

## CHAPTER 4

### REPORT ON THE 1987 EXCAVATIONS THE EVIDENCE FOR POTTERY MAKING AT Q48.4

by

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#### 4.1 Introduction

This season's excavations saw the discovery of an industrial area at the eastern edge of the city. This was quickly recognized as containing the remains of a pottery workshop, complete with puddling pits, part of a potter's wheel, unfired potsherds, and kilns. Only a small part of the area has, as yet, been excavated, so that it is not certain how extensively the pottery-making area was spread, or how many workshops were in use; if, as seems virtually certain, much of the pottery in use at the Workmen's Village was manufactured here, a far larger establishment of potters is to be expected.

Within its limited span of occupation, the workshop site saw a major change of use with extensive rebuilding. The pottery-making phase was the earliest, and consequently the remains of its presence became buried beneath the remains of the second phase. The description of the pottery industry which follows is distilled from the analysis of the site's stratigraphy already given in Chapter 2. The process of analysis was, however, a reciprocal one, in that, where ambiguity of interpretation appeared, the knowledge that the first phase had seen the workings of an industry leaving distinctive remains (including the unfired sherds) sometimes helped to bring clarification.

#### 4.2 The workshop

In general, it seems that the pottery-making area was localized in an area on the western edge of the enclosure (see Figure 2.23) and comprised initially an open space, later turned into a long narrow room, with possibly four rooms at its northern end. Three of the latter, however, produced no indications of pottery manufacture in the way of unfired sherds. Within this area was a small cubicle, in which part of a potter's wheel was found, as well as various other installations. Outside the rooms, in what was presumably a courtyard, are further traces of related activity, and, at a convenient distance and downwind from the workshop, the kiln (see Chapter 3). Unfired sherds come primarily from the workshop area, but also from the area of the kiln; unfortunately the buildings are so poorly preserved that it is not possible to tell if further rooms associated with the industry were to be found here. Neither are there any clear indications of which parts of the workshop were roofed, or whether there were any internal subdivisions.

The uses of the installations associated with the potter's workshop are difficult to identify. The most obvious is the puddling pit, D5 [3166]. This was formed by a roughly oval depression in the *gebel* surface, apparently up against the enclosure wall (if it existed at this early stage in the site's occupation). At least at its southern end the pit was edged by rough pieces of limestone; these were missing in the northern part. The pit was filled with a thick layer of clay of a very fine texture, and without any visible inclusions. The size of the pit, approximately 2.5 m x 1 m x 20 cm deep, seems very small for initial clay preparation, for which one expects something deeper. On the other hand, its small size fits the general scale of other elements of the installation.

North of this pit was an area of *gebel* heavily encrusted with clay [3815], and perhaps used for clay preparation, covering an area of 1 m x 1.1 m. It had no preserved boundaries. On the clay surface were traces of spilt red liquid pigment, and at its south end lay a large shallow pottery dish (diameter approximately 50 cm), probably cut down from a larger bowl. Mud also encrusted the interior of this vessel, and it may therefore have been used to transport it. It is possible to recognize in the slight concavity of part of this surface the base of a lower level pit for clay preparation, perhaps the predecessor of the one already described, the edges of which

would have been destroyed by the removal, for re-use, of its edging stones. The whole surface was overlaid by the dense deposit of unfired sherds [3785].<sup>1</sup> To the north of this area, in a separate cubicle-like structure, was a deep pit (E6 [3046]), and next to it a *zir* set up to its rim in the *gebel* [3113]. Neither of these preserves any signs of use; it seems most probable that the *zir* was used in its usual capacity to contain water, whilst the pit was found to contain part of a potter's wheel. The pit's possible connection with the throwing process is discussed below. Stratigraphically these two features appear to be connected with the workshop; and an owner's mark incised on the *zir*'s shoulder, showing a vessel in a pot-stand, may also indicate that it was considered to be part of the workshop's property. However, the layout of the cubicle containing the pot and pit *vis-à-vis* the rest of the workshop is puzzling, in that the doorway of the cubicle faces away from the workshop and would have caused some inconvenience in moving between the two areas.

At the south end of the workshop was a further installation which appears to be connected with the potting activity. This was a carefully constructed oval pit [3712], measuring 106 x 72 x 70 cm cut into the *gebel* and lined with mud brick; the walls and floor were plastered with a layer of grey mud. The pit is similar to that in square E6 in dimensions, although the shape is different; perhaps it, too, was connected with the throwing of pottery, although no wheel parts came from it. It is worth noting that many unfired sherds were found in the general area around this pit, suggesting possible manufacture in this area. As a further point of comparison with E6 [3046], a large pottery vessel was found to the north of the pit, although in this case it was not deeply sunk into the *gebel*.

At the very end of the season a deep pit cut in the *gebel* was discovered in square G5 [3402]. Whilst it showed no very obvious signs of use, the interior bore traces of a coating of mud and therefore could have been associated in some way with the workshop. Its large size and depth (approximately 1.8 m in one dimension x 50 cm deep; it was not fully excavated) would have made it suitable for the soaking and preparation of clay.<sup>2</sup>

Beyond these one can only note the presence of large area of clay staining and patches of trampled clay on the *gebel* surface, especially in the central "courtyard" area, and also the presence of shallow depressions in the *gebel* surface which, in one case, was filled with dried mud and was identified by the excavator as a further puddling pit (F5 [3082]). Its dimensions were, however, small (approximately 1.3 m x 1 m x 16 cm deep). Next to this area was a round depression in the *gebel* (F5 [3083]) which may have served as a vessel emplacement.

#### 4.3 Stages of pottery manufacture represented in the workshop

1. Clay preparation. Very little was found in the way of raw materials in the workshop. The only evidence of "unworked" clay was a small deposit of rather strangely shaped pieces in a shallow pit next to the unused kiln (Pit: [3141]; clay deposit: [3094]) (Figure 4.1). On examination it became clear that the fragments derived from a layer of mud which had been thickly plastered around the outside of an amphora so that the inner surface of each fragment was smooth and shaped, whilst the outer surface was rough and knobbly and showed no attempt at smoothing. Indeed the inner surfaces were so well preserved that it was possible to see that the amphora was badly cracked when it was used for the purpose. The mud itself was light grey in colour and very fine, that is, without much in the way of extraneous material or debris. What this deposit represents is unclear; the mud looks exactly the same as that used in the puddling pit D5 [3166], but it seems unlikely that this would be the usual method of transporting clay to the area of the workshop. Also, the quality of the clay may indicate that it had already undergone some degree of preparation. It is possible that it represents the transport of clay from the workshop to the site where it was found, but it seems a very cumbersome way of doing it. In another context it would be natural to see it as a coating put over a vessel for a repair to the crack visible in the

<sup>1</sup> Interestingly, Holthoer notes that in modern times in the Fayum "a large dish, rotating in a bed of wet clay, was used as a potter's wheel" (1977: 32); it is possible that our vessel served the same purpose, perhaps forming a slower wheel on which vessels were trimmed (see below).

<sup>2</sup> Brissaud (1982: 67) cites modern soaking pits in the Luxor area to be between 2–2.5 m in size and about 40 cm in depth.



**Figure 4.1.** Pieces of clay from the deposit [3094] which show the impression of the surface of an amphora. The scale is 15 cm.

impressions on the clay. If this is the true explanation it would reveal that the potters were interested in accumulating suitable materials from any source, and had already picked the layer of mud from the now discarded amphora. No further areas for the preparation of the clay, such as tanks for soaking or levigation, were recognized during the excavation. These may be still to be found in as yet unexcavated areas.

The water for preparation of the clay would have been easily supplied by the neighbouring well; on-site storage was probably in pottery vessels. The *zir* [3113] set into the ground next to the enclosure in which the potter's wheel was found was probably for this purpose; otherwise, the shallow scoops in the *gebel* surface noted in the vicinity of the workshop indicate what remains of vessel emplacements. It is worth noting also the presence of two shaped stone blocks which were part of a conduit system in the northern part of the site, which could suggest the channelling of water to the area direct from the well.

Although no clay deposits were found in the workshop it is quite clear from the clay in the puddling pit and the unfired sherds themselves that a silt was being used; this was a light to medium grey in colour and of fine quality. It did not react to hydrochloric acid. However, amongst the large numbers of such sherds were a few (40 in all) of a clay of entirely different appearance. These sherds are all of a pale yellow colour and react vigorously when tested with hydrochloric acid. It seems, therefore, that these sherds were made from a marl clay. No evidence of any installations or areas for the preparation of this material was found during the season; and, since the sherds are so few in number, it would appear that marl clay vessels did not form a large part of the workshop's output. The distribution of the marl sherds show them to be concentrated in the same deposit as the bulk of silt sherds, that is, in unit [3785] (32 sherds); the rest came from D3 [3713] (1 sherd) and E3 [3165] (7 sherds). It is interesting to notice that two different wares were apparently being produced within the same workshop, and probably for different types of vessels (see below). Deposits of material for use in tempering the pottery such as sand, limestone or vegetable matter were not found.

2. Throwing. The fill of the deep pit in square E6 produced clear evidence of the use of the area as a potter's workshop. Here was found the upper element of a pair of shaped stones that formed part of the potter's wheel (Figures 4.2–4.4). The piece is of (?) black basalt and is 14.4 cm in diameter; its lower surface has been shaped to form a central pivot about 2.8 cm in depth, and the upper domed surface has been left in a rough condition. The pivoted face shows concentric striations and a high degree of polish from its use. The lower socketed element into which the pivoted face would have fitted was not found. An identical stone, this time found together with the lower element, was recovered from house T36.11 in the North Suburb, and was there identified as a “grinder or door socket” (*COA* II: 25, and Pl. XXX.6; for the identification of these as part of a potter's wheel see Hope 1981: 127–128); however, since no further information is recorded as to the exact find spot, little more can be said of the find.



**Figure 4.2.** View of the underside of the potter's wheel. The scale is 15 cm.

It is not certain precisely how these socketed stones were used. Most probably they formed part of a simple fast wheel, in which the wheel is turned by hand, or by foot as appears to be suggested in the representation of potters at work in the tomb of Kenamūn (this scene is illustrated and discussed in Arnold 1976: 27–28). Amiran and Shenhav (1984: 107–112) have demonstrated on a closely similar pair of stones of Canaanite-Israelite origin the impracticability of throwing vessels directly on top of the upper stone, i.e. of using them in an unmodified condition as a simple hand-spun wheel, and concluded that a further part must have been necessary to the operation, but which has been lost through time. By attaching a large wooden





Figure 4.3. Side view of the potter's wheel. The scale is 15 cm.

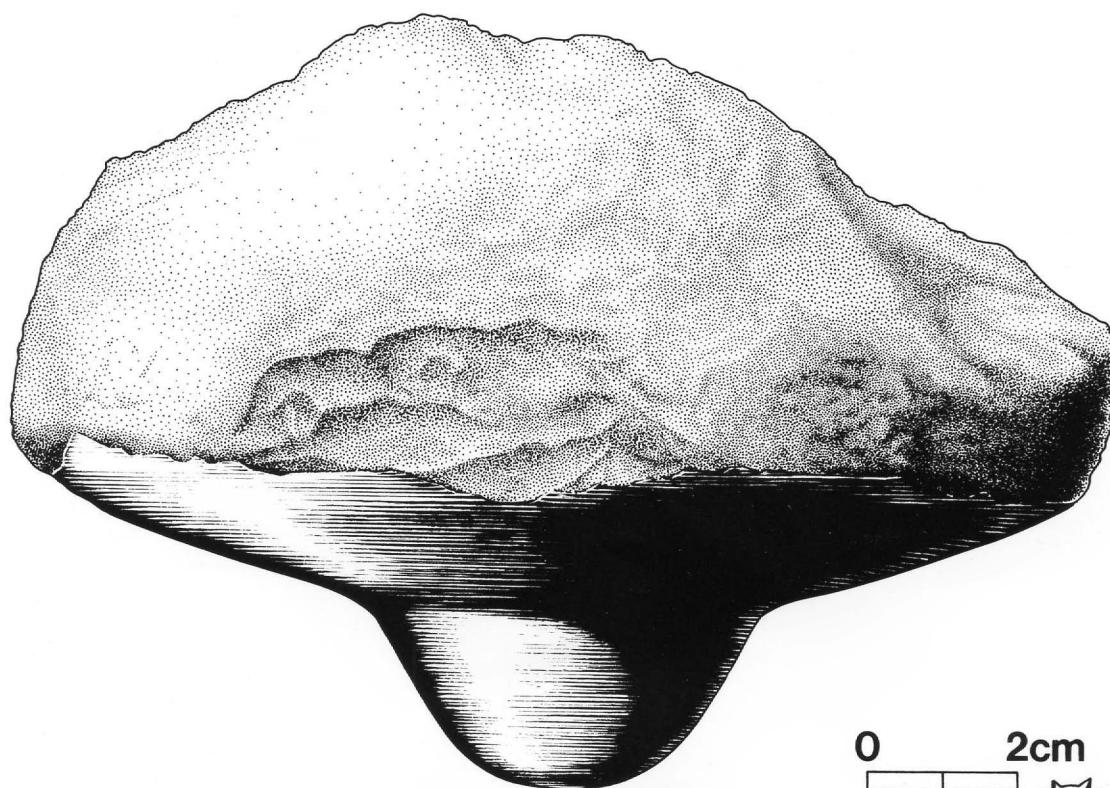


Figure 4.4. Side view of the potter's wheel. Drawing by A. Boyce.

board of 60 cm diameter to the upper surface of the pivoted stone, sufficient momentum could be gained by an assistant turning the wheel to enable the potter to throw small vessels. It is unclear whether the maximum speed of 60 r.p.m. attained using this method would have been enough to throw the larger vessels for which we have evidence from the unfired sherds, where a maximum diameter of 48 cm is recorded.

It should be noted that similar pairs of stones have been recorded as forming the bearings for the foot-wheel of modern Arab potters in Palestine (Singer, *et al.* 1954: 201); and indeed the pivoted stones found in a potter's workshop during the excavations at Lachish, of the thirteenth century BC, are described as forming "bearings for two separate foot-operated fly-wheels" (Tufnell 1958: 91). However, the lack of unambiguous representational evidence for this type of wheel until a much later date than the Eighteenth Dynasty has made scholars doubt its presence in the New Kingdom (Holthoer 1977: 32, 34; see Hope 1981: 130–132 for a fuller discussion of the evidence; Hope 1982, however, argues as here). However, despite the association between our piece and the carefully constructed pit lined with mud brick (E6 [3046]) in which it was found, it seems unlikely that the pit was connected with the installation of a kick-wheel, if only because the dimensions of the pit are probably too small (c. 88 x 50 x 56 cm) to have accommodated the flywheel which in modern Egyptian potteries is usually of around 1 metre in diameter (Brissaud 1982: 90). It is tempting despite this to see this pit and the adjacent *zir* as part of the thrower's area of operation, both because of the presence of the wheel and because of the small walled-off area in which they are situated, which would form a suitable boundary between his craft and the activities in the rest of the workshop. These remarks notwithstanding, the way in which these installations were used is unknown; the *zir* may well have been used to hold water, but the pit neither contained any distinctive material to indicate usage nor had any traces of activity (apart from a gypsum-plaster covered stone block in one face) on its walls or floor. Perhaps it served as a convenient lower level from which an assistant could turn the wheel for the potter in a greater degree of comfort than squatting would have permitted, or conversely it may have offered a more comfortable level for the potter himself to work at. In the end, then, it is not possible to say definitively what kind of wheel was being used in the Amarna workshop; it can only be hoped that future excavations in adjoining areas will provide firmer evidence.

3. Drying and turning. In modern potteries, towards the end of the throwing process a cord is wrapped around the exterior of some larger vessels in order to support the walls as the vessel dries. This is then left in place until the pot can maintain its shape without sagging or warping. The process leaves distinctive impressions on the vessel walls, such as are seen on many of the unfired sherds from our site, most commonly on large bowls or "hearths" (Figure 4.8.f, ff; f: D4 [3154]; ff: E4 [2942]). The string marks on these may almost be considered as decoration, as well as indicating a functional origin. They also occur on the outside of closed form vessels (Figure 4.8.ee, from D5 [2902]). Drying needs to be carried out in a controlled manner, so that the pots are protected from extremes of temperature and also are all equally exposed to the air; this is often therefore carried out under cover, or with the pots being covered at night or during the warmest parts of the day. No specific area has been identified in the Amarna workshop where this could have taken place; however, it is unlikely that such an area, or, for that matter, areas for the storing of fired pottery, would leave clearly discernible archaeological traces (Nicholson and Patterson 1985: 59). Neither does the distribution of finished as opposed to unfinished vessels give any indication as to where this may have taken place; both types seem well spread between the workshop proper and the areas outside it, particularly those adjacent to the kiln.

After a period of drying, vessels did not necessarily go directly to the kiln, and a further stage in the manufacturing process was observable from a large number of the unfired sherds. Most notably, many fragments from flat bases were extremely heavy and coarse, and showed deep finger indentations and irregular and uneven bases and walls (Figure 4.7.aa–bb; aa: D4 [3156]; bb: F3 [2954]); in all, they bore little resemblance to known bases from fired forms. These sherds came from vessels which had been discarded for various reasons after the initial throwing process had been completed but before turning had taken place. By this process, excess clay from the vessel walls and base is trimmed from the pot after drying to the leather-hard stage, as the vessel revolves on a wheel. It can leave observable characteristic markings on the trimmed surface, most noticeably a slight change of angle between the turned and unturned areas, and also, if not smoothed or otherwise modified afterwards, a change in surface texture resulting from operations

performed on leather-hard rather than wet clay (see Figure 4.7.d).

Further evidence for the turning process comes from the recovery of numerous flat fragments, all of which showed very similar characteristics (Figure 4.7.cc-dd, both from D5 [2902]). The fragments came originally from round objects, one face of which was broader than the other, the maximum diameter falling between 8 and 14 cm. Either face can show spiral marks from string-cutting, or can be flat and featureless; frequently one or other face has the cutting marks partially obliterated as if it had been pressed firmly against another surface. These fragments seem to be the result of the final trimming of the base itself. In its previously rough condition the base needs to be made flat, and this is best executed by cutting off a thin slice from the base of the pot whilst it is revolving — thus producing the spiral string markings seen both on the finished vessel base and also on the “slice”; the other surface will show more or less clear traces of the method of removal of the vessel from the wheel-head after throwing. That this is the case is further supported by the fact that a few fragments show two edges, the original “slice”, therefore, having had a disk-like shape; this would result from the initial slice having been too thin and therefore breaking through the original clay surface. The fragment illustrated in Figure 4.8.gg, which appears to be handmade, may be a more elaborate form of such a “slice”. Such trimmings as result from the process can of course be soaked in water and reused.

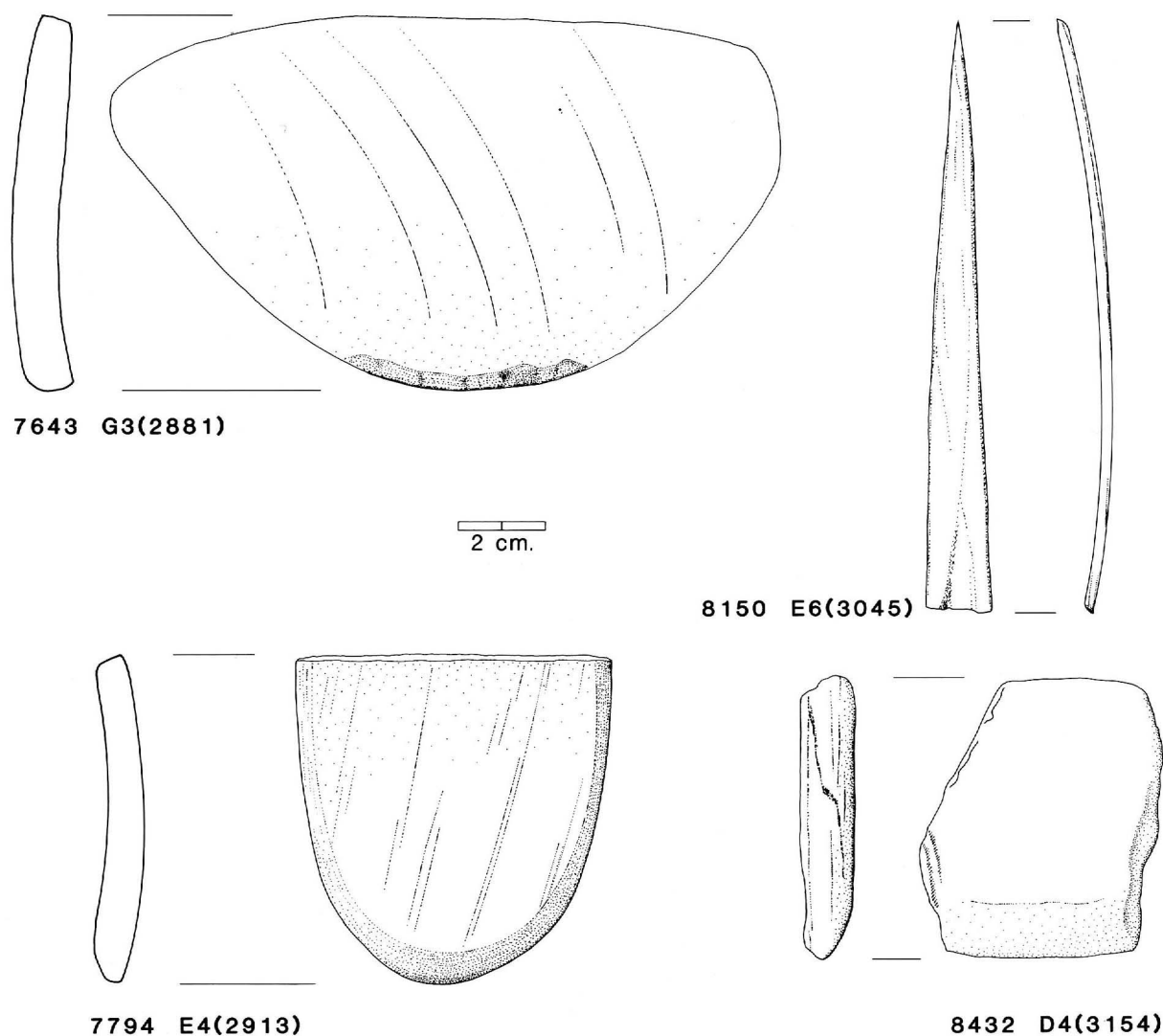
A major advantage of the turning technique is that its use speeds up vessel production. It enables the potter to throw less well-finished vessels, rather than attempting to produce the final form in one go. These can then be turned to the desired shape after initial drying. At this point the vessel can better withstand handling and can indeed be trimmed into shapes which would not be possible to produce in wet clay. Since the turning process need not be carried out by the potter himself, the technique also increases the potential rate of production of the workshop. The unfired and unfinished sherds can therefore be interpreted to suggest the mass-production of pottery. This is emphasized by the fact that all of the vessels in question are of a utilitarian and domestic nature; presumably the demand for such vessels would be constant, and, given the quantities of sherds from the Workmen's Village, frequent.<sup>3</sup> The same sort of “industrialization” of production was noted at the Palestinian site of Tell Beit Mirsim where the examination of fired pottery from the excavations yielded copious information on the methods of manufacture of the vessels, and drew forth similar conclusions that mass-production of vessels for a domestic market led to “short-cuts” in manufacturing technique (Kelso and Palin Thorley 1943: 97).

Interestingly, Arnold (1976: 29) notes from her examination of sherds gathered in the area of the “well” at Deir el-Medina that many vessel bases show traces of what she describes as hand-finishing on their exteriors. Without seeing the material in question, it sounds likely that these sherds exhibit the same technique for rapid large-scale production, that is, of trimming the vessel to the finished shape. If this process was carried out by an assistant to the potter using a slower wheel, or working quickly, the traces left may be comparable with hand-finishing carried out without the use of a fast wheel. Arnold associates the hand-finishing of exteriors with production in small rural workshops.

The identification of tools used in the throwing and turning processes is made difficult both because of their *ad hoc* nature, in that a wide variety of implements of everyday usage could be called into service for such tasks, and also because other industrial processes are known to have taken place on the same site and may also have required specialized but now unrecognizable tools. Furthermore, those of wood or other organic material would have been lost through time. However, the following can be suggested as perhaps forming part of the potter's tool kit (see Figure 4.5 for some of these). From the same context as the upper stone of the wheel came a rib-bone, worked to a point at one end (no. 8150); a further fragment of flat bone with very smooth surfaces was recovered from near the kiln. Five so-called “spade-sherds” were also found in the vicinity; these are characterized by one curved edge worn smooth through abrasion. These came from G3 [2881] (object no. 7643), E4 [2913] (object no. 7794), E3 [2881] and E3 [3123] (2

<sup>3</sup> It is worth noting that ostraca from Deir el-Medina record the issue of large numbers of vessels as part the workers' supplies: Janssen (1975: 485) gives figures of 54, 70, and 290 for vessels of three different types as forming part of the deliveries in the Nineteenth Dynasty. Since deliveries appear to have been scheduled to take place every 10 days, albeit that the number of vessels in such a delivery is not known, the quantities of pottery in demand must have been considerable and called for speed of production.

sherds). Tufnell (1958: 91) notes the presence of such sherds (and also a bone point) in the potter's workshop at Lachish, and Pritchard illustrates two more such sherds from his excavations at the Phoenician city of Sarepta (Pritchard 1975: Fig. 29, 6 and 7). Indeed, at the latter site these were the only positively identified tools from the large area of workshops and kilns found there. Their dimensions are close to those of the sherds from the Amarna workshop, and differ from them mainly in that the Sarepta sherds were pierced for greater convenience in handling. Such sherds could have been used either for the scraping of the vessel surfaces or as "ribs" for the shaping of the interiors of large bowl forms. A fragment of smooth-surfaced schist (no. 8432) may also have been used for smoothing vessel walls. Finally, a number of identifiable bronze implements such as rods, spatulae, and needles, and also many now unidentifiable fragments of metal, may have formed part of the potter's equipment.



**Figure 4.5.** Objects which could have been used in pottery manufacture. Nos. 7643 and 7794: spade sherds; 8150: worked bone point; 8432: fragment of smooth-surfaced schist.

In the light of these implements, it is noteworthy that in his study of modern potters in the Luxor area, Brissaud notes the sparsity of tools used by the potters, and lists their tool kits as containing string for supporting vessel walls during the drying, and sometimes throwing, process; fine cord for cutting the vessels from the wheel-head or from the clay mound on which they were thrown; a sherd with edges worn smooth through continual use which is used for shaping and



finishing; and an old knife blade for cutting the clay and trimming the lower part of the vessels (Brissaud 1982: 102). The two further items noted in his list, one for making incised decoration, the other for supporting a potter's cigarette, are not relevant to the Amarna workshop! In view of the non-distinctive nature of the above, it is not surprising that the recognition of ancient potter's equipment relies more on context than positive identification.

4. Decoration. The final stage to the production of the pottery before it was fired was the application of any surface treatment required. Since the vast majority of silt-ware pottery from Amarna exhibits a red slip at least on the exterior, it has come as no surprise to find lumps of red pigment and also to encounter many fired sherds which show traces of spilt-liquid pigment over both their surfaces and broken edges. The lumps of red pigment that have been found are concentrated in the area on the western edge of the site, in the area most clearly associated with potting: D4 [3162], E5 [3722], and E4/5 [3014]. Red-slipped mud sherds are rare, as one would expect, except in the kiln fill itself where several sherds show this finish. More puzzling is the frequent occurrence of lumps of yellow pigment, and the occasional occurrence of mud sherds with a yellow slip. No recognizable parallels for the latter have been encountered in any of the fired silt-ware sherds found at Amarna so far; the most common use for yellow pigment on pottery is in the decoration of female figurines.<sup>4</sup> Neither is the finding of traces of spilt-yellow slip common as was the case with the red pigment. It should also be noted that, in a few cases, fired sherds were found which, as well as having traces of spilt-red liquid pigment, also showed traces of similar spilt-blue colouring; however, no mud sherds were found which showed any trace of blue-painted decoration, and its use may, therefore, be unconnected with pottery manufacture at this workshop.

It is noticeable that in many cases the unfired sherds have a thin powdery whitish coating, usually over both the exterior and interior but occasionally over just one surface. In some cases this layer is clearly visible under coats of applied slip, both red and yellow. It seems likely that this is a deliberately applied coating, rather than a naturally occurring efflorescence, since it is not seen on all the unfired sherds and never on identifiably unturned pieces. The coating is seen most frequently in sherds from unit D5 [3785]. It is possible that it represents the application of a very fine clay solution (slip) which dries to a far lighter colour than the main clay body and forms an undercoating for the colouring. No traces of such a coat are ever visible on fired silt-ware sherds. If this is the case, however, the nature of the coloured coating is unclear: is it a separately applied slip (i.e. a mixture of fine liquid clay mixed with colouring material), or a wash of pigment and water over an uncoloured slip coat? Certainly the spilt pigment appears to have a thicker consistency than could be expected from a simple water and ochre mix, but its precise nature is at present unknown.

Unfortunately no installations have yet come to light which would indicate where this part of the production process was carried out; neither have any concentrations of spillage been noted which could suggest possible locations for the activity. In fact, deposits producing sherds showing traces of spillage come from every part of the site. However, a few spots of spilt pigment were noted on top of the puddling surface D5 [3815] and therefore date to a period before the room was filled with refuse, which would indicate that the slipping process was carried out at the same time and in the same area as the shaping of the clay was done, and without any permanent installations for the process. No traces of other forms of surface treatment such as polishing or burnishing were noted.

#### 4.4 The forms

Over 900 unfired sherds were recovered during the excavation of the area. These were mostly small and often in very poor condition, owing to their fragile nature, a condition which was exacerbated by the continued occupation and activity on the site after potting activities ceased. As a result of these processes it has proved impossible to reconstruct even small parts of vessels from the available material; thus, in considering the following breakdown of what was found, the difficulty of correctly attributing tiny rim fragments to larger shape categories should be borne in mind.

<sup>4</sup> Part of an unfired female figurine of this kind was recovered from the workshop, unit D3 [3713].

As stated above, few of the diagnostic sherds belong to fully finished forms. The nature of most of the bases indicates that the vessels were unturned when they were discarded. Possibly sagging or cracking whilst drying led to their being put aside for later recycling (for examples of cracking see Figure 4.7.aa and 4.8.h; in the case of the former the base has also been broken through). Bases, therefore, cannot be used as a guide to the forms from which they derived. Consequently, the discussion of the forms represented in the workshop is based on the rim sherds (which part of the vessel did not require extensive re-shaping) except where bases can be seen to have been finished. The distribution of the unfired sherds by unit and by basic fabric and shape category is given in Table 4.1. Weights are in grammes; where "<" occurs in front of a weight this indicates that one or more clay fragments were included in the weighing which were later identified as not being part of a vessel and discarded.

By far the most common categories of vessels represented in the unfired sherds from the workshop were those from open bowls, and, as with the fired pottery from Amarna, the most common vessel type represented is the simple rimmed bowl (group 5). All of these sherds were of grey silt clay, and about half showed traces of the white powdery coating mentioned above. Only one rim sherd was red-slipped. Both the vessel diameters, inasmuch as they could be gauged from the fragmentary conditions of the sherds, and the rim shapes are entirely consistent with what is known of the rims of fired vessels at Amarna;<sup>5</sup> it is however worth noting that thicker-walled rim types were perhaps more common amongst the unfired sherds than would be expected from fired sherds. This would indicate that some small degree of trimming could also be practised on the upper parts of the vessel. Rim fragments from these bowls are shown in Figure 4.7.a–c. The fragment "a" is from the workshop [3785](?), and represents one of the heavier-walled bowls discussed above; in this case the vessel diameter is somewhat smaller than usual. The fragments "b–c" (both from F3 [2940]) are from rubbish deposits outside the kiln and represent finished vessels; both, however, are unslipped. Finished bases for these bowls (or possibly for bowls with out-turned rims, although these were rare amongst the unfired sherds) are illustrated in Figure 4.7.d–e; these again are not from the workshop but from rubbish deposits around the kiln (d: G3 [2934]; e: G3 [2886]).

The second most common category of unfired sherds was those belonging to large open bowls, usually known as "hearths". These were recognized both from their distinctive rim shapes and also from their string-impressed exteriors. Body sherds with a smoothed and finished interior surface and a string-impressed exterior are most likely to be from this type of bowl. The sherds were all of silt ware, and again were consistent with fired forms of the same vessels known from Amarna. All the fragments of these vessels came from the workshop area, with the possible exception of one fragment from F3 [2962]; this may represent a hearth or possibly the rim of a bread platter, but the sherd is too small to draw any definite conclusions (Figure 4.8.g). None was slipped, and only two showed traces of a white coating. Fired forms are usually unslipped or may have a red rim band; occasionally an all-over red slip is present. Figure 4.8.f and ff show rim fragments of this type of vessel from D4 [3154] and E4 [2942] respectively.

Small bowls with out-turned rims (group 6) were also present although rare amongst the unfired sherds. Most interesting are two sherds which are almost certainly from the same vessel (Figure 4.8.h–i, both from E6 [3045]). Note the fully formed upper part as compared with the heavy unfinished base; the cracking on the surface of the upper part may be one of the reasons why the vessel was discarded. None of the sherds showed any trace of slipping or of white coating.

One of the most interesting discoveries amongst the unfired pottery was the presence of a number of fragments of "cobra bowl": that is, an open bowl with a wavy rim and an upreared cobra head set in the centre of the base (see Kemp 1981: 14–16 for illustrations of this type of vessel). Many fragments of such rims and an unfired cobra-head were recovered (Figure 4.9.j–k, both from D5 [3785]). All the sherds came from the lowest levels of rubbish within the workshop; none showed any traces of surface treatment. Such vessels are known primarily from the Workmen's Village (although a small group was recorded from the North Suburb, Kemp

<sup>5</sup> Rim diameters ranged from 14–28 cm; 87% of the rims fell between 18 and 24 cm diameter.

1981: 16, n. 8), and their discovery at the pottery provides another strong link between this area and the Village. None of the cobra-bowl sherds showed any trace of decoration. From the fired examples known the decoration can be seen not to be of a regular style: sometimes the bowls have a red exterior, or may have a red rim band, or may be left plain. Occasional drops of blue paint are visible on the vessel walls, apparently placed there intentionally although appearing very sloppily executed.

The final open form recognized from the presence of a few sherds is that of carinated bowls (group 7). Fragments of one came from the kiln fill (Figure 4.9.l, from G4 [2991]), and its red slip suggests that it formed part of the last kiln loading. Also in the kiln fill was a fragment of what was probably a larger vessel of similar type (Figure 4.9.m, also G4 [2991]), this one being unslipped. A further fragment of this type was found in the workshop, again of a similar but slightly different form (Figure 4.9.n, E4 [2903]). All the sherds were of silt ware.

The fragment of ring-base illustrated in Figure 4.10.v (E4 [3014]) is probably from an open form, but the type of vessel is unknown; shallow poorly defined bases of this type occur on both group 11 and group 7 bowls. Neither is it possible to tell whether the base was finished: its inner surface on the tiny area preserved appears to be very uneven.

Unfired diagnostic sherds from closed-form vessels were rarer, although a number of body sherds could be distinguished by their relatively unsmoothed interior surfaces. The most common identifiable form was that of a jar with a short neck and an externally thickened rim (Figure 4.9 o-p, o: E5 [3014], p: D4 [3156]). In one case the sherd showed traces of red slip on the exterior surface. All the sherds were of silt ware, and came only from the workshop area. The only other definite rim form attested in the sherds is that probably belonging to a biconical vessel (group 17). Two such sherds were found, both from the workshop area; both were of silt ware. The larger example is shown in Figure 4.9.q (from [3785]?). A few further tiny fragments could belong to this type of vessel but are too poorly preserved for certain identification.

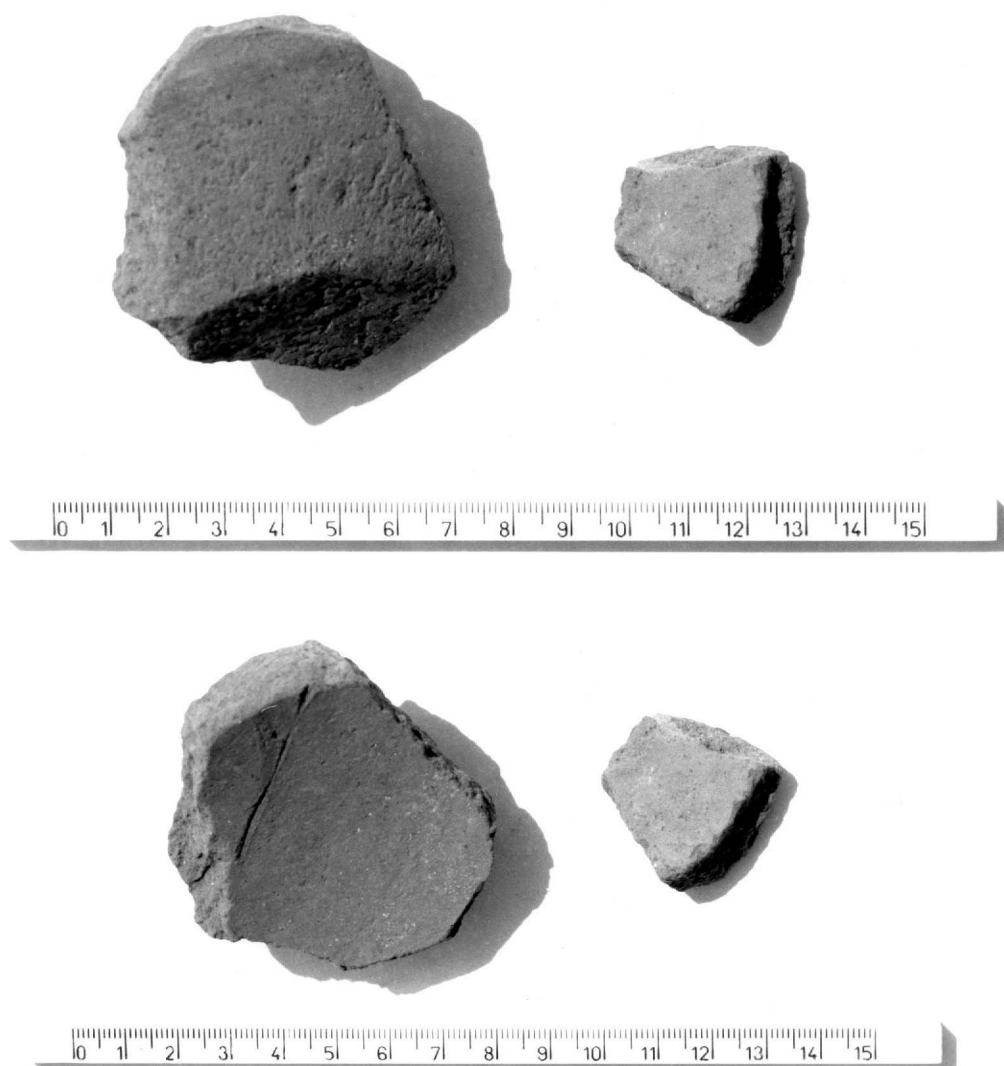
Two bases belonging to closed forms were identified amongst the unfired sherds, one certainly finished, the other still being in a somewhat rough condition (Figure 4.9 qq-r, both from D3 [3372]). From their size both would seem to come from small-scale vessels, both apparently being too small for the rim types mentioned above. Both are of unslipped silt ware.

At the other extreme comes the body sherd illustrated in Figure 4.10.s, from D5 [2902]. This appears to belong to a closed form and has a characteristic exterior bulge seen on some large closed-form vessels (for example COA I Pl. LIV type, LXXX/252, which closely resembles the piece in question). The external thickening of the wall may be the result of joining two separately thrown sections of the vessel, a well known technique used in the manufacture of large or complex pots. This suggests the manufacture of considerably larger closed-form vessels than those mentioned above; however, this remains the only identifiable sherd from such a vessel.

Finally, a number of sherds indicate that the manufacture was taking place of tall offering-stands (Figure 4.10.t-u, both from E4/E5 [3014]). Rim and two possible base fragments closely resemble shapes encountered during work on the Main Chapel at the Workmen's Village (AR I: 165-167), and several cylindrical fragments come from the thick-walled stem of such vessels, also noted in fired fragments from the Workmen's Village. These show a characteristic steep spiralling pattern on the interior face. Again, as in the fired examples, all these sherds are of silt ware; a few show traces of a white powdery coating.

The marl sherds recovered during the season are all from closed forms. Unfortunately, only one tiny rim sherd was preserved, apparently but not definitely from a short-necked jar with a thickened rim (group 14). The body sherds in unit [3785] came from at least two vessels, and several showed cord impressions on the exterior.

Two unfired sherds were also recovered from a room of house P46.33 (Grid 2, K16 [3184]), excavated this season (Figure 4.6). One was from the finished base of an open vessel with a diameter of 8-10 cm; on the interior surface a deep line had been incised. The other was a body sherd from an open form, and showed traces of a white powdery coating on its outer surface.



**Figure 4.6.** Two unfired sherds from house P46.33 (Grid 2, K16 [3184]). The scale is 15 cm.

#### 4.5 Conclusions

The picture of the pottery factory as so far revealed cannot be complete. Several possible reasons for this suggest themselves: it may have suffered so much disturbance in later phases of occupation that areas have been destroyed or otherwise rendered unrecognisable, or parts of it may lie in unexcavated areas. Nicholson and Patterson (1985: 58) noted in their examination of two modern abandoned workshops at Deir el-Gharbi (Ballas area) that clay piles were normally removed from abandoned sites in order to keep the area clean and for use elsewhere, and piles of broken sherds were not left behind. It need cause no concern, therefore, that key elements of the industry appear to be lacking. Thus we have found no large supplies of raw material, either silt or marl clays, nor of tempering material; neither have any installations for large-scale soaking or levigating of clay come to light. Surprisingly, also, very few kiln waster fragments have been discovered from anywhere on the site; given the obviously extensive use of the kiln, a considerable pile of such debris could have been expected to accumulate in its vicinity. Presumably this was either being removed by the potters themselves (a practice which is not attested by what is known of other ancient Egyptian kiln sites, or from modern ones), or at a later



date by subsequent occupants using the site for other purposes.

What stands out clearly from the archaeological record is that pottery production ceased at the workshop long before the site itself went out of use but after a production sufficient to necessitate the installation of a second kiln. Whilst we can have no idea as to the reasons behind this, it seems obvious that the need for pottery would not have ceased and that other workshops must have replaced it. Whether these lie in the immediate neighbourhood or moved further away will only be known through further excavations in the area.

As to whom the pottery was intended to supply, the following points can be made. The workshop (or possibly workshops) is situated in an isolated area, east of the eastern boundary of the Main City, and on a route associated with the transport of water out to the Workmen's Village (*AR IV*: 124–126). The finding of fragments of cobra bowl amongst the unfired sherds also points to a close connection with the village. It can be reasonably asserted from this that the workshop was providing at least part, and possibly the entire supply, of certain types of pot to the village. Many types of vessel, however, remain unrepresented in the workshop or are present only in very small numbers; most particularly, despite the presence of a few sherds of marl clay which may be attributable to a known form, the bulk of marl-clay vessels, such as amphorae and meat jars, which are present at the Village in large numbers, do not occur. Neither is there any substantial evidence amongst the sherds for blue-painted silt ware vessels. These can therefore be seen as the product either of as yet unlocated workshops at Amarna, or as "imports" from outside areas. Certainly the standardization visible in some of these wares as regards both form and fabric suggests a single centre of origin providing for the whole of Egypt.

It has been remarked that the lack of large-scale ash deposits or accumulations of wasters on the surface of Amarna is evidence for the absence of a pottery industry at the site. In the light of the current season's finds, however, it seems likely that such surface indications should not be expected, and therefore that the potential for locating further workshops during future seasons is good. Neither should the concept of a pottery "industry" providing the bulk of the wares used in the city be interpreted as necessitating large agglomerations of kilns and workshops which would together make a considerable impression on the landscape. Rather, the few indications available at Amarna point to fairly small-scale production for a limited market.<sup>6</sup> Indeed, some of the finds from this season's work suggest domestic production at least in houses of a medium size and above. In house P47.22 what appears to be a pottery kiln was found in the precincts of a private estate (see Chapter 3, Section 5); further kilns of the same sort are identifiable from the plans of the German excavations (one of them P47.20, see Chapter 3, Section 4). Also, two unfired sherds were found during the current excavations within house P46.33, (Grid 2 K16 [3184]). This was a house of no great size or quality. The find of the complete potter's wheel in house T36.11 mentioned above is further evidence of the same.

The Workmen's Village itself does not seem to have been involved in such "domestic" production. Several possible reasons suggest themselves. The most obvious is that, as the Village was a state-supported establishment, the state made provision for the supply of pottery, as is known from Deir el-Medina (Janssen 1975: 485–488).<sup>7</sup> However, the Village is so far from the supply of clay and the large quantities of water necessary for pottery manufacture (see Chapter 1 for the level of the water table in the well adjacent to the workshop; wells further out into the

<sup>6</sup> It is noticeable, however, that on the few Egyptian sites where kilns have been found there is usually more than one in use at any time, for example those at Ayn Asil in Dakhla Oasis where each of two workshops included four kilns (Soukiassian, et al. 1985, 152–154). By comparison the Amarna workshop as exposed can be seen to be exceptionally small, though this may well have more to do with the length of occupation of the workshop than its scale of production. For comments on the likely nature of the ancient Egyptian pottery industry, see Hope 1985: 2–3, who emphasises the specialization of the craft in ancient Egypt. The fact that pottery kilns existed within private estates at Amarna (see Chapter 3) raises an interesting question as to the mode of employment of the potters involved. Cf. also the summary in Eyre (1987): 192–193.

<sup>7</sup> However, Bruyère (1935: 341) notes the presence of "un dépôt de puzzolane", presumably slag-like material, and from it identifies the presence of a pottery kiln immediately outside the south enclosure wall dating to the Eighteenth Dynasty, which was built over by houses in the later New Kingdom. Whether this indicates a different means of supply (or possibly self-supply) at the earlier period, or whether this represents a supplement to the village by the inhabitants is unknown. He also suggests (*ibid.*: 341) that most of the pottery at Deir el-Medina was made on the spot by potters working in their homes, though no further evidence is offered in support of this.

desert would have been impracticable) that the possibility remains that the industrial area was an outpost of the Workmen's Village, catering for the village's own needs.

**Acknowledgements**

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# 1987 excavation

Unit	Sq.	No.	Wt.	Marl	Silt	Gp5	Gp6	Gp7	Gp11	Cobra	Base	Gp14	Gp17	Closed	Stand	Trimming
3713	D3	5	120	1	3				1							
3372	D3	8	330											8		
3720	D3	1			1											
3154	D4	38	720		16	7		1	9	2	1				1	1
2903	D4	24	430		20						1			1		2
3156	D4	49	<880		31	7		1	3		1	1		5		
3162	D4	4	<250		2						1					1
3785	D5	417	<2790	31	247	61	7	1		14			1	13R 17Y 2		23
3785?	*	6	60		4									1R		1
3785?	*	29	580	1	13	11			1				1	1	1	
2902	D5	17	580		9						1			3		4
2894	D5	1	50												1	
3784	D5	2			1											1
3165	E3	7	50	7												
3123	E3	2	190		1									1		
3220	E3	1	10		1											
2903	E4	1	10					1								
2942	E4	1	20						1							
2941	E4	1	20			1										
2979	E4	1	20		1											
3007	E4	11	120		11											
3014	E4/5	90	<1634		+	7		1	12			1R 1		+	15	
2946	E4	2	10		2											
3722	E5	121	<1955		96	9			7		1	4	1			
3759	E5	4	50		4											
3744	E5	3	60						1							
3743	E5	6	40			1R 2										
3029	E6	1	20				1									
3045	E6	3	440		1		2									
3038	E6	3	270		2		1									
3036	E6	3	<60						1							

(continued on next page)

## Evidence for pottery making

2949	F3	4	<50													
2954	F3	1	220									1				
2940	F3	9	75			9										
2953	F3	2	100	1								1				
2962	F3	2	<30			1			1							
2938	F3	11	<530	7					3					1		
3089	F3	1	20	1												
<hr/>																
3091	F4	1	20									1				
3063	F4	1	25	1												
3086	F4	10	170	8	1							1				
<hr/>																
2998	F5	1	30	1												
<hr/>																
3328	F6	3	20	1		2										
<hr/>																
2929	G3	1	80	1												
2927	G3	5	110	3								1		1		
2885	G3	1	20	1												
2886	G3	4	70	3	1											
2928	G3	3	25	1	1	1										
2934	G3	4	150	1	3											
<hr/>																
2983	G4	1	10			1R										
2987	G4	4	20	1		3R										
2991	G4	4	80							2R						
										2						
<hr/>																
3354	G5	2	70	2												
3394	G5	2	20	2												
<hr/>																
3184	K16	2	80	1								1				
<hr/>																
Unit	Sq.	No.	Wt.	Marl	Silt	Gp5	Gp6	Gp7	Gp11	Cobra	Base	Gp14	Gp17	Closed	Stand	Trimming
<hr/>																

R: Red slipped

Y: Yellow slipped

+: Present, precise number unknown

\*: Provenance not certain

**Table 4.1.** Table of distribution of unfired sherds. All unit numbers refer to Grid 1, except for the last entry, [3184], which comes from the house in Grid 2, P46.33.



1987 excavation

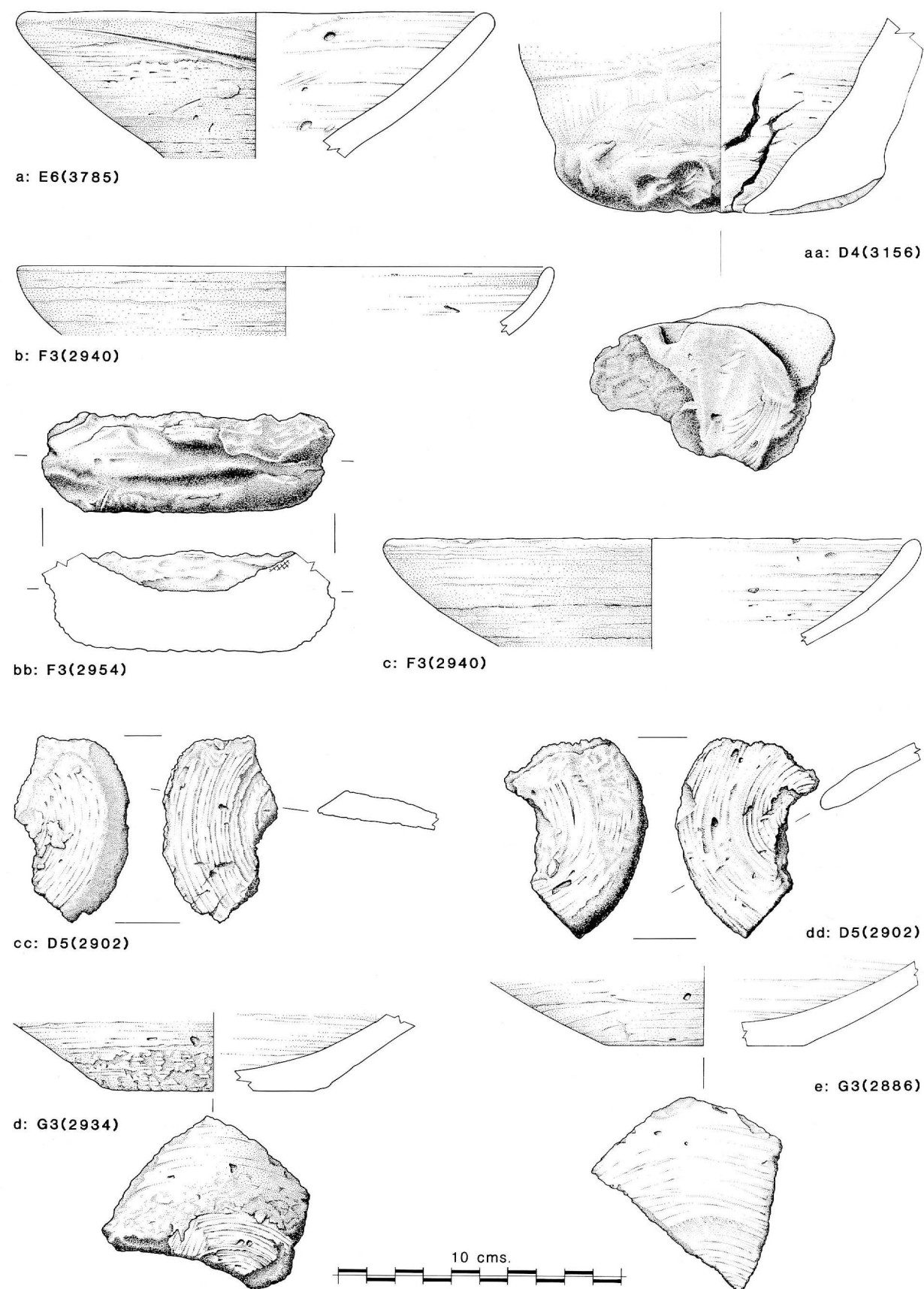


Figure 4.7. Unfired sherds, at half-scale. Drawn by A. Boyce.

Evidence for pottery making

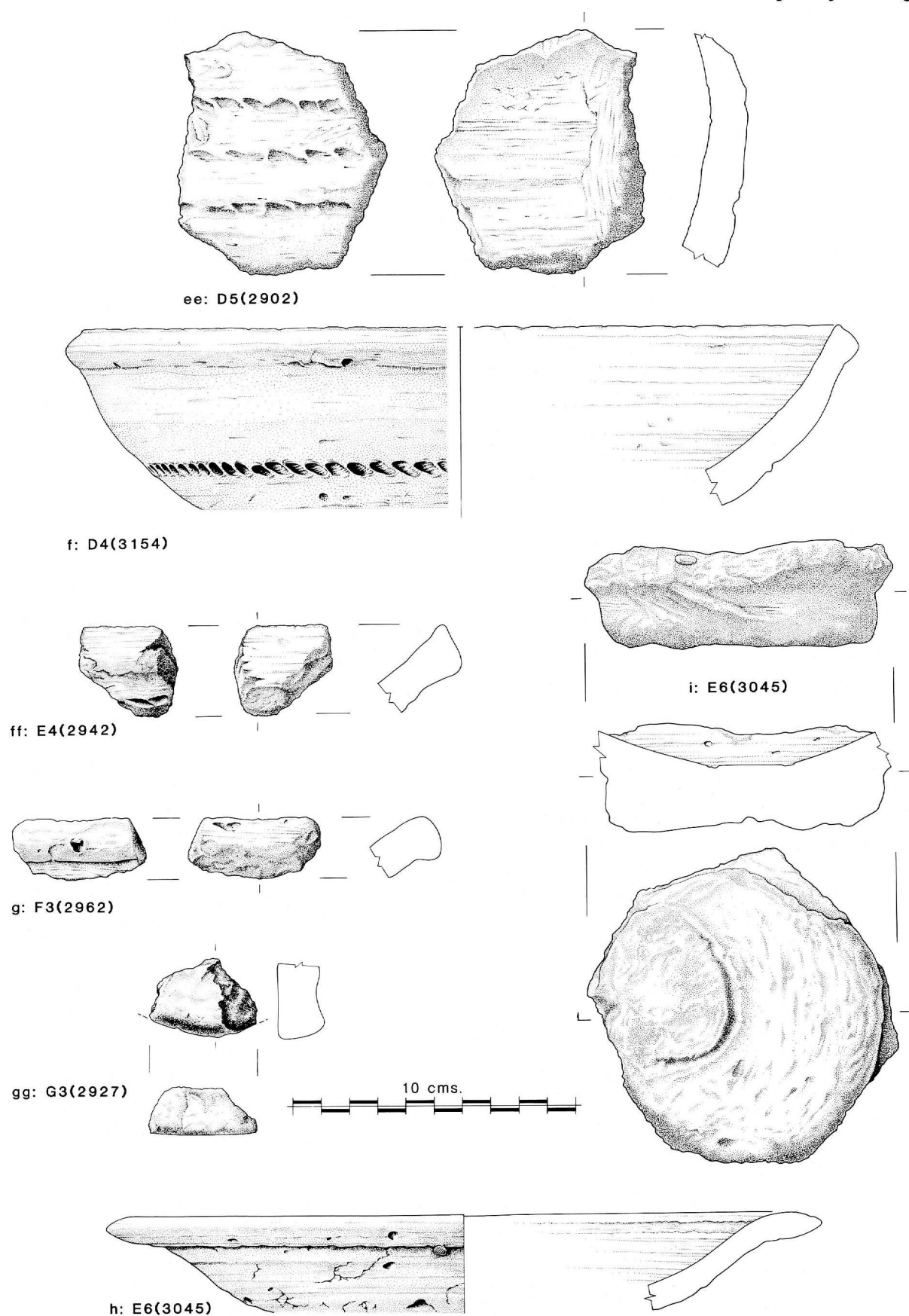


Figure 4.8. Unfired sherds, at half-scale. Drawn by A. Boyce.

1987 excavation

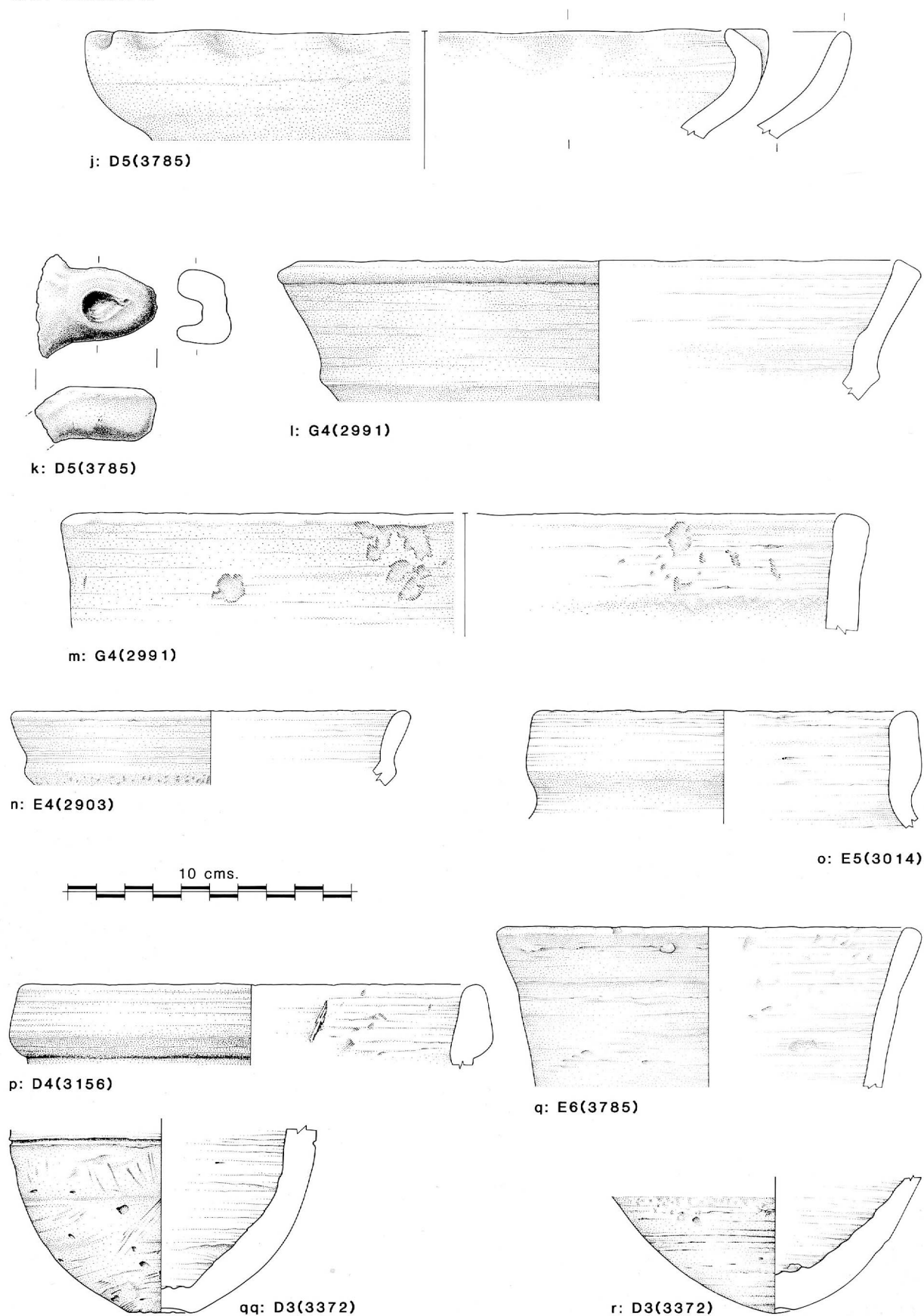
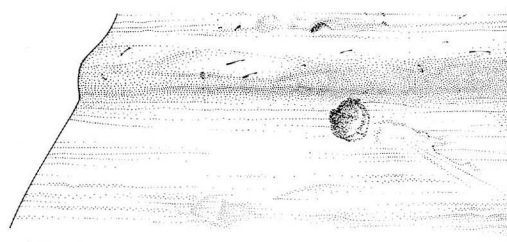
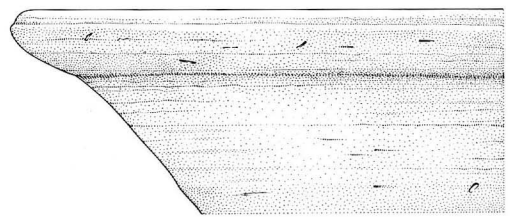
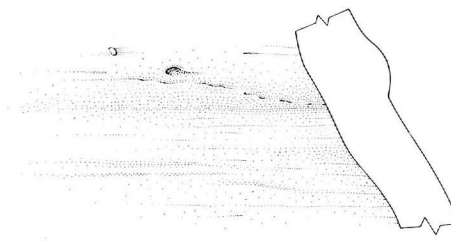


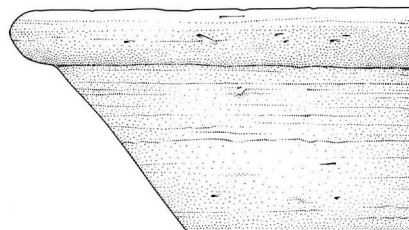
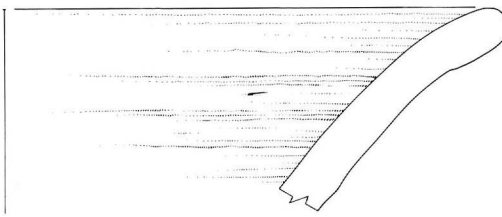
Figure 4.9. Unfired sherds, at half-scale. Drawn by A. Boyce.



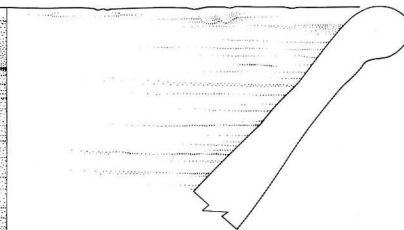
s: D5(2902)



t: E4/E5(3014)



u: E4/E5(3014)



v: E4(3014)

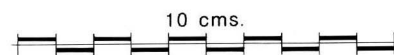


Figure 4.10. Unfired sherds, at half-scale. Drawn by A. Boyce.