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Intercultural Relations between South and Southwest Asia

Studies in commemoration of
E.C.L. During Caspers (1934-1996)

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INTERCULTURAL RELATIONS BETWEEN SOUTH AND SOUTHWEST ASIA.

STUDIES IN COMMEMORATION OF E.C.L. DURING CASPERS (1934-1996)

E. Olijdam & R.H. Spoor (eds)

BAR International Series 1826 (2008): 56-60

Materials Used in the Bronze Age

Shereen Ratnagar

In discussions on the subjects that joined us in our friendship, Inez During Caspers encouraged my interest in map work. Yet, she

appreciated the importance of self-criticism, and here I shall discuss some pitfalls in certain approaches that I (like others in the field)

have taken. In the space available, I can only contribute a note as a tribute to a dear friend who did pioneering work on Bronze Age

connections across regions.

Materials like copper, silver, gold, tin-bronze, leadbronze, shankh shell, agate-carnelian, lapis lazuli, steatite and ivory have been found at Harappan sites. When we discuss the economy/trade of the civilisation, we first establish where, in and around the Indus region, or indeed in distant areas known to have been in contact, all these materials are to be found naturally. The point of this note is to cite examples that question the way in which we establish such 'facts'.

Often there are multiple sources of metals and stone, and we note all the geographically relevant occurrences, as 'possibles', in the course of our research. Very few materials have been put to lead-isotope analysis so far, and other laboratory methods have often not given categorical answers pinpointing particular sources as was expected in the 1960s and 1970s (e.g. Kohl, Harbottle & Sayre 1979).

Physical and chemical analyses are not, however, the point of this paper. Archaeologists are neither metallurgists nor geologists. Archaeologists explore regions for habitation sites and mining sites rather than geological features. They dig sites, identify the materials of the excavated artefacts, classify the artefact types, and submit artefacts to scientific laboratories for further kinds of information. Understandably, then, archaeologists rely heavily on published information on sources.

It is essential, but not always possible, to investigate the authority used by a published report—say a volume on the geology of a region—for a particular piece of information.

K.L. Joshi, author of the authoritative *Geography of Himachal Pradesh* (1984), mentions a number of galena and copper ore locations in the Shivaliks that are of relevance to Harappan archaeology, considering the location of the sites of Ropar and Kotla Nihang Khan near the navigation

head of the Sutlej river. Following Chetwode (1972), Joshi notes that the rulers of Kulu destroyed the records of an old silver mine after it was abandoned in the mid 19th century, so that the name 'Rupi' remains almost the sole reminder of galena mining in this area. The British had in the 1870s made an attempt to revive the silver mining but gave up because of the costs of refining and the problems of transport (Chetwode 1972: 74-80). More importantly, Joshi (pers. comm. 19 May 1999) noted, concerning his field work, that he often named a place as a possible origin only because "the potential exists —and that too largely unestimated". Abandoned mines are not easy to find: "I consider [the place names] nothing more than their probable locations. They are unidentified in the field both by professional field scientists and officials. Old men do [however] tell and retell about their ancient existence". In search of a closed copper mine in Chamba in the 1950s, Joshi could only find muddy water where the mine was supposed to be, and the information that another geologist had previously explored the area. People do not remember the exact locations of minerals in their locality if these are no longer in use.

For his part, Besenval (1988: 232) declares that from personal experience of visiting about 50 copper ore locations in Iran, Afghanistan and Oman, he is convinced of the low probability of finding protohistoric mineral extraction at a mine or quarry as subsequent mining at major sources obliterates traces of early extraction. And we can surmise that huge heaps of slag and debitage at copper sources like Bairat and Singhana in northern Rajasthan (Chakrabarti 1985-1986: 66) would make protohistoric traces virtually unrecoverable.

Needless to say, tracts on the geology of one or other region must perforce use hearsay or published information to some degree; not every locality can always be personally verified by a scholar. We find that in the late 19th century the geologist Vredenburg missed the lapis lazuli deposits in the Chagai range of the barren Chagai district in Pakistan (see Baluchistan District Gazetteer 1907). He reported, obviously on hearsay, that "turquoises are also said to be found in the [Kacha Koh] hills" (1907: 10). The Kacha Koh lie about 300 km west of the source of lapis and turquoise that were made known to us by the archaeologist J.-F. Jarrige in the 1980s (Jarrige & Hassan 1989: 160).

Let us consider, for comparative purposes, a landmark in South Asian historiography, Irfan Habib's *Atlas of the Mughal Empire* (1982). The 'A' sheets in this Atlas map the documented villages and towns of the different provinces of the empire, while the 'B' maps present economic data

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on the 16th and 17th centuries: land and river routes, forest, livestock, agricultural production, crafts, mines and quarries, and so on. Habib's methodology is exemplary. He has used various and many sources of the Mughal and later periods, local official tracts, chronicles,

and travellers' accounts. Habib notes that not every place named in a contemporary source as a mine could be located on his maps. Also, it was necessary to check on both the accuracy of the information and the completeness of coverage achieved in the mapping (1982: xiv-xvii). For the 'A' series maps, Habib used an independent source—the Census of 1911—to check on the degree of completeness of coverage that he had achieved. He could confirm thereby that the map of Mughal-period Sind, for example, with most settlements hugging the banks of the Indus, was not skewed. Habib acknowledges, however, that he had no criterion for verifying his economic data—much of which came from travellers' accounts—so that it is regions along the well-frequented routes that are documented, not the rural interior. Thus the absence of a map entry in the *Atlas* does not mean absence of a particular resource location, nor yet that such a resource was economically unimportant. A Harappan archaeologist would be struck by the absence of lapis lazuli and gold of the Kokcha river on Habib's Map 1A-B. Two contemporary sources had erroneously placed lapis in the region of Ghorband instead of the Kokcha valley.

We also find that the medieval-period documentation is not self-evident. Habib marks (map 4B) lead and silver as resources of Kulu, even though the Mughal-period texts only state that lead-silver came from the mountains in the north of the Suba of Lahore: it was with reference to a British history of the Punjab hill states published in 1933 that the location of galena in Kulu could be established. It is not only that an ancient or medieval source can be wrong about a particular resource or location. We also find that a source of minerals may have been tapped in one period but not in another. For example, in Oman copper was mined (in literally dozens of places) in the 3rd and early 2nd millennia B.C., in the 9th and 10th centuries AD, and then by the Portuguese in the 17th century (Franklin, Grosjean & Tinkler 1976), so that the 1st-century *Periplus of the Erythrean Sea* actually records (section 36) that the western coast of the Oman peninsula was importing, along with teak and sandalwood, copper from Barygaza in western India!

A specific case that encapsulates the problem of how we construct knowledge in Harappan archaeology is the carnelian of Ratanpur, south of the Narmada, in the vicinity of Rajpipla. Carnelian is an important Harappan material in that it is the stone used in two crafts with skills unparalleled in the other Bronze Age civilisations: the making of long and slender, translucent red beads, and also of smaller beads with etched decoration. Among the contexts in which such beads have been found are house caches at Mohenjo-daro and Harappa, elite burials and temple foundations in Mesopotamia, and elite burials at Altyn-depe.

Scholars—myself included—have given special importance to Ratanpur as the source of this carnelian. Sankalia (1987: 51-52) stated that "... there is little doubt that agate

and carnelian beads were manufactured at Lothal from the raw material found in Ratanpur quarries ...". I singled out Ratanpur (Ratnagar 1981: 128), mentioning sources like the Hab river bed and the Helmand basin only *en passant*, because of the importance of Ratanpur carnelian in recent times, the reference in the *Periplus* to carnelian exports from Barygaza nearby, and the identification of carnelian-bead workshops at Harappan Lothal. Shashi Asthana (1993: 275) admits that carnelian is widely available through the country but singles out Ratanpur as the Harappan source, placing it (erroneously) in Kathiawad and thus surmising that there were several Harappan sites in its vicinity. Lahiri (1992: 79-81) mentions Ratanpur-Damlai and also the Kopadvanj source.

While Bridget Allchin (1979: 95, 97, 99, 101) records the existence of discarded agate nodules on the upper Narmada and the Ken, and also a source of carnelian in the Kirthars, she considers Ratanpur the likely source because of the quality of the stone used by the lapidaries of Chanhu-daro. Kenoyer, Vidale and Bhan (1994: 285) for their part suggest that Ratanpur and/or the region of the Rann of Kutch were tapped for Harappan carnelian, and that bead manufacture too was centred on Ratanpur until it was shifted to Khambhat because of brigandage. The information given by Commissariat (1938: 262) (who relies on the testimony of Duarte Barbosa on Limodra as a place of agate cutting around A.D. 1515) is that the seat of the lapidary industry shifted to Khambhat in the 17th century.

Menon (1995) is one of the few archaeologists who considers several carnelian sources in modern Gujarat state, with Ratanpur as only one of these. As documented by the geologist Merh (1995: 166-167, map 17), the other sources lie south of Bhuj, east of Bhuj, near the eastern edge of the Great Rann, and north of Rapar, near the western edge of the Little Rann not far from Adesar, on an island in the Little Rann, and in Saurashtra north of Rajkot, and in the Gogha-Bhavnagar region. To these we would add the agate deposits of Kopadvanj on the river Mazam/Majhim, east of Ahmedabad, in mainland Gujarat. This last deposit is overlooked by Merh but recorded in the Census of 1961 (Trivedi 1961c) and discussed by Irfan Habib (see his map 7B). It is mentioned in Mughal-period documents and also by Watt in his *Dictionary of the Economic Products of India*. In 1961 the people of Kopadvanj were collecting agates and 'moss-pebbles' from the river bed.

Near the Harappan site of Kuntasi on the Gulf of Kutch and near the southwestern tip of the Little Rann (Dhavalikar, Raval & Chitalwala 1996: 5, 6, 20) agates and carnelians are found in cavities in the basalt rocks, as veins, and as pebbles. This small site has yielded three long barrel-shaped carnelian beads, but no unfinished beads that would point to making of beads from local stones. There is yet another possibility. At Ujjain, in Period 3 (200 B.C. to A.D. 1500), there was a bead workshop. In the

literary tradition Ujjain was rich in gems and in the *Periplus* (section 48, see Casson 1989: 81-83) stones were sent from here to Barygaza; this was ancient 'Akara' region, which name seems to signify 'quarry' or 'mine' (Banerjee 1959; 1965). We recall that the chalcolithic site of Kayatha, where some Harappan contact is in evidence, lies only a short distance east of Ujjain, and it is not impossible that Harappan people occasionally procured jewel stones from the gravels of the river Sipra. Why, then, is Ratanpur singled out by Harappan archaeologists as a source of special significance? The main reason is its high yields of pebbles of suitable colour for the lapidary. This is because of the ferruginous nature of the lateritic soil in which they occur (*Imperial Gazetteer of India XXI*: 292-293). Bridget Allchin's argument rests on the quality of Harappan carnelian. There is also the consideration that at later Iron Age Bharuch (*Indian Archaeological Review* 1959-1960: 19) there was an agate-based bead-cutting workshop. But these are not sufficient reasons for insisting on Ratanpur as the single most important source.

Ratanpur lies at a short distance south of the Narmada river, in an area covered by —now open— teak forest. John Copland had reached the quarries of the Limodra locality in 1814 by boat from Bharuch (Commissariat 1938: 268-270). The Bundhwa, a small tributary, flows past Ratanpur to join the Narmada a couple of kilometres away. In November 2000 this tributary was a trickle with small stagnant pools. At Ratanpur proper stands the *dargah* of Baba Ghor, a saint of Abyssinian-Siddi origin, and about 50 Siddi families live here. The shrine is popular with tribal people, and this is a tribal area.

The agate quarries being worked today are in the localities of Damlai, Dholkua, and Molpur, each several kilometres from Ratanpur. At Molpur I saw that, as mentioned by Kenoyer, Vidale & Bhan (1994), pebbles/cobbles were being dug out from a layer of conglomerate 1 to 1.5 m below the surface of the red soil, to be transported to the house of the contractor at Ratanpur. The Bhil quarriers sell the pebbles by weight to the contractor, and it is the latter who washes, chips, and examines the pebbles to choose suitable ones for transport to the bead makers at Khambhat. Today at least, it is not the Bhils who chip or examine the pebbles or select them. In the medieval period too, Bhil people extracted the stones for an Abyssinian trader, brother of the person now revered as a saint. But this does not establish any primordial link between Bhils and carnelian. The pebbles, in their cortex, look like small- to medium-size potatoes, and there is no skill involved in digging them out. The quarries are irregular pits in the soft red soil, 2 to 4 m in diameter. They are not the 9 m deep shafts with connecting galleries reported in 19th-century British accounts (see Allchin 1979: 100). The involvement of the Bhils in this industry, it appears, has more to do with Rajpipla being a predominantly tribal area and with the exploitation of cheap wage labour, than

an association of remote antiquity. Standing as it did on the eastern end of the Bhil area of central India, the princely state of Rajpipla had a high tribal population, and it is the poorest people who do this unskilled work. It is also noteworthy that the Ratanpur gemstones were never a source of revenue for the Rajpipla state (Dilipbhai Pandya and Dinshaw Gamir, pers. comm.).

There is thus nothing self-evident about the identification of Ratanpur as the source of Harappan carnelian. The area was so thickly forested that as late as the 19th century, wild elephants were found in Rajpipla territory (*The Times of India*, Ahmedabad, 3 November 2000, reporting on the research of the GEER Foundation). Copland's report, of which a summary is given by Commissariat (1938: 268-270), reveals that in 1814 a narrow path led from Ratanpur, through forest, to the quarries. Copland found no human habitation *en route*. The fields of pulses, millets and cotton in the Jhagadia area observable today owe their fertility to the Karjan Reservoir Project, Dholkua Distributary, and cultivation in this region is not more than about two centuries old. Thus, even though this source is not distant, as the crow flies, from the Harappan bead production centre of Lothal, dense forest would surely have meant poor accessibility. Streambed gravels and pebbles are much more visible than conglomerate layers lying deep below a forest floor.

Second, no Chalcolithic sites are known in the area. Allchin reports nothing earlier than medieval remains at Limodra. True, prehistoric cultivation could have involved shifting villages, preventing the building up of mounds.

Third, the pebbles and cobbles currently dug out and those selected by the contractor for transport to the workshops are not particularly large, as has been said. No local informant made any such claim. We do not know how many nodules of three-pounds weight Copland saw in 1814. In fact the Census 1961 report (Trivedi 1961a: 10-11) states that agate pebbles found on an island in the Little Rann are more massive than those currently being excavated at Ratanpur.

Fourth, the contractor's family at Ratanpur stated that after there has been a good flow in the Bundhwa, the streambed is searched for carnelian pebbles that have been newly washed down. In general, as stated above, river banks and beds are a more likely prehistoric source than underground rock formations, deep shafts, and horizontal mine galleries.

Fifth, there is the question of the historic record. Medieval travellers' accounts describe the importance of Ratanpur as a source. We have referred to Duarte Barbosa who was in Gujarat between 1515 and 1520. Irfan Habib (1982: notes on map 7B) refers to the testimony of Finch (1600), Mandelslo (1638), Thevenot (1687) and Copland (1814) on the quarries, Thevenot and Copland both mentioning Limodra/Neomodra. But how far back does this industry at Ratanpur go?

Literary references of the 12th century are ambiguous. A chronicler recorded that the Chaulukyan ruler of Gujarat, Jayasimha Siddharaja, defeated a 'rakshasa' named Barbaraka who had been preying on hermitages in the forest, and on being released the latter presented him valuable jewels. Is this a reference to a Bhil chief making a tribute payment of carnelian stones? 'Barbaraka' could have been the name of a tribe (Majumdar 1956: 81-96, 494-497), but the name occurs in a bewildering variety of contexts through the centuries and there is no certain interpretation. Moreover, Majumdar (1956: 408-409) observes that this episode has a striking parallel in the *Ramayana*. Sankalia (1941: 95-97) refers to pillars of perhaps the 12th-13th centuries at Ratanpur, but no trace has survived. So too, Sankalia's study does not discuss any inscription in the vicinity. Allchin's field work, as we have seen, reported no material before about A.D. 600 at Limodra. An oral tradition among the Siddis of Jambur, in the Gir

59 forest of Saurashtra (Trivedi 1961b: 6-7) is also of significance. At Jambur too lies a *dargah* of a Siddi, and this was a brother of Baba Ghor, the saint of Ratanpur. The tradition recorded here says that Baba Ghor was a "pioneer of the agate industry of Gujarat". This Abyssinian who came and settled in Ratanpur was cooking at a fireplace one day. On a heap of glowing pebbles he noticed some that had become translucent and lustrous. Thus began carnelian collection and trade in carnelian. The literal truth of this legend cannot be established, but what is important is the memory that there was no carnelian industry before Baba Ghor, say 600 years ago.

Just as Ratanpur is not so obviously a source of Harappan carnelian, as has often been suggested, so too the Ganeshwar-Jodhpura culture is not as unequivocally a source of Harappan copper as we may like to believe. No final reports of the excavations at either Ganeshwar or Jodhpura have been published. The sites are about 40 km distant from each other, in the area with some of the richest copper ores of Rajasthan (e.g. the ores of Bairat). Excavations at Jodhpura uncovered a 1 to 1.5 m habitation stratum at the bottom of the mound with a rolled and weathered, badly fired, incised red pottery (*Indian Archaeological Review* 1972-1973: 29-30). At Ganeshwar (*Indian Archaeological Review* 1983-1984: 71-72; 1987-1988: 99-102; 1988-1989: 76-78) a hoard of about 60 large flat copper axes was accidentally discovered in a pond when a road was being constructed in 1966. Subsequent excavations yielded an early level with animal bones and flaked stone tools followed by two levels with the same kind of pottery as at Jodhpura, microliths, copper objects, and a few beads. No ground stone axes or querns were found. Among the excavated copper objects were more flat axes and arrow heads, wire fish hooks, rods, bangles, rings, etc. The Ganeshwar-Jodhpura 'culture' has been accepted as a source of Harappan copper because of the following considerations. The Ganeshwar-Jodhpura pottery has

stratigraphic priority to the Black-and-Red ware of post-Harappan Ahar. Also, there is a radiocarbon sample from the upper horizon of the earliest stratum at Jodhpura which gives a date, it has been said (Agrawala 1979: 91; Hooja & Kumar 1997: 327) of 2500 to 2000 B.C. or a general contemporaneity of the culture with the Harappan. This even though Possehl and Rissman (1992: 477) mention two radiocarbon dates for that stratum, calibrated to 2850-2755 and 2895-2515 B.C. respectively. Some Ganeshwar pottery has affinity to pottery from early Kalibangan, and there are some reserve-slip sherds at Ganeshwar (Agrawala 1984: 161). A terracotta cake was found at Ganeshwar (Agrawala & Kumar 1993: 125), while a chert fragment could be the tip of a Harappan blade. So too there is a possible swallow-tail tip of a Harappan-type metal arrow head and also a double-spiral pin (*Indian Archaeological Review* 1983-1984: 71) at Ganeshwar. It is said that there are an unusually large number of copper artefacts at Kalibangan, said to be easily accessible from north Rajasthan. Meanwhile, Harappan pottery was found at Chavasri in Jhunjhunu district (Hooja & Kumar 1997: 336, no. 49), and Dadiya Pajyali and Bewapattan in the Sikar district have Harappan pottery and microliths (Hooja & Kumar 1997: 336, no. 77, 338, no. 144). Lastly, as H.C. Misra explained, copper artefacts —albeit undated— have turned up on “practically every sand dune” in the Neem-ka-Thana and Khetri *tehsils*, though not at Jodhpura. Against this argument could be cited bits of information that cast doubt on our hypothesis. Not a single piece of copper was found in Jodhpura level I. Copper slag occurs at only three out of 200 explored sites tabulated by Hooja and Kumar (1997: 335-339). The number of copper pieces from Ganeshwar —1000 according to Agrawala and Kumar (1993: 125), but 5000 according to Hooja and Kumar (1997: 328)— appears to be greatly inflated by a large proportion of small fragments. Banawali, Rakhi Garhi and Mitathal, situated closer to the north Rajasthan copper deposits than Kalibangan, have not been reported to be particularly rich in copper artefacts. The huge flat celts of copper at Ganeshwar came from a pond, and many of the other complete artefacts, from the surface of the mound, the latter having been ploughed for many years. Thus, clear archaeological contexts are not available for many of the artefacts. In fact, the Ganeshwar-Jodhpura ‘culture’ as an archaeological entity is as yet not adequately defined. The pottery and copper artefacts do not co-exist at all the sites from this culture, and it appears that the incised and badly-fired red ware is found at many sites beyond northern Rajasthan, for example near and east of Delhi. Possehl and Rissman (1992: 477) state that the Ganeshwar tool forms are “definitely Harappan”, but the huge, thick and heavy flat axes with small and shallow depressions and both surfaces convex, could have clearer parallels in the Copper Hoards of western Uttar Pradesh than at Harappan sites (see Agrawala & Kumar 1993: 125, 128). The Ganeshwar arrowheads and fish

hooks that I was able to see are not particularly Harappan, and we should be careful not to see cultural connections simply because the artefacts are of hammered copper. Among the beads from Ganeshwar there was none of shape or size that could even remotely qualify as a Harappan type.

Compiling long lists of metal or stone occurrences thus does not amount to very productive research. The worst we can do is to accept a statement just because it has been repeated time and again. Ancient and medieval authorities often relied on hearsay because geographical information was hard to procure. But field scientists too, when covering the resources of an entire region, are unable to verify each piece of information they gain from existing literature. Exploration reports should include the maximum locational detail possible so that it can be verified. It is surprising to see how few archaeologists refer to Irfan Habib's *Atlas*: information from historical documents can sensitise us to the periods when particular resources were, or were not, in use. Moreover, we have no great body of work on the use of materials in particular localities across time. We may not agree with all the points made by Bridget Allchin in her paper, but it is exemplary in its discussion of the internal evidence for the use of one kind of stone. As for the Ganeshwar-Jodhpura case, perhaps we have failed to delineate the culture in archaeological terms, and to clarify its chronology. Greater accuracy in describing the finds and their typology would also be welcome.

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Notes

1. This and other information below owe much to Sri Harish Chandra Misra, Exploration and Excavation Officer, Government of Rajasthan, who allowed me to study all representative artefacts in the Ram Nivas Garden collection in Jaipur in November 2000.
2. Period III at Ganeshwar, which produced the maximum number of copper objects, is in one of the later reports (*Indian Archaeological Review* 1987-1988: 102) said to have dated to several centuries after 2000 B.C. To add to the confusion, the report for 1988-1989 states on page 78 that Period III at Galvashram-Ganeshwar (the same site) is Iron Age and has the remnants of iron smelting, on which all previous reports were silent.
3. The *Indian Archaeological Review* report on Galvashram-Ganeshwar for 1988-1989 mentions Harappan pottery on page 77, but this is not discussed by Hooja & Kumar (1997).
4. Copper arrow heads and fish hooks of the Ganeshwar sort at Kalibangan (Hooja & Kumar 1997: 330) could not be verified by this author. Note also that the Sibania site that produced two long copper celts "with Indus script" (Agrawala & Kumar 1993: 131) lies well northwest of the Ganeshwar-Jodhpura cluster: it is in district Bikaner, not very far from Kalibangan.

5. This is a marked contrast to the expertly cut beads, perhaps of Harappan origin, found in the Kayatha hoard.

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