitumen splattered on exterior.
j. Bowl with thickened rim (SyLsRS?) (V [3]), traces of fine sand, D 35, T .63, CB reddish yellow (5YR 7/6), interior and exterior red (10R 6/4) slip.
k. Top (LsVgR) (VI [4]), 35 percent grog(?), limestone and plant fragments, D 16, T .89, CB reddish yellow (7YR 7/5), string cut base, grey sludge on interior, interior rim abrasion.
l. Ring base (LsVgR) (IV [4]), 5 percent medium sand and plant fragments, base D 8, side T 1.90, CB reddish yellow (5YR 6/6), broken edge flaked by percussion.

bowls are all probably from Mesopotamia, Iran or nearby areas around the Gulf. These too are found both early and late at the Hafun Main Site. The Sandy Red-slipped large jars and bowls and the Vegetal-tempered Dark Brown Burnished cooking jars are probably of South Asian derivation. These are found only in the early layers. Also in these was the one vessel from the site which might superficially appear to be in the East African Early Iron Age tradition, a small bowl with copious angular quartz and mica inclusions and decorated with probably a dentate tool (fig. 8 k). However, similar decoration is known from contemporary South Asia.

Though we cannot yet suggest an origin for several other classes of ceramics, the basic pattern is clear. The most common origins for vessels during the site's earlier occupations are South Asian or Mesopotamian-Iranian, with a few vessels possibly of local manufacture, of East African derivation and of Nile-Mediterranean derivation. The vessels do not indicate the identity of the presumed mariners whose meals were prepared on this beach on Hafun South Bay, but they do suggest that during the second and third centuries they regularly provisioned at ports in the South Asian sphere, perhaps on the west coast of India, and at ports in the Iranian sphere, perhaps near the mouth of the Gulf. Later, some time during the third to fifth centuries, few if any vessels of South Asian affinity were discarded, suggesting that the triangular relationship between the Gulf, India and the Horn of Africa had become two-sided between the Gulf and the Horn.

Discussion

From the foregoing, and particularly from the illustrations and their captions, readers should be able to make comparisons with ceramics elsewhere in order to further elucidate the Indian Ocean trade network between the first century BC and the fifth century AD and should be able to reassess the inferences proposed regarding the sample of Hafun ceramics reported here. If these inferences are correct, the implications of this modest collection are greater than might be expected.

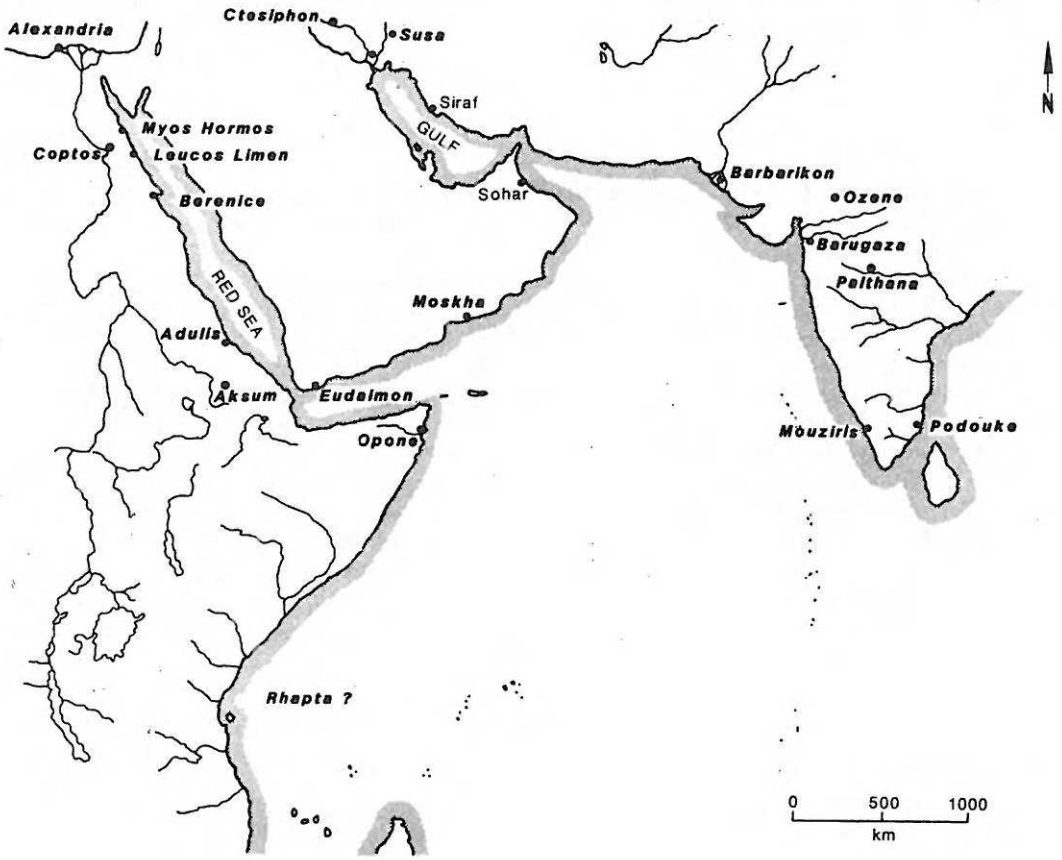
First, as Chittick emphasised in his preliminary reports (1976,1980), these provide the first direct verification of the documentary accounts of pre-Islamic voyaging along the coast of eastern Africa. While the Horn of Africa has its own modest resources of animal products and spices, these could be easily exploited from the northerly Berbera coast. The only reason to tarry on the sheltered beaches around Hafun is to await the changing of the winds, either in November, so one can sail down the African coast, or in May, so one can sail north-eastwards toward South Asia.

Second, the ceramics and the contexts in which they were found indicate something of the organisation of this voyaging. The beach sites are little more than campsites where meals were prepared, and some trade with local people occurred, as indicated by the goat bones and possibly local ceramics. (Much more could be learned of local relations if more extensive and more precise excavations were undertaken to recover more fauna and plant remains, particularly at the Hafun Main Site.) The ceramic assemblage is a mixture of items from many ports, no doubt acquired by ships' cooks as they were needed. Similar mixtures are found in shipwreck assemblages (cf. Sassoon, 1981): they cannot be expected to provide ethnic information regarding the crew or economic information regarding the purposes of the voyages. (Once again, more could be learned about these subjects if areas for the storage of goods and for ship repair could be found.) It is interesting that the Hafun ceramics incorporate no elaborate table wares, suggesting that no

particular distinctions were made between officers and crew. The sites seem so ephemeral that one can question whether the emporium of Opone has been found. It is quite possible that further survey will reveal a larger and more substantial site in the area. It is also possible that further survey will reveal many more of these beach camps, expressing in the aggregate the kind of occupational intensity that a frequently visited trading locality would be expected to exhibit.

Third, if we are correct in our suggestions about the sources of the various ceramic vessels, and if it is correct to assume that their diversity reflects the ports recently visited by the ships which were beached near the camps, then the variation through time at this one node in the vast Indian Ocean network indicates much about economic changes:

1. Those who visited the Hafun West Site around the first century BC had direct contacts with Red Sea ports under Ptolemaic and Roman control, as well as with Gulf ports. The limited number of South Asian ceramics might indicate that those who ventured down the African coast were not directly tied to the Indian trade (in the way that the author of the *Periplus,* by separating his account of the African voyage from that of the Indian voyage, might be read). Alternatively, perhaps they were awaiting the wind on their way north-eastward in May and had not been in Indian ports for such a long time that most vessels acquired there had been broken long before.



2. Those who visited the Hafun Main Site during the second and third centuries AD had made recent visits to Gulf and South Asian ports but few if any with Roman ports. This is a time for which there is little classical documentation of the Indian Ocean but which archaeology can greatly elucidate. Perhaps there were linkages to the Mediterranean world via middlemen in Arabia or the Red Sea (see Sidebotham, 1986; pp. 36-45, 144-174) which raises the possibility that the yet unidentified ceramics from the site are from Aksumite or Arabian ports.

3. The later visitors during the third to fifth centuries seem to have retained links with the Gulf but not to have visited South Asia. This could be taken as support of documentary indications of Sasanid control of the Indian Ocean trade (Whitehouse and Williamson, 1973). It would be wiser, however, to develop a more thorough understanding of the Hafun sites, as well as of contemporary ports around the Indian Ocean, before hazarding such conclusions.

One final point merits emphasis. The Hafun sites, and particularly the deeper and better preserved Hafun Main Site, are at present unique sources of archaeological data on what was certainly a very early world-spanning political-economic system. While some small excavations to recover plant remains and other specialised samples may be warranted, most of the questions we are now able to pose can be answered with technical and statistical study of the full range of already recovered samples. In the best of archaeological worlds, after small supplementary soundings, the Hafun sites should be covered with a protecting layer of clean gravel, surrounded with a fence and safeguarded for more precise archaeological research in future centuries.

REFERENCES

Adams, Robert McC. 1970. 'Excavations at Tell Abu Serifa', *Ars Orientalis* **7**, 87-119.

Broneer, Oscar. 1930. 'Terracotta Lamps', *Corinth IV: Part 2*. Cambridge: Harvard University Press.

Boucharlat, Remy and Audran Labrousse. 1979. 'Le Palais de Artaxerxés II sur la rive droite du Chaour à Suse', *Cahiers de la Délégation Archéologique Française en Iran* **10**, 21-190.

Chittick, H. Neville. 1976. 'An Archaeological Reconnaissance in the Horn: The British-Somali Expedition, 1975', *Azania* **11**; 117-134.

____1980. 'Pre-Islamic trade and ports of the Horn', *Proceedings of the Eighth Panafrican Congress of Prehistory and Quaternary Studies, Nairobi, 1977*, edited by R.E. Leakey and Bethwell A. Ogot, pp. 364-366.

Guillain, C. 1858. *Documents sur l'histoire, la géographie et le commerce de l'Afrique Orientale*. Paris: Arthus Bertrand.

Harden, D.B. 1934. 'Excavations at Kish and Barghuthiat: Pottery', *Iraq* **1**, 124-136.

Herbert, Sharon, Henry Wright and William R. Farrand. 1988. 'Investigations at Coptos and in the Eastern Desert of Egypt: 1987', submitted to *Newsletter of the American Research Center in Egypt*.

Howland, Richard. 1958. 'Greek Lamps and Their Survivors', *The Athenian Agora* **IV**, Princeton: Princeton University Press.

Huntingford, G.W.B. 1980. *The Periplus of the Erythraean Sea*. London: The Hakluyt Society.

Kevran, Monique and Frederik Hiebert. 1988. 'Sohar pre-Islamique: note stratigraphique', unpublished draft.

Labrousse, Audran and Remy Boucharlat. 1974. 'La fouille du palais du Chaour à Suse en 1970 et 1971', *Cahiers de la Délégation Archéologique Française en Iran* **2**, 61-168.

Matson, Frederick. 1943. Technological notes on the pottery in 'The Green-Glazed Pottery', *Excavations at Dura-Europos: The Final Report*, Part I. Fascicle I (M.I. Rostovtzeff, editor). New Haven: Yale University Press.

Rodziewicz, Mieczyslav. 1984. *Alexandre III.* Varsovie: Editions Scientifiques de Pologne.
Sankalia, H.D., S.B Deo, Z.D. Ansari and S. Ehrhardt. 1960. *From History to Prehistory at Nevasa (1954-56).* Poona: Deccan College.
Sankalia, H.D. and M. Dikshit. 1952. *Excavations at Bhramapuri: 1945-6.* Poona: Deccan College.
Sankalia, H.D., B. Subbarao and S.B. Deo. 1958. *Excavations at Maheshvar and Navdatoli, 1952-53.* Poona: Deccan College.
Sassoon, Hamo. 1981. 'Ceramics from the wreck of a Portuguese ship at Mombasa', *Azania* **16,** 97-130.
Shier, Louise. 1978. 'Terra Cotta Lamps from Karanis, Egypt', *Kelsey Museum of Archaeology Studies* **3,** Ann Arbor: University of Michigan Press.
Sidebotham, Steven. 1986. *Roman Economic Policy in the Erythra Thalassa, 30 BC-AD 217.* Leiden: E.J. Brill.
Stuiver, Minze and G.W. Pearson. 1986. 'High precision calibration of the radiocarbon time scale AD 1950-500 BC', *Radiocarbon* **28** (2b), 805-838.
Wheeler, Sir Mortimer. 1946. 'Arikamedu: an Indo-Roman trading station on the East Coast of India', *Ancient India* **2,** 17-124.
_____ 1948. 'Brahmagiri and Chandravali 1947, *Ancient India* **4,** 180-310.
Whitehouse, David and Andrew Williamson. 1973. 'Sasanian Maritime Trade', *Iran* **11,** 29-49.
Whitcomb, Donald and Janet H. Johnson. 1979. *Quseir al-Qadim 1978 Preliminary Report.* Cairo: American Research Center in Egypt.
_____ 1982. *Quseir al-Qadim 1980 Preliminary Report.* Cairo: American Research Center in Egypt.