South Asian Archaeology 2001

Edited by

CATHERINE JARRIGE and VINCENT LEFÈVRE

Volume I

Prehistory

Éditions Recherche sur les Civilisations

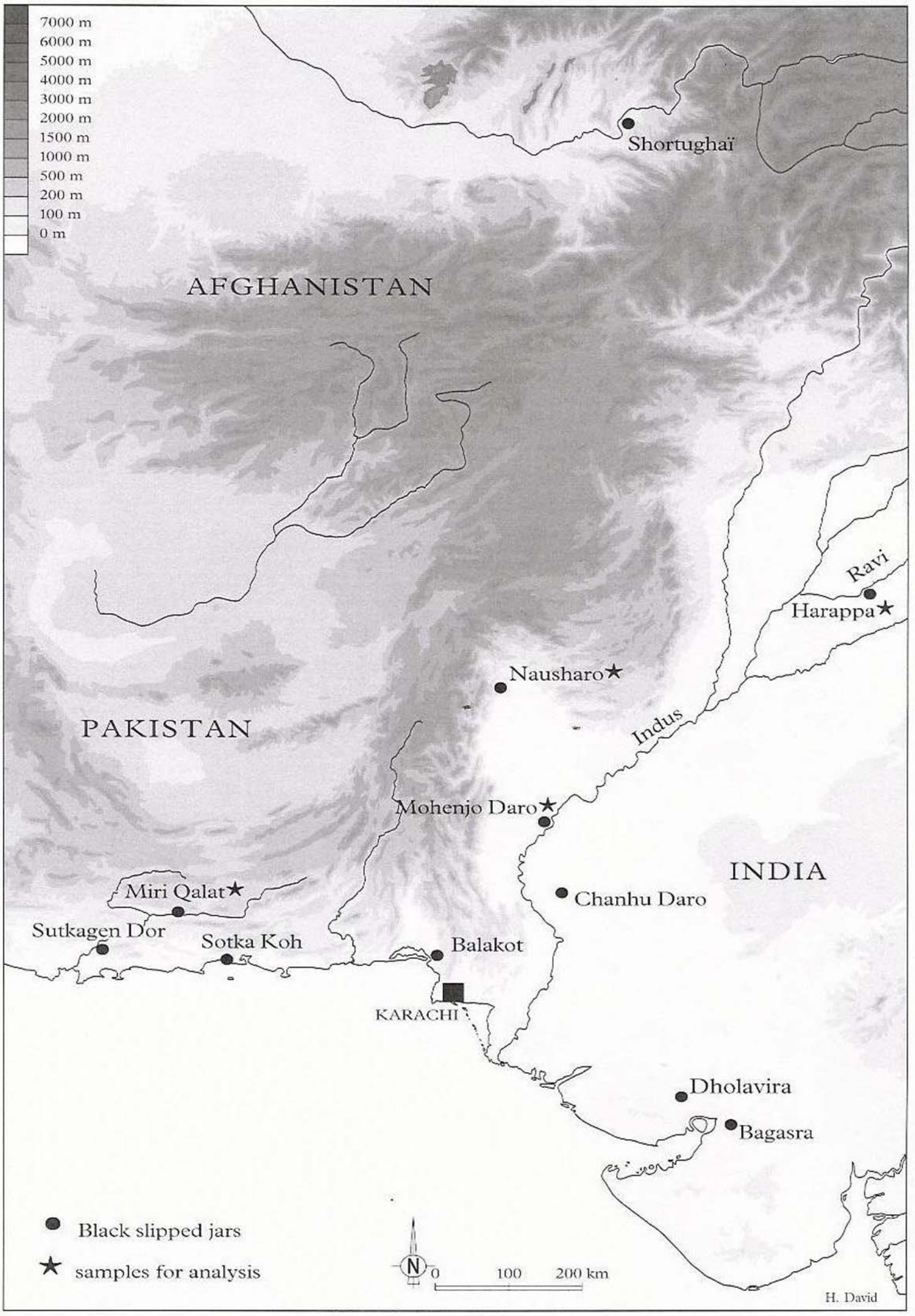

Fig. 1 – Recorded occurrences of Black Slipped jars in the Indus world.

Socio-economical Patterns of a Ceramic Container: the Harappan Black Slipped Jar

SOPHIE MÉRY & M. JAMES BLACKMAN

The following project was launched some 15 years ago by the CNRS in collaboration with the Smithsonian Center for Materials Research and Education (SCMRE). It was first aimed at exploring the contacts between Eastern Arabia and the Indian sub-continent as some 10 different types of Indus pottery have been brought to light in the United Arab Emirates, whether it be from domestic or funeral contexts (Méry 2000: 219-245). Almost all of them are made from strongly micaceous pastes. Thus, we took to the study of micaceous ceramics from Pakistan, where we focused on samples coming from several sites currently excavated: Nausharo, Harappa, Mohenjo-daro and Miri Qalat (Fig. 1).

Main characteristics of an Indus ceramic container

As far as the Indus Civilization is concerned, the Black Slipped Jars constituted the backbone of our study. This type of jar was already described in details in previous publications (Blackman & Méry 1999, Méry 2000, Méry & Blackman 2000), we thus only briefly remind here its main characteristics. It is roughly 70 cm in height, has a capacity between 30 to 40 litres, a very narrow base, a maximum diameter located on the upper part of the vase, and a mouth rarely larger than 15 cm in diameter. Both sides of the jars are generally covered by a black slip. The ceramic paste is dense and contains, in various quantities, mica flakes visible to the eye, more rarely quartz sandy grains. Through the thin-sections, the matrix appears slightly micaceous. The sandy fraction, which represents 10 to 15% of the surface, contains above all brittle quartz fragments, biotite and muscovite flakes, as well as plagioclase, orthose, amphibole, some fragments of calco-alcaline granite and gneiss. One also recognizes some microclines, some zircons, as well as volcanic glass fragments and basaltic hornblendes. In a number of thin sections, the presence of some badly mixed up pure clay nodules, sometimes associated with concentrations of sandy inclusions show that the potters proceeded to a mixture of raw materials (Méry & Blackman 2000: fig. 4). The added sand was well calibrated.

The global analysis of the paste by Instrumental Neutron Activation Analysis (INAA) shows very low calcium contents as well as mafic elements such as cobalt or chromium. On the other hand, contents in potassium, rubidium, cesium and barium, as well as in rare earth and thorium are quite high. These elements are characteristic for acid rocks of plutonic or metamorphic origin, which is well consistent with the results of the petrography analysis and reflects the sedimentary components produced by the Himalayan foothills, basically composed of orthogneiss, micaschist, and granite intrusions. Thus it may very well correspond to the petrographical and geochemical features of the sediments of the Indus Basin. On the other hand, Nausharo and Miri Qalat are situated in very different environments (mainly tertiary limestone for Nausharo, flysh for Miri-Qalat). Thus, the nature of the clays and the sands locally available is of course different. Moreover, it is rather unlikely that sediments from the surroundings of Miri-Qalat and Nausharo will yield, once blended, the same chemical composition as that of the "Mohenjo-daro" group.

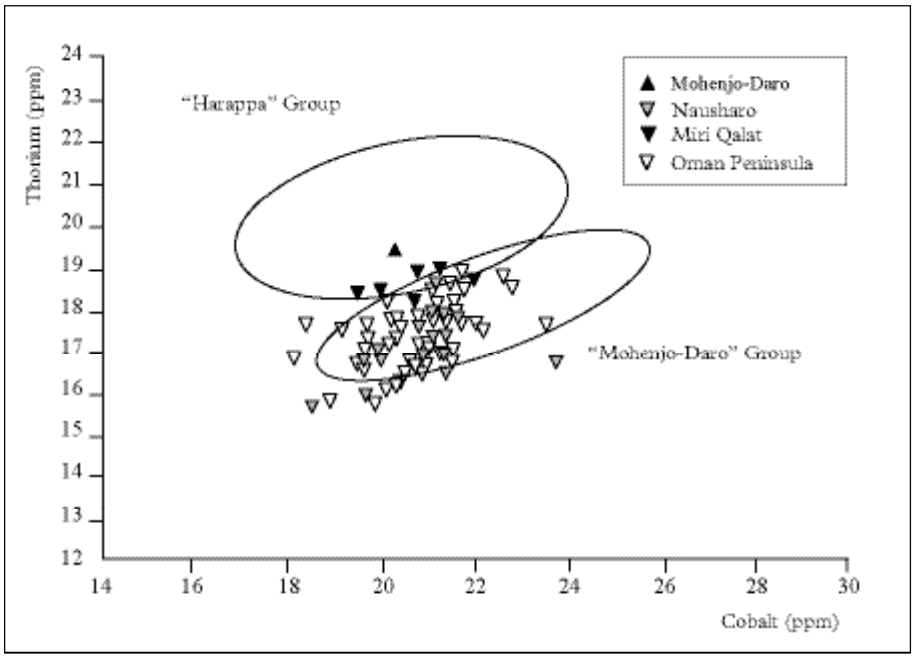

Fig. 2 – The chemical composition of the Black slipped jars from Harappa is distinct from the other samples of Black Slipped Jars we analysed, whatever their provenience.

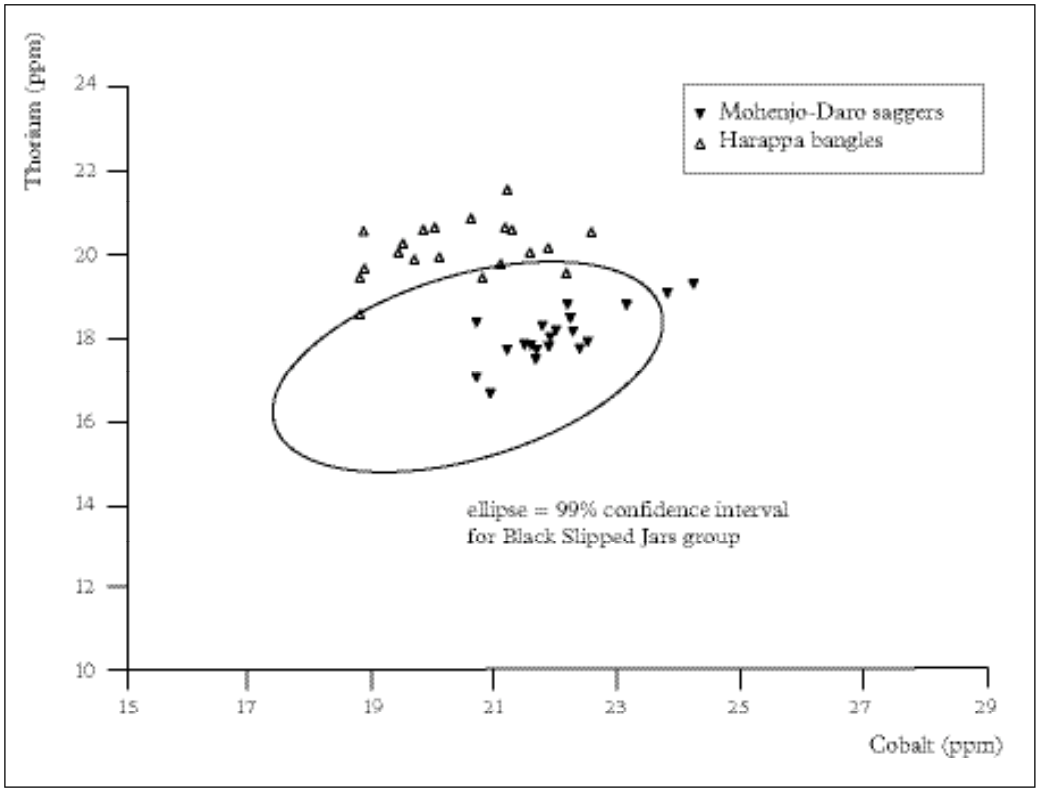

Fig. 3 – The shift between the ellipse corresponding to the Black Slipped Jars and the concentration of dots relating to the Mohenjo-daro saggers may be interpreted as some dilution effect due to the presence of a coarser quartz temper added to the jars.

Still, we may distinguish two distinct, albeit related chemical groups among the Black Slipped Jars we analysed (Fig. 2). The first group comprises samples from Harappa only, plus one from Nausharo. The second group comprises all other samples, i.e. from Nausharo, Mohenjo-daro and Miri-Qalat. The confrontation of these data with that of sandstone bangles previously studied by one of us (M.J. B.) in collaboration with M. Vidale is particularly interesting. Our first group, the "Harappa group", shows the same characteristics as a clay sampled along the Ravi River near Harappa as well as sandstone bracelets previously analysed from Harappa (Blackman & Vidale 1992). It also has the characteristics of large jars with black bands on red slip we recently analysed from the same site (unpublished). Our second group is comparable to the Mohenjo-daro saggars and sandstone bracelets discovered within a workshop. Still, there is a slight shift between the ellipse corresponding to the Black Slipped Jars and the concentration of dots relating to the Mohenjo-daro bracelets (Fig. 3): this shift may be interpreted as some dilution effect due to the presence of a coarser quartz temper added to the Black Slipped Jars.

Hypothesis on potential production sites of Black Slipped Jars

The study of the material from Nausharo (Baluchistan) brought about some important elements to the analysis of the Black Slipped Jars since this was a unique opportunity to study a pottery assemblage in all its diversity. Together with archaeometry laboratories, the C2RMF-Paris and the *Freie Universität*-Berlin, one of us (S.M.) could some years ago analyse samples from Periods IC, ID, II and III on that site. A series of paste types, either micaceous or non micaceous was processed, and it appeared that the majority of pots was not made from strongly micaceous clay, but from a marly clay of local origin (Bouquillon *et al.* 1994). The study of the unfired pots discovered in a potter's workshop belonging to period II has shown that this marly clay was used to make different kinds of pottery models, among them some complex Indus types such as the pedestalled dishes. The comparison with some fired vessels from periods IC, ID, II and III, that is pre- and classical Indus, has shown that their clay was quite comparable to that of the raw pots found in the workshop (Fig. 4). The repertoire of vessels

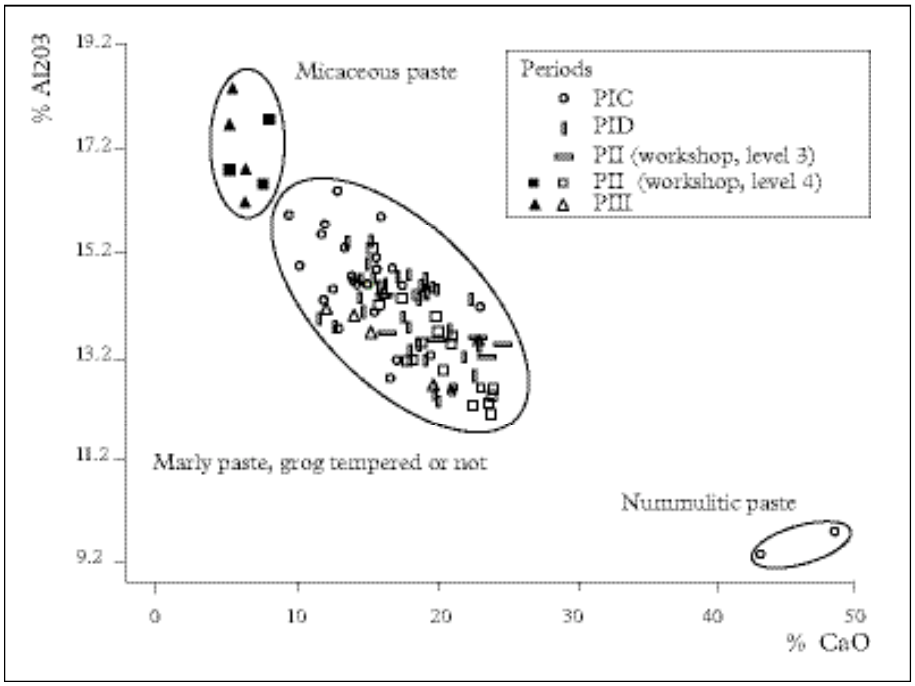

Fig. 4 – At Nausharo, the bulk of the pottery is made from local marly clays contrasting with the composition of the Black Slipped Jars. (After Bouquillon *et al.* 1994).

locally manufactured during periods II and III comprises most of the models typical of the Classical Indus assemblage, with the exception of the Black Slipped Jars. Quite distinct from the local material, the latter actually constitute less than 5% of periods II and III pottery assemblage at Nausharo (pers. comm. G. Quivron). What is more, other vessel types with strongly micaceous clay also constitute a minority on that site at that period. However, we have to mention the fact that some pots with strongly micaceous paste have been brought to light on that site for period ID: we may therefore conclude to the existence of exchange with the Indus Basin before the classical Indus period, but this hypothesis awaits confirmation via further pottery analyses.

As already said before, when confronted with the regional geology, the data from the chemical analysis led us to exclude Miri Qalat (Makran) from the potential production sites we have analysed for the Black Slipped Jars. In order to slightly enlarge our knowledge of the classical Indus ceramic repertoire, we also analysed a small sample of other classical Indus pottery types from Miri Qalat (such as a pedestalled dish and a carinated vessel with a figurative decoration) and Dasht types (a grater and a sherd with an *appliqué* decoration). Their paste ware is very different from those of the Black Slipped Jars (Fig. 5). They may be associated with local productions with a fair degree of probability as their chemical composition clearly shows their relationship with the Emir Grey ware imported into the Oman peninsula (Blackman *et al.* 1989, Méry 2000). They have been manufactured in the neighbouring Dasht plain where many Bronze Age pottery workshops are known (Besenval 1997: 22), as recently confirmed by our laboratory analyses (unpublished).

Thus, two potential zones for the production of Black Slipped Jars are now defined: the first extends along the Ravi river, the second along the Indus river. The distinction between these two groups was made possible because alluvial deposits differ in these contrasting contexts: this is reflected in the geochemical composition of

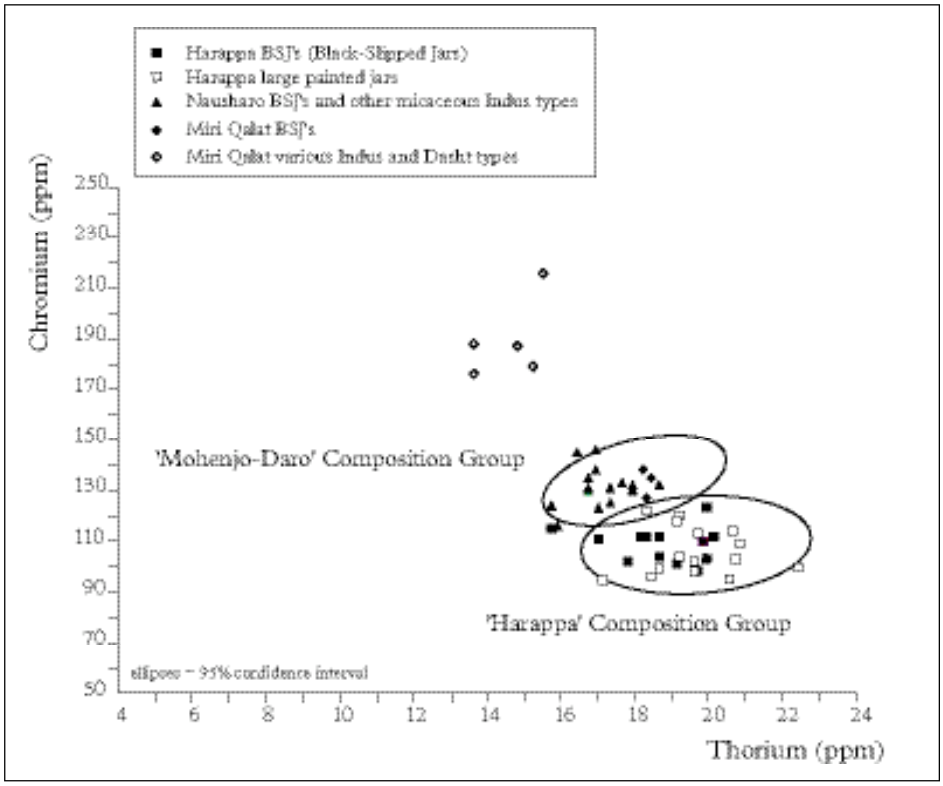

Fig. 5 – The analysis of some classical Indus and Dasht pottery types recovered at Miri Qalat indicate their possible manufacture in the neighbouring Dasht plain. Clays are very different from the ones found in the Indus valley.

the pastes. Harappa lies by the Ravi River, whereas Mohenjo-daro is situated further down the confluence of several rivers, among which one finds the Ravi, together with the Jhelum, the Chenab and the Beas Rivers. Does this imply that the Black Slipped Jars samples from Harappa and Mohenjo-daro were actually produced on these two sites? Existing data do not allow any definite answer to this question.

Let us come back to the notion of "production area": it is a useful notion as far as it allows the delimitation of certain potential production zones and the exclusion of some others. But this notion seldom embraces the concept of "workshop" and this is quite obvious in an alluvial basin context where sedimentation processes are such that same composition clays may be found over very large areas. A whole series of workshops using petrographically and chemically identical clays, still collected from different places, may be found within one large potential production area.

Along the Ravi River, a single pottery workshop that may have produced Black Slipped Jars is known so far. It is located at Harappa. However, other workshops producing this jar type may have existed further up or further down that site. As far as the "Mohenjo-daro" production zone is concerned, sandstone bracelets and the saggars were collected within a workshop context. But what about the Black Slipped Jars? They too were probably locally produced, although we know nothing about the composition of other sites pottery productions, situated along the Indus River, up or down Mohenjo-daro.

Suppose we did have systematic clay samplings from the Ravi and the Indus rivers, suppose we did have ceramic samples from pottery workshops belonging to a series of classical Indus sites within these two zones, would the discrimination possibilities of the INAA be sufficient enough so as to distinguish between productions of neighbouring sites? This is very much questionable in a sedimentary environment of alluvial type. This has proved to be possible in the case of Mohenjo-daro and Harappa, but these sites are separated by 450 km and again, are not situated on the same basin slopes. Would it be possible to distinguish between closer sites, located in a similar environment? This hypothesis should be tested in the future.

Socio-economical implications of the proposed production pattern

The analysis of Nausharo and Miri Qalat material has shown that the Black Slipped Jars and their contents were first intended to the inner Indus "market": we are just beginning to discover the complexity of the production system of these jars within the Indus zone. The composition of some Black Slipped Jars samples (Méry & Blackman 2000: table 2) show that there probably were other production zones within the Indus territory: these have yet to be identified.

The Black Slipped Jars were certainly made to specific orders, as concern their aspect and volume, in order to meet the requirements of transport and trade of their contents. The comparison with some amphoras from classical Antiquity, among which the "Gauloise 4" from Southern France and the "Dressel 30" from Mauritania is quite striking from that point of view: apart from the lugs, which are missing and the base, which is not thickened, they are strikingly alike. These morphological analogies correspond to functional needs: while they are difficult to handle, it makes them easier to be stocked and shipped by the river or by sea. One may surmise that these jars were protected during transport, as their thin walls and bases are quite fragile.

While they were made to standard shapes and technology (as the systematic presence of an inner and an outer slip), their capacity as containers seems to be more variable. Most published whole jars from Mohenjo-daro, Chanhu-daro and Nausharo measure roughly 70 cm in height. Within that group however, height or maximum diameter variations are perceptible. All these variations build up to differences in volume which are far from being negligible. As demonstrated by F. Laubenheimer and J.A. Gisbert Santonja (2001: 37), "Gauloise 4" type amphoras, which were wheel-thrown, also show variations up to several litres: in that case, the variations are linked to the difficulty in throwing large vessels with narrow bases. We lack precise technological studies for reconstructing the Black Slipped Jars operating chain. Still, the variations in shapes are probably also linked to building techniques, which involved the use of coils shaped with a kind of wheel. Whatever that was, producers from the Indus basin should have overcome problems of volume variability quite easily, by controlling quanti-

ties either by weighing or counting the goods or else, using standardised vessels in filling the jars.

What did the Black Slipped Jars contain? There is still no answer to that question today. Ph. Gouin (1991: 49) suggested some specialised trade in dairy products, the double-slip of the jars serving to protect the content from the outside. On his part, M. Kenoyer (1998: 97) made a long tentative list of Indus products possibly exported with Black Slipped Jars containers: liquid foods such as clarified butter, pickled vegetables or fruit, honey, wine or indigo. However, characterisation of organic remains tempted so far did not yield any result (pers. comm. Ph. Gouin), as far as we know. Of course, the Black Slipped Jars being covered with some slip are waterproof and their dense paste does not favour the imprisonment of such remains.

Were they containers for the transportation of various goods or designed for a specific kind of goods? In Classical Antiquity, the variation in shapes matched the variation in transported goods. Texts found in Egypt show that consumers from the Greco-Roman period could precisely spot the origin of an amphora (from Chios, Cnidos, etc.) by its shape (Rathbone 1983). They could even gather the nature of their content. However, one does not find such a diversification in shapes within the classical Indus assemblage but other types like the ones with black painted bands may be as large transport containers. However, the fact that Black Slipped Jars were produced in a specific region, that is the Indus basin, and specifically intended for long distance trade, makes us think that they were indeed designed for the transportation of specific goods.

We know that in Southern Gaul, the production of amphoras was very abundant: it corresponded to the request of merchants whose aim was to export Gaul wine to far away market. This large-scale trade contrasted with the amphora production of Northern Gaul, which was much more limited in scale and quantity (Laubenheimer & Gisbert Santonja 2001: 33). As already said, the production of Black Slipped Jars was linked to the Harappan inner market as well as its outer market constituted by Eastern Arabia and the Gulf. Long-distance trade is for sure attested, but was the production of Black Slipped Jars all that abundant? Data are lacking to say anything definite: still, according to published data, one has to acknowledge their low number on a "consuming" site such as Nausharo, as well as on a potential producing site such as Mohenjo-daro. On the other hand, these jars are well attested on a harbour site like Balakot. Thus, many things remain to be clarified.

What is the distribution pattern in the Gulf? They are many more archaeological sites yielding Black Slipped Jars in the United Arab Emirates and in the Sultanate of Oman than there are in Pakistan or India so far (Méry & Blackman 2000: fig. 1). Still, this picture is largely distorted because of the systematic recording of this type of ware throughout the Oman Peninsula for about 15 years. A single sherd is enough to have the site's name on a map, whereas only complete jars or inscribed sherds were generally published in Pakistan or India.

Black Slipped Jars constitute the most frequently attested type of Indus pottery along the Oman peninsula, whereas that same type seems to represent a minority within the repertoire of the Indian subcontinent. According to the chemical analyses, most of them came from the Mohenjo-daro zone, and none from the Harappa zone. They are found on all settlements dating to the second half of the IIIrd millennium in the UAE or the Sultanate of Oman. Some of these settlements have been excavated and constitute reference sites, such as Ra's al-Jins RJ-2, Hili 8, Bat, Tell Abraq and Kalba 4. Simple soundings or even surveys have been carried through on other settlements, such as Ra's Abu Daud to the North of Quriyat. Most of these sites are not located by the coast but inside the peninsula, even far from major communication routes, in isolated zones such as Wadi al-Fajj or Asimah. On many sites, the number of Black Slipped Jars sherds is low: it amounts to a few pieces or a few dozens pieces. Yet, on two sites at least, that is Asimah and Ra's al-Hadd HD1, which amount rises to several hundred pieces. One may object that such jars may break into many pieces; this is true. But a close observation of the sherds, together with reconstruction essays show that the minimum number of vessels nonetheless amounts to more than a dozen of jars at Ra's al Hadd HD-1.

Let's briefly discuss about chronology. Based on Hili 8, Ra's al-Jins RJ-2 and Umm an-Nar stratigraphy and associated material, Black Slipped Jars are in use in the region between 2500-2400 and 2100 BC. Thus, they testify to the antiquity of exchanges between the Indus world and the Gulf. More precise dating is so far unavailable, as rims discovered at RJ-2 may typologically be related either to

Nausharo period II or period III (pers. comm. G. Quivron). The same problem applies for Hili 8.

The analysis of the Jal'an region in Oman shows that the diffusion of Black Slipped Jars and/or their content may have been locally organized from a few specific places (Ra's al-Hadd or Quriyat, for example), before reaching other coastal sites (such as Khor Bani Bu Ali SWY-3 or Ra's Abu Daud).

The proportion of Black Slipped Jars in the ceramic repertoire is much more important at Ra's al Hadd HD-1 than at Ra's al Jins RJ-2, although the latter is situated only 10 km far. This situation may be explained if one considers that Ra's al-Hadd was, in contrast to Ra's al Jins, a real natural harbour and a privileged mooring point for these jars. The discovery of similar sherds at Khor Bani Bu Ali SWY-3, located some 60 km to the south shows that the southern coastal shore of the Jal'an region was part of some kind of regional exchange network. Yet, the small amount of Black Slipped Jars sherds brought to light at SWY-3 during two excavation campaigns (Méry & Marquis 1999: 12) seems to confirm the hypothesis that trade with the Indian subcontinent was preferably oriented towards Ra's al-Hadd. This of course, does not prevent the possibility that the content of the Black Slipped Jars, once fragmented and packed in different containers, may have reached Suwayh under some different form. In the same line of thought, we must add that so far we are unable to distinguish between secondary (and even multiple) jar uses throughout the Oman peninsula, even if this is quite probable.

Comparison with some other types of Indus vessels

After having focused primarily on the analysis of Black Slipped Jars, it is now becoming evident that the analysis of the vessel types can complement our interpretation of the data. In the Oman Peninsula, other characteristic types of the Classical Indus assemblage are also strictly associated with settlements: pedestalled dishes and perforated vessels are the most frequent, but other types are attested. Many of them, though nevertheless representative of only a small part of the diversity of the Indus assemblage, are attested in the Ra's al-Jins/Ra's al-Hadd area, especially on the site of HD-1 (Méry 2000:

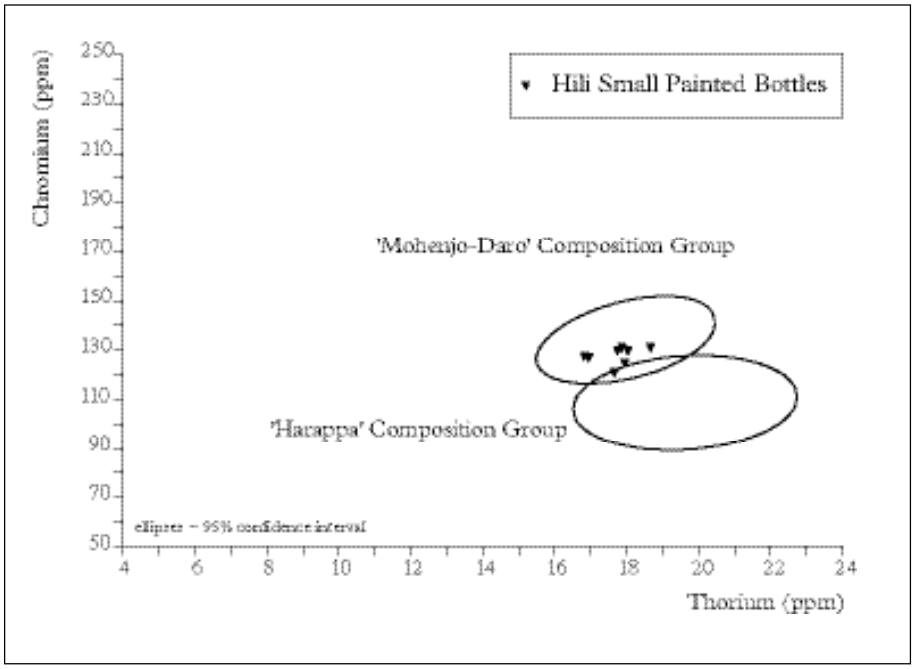

Fig. 6 – Chemically, the Indus bottles found in Umm an-Nar graves fall into the Mohenjo-daro composition group. It confirms a pattern of exchange mainly orientated with the southern part of the Indus basin.

fig. 144). On the Gulf coast, the diversity of Indus pottery types is also apparent at Umm an-Nar (Frifelt 1995: 88, 221, 223-225). But in the interior of the peninsula, only 1 or 2 types are generally only attested along with the Black Slipped Jars. These are the perforated vessels and pedestalled dishes. Pedestalled dishes have been found at Hili 8, Bat and Maysar-1. One of those found at Hili 8 was imported (Cleuziou & Tosi 1989: fig. 11 n. 4) but others are local copies (*ibid.* fig. 11 n. 3, 5), as it is the case with the one found at Bat. For the latter, this was confirmed by petrographic and chemical analyses: the sherd of Bat falls into the groups of Omani Sandy Wares from Bat and Amlah sites (Blackman & Méry 1999: 17).

Some other Indus types are almost exclusively associate with funerary contexts from the last third of the 3rd millennium. These include small painted bottles, which are the best-represented Indus pottery type in the Oman Peninsula after the Black Slipped Jars. Series of complete pots come from Hili North Tomb A but also from the funerary-pit grave of Hili N that the French archaeological mission is currently excavating in collaboration with the Department of Antiquities in Al Ain (Al Tikriti & Méry 2000: fig. 9 n. 6-7). Bottles were first identified as possible imports due to their characteristic decoration and laboratory analyses confirm this impression, despite the fact that macroscopically the ware is non-micaceous. Due to their frequency in the U.A.E., and the absence of similar pottery shapes in Pakistan, we suggest these were principally intended for export. It would not have been a unique example of such products from the Indus world,

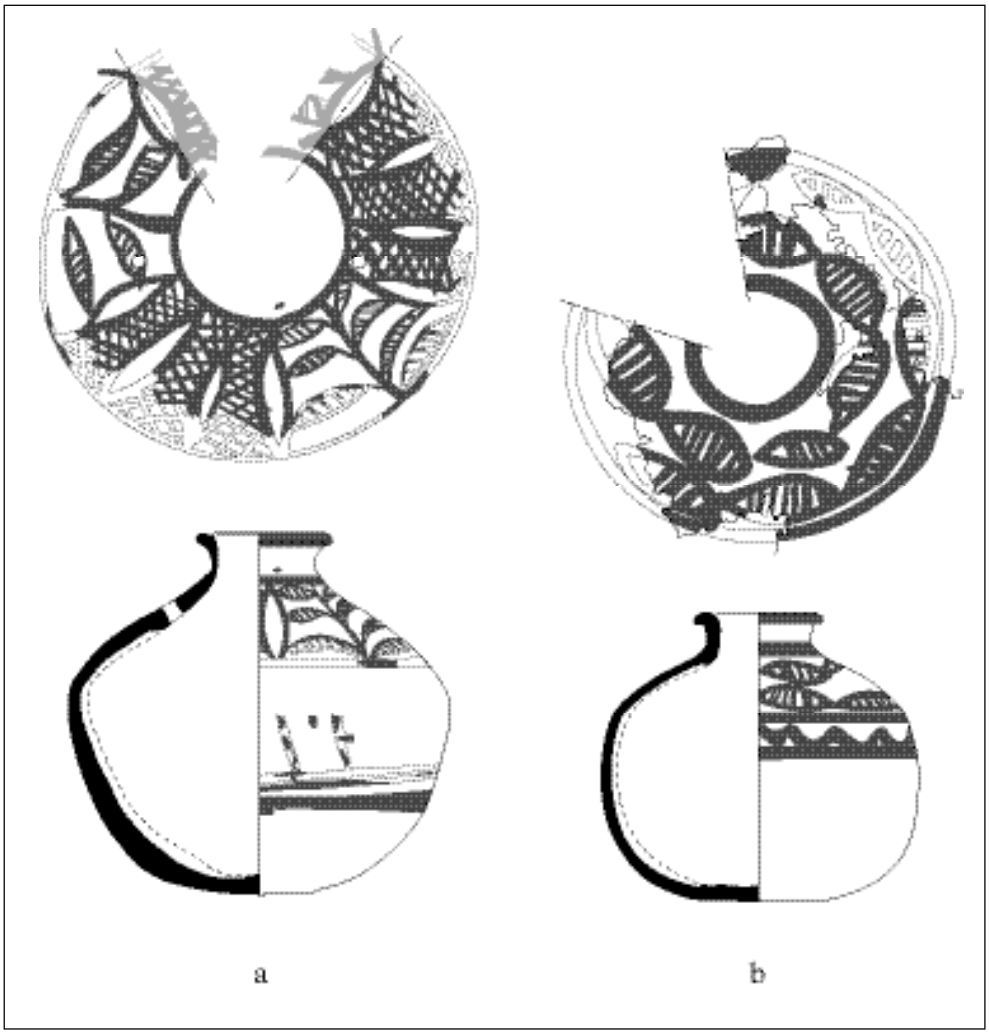

Fig. 7 – A local copy (b) of the well known funerary Indus bottle (a) was recovered at Hili grave N. Its pasteware, technique of shaping and shape are very different from the imported vessels.

as hypothesized by M.-L. Inizan (pers. communication) for some types of carnelian beads. Chemically, the Indus bottles found in Umm an-Nar Period graves fall into the Mohenjo-daro composition group (Fig. 6); thus confirming a pattern of exchange mainly orientated with the southern part of the Indus basin. However, thin-section analysis allows us to differentiate the bottles from the Black Slipped Jars. The sandy fraction is not only scarce but its mineralogical composition is slightly different (no micas, more hornblendes, etc, see Blackman & Méry 1999: fig. 6 n. 5-6). Moreover, the matrix itself comprises mass of tiny muscovite and biotite flakes not visible through eye, which is not the case with the Black Slipped Jars. Thus either the clay was different, or the differences is due to firing, as optical characteristics of tiny mica flakes are altered when the degree of firing is high despite the bigger fraction is not affected. If this second possibility was correct, it would show that the degree of firing was higher for the Black Slipped Jars than for the bottles. More than that, the temper fraction is also different from the Black Slipped Jars

No attempt of copying the Black Slipped Jars was ever detected in the U.A.E. or the Sultanate of Oman so far and for a long time, it was also the case for the Indus bottles. However, a local copy was very recently identified from Hili Tomb N. Its paste is identical to the domestic ware from the Hili area. Its shape (Fig. 7) is slightly different from the imported bottles but this is due to the technique of shaping, as it was coiled without the benefit of rotation, whereas Indus bottles were thrown from coils or thrown in two parts according to Prof. van der Leeuw from the Sorbonne University. Reconstruction of the operating chain of shaping of these pots belongs to a new program we are working on, in order to better understand the technological impacts of the long-distance contacts, and especially the ones with the Indus world, during Early Bronze Age in the Oman peninsula.

REFERENCES

Besenval, R. (1997) Entre le Sud-Est iranien et la plaine de l'Indus: le Kech-Makran. *Arts Asiatiques* 52, pp. 5-36.

Blackman, M.J., Méry, S. & Wright, R.P. (1989) Production and Exchange of Ceramics on the Oman Peninsula from the perspective of Hili. *Journal of Field Archaeology* 16, pp. 61-77.

Blackman, M.J. & Méry, S. (1999) Les importations de céramiques harapéennes en Arabie orientale: état de la question. *Proceedings of the Seminar for Arabian Studies* 29, pp. 7-28.

Blackman, M.J. & Vidale, M. (1992) The production and distribution of stoneware bangles at Mohenjo-Daro and Harappa as monitored by chemical characterization studies. *South Asian Archaeology 1989*, ed C. Jarrige. Madison, pp. 37-43.

Bouquillon, A., Méry, S., Schneider, G. & Quivron, G. (1996) Third Millennium BC Pottery at Nausharo (Pakistan): first results of a mineralogical and chemical program. *Proceedings of the 29th International Symposium on Archaeometry, Metu Ankara, Turkey, 9-14 May 1994*, ed. S. Demirci, A. Özer & G.D. Summers. Ankara, pp. 151-168.

Cleuziou, S. & Tosi, M. (1989) The Southeastern Frontier of the Ancient Near East. *South Asian Archaeology 1985*, ed. K. Frifelt & P. Sørensen. London, pp. 14-47.

Frifelt, K. (1995) *The Island of Umm an-Nar, vol. 2. The third Millennium settlement*, Jutland Archaeological Society Publications 26/2. Århus.

Gouin, Ph. (1991) Râpes, jarres et faisselles: la production et l'exportation des produits laitiers dans l'Indus du 3e millénaire. *Paléorient* 16/2, pp. 37-54.

Kenoyer, J.M. (1998) *Ancient cities of the Indus Valley Civilization. American Institute of Pakistan Studies*. Karachi.

Laubenheimer, F. & Gisbert Santonja, J.A. (2001) La standardisation des amphores Gauloise 4, des ateliers de Narbonnaise à la production de Denia (Espagne). *20 ans de recherches à Sallèles d'Aude*, ed. F. Laubenheimer. Paris.

Méry, S. (2000) *Les céramiques d'Oman et l'Asie moyenne: une archéologie des échanges à l'Âge du Bronze*. CNRS, CRA 23, Valbonne.

Méry, S. & Blackman, M.J. (2000) Harappa et Mohenjo-Daro: deux zones de production de jarres à engobe noir au Pakistan à la période Indus. *Paléorient* 1999/2, pp. 167-177.

Méry, S. & Marquis, P. (1999) Un habitat côtier de l'Âge du Bronze à Khor Bani Bu Ali SWY-3 (Sultanat d'Oman): deuxième campagne de fouille. *Bulletin of the Society for Arabian Studies* 4, pp. 9-12.

Rathbone, D.W. (1983) Italian wine in Roman Egypt. *Opus* 2, pp. 81-98.

Fig. 1a – The "Leopards Weight" (height: 16,7 cm). © C2RMF, D. Vigears.

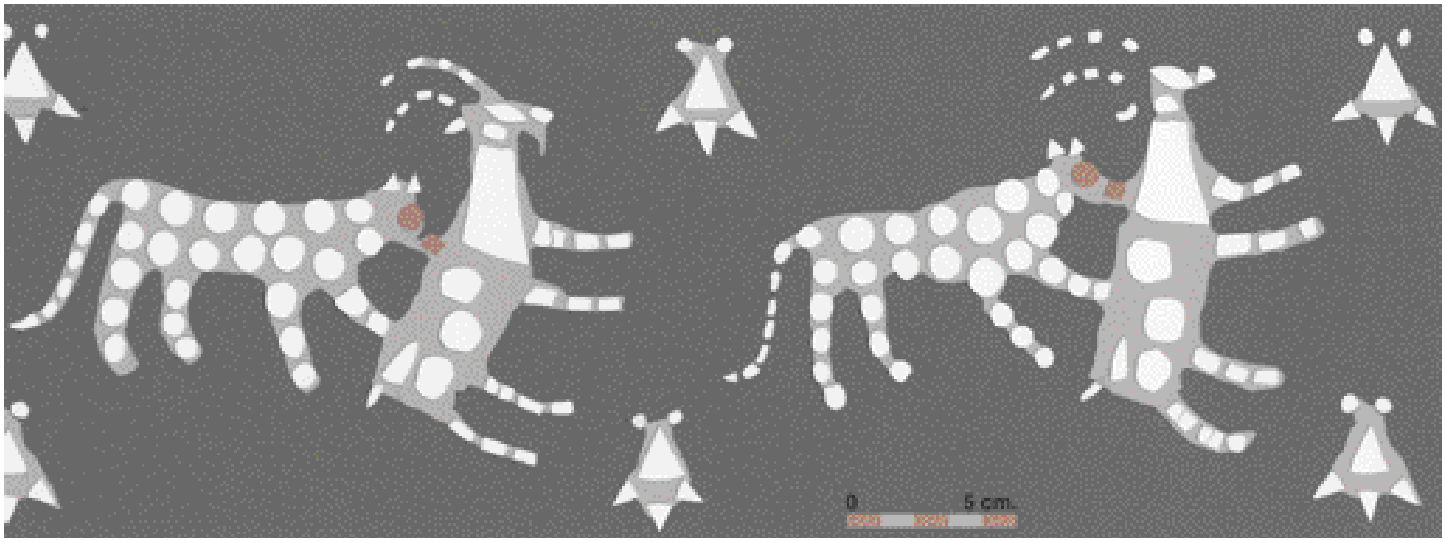

Fig. 1b – Unrolled view of the "weight". (Drawing by G. Quivron).