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Island in the Rann

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Abstract

Since the exploration by R.S. Bisht, Mardakh in the Little Rann of Kachchh has emerged as a likely source of Harappan bead stones. The geography and land use of the Little Rann, an area not well documented even today, have been outlined. Higher sea levels need to be taken into account while considering its potential as a source in Harappan times. Overall the argument is that the sources of materials used in the past are not as obvious as some of us have hitherto thought.

Introduction

In the Bronze Age, stones and metals would have been extracted in a number of ways from their sources (forests, quarries, mountainsides, deserts, coasts, islands), for use in villages and towns. They could have been procured in exchange from people who knew the product (say, ivory or honey) and how to extract it, without the consumers themselves having any knowledge of the land. Traders of one group could have interacted with those of the other in either of their regions, or else at a frontier, or else in a third or neutral zone. In many parts of the world, cattle raids on neighbours have been a way of increasing one's own herd (and thus one's wealth and power) by force. But, it is also possible that seasonally migrating pastoralists were instrumental in the movement or dispersal of a particular kind of stone or craft item. Moreover, an organized state society may itself need to set up an extractive 'industry': acquiring a product by recruiting and directing the necessary personnel, and fitting out small or large expeditions for one visit or sustained extraction. All these possibilities cross our minds when we consider the enigma of the rich semi-precious stone resources of an isolated island in the Little Rann of Kachchh, not far from several small Harappan sites: but past geography is relevant to the answers we can suggest.

Little has been published on the rich deposits of semi-precious stones on the island (*bet*) of Mardakh in the Little Rann of Kachchh (henceforth LRK); two unsuccessful attempts to reach this island were made by this author, but it was surrounded by water. Even though the monsoon – when the Luni takes water into the northeastern corner of the Great Rann and the rivers Banas, Saraswati, and Rupen bring rain water into the LRK, and strong tides sweep sea water in from the Gulf of Kachchh – lasts only from mid-June to mid-September, much water remains on the surface of the Ranns until about April. The LRK is thus, in most years, dry and crossable by car only between mid-April and mid-June. So I drove to the Mardakh Bet in June 2012. In this dry season, several tracks are visible across the floor of the Rann, but we lost the track on a couple of occasions. Residents of the area around the LRK say that a person must know the routes before attempting to cross over to any of the *bets* – of which there are, according to one source twenty, and another source over seventy. (Actually these are raised plateaus of different heights, so that the number visible as islands depends on how high the water is standing at any time in the LRK.)

Arable soils in both Ranns are, as we know, not visible. But in the early nineteenth century, A. Burnes had noted that it was the pastoralists who appeared to be the more prosperous section of the rural population of Kachchh, not the agriculturists, and that from one of the villages of Khadir Island, some "32,000 lbs" of butter were annually exported (cited in Rushbrook Williams 1958: 222). The valuable grasses that grow on the bets of the LRK and along its margins have been mentioned in much of the literature on the region – 37 species of good grasses grow here. Colonial period records are an important source on the pre-modern ecology because they refer to disputes over the revenues from grass-cutting on

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certain of the islands including Pung Bet, the disputes being between certain of the shore villages such as Kanmer, Tikkar, and Palanswa (UN 1968: 220-225). The Gazetteer of Kachchh of 1880, however, has disappointingly little to say on the LRK.

While the Pung Bet is the largest, Mardakh is said to be the highest Bet (about 55 m AMSL.) in the LRK. It is visible from some places on the western shore, but one cannot cross over from just anywhere. We followed the tracks of the salt trucks from Venugam (also called Venasar), 25 minutes by car from the main Bhachau-Adesar road (along a road that is in very bad shape), and about 16 km south-south-east of Adesar. We got on to the dry bed of the LRK at the shore near Venugam. The marking on the 1978 edition of the Survey of India map of *Kathiawar* (1: 1,000,000) is "Varnu Wandh". At this village lies the now crumbling tomb of the British surveyor "Murdoch", after whom the bet is said to have been named: apparently he died there of cholera.[1] Its inscription(s) is no longer extant. From here the western end of the bet is about 8 km.

This crossing could perhaps coincide with a Harappan route, as Surkotada is located near Adesar. (Another approach could have been from the Harappan settlement of Kanmer, to the south-west.) In fact, in 1985 R.S. Bisht and his team explored this stretch of the coast of the LRK, and located a protohistoric site very near Venugam, called Khandariya. We could confirm the distance given by Bisht *et al.* to the Mardakh Bet (see *IAR* 1985-86: 15-17).[2] (See also the Google satellite map of this region.)

This not being the Great salt Rann of Kachchh, the transit from the land into the LRK is gradual, almost imperceptible. Its margin is "low throughout, rich and wet on the south or Kathiawar side, dry and rocky on the north or Vagad side" (Gazetteer of Kachchh 1880: 12). (The shores of the LRK are clearer when one is looking outward and westward from the LRK.) Salt-making labourers have built a shelter on the Mardakh Bet for shade and a place to eat. We followed them there, and then looked around. The Gazetteer of Kachchh of 1880 shows no appreciation of how different the LRK is from the Great Rann. However, many differences become clear especially when one travels in June.

First, the floors are different: that of the Great Rann is caked with a thick layer of hard, shining, crystallized salt slabs that one can peel off, whereas the LRK in the dry months of mid-April to mid-June is actually a stretch of mud flats (Fig. 1) and does not present a blinding white vista of crackling salt (Fig. 2) as does the Great Rann. Second, when the Radhanpur-Bhachau stretch of railroad was built, the physiography of the area around the junction of the Great and Little Ranns was altered: the railway between Santalpur and Adesar runs across what is now a very narrow (though deep) 'neck' of water between the Ranns, perhaps about 22 km wide. (See a map from Santalpur to Adesar on Google.) So nowadays although there is a slope from north to south, there is not much of a passageway for water to enter the LRK from the Great Rann.

Third, the LRK is shallower than the Great Rann (see Merh 1995: 160, Table 16). Fourth, the camels of Kachchh have adapted to walking through the water that collects in the Ranns, even if it is up to their necks.[3] But they cannot negotiate soft or squishy ground when it is not quite dry, as that would be slippery.

A fifth and last point is that while the high tide in the Gulf of Kachchh sweeps salt water into the LRK near its narrow mouth on its south-west, in the neighbourhood of the Harappan sites of Kuntasi and Bagasra, it appears that (although precise data are lacking) it is mainly fresh water from the Banas, Sarasvati and Rupen rivers that fills the entire triangle of the LRK, and it is not as saline as the water in the Great Rann. The Great Rann is more exposed to squalls from the Arabian Sea, when strong winds literally sweep in sea waves.

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1 The Gazetteer of Kutch, however, says (p. 253) that this is the tomb of "MacMurdo" (Capt. James MacMurdo who led British troops across the LRK against the plunderers of Vagad).

2 *Indian Archaeology a Review* (*1985-86*: 15-19) states that "The Khandariya mound at Varnu Wandh appears to be a small protohistoric hamlet which was reoccupied during the late medieval period." Here were found pottery, waste chalcedony flakes, and microliths. "Possibly, the site could be a hamlet of miners engaged in collecting and extracting chalcedonic raw materials from the famous agate fields of Mardakh Bet which lies 10 km away in the Little Rann." (The discovery of the Harappan site of Kanmer is also reported in this notice.) Not much appears to be left of the Khandariya site, or else I was searching in the wrong place.

3 Note that the consensus of opinion rules out the camel in Harappan territory in the third millennium B.C. The one-humped dromedary is believed to have been domesticated in Arabia in the first millennium B.C. The two-humped Bactrian camel remains a shadowy figure on the Harappan landscape (Ratnagar 2004: 236-37 for references).

Fig. 1: Cracked floor of the LRK in June en route to the Mardakh Bet in the distance

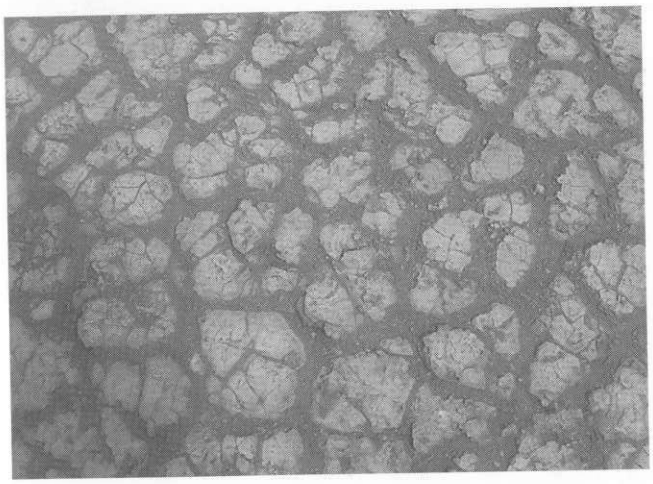

Fig. 2: Floor of the LRK

As indicated above, there are places which remain wet in both Ranns even in June, while other places are high enough to be called islands or bets. This is relevant to us because the rise and recession of the water in the LRK has caused some confusion. Is Mardakh one island or two? For most of the year, the Mardakh Bet (about 10 to 15 km long, west to east, by a rough estimate) stands as two islands, with about 2 km of a low stretch between them being covered by water. It is drawn on maps (and appears on satellite pictures) as one leaf shaped island, the eastern end narrowing to a point.

On the first day we drove to the lower of the two islands/parts in the west, the ground rising gradually as we came on to a stone-strewn plateau. In the distance (further east) rose a higher plateau, too far to walk to, leave alone in the middle of the day (Fig. 3). (Between late June and early April, in any case, you cannot walk from the one to the other. For this reason the local people refer to them as the *Motu Mardakh* and the *Nanu Mardakh*.) Both islands appear to be mainly basalt islands. There are cryptocrystalline (siliceous) stones strewn over the lower Mardakh – (Fig. 4), with brown carnelian, chalcedony, coarser grained green jasper and a large chunk of dense black jasper, and huge rocks of yellow chert in their cortex (Fig. 5). Signs of third-millennium activity, if any, would however have been hard to detect on such ground.[4]

4 It is a disappointment that S.S. Merh's *Geology of Gujarat* (1995) offers nothing on this island or the geological history of the formation of these stones at the surface.

Fig. 3: Great Rann floor east of Khadir Island

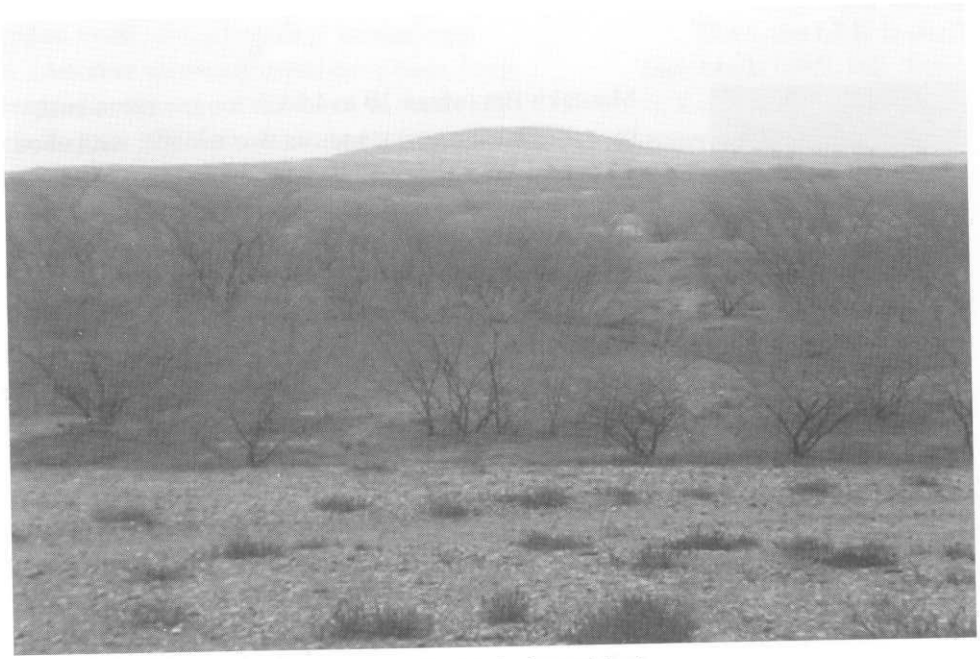

Fig. 4: View of the higher Mardakh plateau from the lower island

It was on the second day (06 June 2012) that we were able to view, from a distance and standing in the LRK, the low saddle of land that actually connects the two parts of the island in the two dry months of the year (Figs. 6-8)[5]. We took a different path, to the higher of the two plateaus, over ground that was less travelled. The western part of Mardakh, one could now see, is smaller in area than the eastern. The eastern part is however the higher plateau, say 55 m AMSL; and in its northern part rises high. The shape

5 It was not possible to get the entire span of low land in one photograph: I have photographed each end, west and east, and made a roug sketch.

Fig. 5: Chert on the surface of the lower Mardakh plateau

of Mardakh is clear in the Google satellite Map of Varnu Wandh, 2012.

The larger and higher part/island was a disappointment. Its northern slope is disfigured by extensive quarrying that had occurred, I was told, in the mid-twentieth century. There are remnant heaps (Fig. 9), from pebbles that would have been examined, some chipped, and discarded. Some heaps were waist high. There were the concrete remains of some kind of water facility that must have been constructed for the dozens of workers that would have been employed. Local people recall that "a Kashmiri" entrepreneur/contractor had spent many years here, carrying away huge quantities of certain semi-precious stones from the island. Importantly,

Fig. 6: On horizon, western end of low saddle connecting the two Mardakhs in the dry months

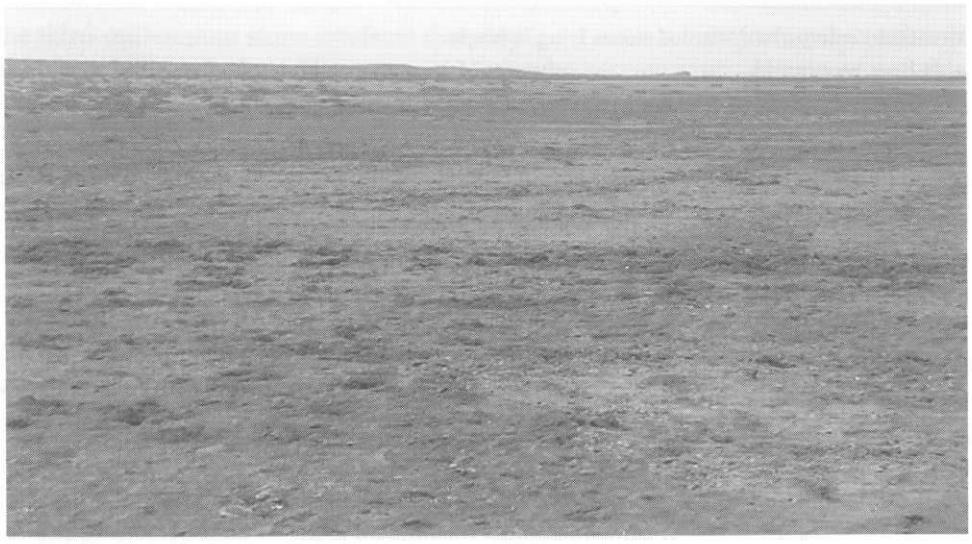

Fig. 7: On horizon, eastern end of low saddle connecting the two Mardakhs in the dry months

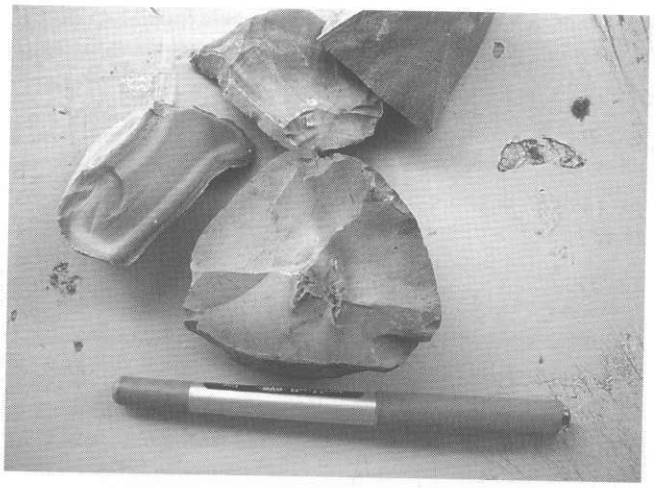

Fig. 8: Chert and banded agate from the lower island plateau

Fig. 9: Debris of stone quarrying in the twentieth century, the discarded stones lying in heaps

there are deep ravines carved out by a few rivulets running from the summit of the island down the northern slope. Water could have been collected for all-year use at places along the base of the slope, in the past and probably in the twentieth century. The question that came to mind was, is it at all possible that third-millennium pastoralists could have found Mardakh habitable during the hot months? Could a Harappan expedition, if any, have found enough water to sustain it for several days if not weeks? This brings in the second part of this paper.

A Source for the Harappan Bead Industry?

Finding the existence of a particular resource near the sites of an ancient culture area is no argument for that resource having been used by the people concerned, and work on early trade and economics cannot stop at mapping the occurrences of metals and stones (Ratnagar 2008). Reports on the availability of a mineral in one or another place can in any case be wrong, and on this I had quoted (Ratnagar 2008) the advice of the geographer K.L. Joshi. I also referred to the caveats lodged by Irfan Habib in his exemplary *Atlas* of Mughal India, as well as the

errors that occurred in early colonial locational data. The argument then focussed on Ratanpur-Rajpipla as a source of carnelian. There are several reasons why archaeologists (myself included) gave this source so much emphasis: its importance in the sixteenth century for the several travellers who described it; carnelian work at Harappan Lothal; reference in the first-century *Periplus of the Erythraean Sea* to carnelian exports from Barygaza; etc. (see also Ratnagar 2004: 145-46). But not only are there many *other* places that yield agates in Gujarat (Ratnagar 2008: 56-58), many factors cast doubt on Ratnapur as a source for the Harappan period. Until recently the Ratanpur area was thickly forested, with elephants known there until the nineteenth century and hence unaccessible; there are no Chalcolithic or Early Historic sites there; tribal people provide cheap and unskilled labour for the digging out of the pebbles – this does not mean that there is any 'primordial' connection with the resource; and the area was cultivated only after the Karjan reservoir came into being, about 200 years ago. So my argument was that, however rich a place is in a particular kind of mineral resource, landscape and geography should be taken into consideration.

It is good to know that Law *et al.* (2007) agree with this point. Their work has been to conduct rigorous provenience analyses in laboratories of stones that occur at Harappan sites and to match the results with those of stones collected at particular sources. The raw material resource areas that they sampled were Ratanpur, Mardakh, and Khandek, the latter two or three kilometres from Surkotada (their text is somewhat confused on this point, but the location near Surkotada has been verified). However, the third-millennium stone artefacts that they analysed come only from Harappa and Nagwada. None of the Surkotada finds were analysed.

Again it may be asked, is close proximity to a good source of agate enough to make that a source? Did the people of Surkotada exploit the varieties and quality of the local stones from present-day Khandek village? It is hard to tell. First there is the question of quantities. How much agate-chalcedony-carnelian did the excavation find at the site? Surkotada is a rare Harappan site in that the small finds were meticulously counted, recorded, and catalogued for the final report (Joshi 1990). We know that about 300 shell ornaments and miscellaneous artefacts were excavated here; 115 fairly standardized chert blades; and about 3000 steatite beads (this last number is not, of course, an indicator of the volume of steatite used because the beads are very small). In contrast, carnelian beads were only 113 in all, agate about 15, jasper beads even fewer. Many of the carnelian beads, besides, are of small size (see Joshi 1990: Fig. 74). And the report makes no mention of waste flakes or debitage.

One could argue, of course, that it need not be quantity alone that indicates the importance of a resource. First, about 95 of the 113 carnelian beads had been stored in three pots in Surkotada IC levels, which would indicate that they were stored because they were valued for some social or political reason. One of these beads was about 6 cm long. And although the agate beads were not many, they are reportedly of exquisite colours and workmanship – black and blue agate beads occur and there is one unfinished bead of green jasper that is 5.5 cm long (Joshi 1990: Fig. 76, no. 81). So the link between the Harappan population of Surkotada and the stones available at Khandek remains an open question.

Law *et al.* made a visit in 2007 to Mardakh. I do not know how they infer that its stones were collected in Harappan times: they refer to numerous flakes and heavy patina on some of these from the higher part of the island – that by itself is not evidence of third-millennium flaking. What is more significant, however, is the exploration report of Bisht *et al.* in *IAR* 1985-86 that I have quoted above. Emergent data seem to speak for small Harappan way stations on the shores of the LRK: Shikarpur and Kanmer, and, on the other side, Bagasra and Kuntasi. On the approach from the north, near the junction of the two Ranns, Surkotada would have been a fortress guarding a major north-south route (see Soundararajan 1984).

However, and this brings in the third part of this paper, we cannot expect the third millennium environment to have been the same as now. It is well known that sea levels were a minimum of 2 m higher in 2000 B.C. than they are now. Let us review the evidence.

The Evidence for a Higher Sea Level in Harappan Times

The Indus system has changed since Harappan times (Possehl 1999: 14-18, Figs 9-13; Flam 1999). The Ghaggar–Hakra, a substantial river in Harappan times, either fed the Indus or flowed independently of it into the sea. It must have changed course or lost

water soon thereafter, because there are very few Late Harappan sites around Fort Derawar.[6] The reason for this was the beheading of the streams that fed the Sarasvati-Ghaggar in the Sivaliks, which in its turn was caused by tectonic disturbances. The streams that fed the Sarasvati now joined the Gangetic drainage, via the Jumna River. The Sarasvati/Ghaggar–Hakra had in the third millennium brought appreciable flows of fresh water into the Great Rann, with huge silt loads. Thereafter, the Indus delta has migrated from east to west over the centuries – according to Kazmi (1984), from an original location (around 4000 B.C.) when it entered the Great Rann, the Indus made about four major shifts to the west (see also Merh 2011: 15-17). Thus, the first point is that, in the third millennium the Great Rann held an appreciable proportion of fresh water. Second, it was adjacent to a sea with higher levels.

Khare and Mehta (2011: 37) point out that the peninsulas of Kachchh and Kathiawad are flanked by relatively wide continental shelves, so that the shores are subjected to high storm surges. Both, the Gulf of Kachchh and the Gulf of Khambhat, being narrow, have an unusually high tidal range. In his doctoral dissertation of 1973 S.K. Gupta ascribed fossil coral reefs and beach rocks occurring at 2 to 6 m AMSL and up to 10 km inland, to higher sea levels in the past, the latest such high-sea-level episode being around 4,000 B.C. (see Gupta and Amin 1974). Merh (1995: 6, 103) refers to raised beaches, mudflats, and "shelly beach rocks" marking ancient shorelines on the south coast of Kachchh. Mathur *et al.* (2004) have found that between 4000 and 2000 B.C. the level of the Arabian Sea was 2 to 4 m higher than the present. Since 2000 B.C. [or the last centuries of the Harappa civilization], sea levels have been falling, as evidenced by raised mudflats located further inland than those now being formed on the shoreline. About 8 km inland of Porbandar on the coast of Kathiawad, these scholars found, on ancient mudflats about 1 m above the present high tide mark, a gastropod shell that has been 14C dated to roughly 2000 B.C. Apropos of the third-millennium B.C. site of Kindarkhera which lies 20 km inland of Porbandar, Gaur and Sundaresh (2005; also Vora *et al.* 2011: 56) found a map of 1856 which shows that boats could go in to the site at high tide – this stretch is now flooded during the monsoon, but there is no boat approach any more . And near Mithapur on the northwester coast of Kathiawad, Mathur *et al.* refer to some sh from an old lagoon bed now substantially inland, dating to the beginning of the first millennium CE

Mathur (2002) observed that around the port site of Lothal, tidal flats are being created further and further out to sea, and Khadkikar and Basavai (2004) and Khadkikar *et al.* (2004) in their field study found that the settlement of Lothal [today 12 m AMSL and 26 km from the seashore] was probably built on a relict salt marsh inundated by tides (meaning an area once submerged at high tid but not directly hit by the waves of the sea). Marir organisms, pollen and fauna typical of inter-tidal and supra-tidal environments, were found in the sediments. Incidentally, deposits at the base of the Lothal 'dock' basin contain foraminifera or marin protozoa that represent a 'near shore' or 'marginal marine' environment (Nigam 1988). The excavato Lothal (Rao 1979: 18-19) had observed that the si may, during the monsoon months, be surrounded b 4- to 5-feet depth of water. The dock basin at Loth had two inlets, 12 m and 7 m wide, connected witl the local channel and the Bhogavo.

Many other low-lying areas of Kathiawad wou also have been under water. Gaur and Bhatt (2008 100) found, further south along the west coast of t Gulf of Khambhat, Hanuman-no Timbo which is a third-millennium B.C. site located probably on an old channel of the Shetrunji: fishing boats are able reach this inland site today at high tide. The Gazet of Kathiawar (1884: 68) refers to numerous sheets saline water (called *gheds*) along the southern coas The northwestern tip of the peninsula too is almos cut off by a low depression, the Rann of Okhaman (Sundaresh *et al.* 2011). The Gazetteer of Kachchh (1880: 16) for its part mentions an ancient stitched boat and pierced anchors buried on the south LRK shore at and near Vevania, which is not far from th Harappan site of Bagasra.

As for the Great and Little Ranns, today during the monsoon when sea levels reach their annual highs, and especially at high tide, the sea sweeps into them by way of a number of creeks. A sea leve higher by, say, 2 to 4 m in Harappan times than tod (Mathur *et al.* 2004; Gupta 1977:190), the discharg of the Eastern Nara into the Rann, the Indus delta lying in closer proximity, and more water flowing

6 From 174 Mature Harappan sites and a total settled area of 974 ha, settlement fell to 50 Cemetery H – mainly burial – sites totalling ha (Possehl 1995 based on the field work of M.R. Mughal). This phenomenon is not discussed by Merh (2011: 21-23).

south from the Great Rann into the LRK, would all have meant that the Ranns held greater depths of water in the third millennium B.C. Today located 3–4 m above sea level (Karanth n.d.), the LRK was steadily silted but could, in the third millennium, have had a depth of more than, say, 5 m, argued Gupta (1973), making it impassable except by boat. According to Merh (1995: 160), the Great Rann has received, since the fall of sea level, something like 10 m of sediment. Gupta, estimating the rate of sedimentation in the Little Rann (1977), found that it was, two thousand years ago, about 4 m deeper than today.

In the excavation report on Kuntasi (Dhavalikar *et al.* 1996), Rajaguru's chapter on geoarchaeology states that around this site, 7 km inland and at 15 m above sea level, there is a "fossil tidal clay" at a depth 10 m and more below surface – it was of marine, specifically deltaic or estuarine, origin. Also, the sediments of the Kuntasi mound yielded traces of marine fauna, and possibly tidal waters were reaching the settlement. Last, in a precise and authoritative coverage of several west coast sites, Deo *et al.* (2011) found that before and during Harappan times, there was a relatively good stream flow from the vicinity of Kanmer into the LRK, and the streams deposited fine silt and sand; thereafter, they began depositing coarser material. These scholars confirm the dimension of landscape change mentioned above, but, importantly, evoke not just eustatic change but also possible aridification as causes. (I am not competent to go into the latter.)

Conclusion

Before inferring that there were Harappan expeditions to Mardakh, we must acknowledge that these would have had to use boats to ferry quarries and Harappan supervisors some eight to ten km across the water – and back after some days. Also, in the period of higher sea levels there were two islands, not one joined by a low causeway as now. Third and most intriguing: has anyone surveyed the far – south – side of Mardakh?

Because of the practical certainty of the LRK and Great Rann having been gulfs of the Arabian Sea, we cannot suggest that mobile pastoralists periodically arrived at the shore settlements with stones collected during brief sojourns on Mardakh. Unless I am wrong, one does not expect flocks to have been seasonally or regularly ferried by boat. This even though many of the islands of the LRK are known in modern times to have a variety of grasses that flocks can feed on. If there indeed was a Harappan-period collection of stones from Mardakh, that would have been possible because of the organizational capacity of an early state: to fit out the right kinds of shallow-draught boats with supplies including fuel and food, and to provide digging and cutting tools and storage vessels for periodic expeditions, and also to set up a chain of command among the people sent out.

So the answers to archaeological questions are not waiting on the ground for us to discover. Laboratory analyses do not give categorical conclusions either, unless samples are taken from all relevant sources and excavated assemblages. And when we work in the context of a dynamic landscape, we must factor in many imponderables, such as the possibility of two separate islands accessible only by boat, and the logistics involved in such a system of procurement. In sum, all that can be said at this stage is that it is less easy to doubt the LRK as a source of Harappan jewel stones than it is to rule out the Ratanpur-Rajpipla source.

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