** 41 **

Excavation of an Indus potter's workshop at Nausharo (Baluchistan), Period II

Sophie Méry

The Indus craft industries and exchange of manufactured products have been major topics of research over the last ten years. Research has primarily focused on prestige items and luxury ornaments like steatite stamp seals, stoneware bangles, long barrel-shaped carnelian beads and shell ladles, which were manufactured and/or distributed in major urban centres like Harappa and Mohenjo-Daro (among others, see Halim & Vidale 1984; Pracchia, Tosi & Vidale 1985; Kenoyer 1984; 1985; Blackman & Vidale 1992; Vidale 1989; Rissman 1989; about pottery-making, see Pracchia 1987; Dales & Kenoyer 1986; 1992; Wright 1989).

The recent discovery of a potter's workshop in the excavations directed by J.-F. Jarrige (1989; in press) at Nausharo, Baluchistan, now makes it possible to study pottery-making in a small town from about 2500–2400 BC, a site from which manufactured products like utilitarian pottery vessels were possibly distributed to a network of neighbouring villages. In this paper, I am going to discuss the types and distribution of tools, equipment and unfinished vessels in the workshop. Then I shall present a preliminary reconstruction of the production sequence, with references to observations made with the help of a professional potter (C. Biquand), and to the first results of an archaeometrical program carried out at the Laboratoire de Recherche des Musées de France (Bouquillon & Méry 1993).

Stratigraphy, spatial distribution

Excavations on the northern slope of the southern mound of Nausharo were begun by S. Pennec in 1987, and continued by P. Marquis and the author during the 1988–89 campaign. The area covered 40 m^2 (squares K3-D-E-F and part of square K-4D). Four occupation levels were found, which yielded structures and material related to pottery production, dating from Period II at Nausharo, i.e. the first phase of the Indus Period, around 2500–2400 BC.[1]

Phase 4

The most ancient level excavated, at 2.45 m below the present-day level, dates from the first part of Period II. There, the working area of a potter's workshop has been exposed (fig. 41.1). It is bounded to the north by a huge retaining wall, a platform which was built in Period I and raised during Period II (Jarrige 1988), and to the south by a 0.60 m wide mud-brick wall with a niche. The corners of

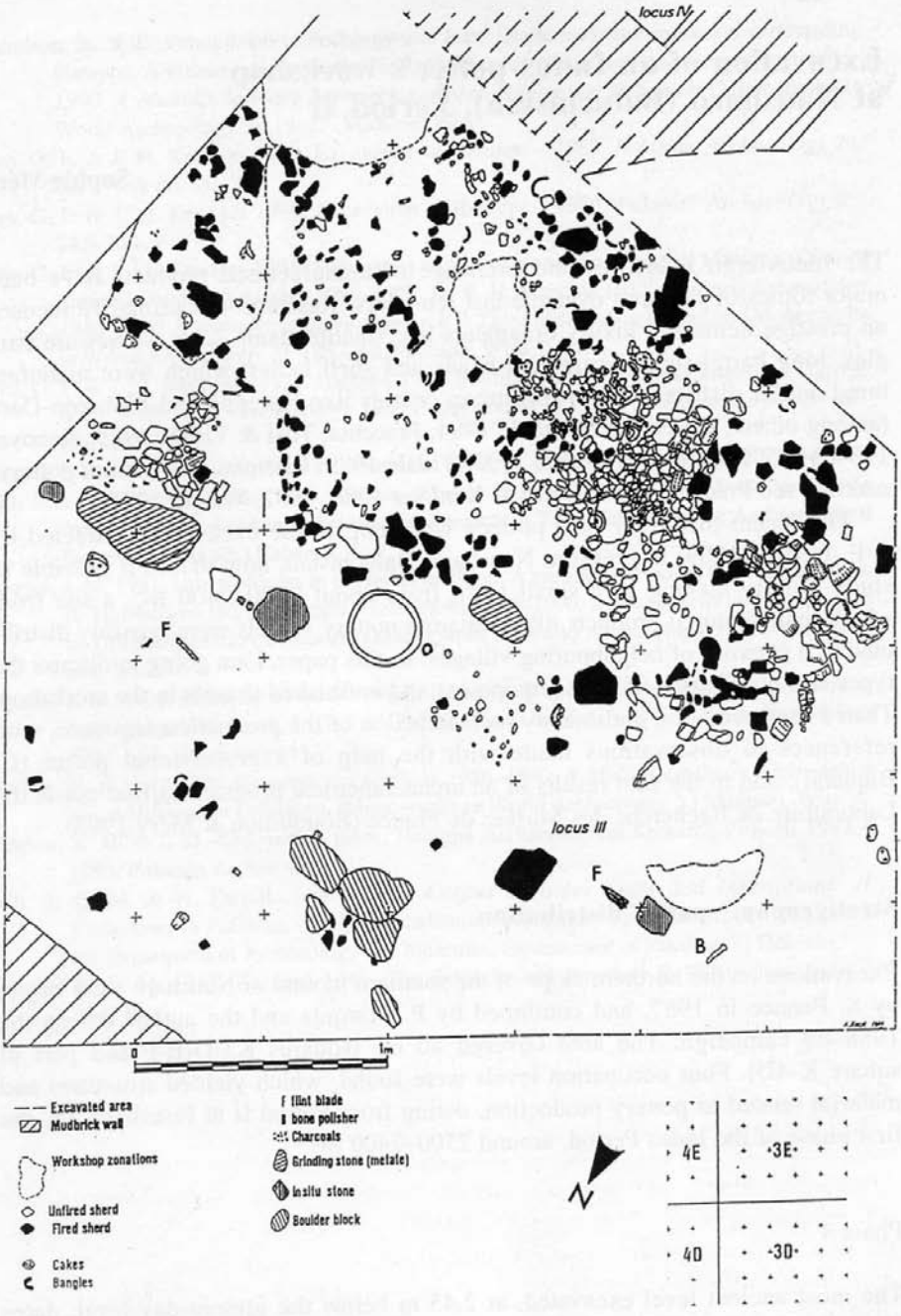


Fig. 41.1. Plan of the potter's workshop of Nausharo Period II. The niche in the southern wall is not represented. Tracing S. Méry & S. Pennec. (Drawing A. Roch.)

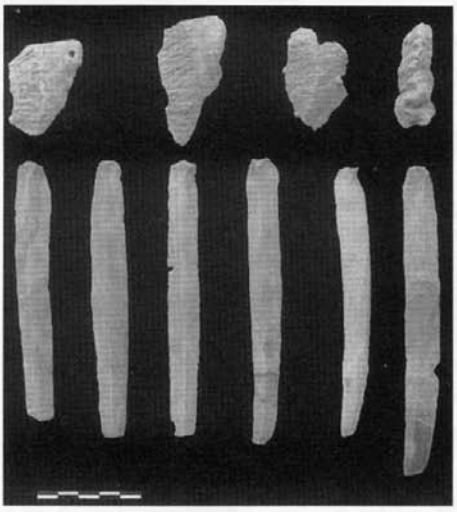


Fig. 41.2. Flint blades to be used as turning tools and probable turning wasters (unfired clay scraps). Nausharo Period II, phase 4 potter's workshop. (Photograph C. Jarrige.)

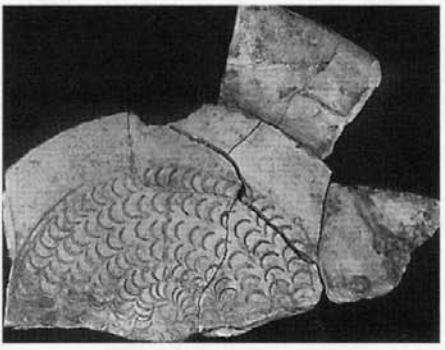
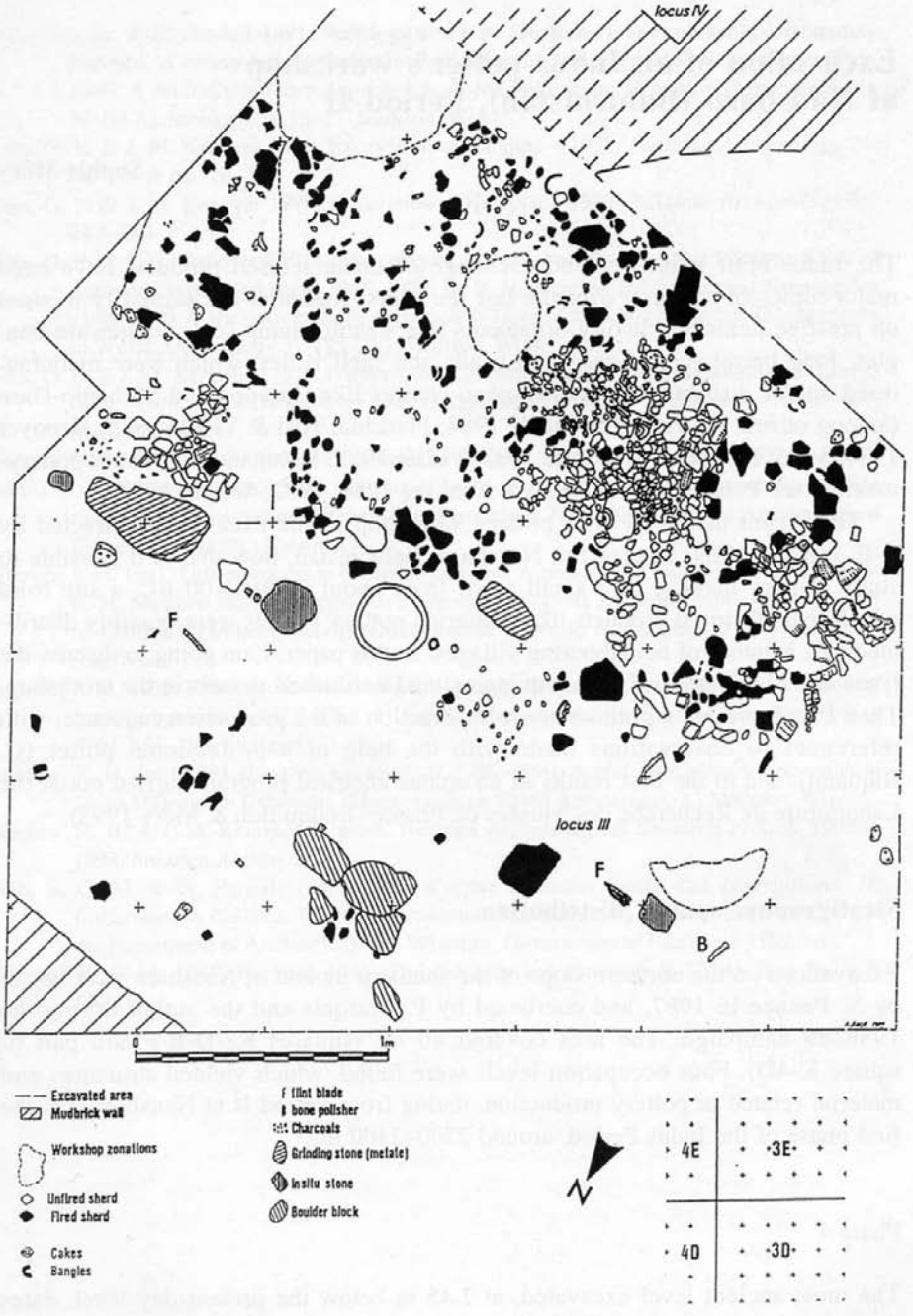


Fig. 41.3. Unfired clay pedestalled dish from the phase 4 potter's workshop. External rim diameter: 30 cm. The throwing, turning, and impressing of the centre of the dish were already completed, as well as the assembling of the dish and the base. (Photograph S. Méry.)

two further rooms (unexcavated) rest against the opposite side of the southern wall.

The central part of the excavated area was used for forming vessels. Most of the potter's tools found in the workshop were found here as, for instance, four unused flint blades (fig. 41.2), a fired clay scraper and a bone spatula shiny from use. The blades were found resting on their external side and grouped to form a store near a semi-circular area where the soil is burnt. There were also two grinding stones (possibly used to crush pigments) and a clay coil measuring 40 cm in diameter. More than 200 scraps of unfired clay (fig. 41.2) left either from the turning of the vessels or from their scraping, were scattered on 1 m^2 to the south of the grinding stones.

The southwestern part of the workshop was used to store the vessels after they had been formed and finished. Some 25 unfired clay vessels (among them seven pedestalled dishes, fifteen bowls with bilateral projecting rim, one miniature pot and at least one perforated vessel) have been found, making a 15 cm thick pile covering about 2 m^2.[2] Two of the pedestalled dish vessels were well preserved (fig. 41.3). Perforated vessels, located at the top of the pile, were much more fragmented (about one hundred sherds, often smaller than 2 cm^2). Judging by the number and types of unfired vessels, as well as the lack of spreading of the sherds, the objects were probably standing on a shelf. The vessels were stored after the completion of the different forming operations, as, in the case of the pedestalled dishes, the turning, impressing and assembling of the plate and the base. Before the last drying and the firing, the decoration of the vessels remained to be done: only the rim of a plate shows traces of a red pigment while fired clay pedestalled dishes of this peculiar variety are always found in Period II levels painted in red



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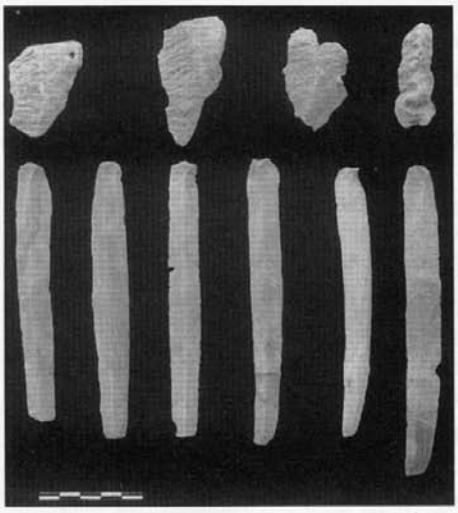

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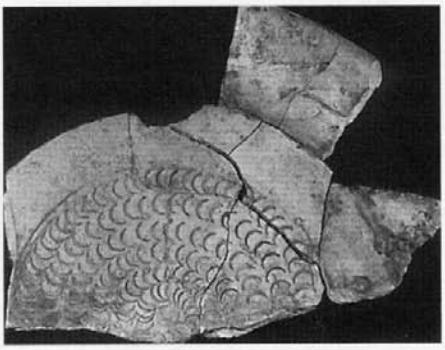

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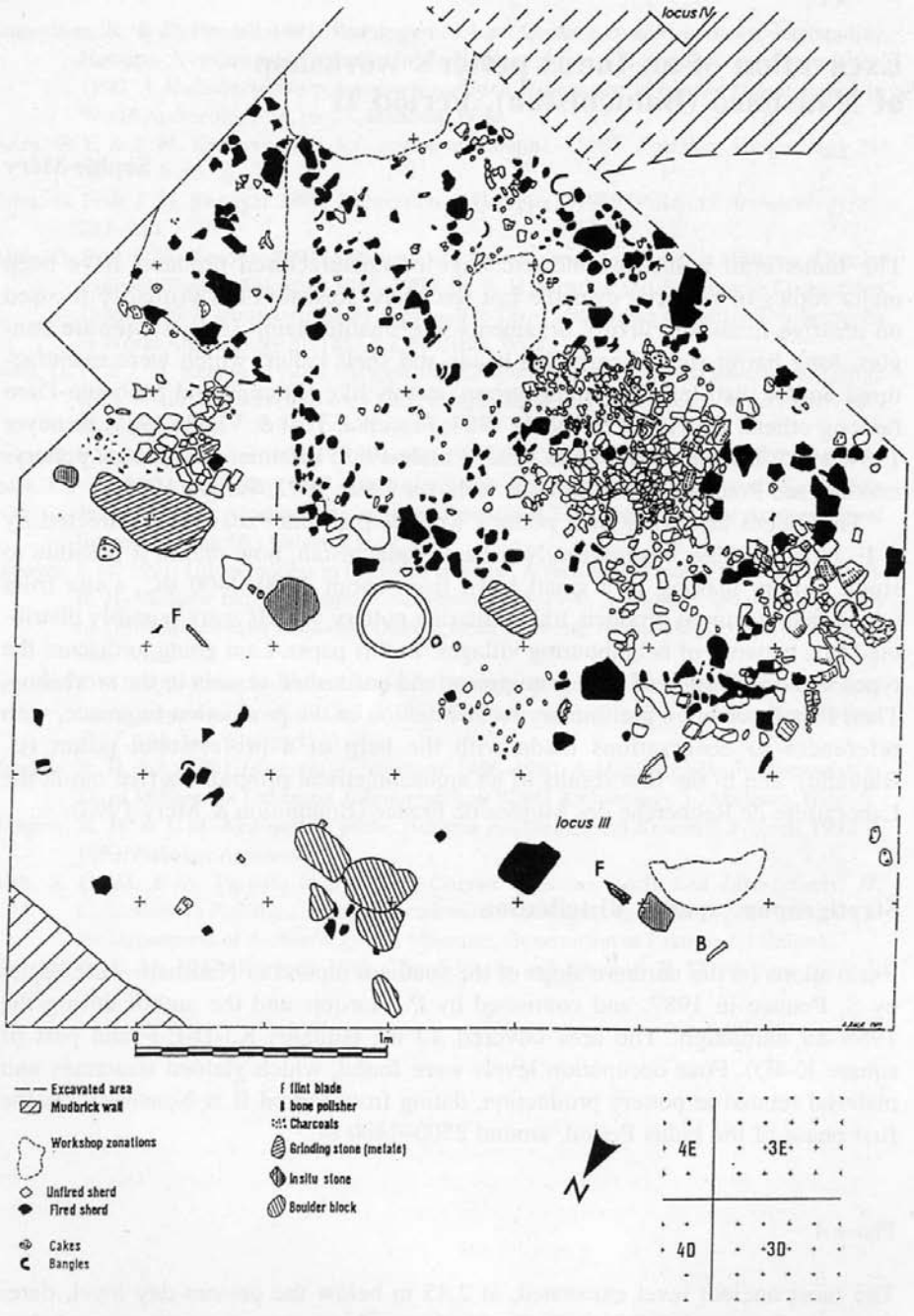

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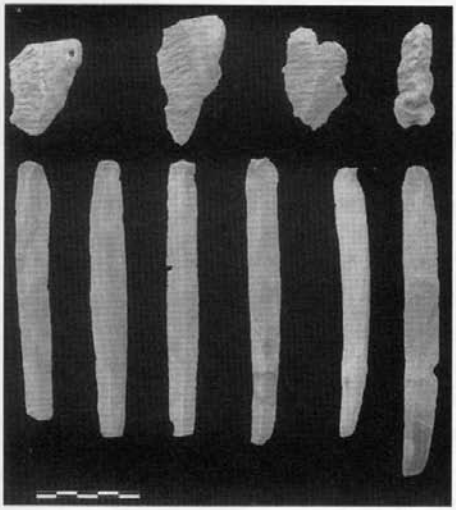

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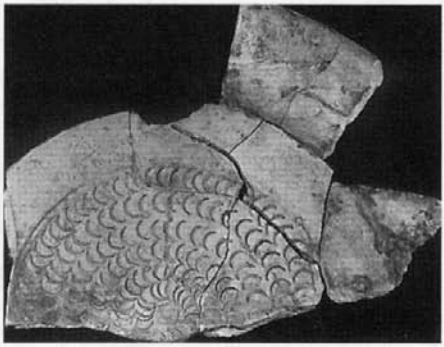

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and black. According to brush strokes which can be seen on these fired vessels, this stage of manufacture involved the use of a rotating device.

The situation is completely different along the retaining wall, since few pottery sherds, bangles and cakes are scattered in a greenish dense muddy level characteristic of the lanes during Period II at Nausharo. On the other hand, lanes were always found between the retaining wall and the houses during Period III. Therefore, we would suggest that there was a lane between the workshop and the retaining wall. There is no trace of a mud-brick wall between this lane and the occupational floor of the workshop, but three groups of large stones, 1 m apart, follow the orientation of the retaining wall. According to the type of activities carried out between the southern wall and these stones (drying, turning and painting at least), the space must have been roofed to offer protection against the rain or sun. These stones could be the remains of wedged-up posts of a verandah facing north, or part of a light partition.

Whatever the reason, the workshop was deserted suddenly, but we cannot say if it was due to a flood or a fire since the unfired clay vessels are neither melted nor fired. But considering the good preservation of the unfired clay sherds, which are very fragile and liable to deterioration, the area was sealed with wasters and kiln bricks soon after it was abandoned.

Phase 3

A building (8 x 3 m) with two rooms was constructed over the ruins of the workshop of phase 4 (fig. 41.4, level A). The northern and southern walls of room 2 rest against the eastern wall of room 1. A door giving access from room 2 to a lane (1 m wide) along the retaining wall mentioned above was later blocked.

Different types of wasters related to pottery production have been thrown into room 2. Among the six superimposed levels resting over a white compacted ashy level, a refuse dump contained unfired clay sherds, another one was full of firing wasters (blistered and warped sherds, vitrified kiln bricks and coating fragments), a third one contained several pieces of fired clay moulds. We also noticed glazed coating fragments in a primary position, on the facing of the western and southern walls. Therefore, we suggest that room 2 was used, or more likely re-used, for pottery firing. We do not mean a constructed kiln, but an open-air firing device, a type of structure already known at Mehrgarh at the beginning of the third millennium (Audouze & Jarrige 1979; Jarrige & Audouze 1979). To support this hypothesis, there are 40 cm thick white compacted ashy microlevels containing few potsherds and firing wasters extending south of room 2. As in Period VI at Mehrgarh, this could have been merely one firing type among others, since a double-chambered kiln dating from Period II has been discovered at Nausharo 100 metres away from NSK squares (J.-F. Jarrige & G. Quivron, personal communication).

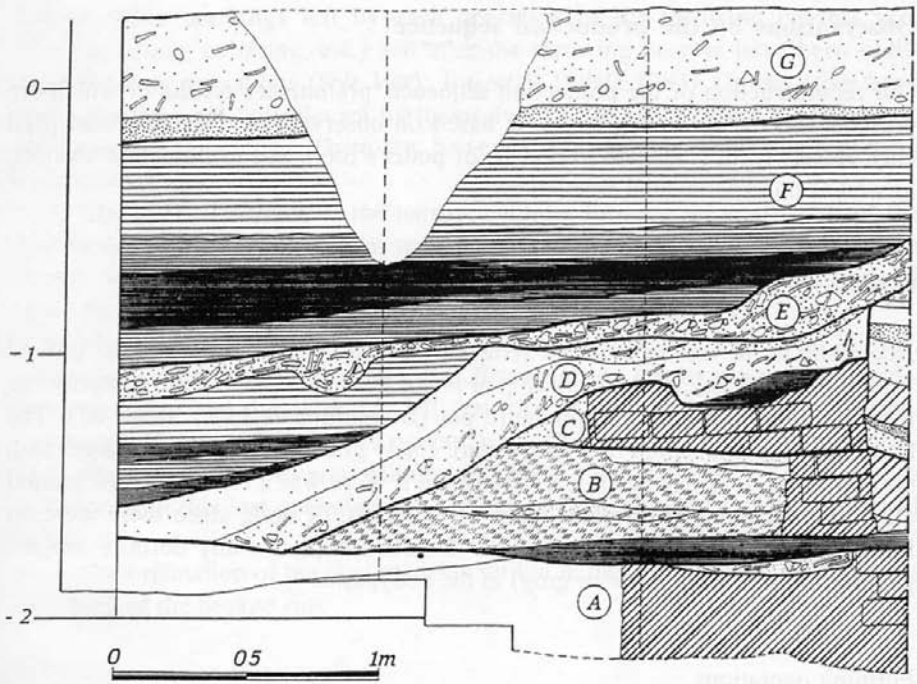

Fig. 41.4. Section through sector NSK of Nausharo Period II: phase 3 (=A), phase 2 (=B) and phase 1 (=C). (Drawing G. Quivron.)

Phases 2 and 1

The following two phases are rebuilding phases of the mud-brick structure (fig. 41.4, levels B and C), which was badly damaged by the erosion of the mound (level D). Between this building and the retaining wall, there is a succession of muddy levels and ashy levels, 15 cm thick, full of pottery-firing wasters. The pottery wasters were probably used on several occasions to reconstruct the ground of the lane.

Observations on the production sequence

Our reconstruction of the production sequence, preliminary results of which are presented in the following pages, is based on observations of unfired and fired clay vessels from Nausharo Period II, of potter's tools and manufacture wasters, as well as on experimental simulations.

Clay and preparation of the body

According to the results of a first series of mineralogical analyses, all the unfired vessels characteristic of the workshop of phase 4 have the same paste composition, the only exception being a miniature pot (Bouquillon & Méry 1993: 87). The body has the composition of a sandy marl, finely grained (no inclusion larger than 400 microns). It is not possible to determine if there was a refining of the natural clay, or a blending of different types of materials, or both, since there were no lumps of unprepared raw material in the workshop, nor any definite anthropogenic element (like straw or grog) in the bodypaste.

Forming operations

As far as vessel forming is concerned, several techniques have been attested in the workshop of phase 4, including for a single type of vessel (the dish and the upper cylindrical part of the base of the pedestalled dishes were very probably wheel-made, since the broad flaring base was possibly moulded, as at Mohenjo-Daro UM, see Dales & Kenoyer 1986: 216). Experimentation shows that the clay used by the Nausharo potters was plastic enough to be thrown, but also firm enough to be suitable for throwing flat and large shapes like dishes.

Throwing

The first direct indication showing wheel-building technique is a fragmentary clay ball, in the shape of a truncated cone, with a small depression at the top, found in the workshop of phase 4. Its base is flat, with a uniform-dotted texture, the pressure being applied on soft but unmoistened clay. On the other hand, on the sides of the cone, fine parallel striations were left on a smooth and regular surface characteristic of moistened clay. In this instance, the morphology and the macrotraces visible on the clay ball indicate that it was very probably centred on the wheel (i.e. the clay ball was wetted after being firmly placed on the centre wheelhead, it was then pressed simultaneously with both hands so that the clay revolved smoothly through the hands and concentrically with the wheel). The estimated weight of the complete dry ball is 1.5 kg, which is sufficient to throw a dish.

Throwing marks are usually no longer visible on the unfired clay vessels of the workshop, nor on the fired clay pedestalled dishes, large bowls and perforated vessels that we studied for comparison from Nausharo Period II. This is not sur-

prising, since markings left by each operation of the throwing process (i.e. opening, lifting, collaring, etc.) and after the throwing process have been obliterated by later operations (Rye 1981; Buson & Vidale 1983). On the other hand many markings are not relevant by themselves to definitely assess the throwing, since they are ubiquitous. There are, however, three salient exceptions regarding pedestalled dishes.

1. The internal surface of the narrow cylinder forming the upper part of the base shows characteristic oblique wrinkles due to the collaring. In such a case, a thrown cone was pressed with both hands from the exterior, creating the lifting of the walls as well as compression ridges on the internal surface of the cone.

2. The external surface of the beaked rim of the dishes shows typical 'rilling', i.e. rhythmic undulating ridges and very fine striations left by the potter's hands. From a centred and flattened clay ball, the rim of the dish was vertically lifted, then bent to form a 45° angle, an operation which has to be done in a single gesture, otherwise the vessel may collapse (Colbeck 1981: 125–128). The markings resulting from this last operation have remained untouched on several vessels of Period II.

3. The orientation of the clay particles visible in the section of the dish follows the tilting of the beaked rim.

Moulding

Ten different fired clay moulds were found in levels of phases 4 and 3, with a maximum diameter between 26 and 42 cm, and a minimum diameter beween 8 and 15 cm. The same type of mould in the shape of a truncated cone is known from Period VI at Mehrgarh, where the use of moulding increased in Period VII (Santoni 1989: 179 & fig. 8.1). During the Indus Period, the technique was widely used, but no moulds have been published so far, although some pieces have been found at Mohenjo-Daro and Balakot (Dales & Kenoyer 1986: 65–66). As at other Indus sites, moulds were used at Nausharo to shape the base of several vessel types (the plastic clay being pressed inside the mould), especially jars of various dimensions. Usually, the imprint of the mould and the seam at the edge of the mould is obliterated, both on the internal and the external surfaces. Two characteristics of a complete mould found in a refuse dump from phase 3 (fig. 41.5) confirm the view that the mould was maintained, either on a turntable or on a wheel, when it was revolving (Dales & Kenoyer 1986: 65). On the one hand, one series of deep oblique cuts visible on the rim of the small diameter probably helped the adhesion of a plastic coil or a ring. On the other hand, the peculiar shape of the rim was maybe intended to wedge a cylindrical clay chuck, also used to maintain the mould on the wheel. Another possibility is the use of a big lump of semi-plastic clay to maintain the mould.

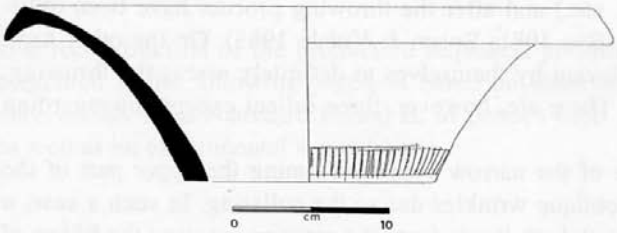

Fig. 41.5. Fired clay mould, Nausharo Period II. (Drawing P. Gouin.)

Finishing the shape: the case of the pedestalled dishes

Turning

In the workshop of phase 4, turning is certified by the co-occurrence of two flint blades with polish (Anderson-Gerfaud *et al.* 1989: 446) as turning tools, and of several dozens of scraps of clay as turning wasters.[3] Most of the clay scraps are 1.5 cm wide and 0.5 mm thick, the largest being 7 cm long. On one face they bear series of longitudinal parallel striations, with small particles of pulled away clay, the other face being covered by wrinkles (fig. 41.2). At Nausharo Period II, the turning often left facets (irregular in size, shape and location) and very thin deep grooves on the external surface of the dishes (except on the rim), as well as on the external surface of the bowls, below the rim. The experimental turning operated by C. Biquand with flint blade replicas produced similar clay scraps, stigmata on the vessels and polish on the blades after a 45 mm turning (a polish very different from the one obtained after hand-scraping work, see Anderson-Gerfaud *et al.* 1989).

Assembling

The dish and maybe the base of the pedestalled dishes were assembled when leather-hard, after the turning of the dish and its impressing. Short incisions cut on the centre of the dish and/or along the upper rim of the base are sometimes visible on both the unfired and fired clay vessels of Period II. The base was placed against the dish, after some semi-fluid clay was applied on the external surface of the centre of the dish, and after soft clay was applied on the internal part of the upper part of the base. Then a coil was thrown on the external junction between the dish and the base (a process illustrated in Colbeck 1981: 146–147). A variant is rarely found at Nausharo Period II: the base is placed on the centre of the dish just after it has been thrown. In such a case, the walls of the upper part of the base are everted and there is no additional coil to make the junction between the base and the dish (Colbeck 1981: 150–151).

Scraping

This operation was undertaken with the help of a sharp-edged tool such as a blade, in order to remove excess clay in the medium internal part of the base of the pedestalled dishes. Several pottery sherds of Period II bear negatives of such

scraping, i.e. series of deep angular striations irregular in orientation which sometimes criss-cross the oblique wrinkles due to collaring. Many short and thick scraps of unfired clay have also been found in the workshop.

Decorating

Impressing

In the workshop, impressed marks on unfired vessels are typical of longitudinally split reeds which were vertically pressed on the surface of the dish, then slightly inclinated when removed by the potter (the external edge of the impression is vertical and smooth, its internal edge is oblique and irregularly indented).[4] At first, a double circle was incised in the centre of the dish (the rotating device was probably moving, and the potter's hand was unmoved). Then, the extremity of a tool was pressed, at regular spaces, in order to leave impressions organized in smaller and smaller concentrical series, a technique involving a very slow and irregular revolving of the vessel (fig. 41.3). According to the orientation and morphology of the imprints, the potter was a right-handed person, the rotating device revolving in an anti-clockwise direction.

Painting

As mentioned above, among the unfired vessels from the workshop, only the rim of a pedestalled dish was painted in red. However, fired clay pedestalled dishes of this variety are always found painted in black and red at Nausharo Period II (see Quivron 1994). The external surface of the vessel was slipped in red, except for the central part of the dish. According to the brush strokes, potters used large flat brushes, while the vessel was rotating. Many large bowls of fired clay dating from Period II were also painted in red. On the other hand, perforated vessels were unpainted.

Firing

There are two new pieces of evidence at Nausharo about Indus pottery firing techniques.

1. Fragments of modelled cakes made of a mixture of clay and straw have been found in one refuse dump of phase 3. They are flat, rounded, 25 to 30 cm in diameter and 3 to 4 cm thick. Based on present-day comparisons in Baluchistan, these objects may have been used as a covering or a lateral protection of the open-air firings. A complete piece has also been discovered by C. Jarrige in a potter's workshop refuse dump dating from Period III.

2. Some twelve overfired jars (with a rim diameter between 22 and 34 cm) were thrown into another refuse dump of phase 3 (fig. 41.6). A semi-fluid mixture of clay and straw covered the external surface of the rims of these jars in order to stick the lids on. We propose to interpret these jars as firing-boxes, prob-

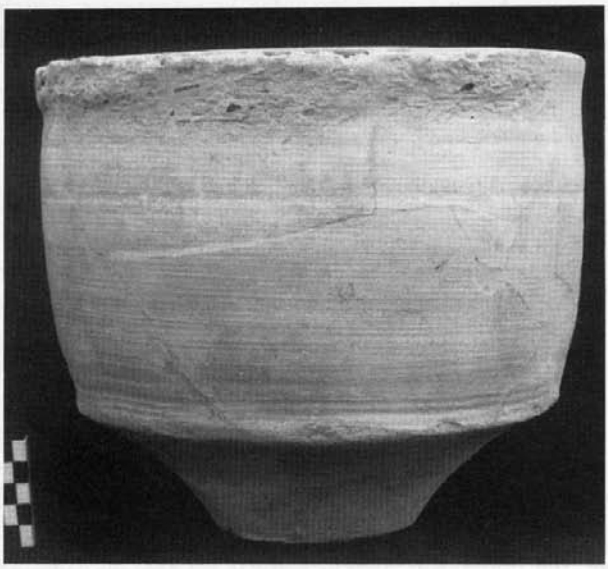

Fig. 41.6. Firing-box without its lid, Nausharo Period III. The rim of the unrestricted jar is covered with a mixing of clay and straw. (Photograph C. Jarrige.)

ably used to protect small fragile objects from breakage as well as from combustion gas and flames (Gouin & Méry, in preparation).[5]

Conclusion

From the types and amount of vessels manufactured in the potter's workshop, the range of techniques involved (throwing/turning, moulding), the high level of technical competence required for making such vessels, as well as the standardization of the finished products (macro-traces, morphometrical features), it is obvious that potters working in the workshop of Nausharo were specialized craftsmen[6] producing utilitarian vessels for use beyond household consumption. Their pottery production system agrees with the definition of a 'workshop industry' by S. van der Leeuw (1977).

The black-slipped micaceous storage and transport jars found in houses of periods II and III exhibit a different pattern, and they were probably not produced at Nausharo itself, judging from their mineralogical composition (Méry 1991: 70; Bouquillon & Méry 1993: 87). This type of container, which can be considered 'specialized' in terms of manufacturing, shape and presumed function was widely distributed during the Indus Period all over the Indo-Pakistani borderlands, and even in Oman (Méry 1991). The single site of production characterized by such jars is Harappa (J. M. Kenoyer, personal communication), but we suspect that there may have been other production centres along the Indus hydrographic basin.

Notes

[1] The typological study of the pottery from the workshop will be published separately by P. Gouin.

[2] The pedestalled dishes are large plates (with a beaked rim) on tall hollow bases which correspond to variety 2A of Mohenjo-Daro UM (Dales & Kenoyer 1986: 212; see also Quivron 1994). The unfired pieces from the workshop and the fired clay vessels of the same variety collected in 1989 at Nausharo (Period II levels) have standardized dimensions (the maximum diameter of the dish and the base varies between 30 and 32 cm, the top diameter of the base varies from 5 to 6.5 cm). The bowls with a bilateral projecting rim and a carination 2 cm below the rim, also have standardized dimensions (maximum diameter 28–30 cm). They correspond to varieties 37–39 of Mohenjo-Daro UM (Dales & Kenoyer 1986: 169–178).

[3] Turning is a finishing operation, completed when the vessel is 'leather hard'. In order to trim away the excess wall thickness, a cutting tool is held against the rapidly rotating re-centred vessel.

[4] P. Gouin (1990) recently suggested that the pedestalled dishes were used as cheese-graters. If this hypothesis is correct, impressing was a finishing technique rather than a decorative technique.

[5] As pointed out to me by C. Jarrige, similar sherds have been found in an open-air firing structure at Mehrgarh, Period VI, dating from the early third millennium BC (Jarrige & Audouze 1979: fig. 9). It is however not possible to determine if the jars were used as firing-boxes in open-air firings, or if some potsherds of broken firing-boxes were re-used to cover the structure.

[6] Obviously, the socio-economic status of the potters (part-time or full-time specialists/seasonal or round-year activity) cannot be inferred from our data.

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