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Journal of Archaeological Science 34 (2007) 1098–1116

Journal of Archaeological SCIENCE

http://www.elsevier.com/locate/jas

A pottery workshop with flint tools on blades knapped with copper at Nausharo (Indus civilisation, *ca*. 2500 BC)

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Received 23 June 2006; received in revised form 3 October 2006; accepted 4 October 2006

Abstract

Twenty years after its discovery, the pottery workshop of Nausharo (province of Baluchistan, Pakistan), which yielded a series of knapped stone tools in association with unbaked sherds and clay waste, is still of unique importance in Asian protohistorical studies. The types of pottery production (sandy marl fabrics) identified in this workshop, which is dated to *ca*. 2500 BC, correspond to the majority of the domestic pottery discovered at the site during the first two phases of the Indus Civilisation. The flint blades discovered in the workshop were made from exotic flint, coming from zones close to the great Indus sites such as Mohenjo-Daro and Chanhu-Daro. This is also the origin of a small amount of the pottery (micaceous fabrics) found at Nausharo in domestic contexts, e.g. Black-Slipped-Jars. The butts of the blades display features characteristic of pressure detachment with a copper pressure point. Gloss and microwear traces (polish) testify to the blades' having been used for finishing the clay vessels: for actual finishing (trimming) while they were being turned on a wheel, and possibly also for scraping by hand. Both of these operations are distinctly attested to by the presence in the workshop of two different types of clay shavings.

Keywords: Early Bronze Age; Potter's wheel; Specialised productions; Scraping; Trimming; Pressure blades; Copper pressure technique; Glossed blades; Microwear analysis; Clay working; Agriculture

1. Introduction

Situated on a major axis of communication between the Indus basin and central Asia, the IIIrd Millennium BC site of Nausharo (Pakistan, Fig. 1) was excavated under the direction of J.-F. Jarrige between 1985 and 1996 by the *Mission française de l'Indus* (Jarrige, 1988, 1989, 1990, 1993; Jarrige and Audouze, 1979). The remains of a craft area specialising in the making and decoration of vessels in unfired clay were excavated over two seasons (Jarrige, 1989; Méry, 1994; Méry and Marquis, 1990). This discovery is exceptional as fragile vessels of unfired clay and the waste from their manufacture, also unfired, are rarely found in stratified archaeological contexts. Moreover, the non-fortuitous presence of flint tools among the pottery remains at Nausharo opened a new avenue of research: the interaction of several technical practices (Anderson et al., 1989). The site remains a reference for the study of proto-historical pottery techniques in the Indian subcontinent, but also for the study of the formation of gloss from use in flint tool industries.

The workshop, which dates to *ca*. 2500–2400 BC, corresponds to the first phase of Indus occupation at Nausharo (called Period II in the chronology of the site). It is located in zone K of the site. The remains of pottery production were numerous in this part of the site, but not the only ones

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0305-4403/$ - see front matter
doi:10.1016/j.jas.2006.10.002

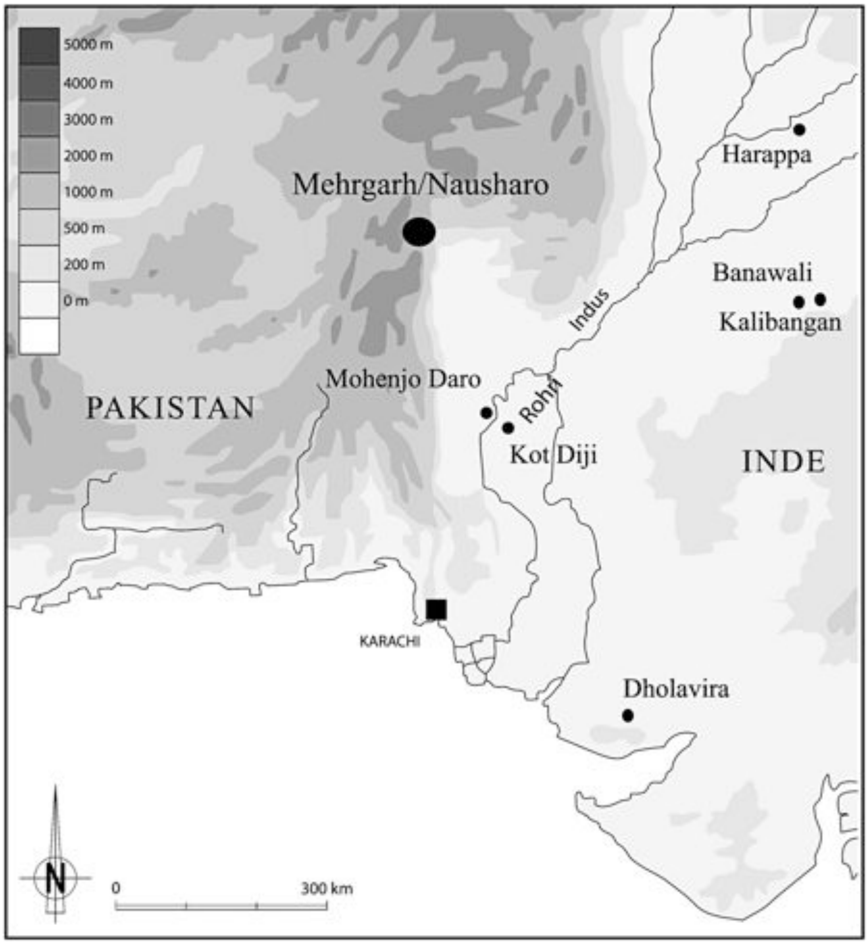

Fig. 1. Location of the site of Nausharo and other sites of the Indus Civilisation mentioned in the text (drawing: H. David).

of this kind found at Nausharo: kilns, fragments of unfired vessels and potters' tools dated to periods II and III (second half of the IIIrd Millennium BC) were found at several locations in the site (excavations of C. Jarrige, J. Haquet and G. Quivron).

After publishing studies (Anderson et al., 1989; Blackman and Méry, 1999; Bouquillon and Méry, 1993; Bouquillon et al., 1996; Méry, 1994) of this craft area, we present here a pluri-disciplinary study focusing on defining the organisation of this zone and manufacture and use of the associated lithic tools, which are also characteristic of the Indus civilisation of around 2500 BC.

2. The workshop

The pottery workshop was discovered when a deep trench was excavated by S. Pennec during the 1986–1987 season (NS.3.87, zone K.3D-3E), then a second season of excavation carried out by one of us (S.M), extended the excavated area in 1988–1989 (NS.3.89, zone K.3D-3E-4D-4E). Several levels of occupation related to pottery manufacture were then brought to light (Méry, 1994), but we discuss here only the earliest level (Level 4), with an area specialised in shaping and storing unfired vessels.

The workshop was cleared over 9 m^2 (Room III, Fig. 2). A mud brick wall, pierced by a niche, delimits the south-west boundary. Beyond this wall, the angles of two other rooms, Rooms IV and V, were cleared, but for technical reasons, we could not extend the excavation in that direction. The fill of Room V also produced remains of pottery manufacture.

The workshop was overlooked to the north-east by a very large retaining wall (*ca*. 10 m wide); whose construction preceded that of the workshop (period Id, pre-Indus phase at Nausharo). Between this retaining wall and the workshop, a band 1 m wide contained only scarce and displaced material in a type of sediment different from that of the actual workshop. This space was interpreted to be a passageway, perhaps an alley, but no trace of a separation wall was found between this passageway and the workshop. The eastern and western edges of the workshop were not reached.

Most of the workshop tools were found on the earthen floor of room III, in the central part of the excavated area (12 blades or fragments of blades made from exogenous flint, a bone tool, a terra cotta tool), as well as prepared material (a large clay coil shaped in a ring, a piece of red ochre, some raw clay), waste (200 shavings of unfired clay), and other objects (two large grinding stones).

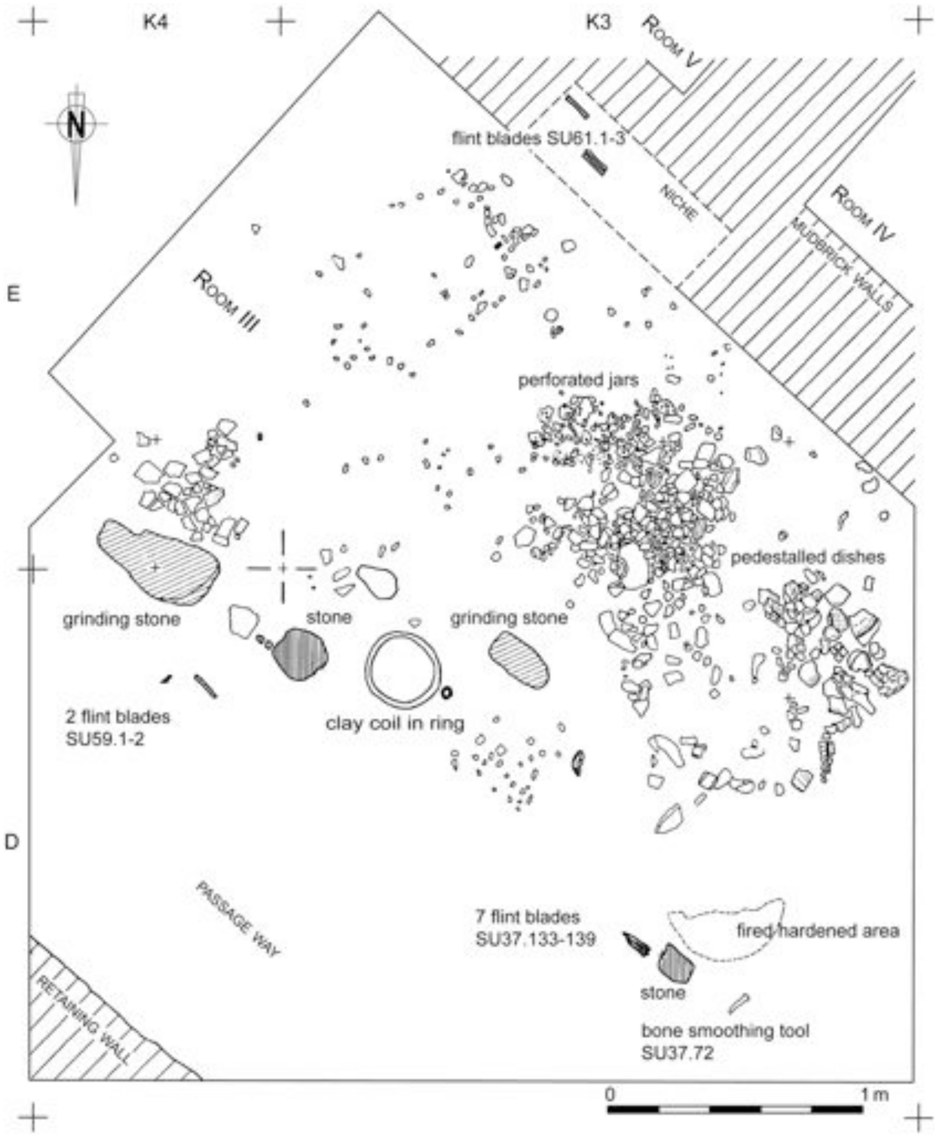

Fig. 2. Location of the fragments of unfired vessels and shavings of clay, together with the potter's tools at Nausharo Period II workshop (level 4) (drawing: S. Méry and S. Pennec).

The end of the excavated area, to the west, was occupied by many fragments of broken unfired clay vessels. The main heap, which covered about 2 m^2 in room III, included the remains of some 25 vessels, in particular 7 pedestalled dishes with maximum diameter and height of 30 cm (Fig. 3a and b). Two of these, found semi-complete, had broken *in situ*. Perforated jars were located close to the pedestalled dishes, but were much more fragmented. For both types of vessels, close examination showed that the operations of shaping and finishing of the form were completed (in the case of the pedestalled dishes, the joining of the three or four parts of the vessel, shaped on the wheel separately, had been finished) but the painting of decorations had not yet been carried out, except in one case.

The area containing the tools was interpreted to be a specialised area for shaping, finishing and decorating vessels (Méry, 1994: 473)]. Was the heap of unfired vessels a reserve of 'raw material' to be recycled, a stock of waste from manufacture or drying? Or was this zone for drying unfired vessels—and if so, given their number, their cluttered state and their low level of dispersion on the floor, could they have been set on carriers?

As the state of preservation was excellent for such a fragile raw material and liable to deterioration, the remains of the workshop must have been rapidly sealed. In the western end of the excavated area (Room III, SU37), some unfired potsherds, broken *in situ*, were found fired (scorched) and hardened. It indicates the possibility of an accidental fire. The layer covering the workshop was rich in waste from pottery production, e.g. bricks of potter's kilns and over-fired potsherds.

At a later phase (Level 3), but still dated to period II, a building consisting of two rooms (Rooms I and II, not illustrated) was constructed on the location of the earlier potter's workshop: abundant and various types of waste related to pottery manufacture filling one of the rooms, attested to the permanence of this type of specialised activity in this part of the site (Méry, 1994: 474).

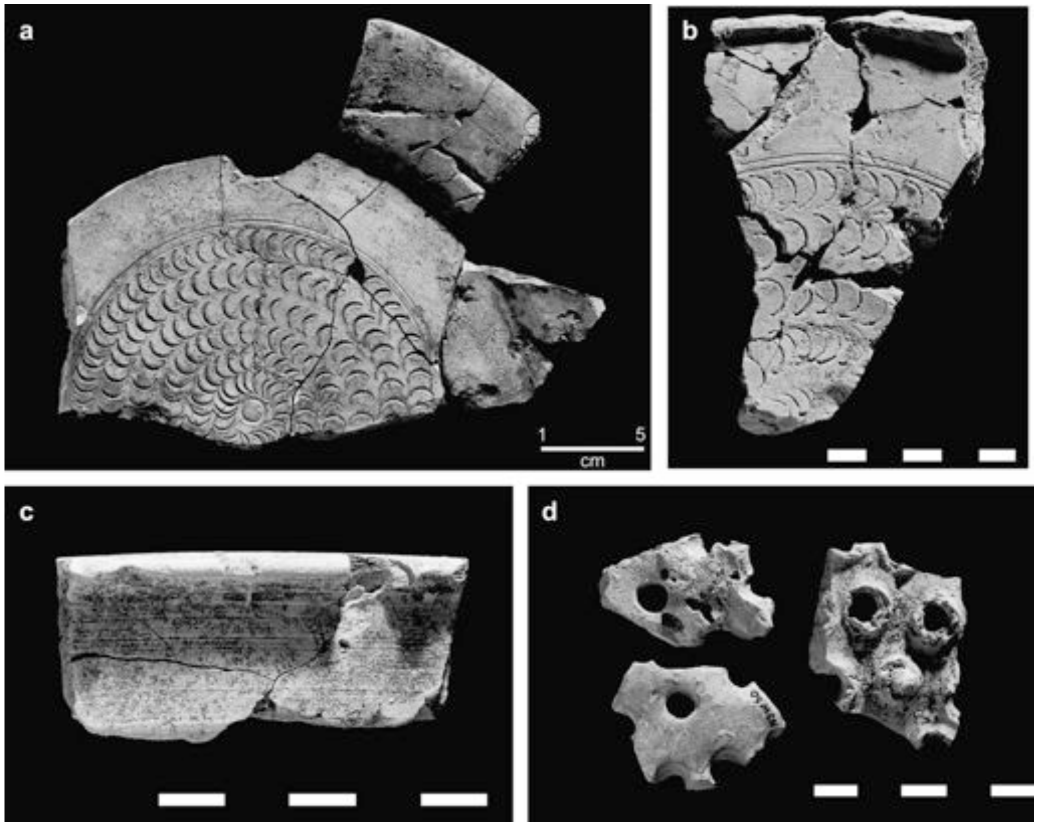

Fig. 3. (a) and (b) Examples of pedestalled dishes, with imprints of split reeds (Room III, SU37). The vessels were found unpainted and unfired (photo S. Méry). (c) and (d) fragments of two other types of vessels: a bilateral projecting rim bowls (c) and perforated jars (d) (photos: S. Oboukhoff).

3. The artefacts and their distribution

3.1. The tools

As has already been stressed, most of the tools and objects in the workshop were found in the central part of the excavated area. In the north-west area, an assemblage of six6 complete flint blades (SU37 nos. 133, 134, 136—-139; Figs. 2 and 4), set on edge, were found with a proximal fragment of a blade (n. 135) near a semi-circular fired hardened area measuring 45 cm in diameter. These tools were *in situ*, intentionally grouped in a bundle which could be interpreted as a reserve of tools.

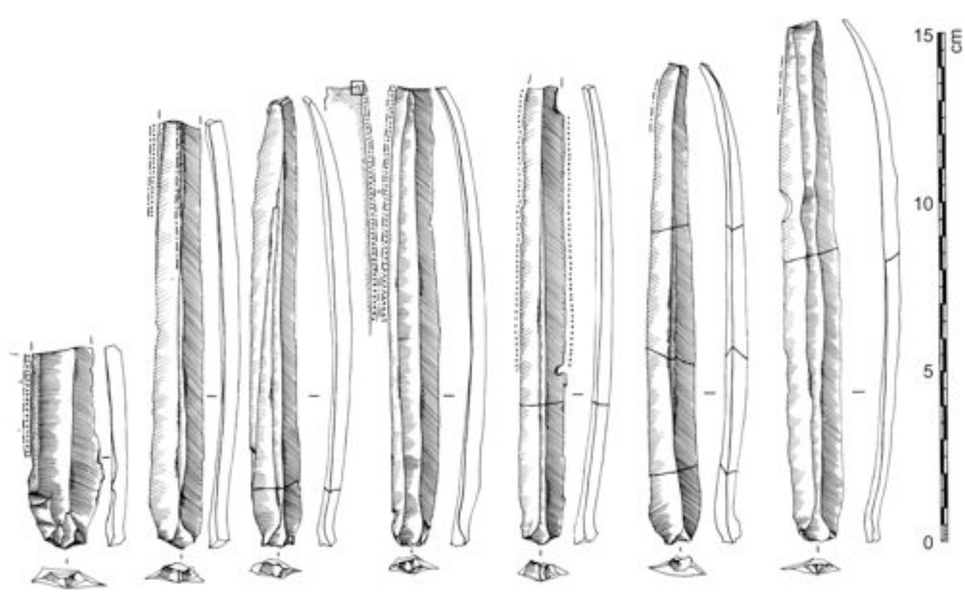

Fig. 4. Six complete or almost complete blades and one proximal fragment (Room III, SU37, from left: 135, 134, 136, 138, 137, 139, 133). Dashes indicate use-wear on dorsal ridges and edges, points show gloss areas, squares correspond to microphotos (drawing: M. Reduron).

Another whole flint blade and a distal fragment of the same type of blade (SU59 nos. 1 and 2, Fig. 2), were found not far from a large grinding stone, a roll of clay 40 cm in diameter and another heap of broken, unfired sherds, including the fragments of a pedestalled dish.

Two other tools with traces or gloss from use were found in the central part of the excavated area: a baked clay piece in the shape of a large spatula interpreted as a 'rib' tool, for shaping, levelling and smoothing pieces (SU37 n. 157, not shown on the original map) and a bone smoothing or polishing tool made from a rib or a shoulder animal bone (SU37 n. 72, Fig. 2). Experiments are in progress to test this hypothesis.

Three other unbroken flint blades were found placed in a niche in the south mud brick wall (SU61 nos. 1–3, Figs. 2 and 5). The first two were grouped together.

All the flint blades are of non-local flint (see *infra*). A small flake and two pieces of knapping debris were found that were made from local flint, but these may be intrusive.

3.2. Raw material and manufacturing waste

Among the most exceptional finds from the workshop (but not drawn on the original map) is a fragmentary clay ball with characteristic morphology and traces (Fig. 6a and b; Méry, 1994: 476) suggesting it had been centred on a potter's wheel, and represented the start of the pressing of the top middle of the clay cone, in order to open up a hole (Barbaformosa, 1999: 78, fig. 1; Birks, 1994: 23). The shape of the ball is a truncated cone, with a flat base. The surface of the base has a 'dotted' irregular texture, and it was pressed when the clay was soft but not moistened. The sides of the cone have a different kind of texture and macro-traces consisting of fine parallel striations, visible on a regular, smooth, surface, which are attributes characteristic of moistened clay.

Fig. 5. Two of the three flint blades recovered in the niche of Room III (SU61, from left: nos. 1, 2) (photo: S. Méry).

This indicates to one of us (S.M.) possible throwing of some pots, or of the base of some pots (in the latter case, the rest of the pot could have been coiled on the wheel). Experiments are in progress to test this hypothesis and thus contribute to the understanding of manufacturing techniques used at Nausharo in the first phase of the Indus period.

Many waste pieces from the working of clay have been identified, with more than 200 unfired clay shavings and 100 or so in fired clay, intentionally collected after their firing. However, the fired shavings remain unexplained, as they do not show any visible traces of wear, and thus do not seem to have been used as tools.

These waste pieces from manufacture are of two different types and their macroscopic analysis led us to differentiate two techniques (or phases in the operating sequence):

- The first type includes short thick shavings of irregular thickness that correspond to waste from working without a mechanised rotational movement. The rough forms were produced when the clay was in a very plastic state, as indicated by the deformation of the material (Fig. 7a and b). This work can be associated with scraping.
- The second type includes long shavings (up to 4 cm), quite thin and with a regular thickness (2 mm or less). They are finely wrinkled on one side and show on the other side the trace of their removal (longitudinal, parallel, very fine grooves) (Fig. 7c and d). They correspond to waste from removal of clay on a rapidly moving rotational support, of vessels of which the paste was plastic but nevertheless firmer than in the preceding case. This work of thinning the walls of clay pots, which can be associated with trimming,[1] necessitates correct centring of the pot on the wheel and regular rotation.

Five objects in unfired clay shaped in flat rings have also been discovered in the workshop (SU37 and 59), and one of them carries an incised potter's mark (Fig. 8), which excludes the possibility that these objects were simple coils intended to make up the elements of a pot. Could they be mandrels, e.g. elements used by the potter as supports or wedges during the trimming?

[1] This trimming technique is still widespread in many countries, used for forms shaped with the wheel using coils, turned or moulded. It is generally carried out on firm paste with the consistency of leather, but may also be practised on a paste which is more malleable (Biagi and Pessina, 1993: 57).

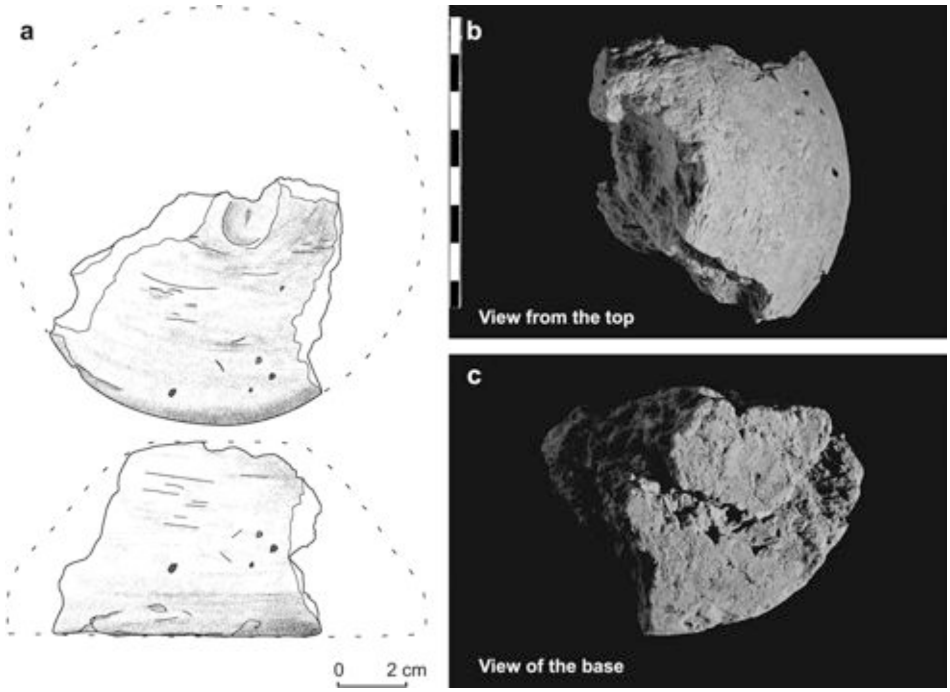

Fig. 6. The centred? and pressed clay ball from Room III (SU37). (a) Drawing: R. Douaud; (b) and (c) photos: S. Oboukhoff.

Finally a small piece of red ochre was found near the largest grinding stone in the workshop, which was most likely intended for the manufacture of paints and slips. A slip is clay in colloidal suspension used to cover all the pot or most of it. Many pots of Period II at Nausharo were slipped in red, and then were painted in black, but for one piece, the unfired potsherds found in the workshop were neither slipped nor painted.

3.3. The unfired pots

Located in the south-west part of Room III, the principal heaps of unfired potsherds (SU37) included the debris of some 20 pots with a thickness of 15–20 cm. Pots of different shapes and potential uses were found together in the Nausharo workshop, proof that it was not specialised in the specific production of one functional type or another.

Three principal models of pots are present: the pedestalled dishes (Fig. 3a and b), the perforated jars, and the bowls with interior or bilateral projecting rim (Fig. 3c and d), with the last two models having been found in a much more fragmented state than the pedestalled dishes. These three functional categories are among the most common in the assemblage of this period at Nausharo (Quivron, 1994: fig. 54.4n, 54.5t, 54.6r; Pelegrin, 1994), as they are on the sites contemporary with the Indus civilisation, especially Mohenjo-Daro and Harappa (Dales and Kenoyer, 1986: fig. 169–177, 215–217, 107–109; Mackay, 1938: 190–191, 203, 207–208; Marshall, 1931: 294, 306–307, 313).

Among the hundreds of unfired potsherds, a single fragment of pedestalled dish retained traces of red pigment and a large piece of red ochre was discovered not far from there, near a grinding stone. At Nausharo, in the levels of Period II, the pedestalled dishes of this type are always found painted in red and black. The orientation and the regularity of the brush traces also indicate that the decoration was carried out when the pot was being turned on a rotating support.

This observation may indicate that the pots were set aside to dry in this area of the workshop before being decorated.

3.4. Vessels used for the firing of pottery

Evidence of baked clay receptacles used for the manufacture of pottery were found in the workshop of Level 4 but even more in the waste from potters' kilns situated in the levels covering the workshop in the east (Level 3, dated later in Period II). These are fragments of moulds for jar bases (Méry, 1994: fig. 41.5) but also receptacles and lids carrying the trace of a seam and retaining the marks of an intentional opening.[2] Some rims retain the trace of two successive seams, representing different states of firing. This implied that they were opened after a first firing, and reused for a second time. They were thus interpreted as saggars (or firing-boxes) and a complete piece was later found in a level of Period III (Méry, 1994: fig. 41.6).[3]

At Nausharo, we do not know precisely what was contained in these 22–34 cm wide receptacles, used in firing, but their

[2] This material was studied by Ph. Gouin (CNRS-UMR 7041, Nanterre-France) and one of us (S.M.).

[3] Saggars are terra cotta containers traditionally employed in ceramic crafts (especially glazed pieces as the coating vitrifies when fired) for the firing of objects which are fragile or covered with a glaze. Firing in a saggar, still used in many countries, provides efficient protection for the objects to be protected from flames, smoke, ashes and any other elements that could damage them.

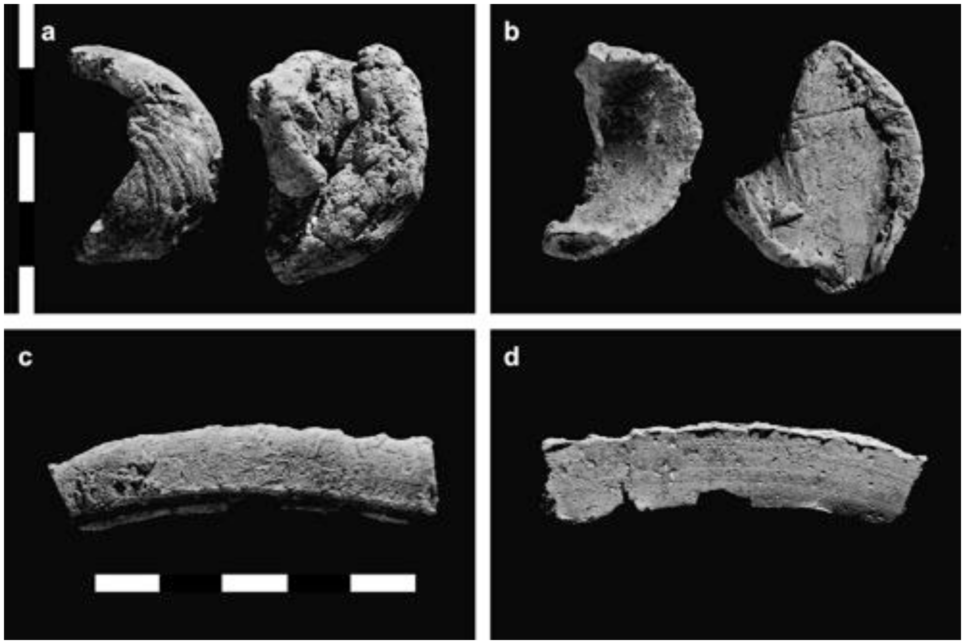

Fig. 7. The two types of clay waste found in Room III (SU37 and 59) (photos: S. Oboukhoff). The short, thick and irregular shavings correspond to waste from scraping, without rotational movement (a, external surface; b, internal surface). The long, regular and thinner shavings (c, external surface; d, internal surface) correspond to waste from trimming, on a rapidly moving rotational support, of vessels of which the paste was plastic but nevertheless firmer than in the preceding case.

size was large enough to accommodate small pots or clay objects, such as the painted figurines and pots of which we have found many examples on the site in the levels of Periods II and III (Quivron, 2000: fig. 3A,C). In the workshop of Level 4, Period II, a fragment of an unfired animal figurine was found, indicating the possible production of domestic pottery and figurines in the same specialised area.

It is the first time that saggars have been identified on a site of the Indus civilisation in the context of 'ordinary', domestic pottery production. The only other known example of this technique in the Indus basin during the second half of the IIIrd Millennium concerns in fact another ceramic craft, that of stoneware bangles of the Indus, a specific and highly elaborated production that was tightly controlled and confined to the largest urban sites of the Indus basin, such as Mohenjo-Daro and Harappa (Blackman and Vidale, 1992; Halim and Vidale, 1984; Vidale, 1989).

4. Characterisation of archaeological unfired and fired pottery

The studies carried out on unfired and fired pots from the potter's workshop of Period II led to the development of a programme of characterisation of the materials.[4]

Pedestalled dishes, perforated jars and large bowls were found together in the Nausharo workshop and the first goal of the analyses of the materials was to verify whether these pots were made from the same local basic clay. To determine this, some 37 samples of unfired pots were analysed using a petrographic study in thin section, mineralogical analysis by X-ray diffraction, and chemical analysis by X ray fluorescence (Bouquillon and Méry, 1993; Bouquillon et al., 1996).

We were able to conclude that a single type of clay was used in the workshop, a sandy marl, finely grained, with little organic matter.[5] The variations observed in thin sections of the granulometry and the relative abundance of temper are very probably related to the natural variability of the composition of the sedimentary deposit and a lack of standardisation (although relative) in the manner of preparation of the paste.

Comparisons made with 38 samples of domestic pottery from levels contemporary to the workshop indicated that the majority of them had exactly the same composition as the unfired pots. This specific composition is also the most frequent in the pottery analysed at Nausharo for the periods immediately before the first phase of the Indus civilisation (i.e. Period IC *ca*. 2700–2600 BC, and Period ID *ca*. 2600–2500 BC), but also from its second phase (i.e. Period III *ca*. 2400–2300 BC) (Bouquillon et al., 1996: 159).

[4] This programme was carried out by one of us (S.M.) in collaboration with A. Bouquillon (C2RMF, Paris), M.J. Blackman (NLAR, Smithsonian Center for Materials Research and Education), G. Schneider (AA, Freie Universität, Berlin). We benefited from the results of work on the formal pottery typology by G. Quivron.

[5] The sandy component, less than 400–500 μm in the unfired potsherds that were analysed, was composed principally of quartz and carbonates. Other minerals and fragments of rocks, such as feldspars, micas and schist fragments were identified in smaller number. With one exception, the clay series identified in the samples is the same: the illites and chlorites dominate (50%), the smectites and interstratified minerals are well represented (40%), kaolinite is low (10%). Chemically, the paste is characterised by the following average components: 26% CaO, 47% SiO_2 and 13% Al_2O_3. The percentage of elements with high colouration power (Mg, Fe) and their mineralogy do not have a noticeable influence on the colour of this paste when fired: the rose-orange paste changes to beige-yellow then to greenish at a high degree of firing. It has a tendency to lighten with increase in temperature.

Fig. 8. Unfired flat ring with potter's mark, maybe a mandrel (Room III, SU37) (photo: C2RMF-Paris).

There was thus no notable change in the origin of the clay locally used and/or its use during the first half of the IIIrd Millennium, according to the samples we analysed from the site (Bouquillon et al., 1996: table 1, fig. 6).

However, parallel to these local productions, we find from Period ID at Nausharo a small quantity of pottery with micaceous red paste, which was not local but came from the workshops of the Indus River.

This consisted mostly of black-slipped storage jars (Mery and Blackman, 2000: table 1; Marcon and Lechevallier, 2000: fig. 2), that constitute less than 5% of the pottery assemblage at Nausharo (G. Quivron, personal communication). The chemical analysis of the paste by instrumental neutron activation analysis (INAA) shows they are distinct from the local material (analysis done by Dr M.J. Blackman). They actually reflect the sedimentary components produced by the Himalayan foothills (with orthogneiss, micaschist, and granite intrusions) and correspond to the petrographic and geochemical features of the sediments of the Indus Basin. On the contrary, the nature of the clays and the sands locally available at Nausharo is distinct, as tertiary limestone is dominant in the local environment.

Chemically, the micaceous wares we analysed by INAA fall into the ‘‘Mohenjo-Daro/Indus River’’ composition group of pottery and none into the ‘‘Harappa/Ravi River’’ composition group (Mery and Blackman, 2005: fig. 2), thus indicating a pattern of exchange orientated towards the southern part of the Indus basin and not its northern part.

5. The flint blades of the pottery workshop

The workshop blade find consisted of 10 almost complete blades of *plein débitage* (i.e. prismatic blades devoid of cortex and transversal scars), and of one used proximal fragment with a clear gloss on the left edge (Fig. 4).

The flint blades display the characteristics of a distinctive Indus blade production, which can be defined by their technique (detached by pressure after a facetted or dihedral platform preparation), their dimensions (length 12–18 cm, width 12–20 mm), and their similar raw material (a frequently zoned or dendritic light brown or light grey flint). Indeed, their raw material is macroscopically identical to that of the Rohri Hills (a flint-rich residual limestone formation from central Pakistan, at the edge of the Indus, about 220 km south-east of Nausharo), that we could survey and sample in 1989.[6] The site of Kot-Diji, at the south-western end of the Rohri Hills, is certainly one of the original production workshops of these blades, as its limited excavation has given dozens of perfectly corresponding facetted platform cores (examined at the Exploration Branch of Karachi), as well as flat platform cores identical to those found within the many workshops situated on the plateaus of the Rohri hills (Biagi and Pessina, 1994; Briois et al., 2005).

These blades, intentionally fragmented, have been observed in several Indus Civilisation collections studied so far by two of us (M.-L.I, M.L.) where they can form a large majority (Kalibangan, Banawali, Dholavira) or a minor component (Lothal, Amri, Saraikhola) of the respective blade/bladelet industry (Inizan and Lechevallier, 1997). At Nausharo, these large pressure blades seem scarce compared to the abundant smaller blades locally produced in other varieties of flint (study in preparation).

Found in the pottery workshop, the blade finds were something of an exception when discovered in 1987, because complete blades are rare in the Nausharo assemblages, as well as in the other Indus assemblages studied (Fig. 1) (Inizan and Lechevallier, 1997; Lal and Thapar, 1967). Moreover, the presence of a macroscopically-visible 1162 blades (n. 139, Fig. 12c and d) gloss on some of them raised the question of their function: were these blades connected with pottery manufacture, or did they serve another purpose? This was a critical question, because knapped flint tools had never as yet been associated with potter's craft areas in archaeology.

5.1. A close-up of Indus knapped stone industries

The frequency of knapped material is relatively small at Nausharo, in keeping with the decrease in quantities observed after the Neolithic at Merhgarh and other Indus sites. On the whole, tools are typologically undiagnostic, since they are blades intentionally fragmented into four or five segments. This deliberate segmentation points to the use of standardised elements in composite tools, in contrast to the blades of the pottery workshop. The presence of hundreds of fragments has allowed the modal type of Indus blades to be inferred: mean blade lengths are 13–14 cm at Banawali and Dholavira, and 15.7 cm at Kalibangan (Inizan and Lechevallier, 1997; Lal and Thapar, 1967). The blade segments display various use-wear traces, such as rounding, step microfractures, gloss, etc. Any insight into their function can only be gained through microwear analysis. Blade production is highly skilled and is not conducted on-site, as inferred from the absence of characteristic waste products, despite the very occasional presence of cores.

[6] Thanks to Prof. Kazi, from the Khairpur University, India.

The presence of a polish on the dorsal ridges of blades and some of the cores is peculiar to Indus industries, but as yet no explanation has been actively sought. Such blades are termed "burnishers" at Mohenjo-Daro (Mackay, 1938: 396; Marshall, 1931: 458), and so are some of the cores at Harappa (Vats, 1940: 349). At Nausharo, a gloss can be observed on 24 blade products (Nausharo Periods II and III, corresponding to the first and the second phase of the Indus Civilisation, respectively), and the only blade core found in 'Rohri-like' flint shows a gloss that has completely rounded its ridges and the edge of the pressure platform.

5.2. Knapping technique: a new technique?

Ten almost complete blades, several of which were broken *in situ*, plus a proximal fragment and a distal fragment of two other blades, were found in association with the different objects or structures in the pottery workshop. The almost complete blades are quite long. Six of them were measured (nos. 133, 134, 136–139; Fig. 4). They range in size between 15.4 and 12.6 cm, with allowances made for the fact that the tip of the longest blade (n. 134) was apparently broken during detachment, shortening the blade by 1 or 2 cm, as for blade n. 137. Their mean cross-sections, as well as that of the proximal fragment, are clearly standardised, with widths of between 15 and 18 mm, and thicknesses between 4 and 5.5 mm. In profile, the blades appear just very slightly curved, and more so towards the distal end. They are also extremely regular, as denoted by their parallel edges and dorsal ridges. The association of those three characteristics (thin cross-section, barely curved profile, parallel edges and dorsal ridges) is diagnostic of pressure debitage, a technique already identified at Merhgarh throughout the Neolithic (Inizan and Lechevallier, 1985; Pelegrin, 1994).

In Siberia, pressure debitage of bladelets has been recognised in the Upper Palaeolithic (Inizan and Pelegrin, 2002). In central Asia, pressure debitage of blades has been recognised as early as the Mesolithic, about the X–XIth Millennium (Brunet, 2002), whereas in the Middle East, from the Zagros and Anatolia to the Indus valley, the systematic use of this technique seems to go back only to the Neolithic (Binder and Balkan-Ali, 2001; Inizan and Lechevallier, 1985, 1990; Inizan et al., 1992).

More precisely, it is identified throughout the sequence of the nearby site of Merhgarh, from the Neolithic to the Bronze Age. Beginning with the earliest occupation, there are bullet cores with their corresponding narrow bladelets, which were probably detached using a short crutch in a sitting position (Pelegrin, 1988). Some wider blades are also documented; they are equally regular and were certainly detached using a long crutch in a standing position (Inizan and Lechevallier, 1997: 78–79) (Fig. 9). The flint comes from local or neighbouring sources. The preparation of the core prior to the detachment of the blades mainly involves the abrasion and rubbing down of the overhang, following a movement directed towards the debitage surface. As a result, butts are generally plain and very small. Experimental knapping has shown that identical results are achieved using tools tipped with an ogival antler point, the latter being applied very close to the abraded edge of the pressure platform. Actually, the same type of debitage, producing blades and bladelets with plain and narrow butts, continues until the Merhgarh Period VII (Early Bronze Age). However, the beginning of the Merhgarh Period III (Chalcolithic) is characterised by a remarkable development: the first appearance of blades and bladelets with thick facetted or plain butts, on which a very small ring crack (1 or 2 mm across), set well back from the edge of the pressure platform, can sometimes be observed (Fig. 10). It should be emphasised

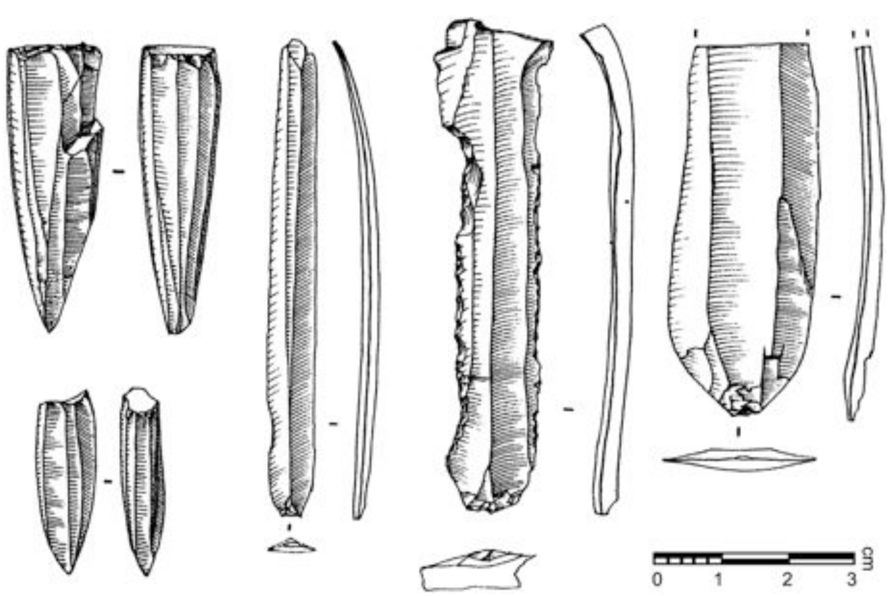

Fig. 9. Two bullet-cores, a bladelet and two flint blades from the Neolithic of Mehrgarh (Period I), as typical examples of pressure production using an antler point, identified by butts that are thin and without cracks (drawing: M. Reduron and G. Monthel).

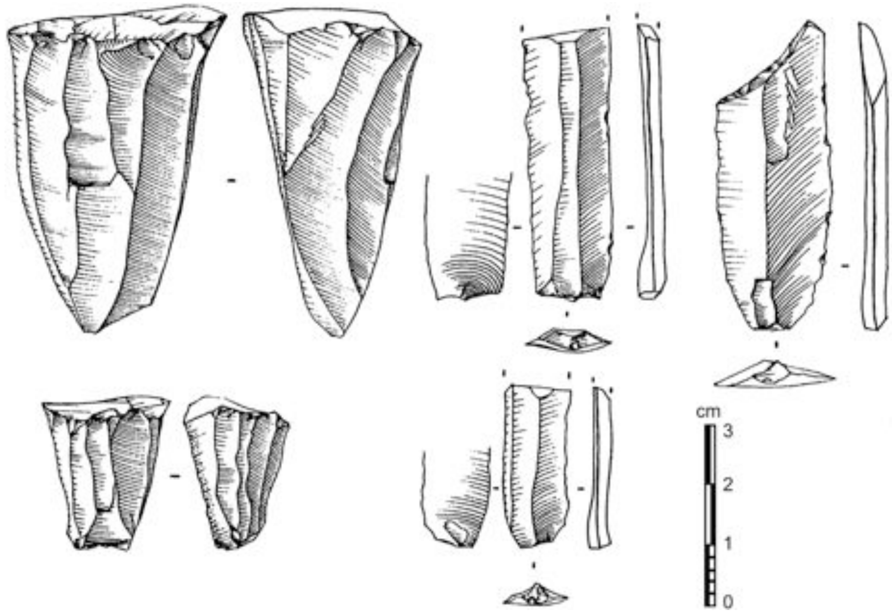

Fig. 10. Two cores, a bladelet and two flint blades from the Chalcolithic of Mehrgarh (Period III), as examples of pressure production using a copper point, which leaves a clear, tiny ring-crack on the butts (drawing: M. Reduron and G. Monthel).

that the thick facetted butts are the outcome of a different mode of preparation, in which the overhang is not removed and small flakes are detached towards the pressure platform rather than towards the debitage surface. Thus, the characteristics of the butts of such pressure-flaked products foreshadow those of the Nausharo pottery workshop blades addressed here (Marcon and Lechevallier, 2000).

The appearance of a new mode of preparation, identified by two of us (M.-L.I, M.L.) as early as 1985 during the study of the material from Merhgarh (Lechevallier, 2003), has suggested the possibility that it may be linked to a technical innovation, consisting of the use of a copper rather than an antler point for pressure debitage. This suggestion is based upon a meticulous observation of the butts. The blades all have distinctly forward-sloping butts, that is, butts with very high edge angles: for instance, in the present case, an angle of 100° for blade n. 134, and even of 110° for blade n. 137 (Fig. 11). Another argument pertains to the occasionally quite sharply raised morphology of the butts. When these are convex-facetted, or indeed when the butt forms a sharp dihedron, the resulting projections are liable to abrade an antler point, and to damage it irretrievably in a very short time. On the contrary, when a copper point becomes distorted, it can easily be put right by gentle hammering between two cobbles. Evidence of the use of a copper pressure point was also observed on blades found at Sheri Khan Tarakai, in Baluchistan, Pakistan (Inizan et al., 1994; Inizan and Pelegrin, 2002; Khan et al., 1990).

Pressure blade production tests conducted by one of us (J.P.) with a copper point, according to various modes of preparation, have corroborated these arguments and helped to understand the significance of the innovation. Because it has a greater bite and resistance than antler, the use of copper allows the detachment of blades to be initiated from a projection or an arris. In addition, the force required is less than when a plain surface of similar size is involved, with the result that wider blades can be obtained. Such blades measure as much as 21 or even 22 mm in width, which is precisely the size of the sturdiest archaeological blades. That these products were deliberately sought is borne out by the morphology of archaeological cores (from Kot-Diji, for example) abandoned after a last series of wide blades was detached from their widest face (Pelegrin, 1994: fig. 50.3b). In addition, by repeatedly faceting the pressure platform it is possible to reduce the core without detaching a large platform opening flake, whose purpose would be to obtain once and for all a plain pressure platform. This has definite advantages, since the creation of such a platform, either at the beginning of the shaping out phase or later during the same phase, is an accident-prone process, liable to shorten the core.

Repeated experiments show that, in opposition to an antler pressure point, which is too soft to create a complete circular crack on a flint platform and must be quite round to stand the pressure, a metallic point can stand to be point-shaped and was shown to be hard enough to create a very reduced fracture initiation area on the platform. On a flat orthogonal platform, this reduced fracture initiation area provokes a small (2–3 mm in diameter) ring crack; on a facetted or dihedral platform, such as these blades, it gives an irregular posterior line to the butt, which is clearly seen on these Indus pressure blades.

In order to verify the strong presumption that a copper point was used for detaching the Nausharo blades, two proximal fragments of complete but broken blades (nos. 136 and 139), small enough to fit into the analysis chamber were given to M. Pernot at the LRMF-Paris for scanning electron microscope and X-ray analysis (Anderson et al., 1989). Working on the principle that heavy elements—most metals belong to this category—absorb electrons, a first inspection under the SEM permits such elements to be located, the areas appearing

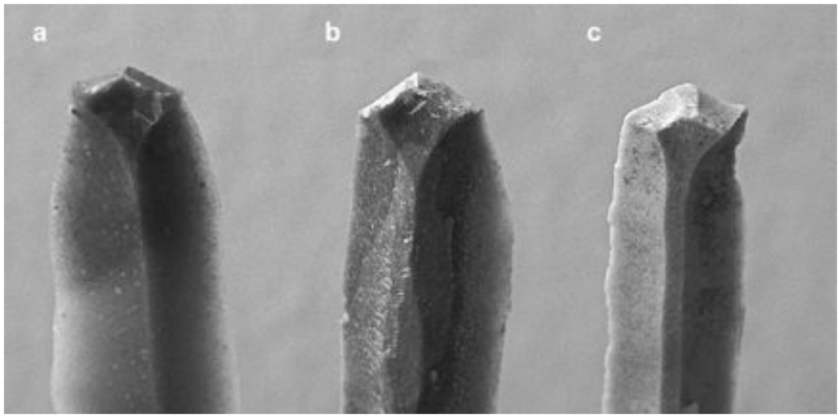

Fig. 11. The butts of flint blades nos. 134 (b) and 137 (a), and of one experimental blade (c). Experimental knapping had already demonstrated that an antler tip will slip if the edge angle of the butt is higher than 95°, whereas the use of a copper point, which moulds to the grain of the flint, allows the detachment of blades with very high angles (photos: J. Pelegrin).

as dark spots on the electron micrograph (Fig. 12). The second step consists of carrying out an X-ray semi-quantitative analysis of these areas. Thus, on the butt of one of the analysed blades (n. 139), close to the assumed pressure point, some very small nodules (ca. 10 μm) were detected, containing high proportions of the elements copper, zinc and lead (Cu, 13–50%; Zn, 9–36%; Pb, 10–77%). The preliminary examination under the SEM did not reveal such small metallic nodules elsewhere than on the butt of n. 139, which eliminates a soil contamination. The percentages of the various metal elements are not indicative of a hypothetical alloy for the point of the knapping tool, since they represent, at least in part, the corroded and not the original state of the metal—a circumstance that possibly accounts for the absence of such traces on the other blade. The fact remains that the non-accidental presence of metal elements, especially copper, confirms the suggestion, based upon observation and experimentation, that a metal point was used for pressure detachment.

Other occurrences of the use of a metallic, copper-based, point for pressure blade production have been recognised in

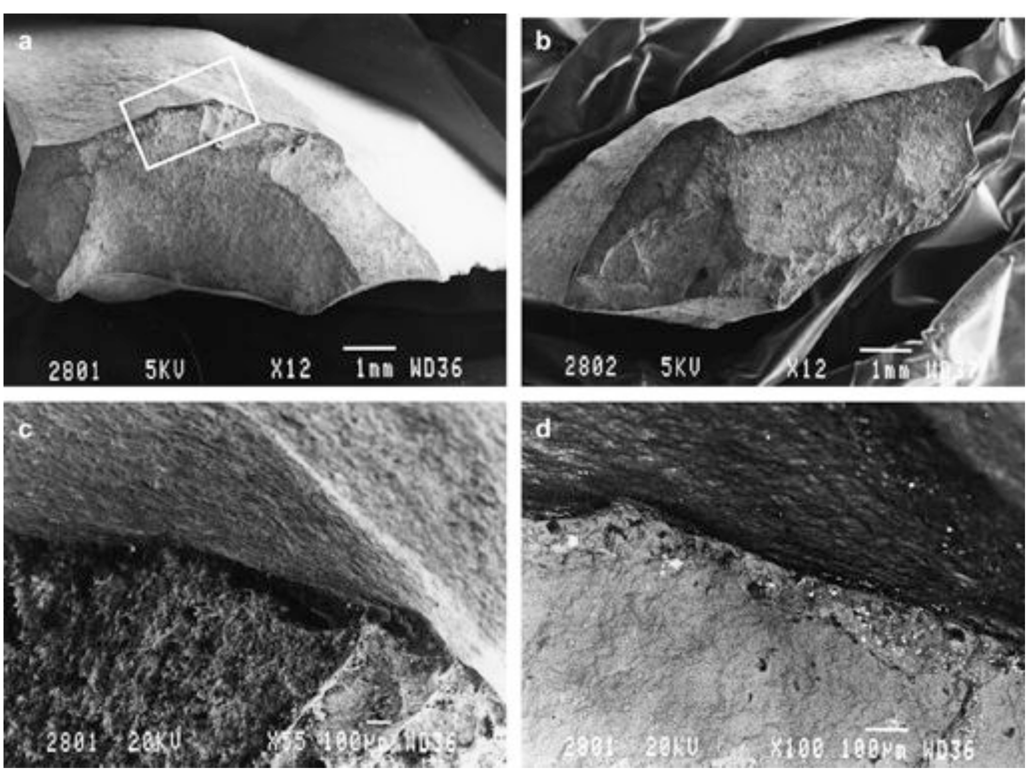

Fig. 12. Location of heavy elements on the butt of blade n. 139 through SEM examination. (a) The dark area (in the rectangle) corresponds to metallic nodules (enlargement 12×). Blade n. 136 (b) shows no trace of metallic nodules. (c) Detail of the dark area (55×): the dark spots are metallic nodules. (d) Detail by electro diffused electrons giving an inverse picture (100×): the 'white' spots are metallic nodules (photos: M. Pernot).

the evolved Recent and Late Neolithic of Greece and of southern Spain (Morgado et al., in press; Perlès, 2004), the latter with positive preliminary metallic analysis. In the Chalcolithic, large lever-pressure blades detached with a copper point are identified in several contexts (Pelegrin, 2006), with copper traces physically identified on blades produced in the South-East of France (Renault, personal communication).

Indeed, the recognition of the use of a metallic point for knapping activities (pressure blade production, but also pressure retouch and indirect percussion) can provide valuable information on the question of the earliest diffusion or production of copper in the related archaeological context (Ambert and Vaquer, 2005).

6. Traces of use and function of the blades

6.1. Methodology and objectives

When flint tools are in frictional contact during use on a particular material, the distinctive combinations of attributes of the material (e.g. humidity, elasticity, resistance, abrasion, cohesion, mineral content, etc.) generate diagnostic microwear traces on the surface areas of the flint tools with which they are in contact. The orientation and distribution of the microwear traces indicate both the working position and motion of the tool, parts of the tool in direct frictional contact with the worked material, and which part is held in the hand or hafted in a handle or other device. The complexity of these variables makes actual experimental enactment of different hypothesised activities a necessity for interpreting the microwear traces found on archaeological tools. This program was conducted by one of us (P.A.).

Are the function and uses hypothesised for the Nausharo blades related to the potter's workshop, or were they abandoned there after another kind of use? Microwear analysis of seven of these blades (i.e. the group of blades found near the fired lens in the NW part of the excavated area, see Fig. 2, SU37), combined with a new series of experiments especially adapted to the context of pottery manufacture, were essential for demonstrating whether or not the blades were in fact directly related to activities carried out in the area in which they were found.

6.2. Description and interpretation of the traces

The seven flint blades of SU37 were studied for microwear traces. Three of these tools (nos. 135, 137 and 138) show visible gloss on their edges (Fig. 4) and two of them (nos. 135, 138) were studied in an earlier analysis using optical microscopy (Anderson et al., 1989). Although the other four (nos. 133, 134, 136, 139) show no visible traces, when they were examined using the optical (metallographic, reflected-light) microscope at 100 and 200×, classic "high-power microwear analysis" methodology (Juel-Jensen, 1994), all showed traces of use.

Blades in SU59 and SU61 were not studied for microwear traces.

Microwear analysis shows the blades were used in an area extending from their slightly curved distal tips, to their proximal end and that both dorsal ridges and blade edges exhibit traces of working contact with the worked material (Fig. 13a and b), in an action orientated perpendicular to the long axis of the blades. The traces have reached different degrees of intensity of development on different blades, but all traces form smooth, brilliant, corrugated-appearing areas and comet-like dark depressions, all of which appear to flow or stretch in a transversal direction from the edge or ridge. In Fig. 14A, the arrows show the direction of flow of the microwear polish and therefore of the motion of the worked material against the blade surface, and the triangles point to characteristic breaks in this microwear polish, a very rare feature. Indeed all the above observations are unusual, because when tools have strong traces of gloss, these are usually oriented parallel to the working edge and correspond to cutting or harvesting (Anderson, 1999).

Microscopic study shows that the blades appear to have all functioned in the same way, because the microwear polish has similar features, distribution and orientation. The weaker development but characteristic appearance of traces on the four blades lacking macroscopic gloss (nos. 133, 134, 136, 139, Fig. 4) appears to be due to the fact they were used for a shorter duration than the blades with visible gloss traces, but for the same kind of work.

6.3. Interpretation of the gloss in relation to material worked

The microwear traces on the objects, characteristic bright and flowing micro-polish and linear marks, were compared with similar traces produced on blades used in experiments which enacted work that could have been carried out by inhabitants of Nausharo. These use-polish characteristics as seen at 100× and 200× magnification (smooth, brilliant and flowing) are generally associated with cereal harvest or reed working in published studies, and are related to the high mineral content (silica) in their stems (Anderson, 1999; Anderson et al., 2004; Juel-Jensen, 1994). Other materials with high mineral content might include hide treated with ochre or another abrasive material (Anderson, in press), soft stone, and of course clay worked by blades during some stage of ceramic manufacture (Anderson et al., 1989; Gassin, 1993). Some insight was provided by observing a blade from Nausharo in the scanning electron microscope (SEM) (Fig. 14b), where the appearance suggests a flow of material deposited on the surface of the blade, duplicating the impression given in optical microscopy. However, EDAX analysis done on the surface of the blade, in both used and unused areas, was ambiguous as to whether residue material was actually present on the blade, because it detected only silicon (Si), which can be either from the flint itself, or from a possible deposit from the worked material (clay, plant silica, etc.). However, no deposit of any other composition than silicon was detected. Therefore, this study used the optical reflected-light microscope at magnifications of 100× and 200× to observe characteristic morphologies of

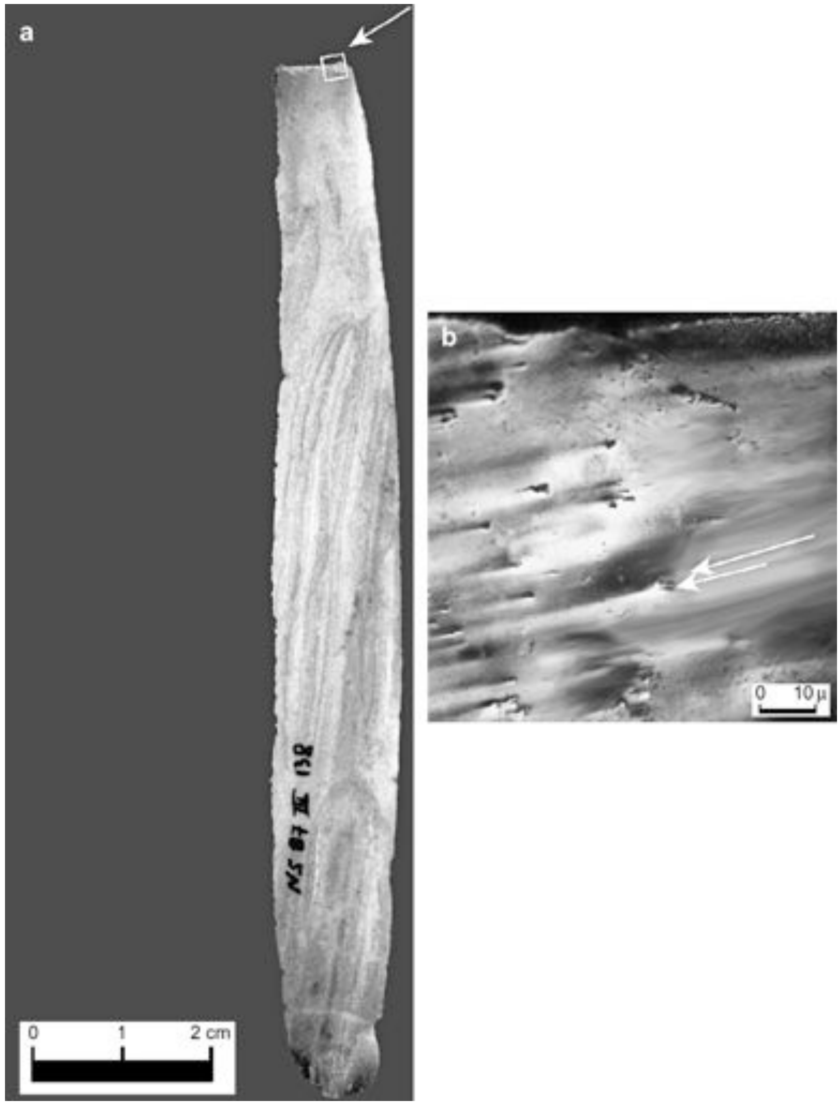

Fig. 13. Ventral face of blade n. 138 showing visible gloss in the right corner of the top (distal) edge, and down the right side (a), and microwear traces in this area (square), seen at 100× (b). Bright, smooth traces with comet-shaped dark depressions, are created by the abrasives in the ceramic paste. Arrows, orientation of striations and direction of motion of the tool (photos: P. Anderson).

microwear traces, and relied upon comparison with experimental data.

6.3.1. Comparison with experiments in harvesting silica-rich plants

The orientation of the traces excludes harvesting by cutting through groups of stems of cereals or grasses, or harvesting of reeds, because these produce traces oriented parallel to the cutting edge, and the traces on the Nausharo blades are found perpendicular to the long axis of the tool, on both dorsal arises and the lateral cutting edge and surface. However, one method of harvest of cereals could well match the traces on the Nausharo blades: "combing" heads from cereal stems in the field. Traces found on Neolithic tools from Syria and Switzerland (Anderson, in press; Anderson et al., 1992) have corresponded to experiments using this harvesting method, where several stems are grasped between a blade and the thumb, and the blade pulled upwards towards the harvester, harvesting only the grain by neatly detaching the seed heads (Fig. 15a), leaving the stems in the field. Our experiments demonstrated that this technique is effective only for hulled grain (that is einkorn, emmer or spelt wheat), all of which have a fragility of the stem just under the seed head, allowing for effective separation at this point on the stem (in French: *errussage*). Our experiments using this technique for the harvest of heads of einkorn wheat (*Triticum monococcum*) and emmer wheat (*Triticum dicoccum*) showed it was most effective in harvesting the seed heads when the cereals were ripe.

When viewed in detail, the attributes of the microwear traces produced on the blade by this use (Fig. 15b) are similar to the traces on the Nausharo tools in that harvesting by stripping of cereal heads produces traces on the used area that appear bright and flowing and smooth, and are oriented perpendicularly to the tool edge in accordance with the use-motion (Fig. 15a–c). However they also show important differences: the microwear surface of the use-area of the

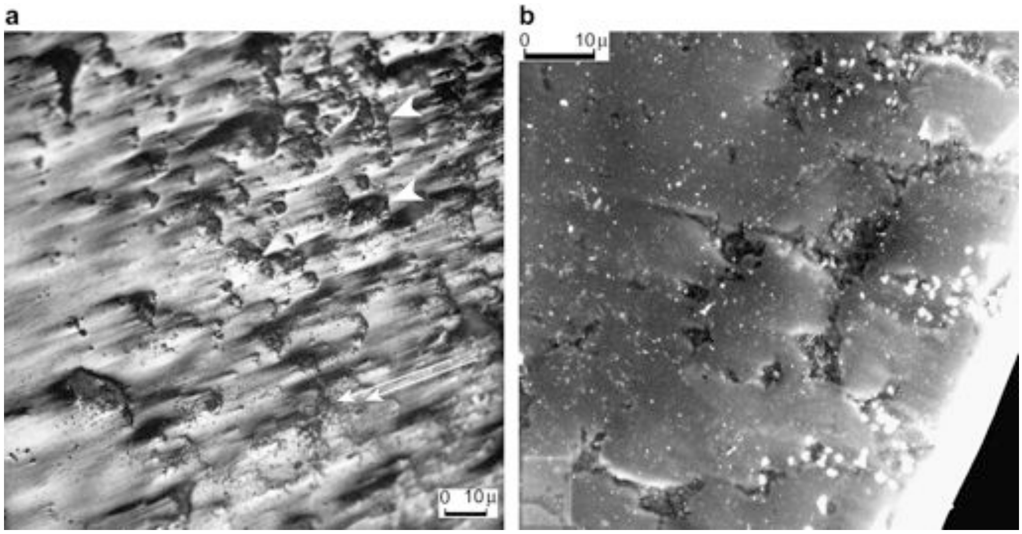

Fig. 14. Microwear traces on a distal ridge on blade n. 135 (100×). (a) Seen with optical microscope: comet-shaped striae (arrows) show the direction of use of the blade is the same as for the experimental blade (see Fig. 16c), as well as bright, smooth and undulating polish, with sharp lips on polished zones (triangles). (b) Seen using the scanning electron microscope (SEM); an impression of a deposit of smooth areas stretching over the surface is given (photo, image: P. Anderson).

experimental tools, seen under the microscope, are flatter-appearing than the surface of the used area on the Nausharo tools, possibly due to the pressure exerted on the blade edge with the thumb in order to strip off the seed heads. Unlike what is seen on the Nausharo blades, on the experimental tool there is characteristic edge damage created by the use-motion, in the form of concave edge damage removals, giving a scalloped profile to the working edge area (Fig. 15b). Significantly, this harvesting technique does not produce the characteristic large, comet-like grooves covering the micro-surface of the Nausharo tools, and the Nausharo tools do not show the edge-damage removals and other microscopic features of the polish surface on the experimental harvesting tools. It is therefore unlikely that this was the use of the Nausharo blades.

6.3.2. Comparison with experiments in working or processing of silica-rich plants

The hypothesis was then considered that the Nausharo blades may have been used inserted into the underside of threshing sledges, as the gloss and the presence of large

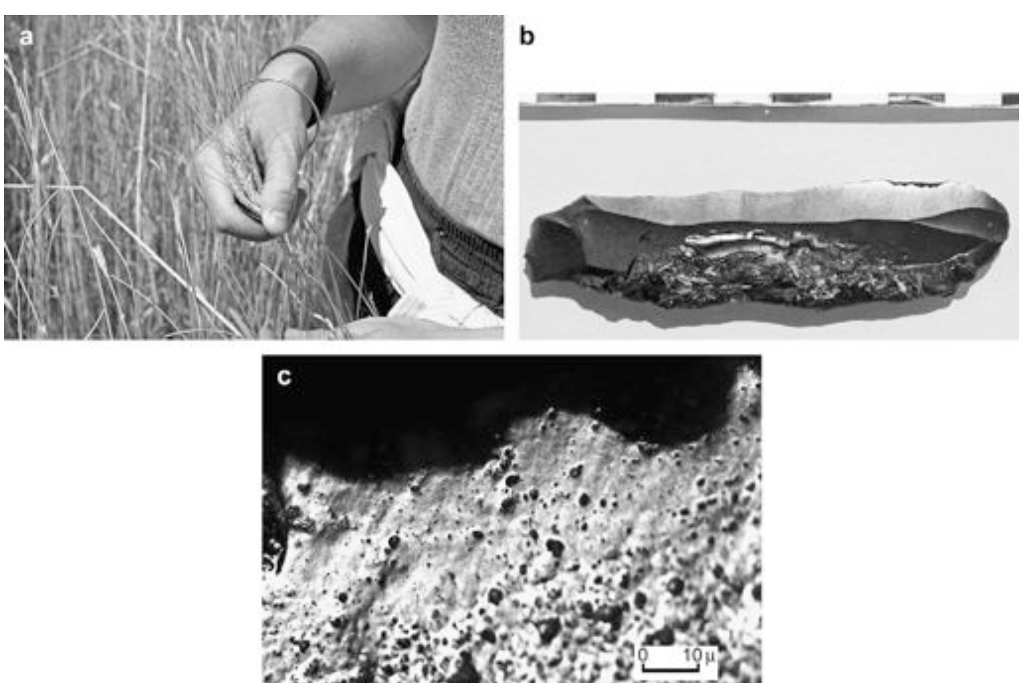

Fig. 15. (a) Experimental use of flint blade to strip off seed heads of einkorn wheat. (b) Macro-gloss on the blade after an hour and a half of use. (c) Microscopic features in the glossed area, 100× (photos, image: P. Anderson).

comet-like grooves show a certain likeness to this use. However, we excluded this hypothesis on the basis of the orientation of the microwear traces *perpendicular* to the working edge on the Nausharo blades, and that particular attributes of threshing sledge blade microwear traces—characteristic randomly oriented abrasion and rough, matte-appearing areas—are not present on the Nausharo blades (Anderson et al., 2004).

The context of discovery of the blades and the orientation and general appearance of the traces suggest another possible use: splitting of reeds. This hypothesis is reinforced by the observation that the bottoms of the interior of the ceramic containers found on the site (Fig. 3a and b) show imprints of crescent-shaped designs which appear to have been stamped into the clay using the curved end of split reeds. The reeds could have been split using the edges of the Nausharo blades, bringing them into frictional contact with the blade edge and the aris, perpendicular to the long axis of the blades. Like cereals, reeds are of the Gramineae family and contain silica (phytoliths) which could produce pronounced gloss on the contact area of the blades. Microwear traces from splitting reeds obtained in experiments are smooth and bright, with grooves (a slightly corrugated appearance) similar to those on the Nausharo blades (Anderson, 1999; Juel-Jensen, 1994: 31–33). Although these similarities exist, the traces on the Nausharo blades show important differences from reed-spitting tools, in particular concerning the impact of abrasives on the tool surface during use: in visual terms, the presence of wide grooves over virtually all of the polish surface, and the abrupt ''lip'' of the polish boundaries (shown by triangles, Fig. 14a), do not occur on tools used for splitting reeds. Therefore this is not the probable use of the Nausharo blades studied here.

6.3.3. Comparison with use on hide and soft stone

The microwear traces give the impression that the Nausharo tools were used to work a material having a consolidated, humid surface, with a plastic, elastic texture, and that this material contained abrasives. The hypothesis that the blades could have cut or scraped humid animal skins whose surface was covered with powdered ochre can be discounted due to the different appearance of the traces seen in experiments scraping hide with ochre (Juel-Jensen, 1994). Tools used for hide preparation lack the extensive grooves and the large extent of the coverage of the tool edge surface area with traces from use, seen on the Nausharo tools (Figs. 13b, 14a and b). Similarly, the apparent plasticity of the worked material, reflected in the distribution of the traces and their fluid appearance, tends to exclude the possibility the tools were used to shape objects or surfaces in soft stone, such as ochre steatite, etc. and the traces on the Nausharo tools lack microwear features produced by working of stone (Juel-Jensen, 1994: 40–42).

6.3.4. Comparison with use on clay

These various observations and the fact that these blades were actually found in a pottery workshop, suggest they may have had a use linked to ceramic production. The appearance and the location of the microwear traces indicate that the blades may have worked plastic (wettish) clay by pressing the dorsal ridges and edges against it (probably simultaneously), perhaps to shape a container or other object by removing strips of clay. Experiments on clay and laboratory analyses of the microwear traces thus produced have been carried out (Gassin, 1993, 1996; Juel-Jensen, 1994), scraping the tool across the surface of the clay containers being shaped. These experiments have led to the identification of flint tools having been used to scrape clay in Neolithic contexts, and in more limited cases, in later European contexts (Anderson, 1999; Gassin, 1996; Juel-Jensen, 1994). The three blades from Nausharo having weaker traces of use may have been used to scrape clay (Anderson et al., 1992: fig. 6). However, experiments working clay by hand did not produce anything resembling the strong, bright, ridged and corrugated-appearing traces, nor the comet-like dark depressions seen on the glossed Nausharo blades. These show microscopic linear traces that are remarkable in their symmetrical distribution (Fig. 14a), with highly regular grooves and waves, and such traces were not produced by scraping clay, for example in Gassin's and Juel-Jensen's experiments, therefore eliminating this hypothesis of use.

Although some variability in traces of working clay can occur due to differences in grain size, temper and humidity, the mechanical-appearing regularity of the ridge and grooves, and the flowing effect of the microwear traces on the Nausharo blades, suggested use of a mechanical device rather than the hand, for scraping of clay objects. We wondered whether the Nausharo blades could have been used as trimming tools, that is, while held in the hand and pressed against the clay while it is turned on a wheel or a lathe, and whether the intense friction reflected in the traces could have been brought about by the force and velocity of such a mechanical device. No experimental reference material concerning this use of tools existed yet in 1988, and in order to test this hypothesis, we asked a professional potter, C. Biquand, to use experimental blades made by one of the authors (J.P.) as spatulas for shaping clay into a recipient while turning on the potter's wheel, in place of the wooden spatulas she usually used for this. These blades then were analysed in the laboratory (Anderson et al., 1989). In the experiments, the clay was fairly humid and similar to the clay analysed from the Nausharo potter's workshop, although slightly finer and more supple in texture. The potter used three blades for periods varying between 20 min and 3 h, pressing 2–3 cm of arises and edges against the clay (Fig. 16a and b). This action successfully removed long shavings or strips of clay that were identical to those found in the Nausharo workshop (Figs. 7 and 14). After an hour of use, a bright, macroscopic sheen developed on the blades, and study of the microscopic attributes of this glossed area showed microwear features identical to those seen on the glossed Nausharo blades (Fig. 16c). Those tools used for less than an hour did not develop macroscopic gloss, but traces seen on a microscopic scale showed all of the same attributes as the microwear that developed on blades used for a longer period, except that the surface coverage of the traces was less.

Clearly, not only does the working of clay in this manner leave distinctive traces, but these traces are sensitive to the

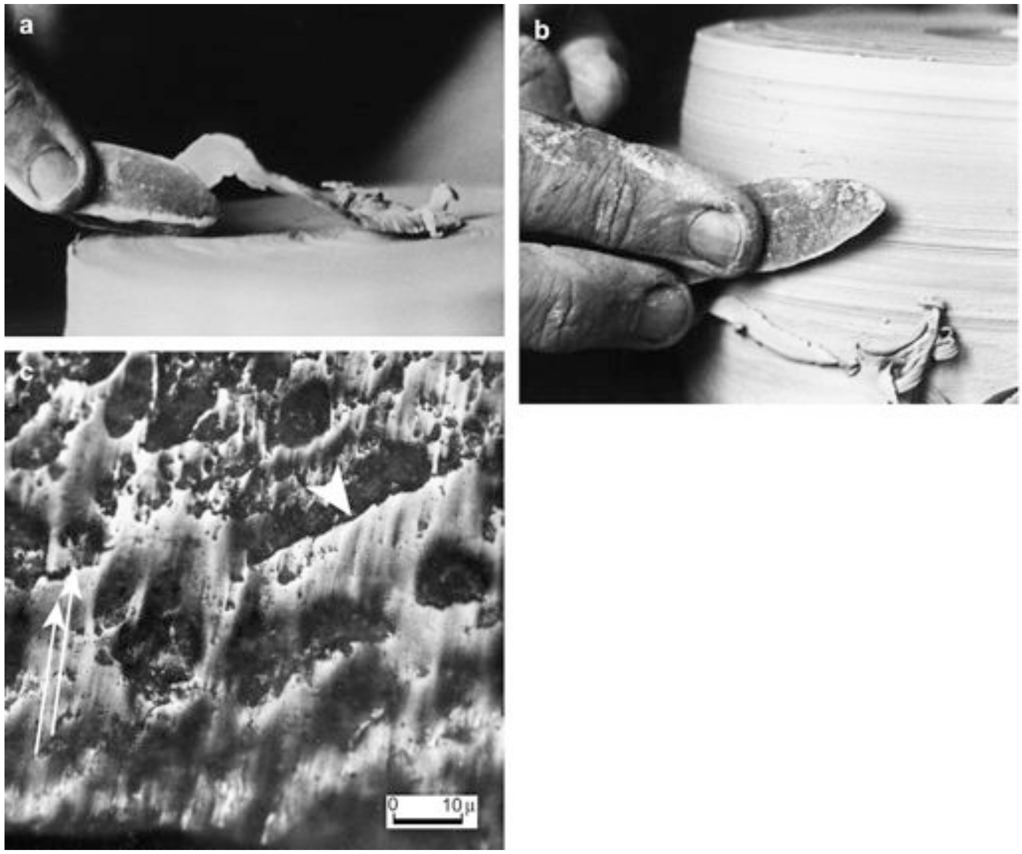

Fig. 16. Experimental use of flint blades by C. Biquand (professional potter), on clay on a potter's wheel, to shape a container, removing fine shavings of clay. As hypothesised for Nausharo blades, use of the edge (a) and a dorsal ridge (b). The traces obtained after 3 h of use (c), 100×, are identical to those observed on the archaeological blades. The traces are in flowing, undulating units which have abrupt lips (triangle), characteristic of working of clay. Arrows indicate the direction of flow of the clay against the blade (photos: C. Biquand, P. Anderson).

clay's humidity, granulometry, the duration of use of the tool, and particularly to the potter's working motion. The experimental tests and microscopic observations confirm the use of these blades as potter's trimming tools, i.e. on a rotating device with a long and regular movement, but not necessarily very rapid. The blades may have been used while held in the bare hand, or wrapped in a sheath or hafted into a handle, but microwear traces in these areas were not developed enough to indicate the hafting or holding method used.

Using microscopic analysis, another possible potter's tool was identified from the flint assemblage of Nausharo Period II, but outside the pottery workshop. This is a core, the only one found in ''Rhori-like'' flint at Nausharo. It has ridges that were used for smoothing and burnishing surfaces of objects (possibly regularising or smoothing), while the clay was in a drier (leather-hard) state than it was during the work of the blades used as trimming tools, described above. However, this is only a hypothesis, and this smoothed core does not come from the pottery work shop.

7. Conclusion

In their attempts to reconstruct the operating sequence for ceramic production, archaeologists have based their studies either on the study of finished products, or of structures and objects associated with pottery workshops. However, most of these remains consist of constructed ovens (or usually the base of these ovens, preserved as reddened or even vitrified, walls) and firing waste, or accessories used in firing, as is the case for the Pre-Indus and Indus phases in Pakistan (Audouze and Jarrige, 1979; Dales and Kenoyer, 1992; Halim and Vidale, 1984; Jarrige and Audouze, 1979; Miller, 1997; Pracchia, 1985, 1987; Pracchia et al., 1985). Finds of tools made for production and decoration of containers are also frequently found in archaeological contexts, including prehistoric ones (for Pakistan in the Indus phase, see Jenkins, 1994; Kenoyer, 1994; Wright, 1989, 1991). All the same, these finds are often isolated and are not generally found in their context of use.

All of the remains found in the Nausharo workshop are unique examples of potter's tools and waste from production of clay containers. Among the tools found, some flint blades were found (Fig. 17), after microwear analysis and experimental verification, to have been used to trim clay on a true potter's wheel, because the microwear traces, as well as the long, thin shavings with parallel ridges, imply that an instrument with long and regular rotation was used. The presence of a possible centred clay ball with marks from the start of pressing the top of the clay cone is also indicative of the presence of a potter's wheel in the Nausharo workshop. The shape of the wheel is unknown, however.

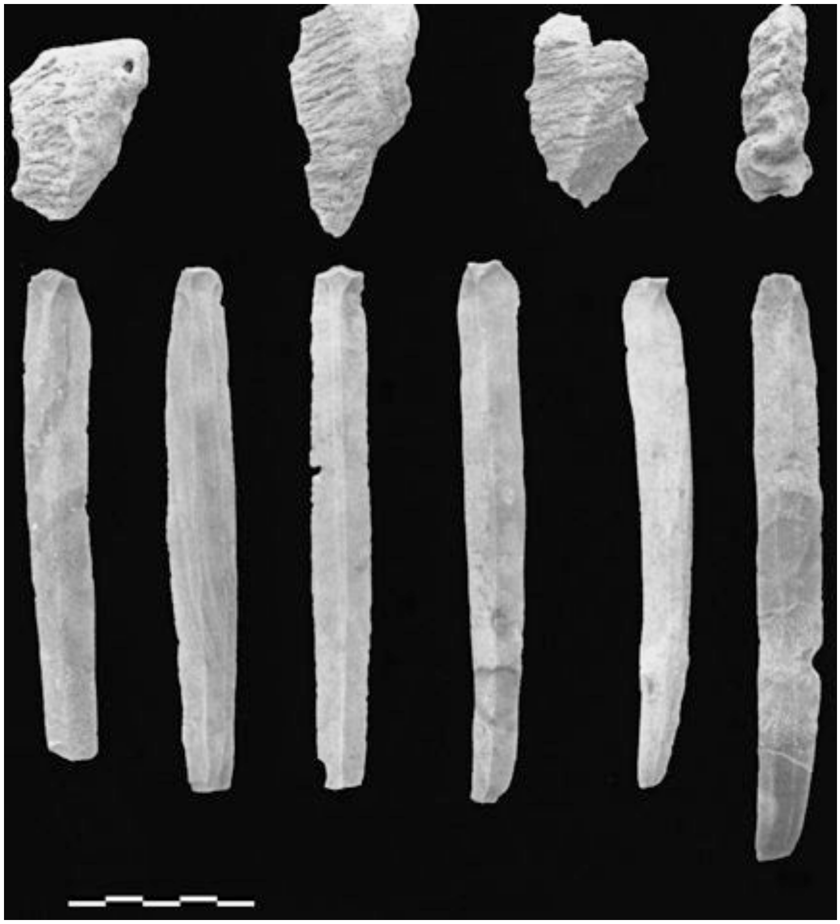

Fig. 17. The tools and products of the scraping and the trimming: examples of flint blades and clay shavings found at Nausharo potter's workshop ((Room III, SU37 and 59) (photo: C. Jarrige).

No flint blades were proven by microwear analysis to have been used for simple scraping of clay pots. For some blades with weaker traces than the ones used for trimming, it was hard to prove they could *not* have been used for scraping, but it is more likely they were used like the others, on clay while turning on a potter's wheel.

It is worth noting that the flint blades found in the workshop were all apparently still useful as tools, as were other tools and devices found in the same context (the bone smoothing tool, the baked clay shaping tool, and the grinding stones). Presumably, none of these were deemed to be worth salvaging, or perhaps, were possible to salvage. The fact that a potter's tool kit was left in the area together with raw clay, red ochre, a coil shaped in ring, clay scrapings and broken unfired pots, indicates the possibility that a sudden event occurred that brought about an abrupt 'abandonment' of the workshop, although the reason remains unexplained (fire?).

In an economic sense, this workshop testifies to a local production (seasonal, more than daily?) of domestic pottery used at Nausharo, which is an extension of the same activity found from the Chalcolithic onwards in the neighbouring site of Mehrgarh (Jarrige et al., 1995; Santoni, 1989). But alongside this production using local clays is a type of pottery for which physical analyses indicate a non-local origin, from centres near to the Indus Valley (Blackman and Méry, 1999; Méry and Blackman, 2005); these are particularly the Black-Slipped-Jars, used for transport. This exotic pottery production can be compared with the non-local manufacture of the flint blades, knapped far from the site, and implying work of high-level specialists. Technically speaking, the analysis of the flint blades characterised and defined traces specific to knapping by pressure using a metal-tipped tool (copper), and this was diagnosed by analysis of residues found on the blades' striking platforms or butts. These were for use locally, as were the ceramics made in the Nausharo workshop.

Both flint and black-slipped jars production show characteristics that indicate the existence of specialised, highly skilled craftsmen. Indus blacks-slipped jars were exchanged in the Oman Peninsula, and the distribution of the blades must also have extended beyond the local area. Indeed, all of the above attributes are well-known features of the Indus civilisation.

Acknowledgements

We were kindly given access to the materials discussed in this paper by the *Mission française de l'Indus*, especially the Director, Dr J.-F. Jarrige, as well as C. Jarrige and G. Quivron

(CNRS, UMR9993). We also thank C. Biquand (potter) for her important contribution to demonstrating how the Nausharo blades were used. C. Perrot (CEPAM) and R. Douaud assisted in preparing the illustrations. We also thank the anonymous referees of this article for their highly constructive comments, as well as J. Feblot-Augustins, M. Ilett and E. Willcox, who did or helped us with the translation.

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